Two new fish passages reconnect 70 miles of Big Rock Creek and break down barriers to migration.

No Fish Left Behind

Story and Photos By
Stephen M. Pescitelli

Imagine you are a fish swimming eagerly upstream against the warming springtime flows, looking for a place to build a nest or catch an easy meal after a long, cold winter. Suddenly, you run into a wall. You move to the left, then to the right. There's no getting around this thing.

More than 1,200 registered dams block Illinois' rivers and streams with an undocumented number located on private property throughout the state. Illinois is not alone. There are few un-dammed, free-flowing river systems remaining in the United States. More than 75,000 dams taller than 6 feet have been documented, and the U. S. Army Corps of Engineers estimates there are another 2.5 million smaller dams. Fish everywhere are having a problem getting around.

Although many dams serve useful functions for humans, scientists agree they are detrimental to aquatic ecosystems, blocking fish and mussel (larvae hitch a ride on fish to move around) movements, degrading habitat and water quality, and impacting natural river functions such as sediment movement. Dams have been implicated by many researchers as one of the primary causes of the decline in game and non-game fisheries.

What can be done about this dam problem?

"Really, the best solution, at least from a fishery standpoint, is to remove the dam," explained Bob Rung, Department of Natural Resources (DNR) regional streams specialist. "Removal eliminates upstream habitat and water quality problems and restores the natural channel for fish passage. But, obviously we can't remove every dam."

Throughout the state there are many old, deteriorating dams, some of which are unsafe. They no longer serve their original function and make good candidates for a properly designed removal

The completed fish ramp on Big Rock Creek allows fish to move easily upstream (left). Prior to placement of the ramp, the dam was unpassable (right).

project (see sidebar). Other dams still serve useful functions, are valued by local communities or are privately owned and can't be removed without permission. If a dam cannot be removed, the next best fisheries management strategy is to try to reconnect these streams by providing fish passage.

Big Rock Creek is a rural stream in a rapidly expanding urban area, and one of the larger tributaries to the Fox River. Based on recent DNR fish and mussel surveys, this Kane and Kendall county creek is one of Illinois' best.

"One of Illinois' rarest fishes, the greater redhorse, was found in Big Rock Creek, along with the spike mussel, both Illinois endangered species," said Rung. "Several cool-water species also are present, indicating the presence of considerable groundwater flow. Based on our findings, the entire creek received an 'A' stream quality report card rating."

The survey also revealed a major problem. Two dams on Big Rock Creek appeared to be blocking fish movement, affecting the distribution of several species. Greater redhorse, channel catfish and mottled sculpin were absent upstream of the dam, and other migratory suckers were in low abundance. In addition, miles of the creek dried up during the 2004 and 2005 droughts, threatening the loss of other upstream fish and mussel species. With dams standing in the way there was no way for these species to return from downstream sources when water levels improve.

Because of the problems dams create across the country, the U.S. Fish and Wildlife Service (USFWS) initiated the National Fish Passage Program, a program to help reconnect rivers and streams through dam removal and fish passage projects.

Ramp construction at Drakes Dam required use of skilled operators and laser-based surveying equipment to ensure proper rock placement.

The bypass ramp was dug out to specified elevations (top), and then lined with rock (right).

"Although the program has been going on for several years with many successful projects, we did not have any projects in Illinois," stated Nate Caswell, fisheries biologist with USFWS. "Big Rock Creek was a good candidate because it is a high-quality system and has rare species. Another important factor was that by getting fish past two barriers, an additional 70-plus miles of stream habitat would be available."

Before applying for funds, ownership of the dams—often a difficult task—and their willingness to participate in the program had to be determined.

Located in Plano, the first dam was known locally as Drakes Dam and was originally built to power the water pumps for the city. It appeared to be located on city property but actually was owned by an overseas development company—who was in the process of selling it to a local developer who was eventually going to turn it over to the city as a park site. Since it was valued as a historic structure, with the mill house and raceway to be part of the new city park, removal of Drakes Dam was not an option. After several phone calls, letters and a presentation to the Plano City Council, consensus was reached to build a ramp, just like a big riffle, downstream of the dam to allow the fish to easily swim past the barrier.

The second dam, located on private property, is used to feed water to off-stream recreation ponds. Obviously, removal was not an option and the design challenge was to get fish around the dam without disrupting the water delivery system. With input from the landowner—an engineer—and many other experts, a small bypass channel was designed.

Project funding required one additional component—partners. Enter the Big Rock Creek Watershed Committee, a group active in preserving the stream system.

"We were absolutely thrilled to be a part of this great opportunity, and to be the first in the state to have a fish passage project," said Brook McDonald, executive director of The Conservation Foundation, an organization active in preserving natural areas in northeastern Illinois and coordinator of the Big Rock Creek Watershed Committee.

After the necessary permits and funding were obtained, and weather permitted, the ramp project started in the spring of 2005. It took three days, 73 truckloads and 1,300 tons of rock—some stones up to 3 feet in diameter were necessary to make sure the structure held during floods—to build the ramp. Even before the ramp was finished, fish were trying to swim past the barrier.

The increasing presence of non-native invasive fish species, such as Asian carp and round gobies, is complicating efforts to restore fish passage for our native species. In some cases, especially near the confluence of the Illinois River, dams may have to be left in place to keep non-native invaders out. More information is needed on how effective low head dams are as barriers, especially for Asian carp known for their jumping abilities, as well as the extent of the distribution upstream and threat of movement from accidental or intentional release.

For information on recent removal projects visit www.co.kane.il.us/kcstorm/brewster (Brewster Creek) and www.southbataviadam.com (Fox River at Batavia).

To learn about the USFWS program, visit www.fws.gov/fisheries/FWSMA/fish passage or call 1-800-344-WILD (9453).

"Those fish were swimming right by the tractor while I pushed rock around," the surprised heavy equipment operator remarked. "They really want to get somewhere." The first fish seen swimming over the dam was a bluntnose minnow.

The bypass channel on the second dam took less rock and only a day and a half to complete, but the placement was trickier. With an entrance elevation the same height as the dam, the channel was designed to work primarily at higher flow levels during the spring when fish are actively migrating. This configuration also will have minimal impact on the landowner's water system.

The spring following ramp construction, a group of migratory shorthead redhorse were found spawning over a nest in Big Rock Creek.

With construction complete, the next phase of the project began: evaluation of the structures. Low water levels during the summer of 2005 made evaluation difficult, but pellet-sized tags with unique numbers were placed on about 150 of the larger, more mobile species to permit identification of individual fish. During the spring of 2006, an additional 500 fish were marked with fin clips, primarily shorthead redhorse, a member of the sucker family known to make spawning runs into Big Rock Creek.

Shorthead redhorse were collected upstream of the ramp one year after construction (left). To date, 12 fish species have swam up the bypass channel and into the sampling net (below).

Few fish were recaptured, indicating a large population existed, however, a large group of spawning shortheads were observed upstream of the passage. Many fish, including small minnows and darters, have been found living in the rock ramp, from the top to bottom. It seems fish should have no trouble getting over this structure.

Evaluation of the structures will continue for several years to provide valuable information on the two techniques.

Small streams are dynamic systems, subject to natural events such as floods, droughts, hot weather and winter ice. Add in any problems from human-related activity and they can be a tough place for aquatic critters to live. But as long as the creek is part of a larger, interconnected system, they can recover and thrive.

With the two fish passage projects completed, Big Rock Creek is now reconnected from the Fox River all the way upstream, providing a healthier and more sustainable system for fish and mussels.

With time and further evaluation, the two Big Creek structures should serve as models for restoring fragmented stream systems so no fish are left behind.

Stephen M. Pescitelli is the Region II stream specialist with the DNR Division of Fisheries.