

# Letting Rivers RUN

Iowa's first whitewater park opened in 2011 in Charles City on the Cedar River. The course has three water features playable at multiple river flows and skill levels. Kayakers, stand-up paddle boarders, tubers, anglers and river enthusiasts enjoy this free, downtown park. The 10th Annual Charles City Challenge this June includes competitive events. Learn more at [ccwhitewater.com](http://ccwhitewater.com)

See how removing or altering dams spawns better fishing, greater access and waves of safer fun.

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PHOTOS FROM DNR RIVERS PROGRAM





Dangerous recirculating currents below a lowhead dam in Quasqueton on the Wapsipinicon River existed before the area was transformed with rock rapids. In the early 1990s, a pontoon boat with two passengers, trapped by life-threatening waters, required rescue here.



Work in 2014 mitigated this dangerous 6-foot lowhead dam in Quasqueton in Buchanan County into attractive arched rock rapids on the Wapsipinicon River. The stairstep-like rock arches dissipate the energy of falling water into a safe river stretch navigable by paddlers, passable for fish and angler friendly.

Streams and rivers course like a network of arteries throughout Iowa, supplying towns with drinking water, ample water for boating and habitat for fisheries. But these arteries have clogs in the form of low-head dams. Once built to power the milling of lumber, grains and flour or for small hydroelectric generation, these dams stopped serving those purposes long ago. While most of the old mills are gone, save for a few historical landmarks, many old bones remain—concrete dams that limit river movement of fish and freshwater mussels and create “drowning machine” hazards for unknowing river users.

“When people started building dams, they often didn’t realize they were creating deadly recirculating currents,” says Nate Hoogeveen, river programs coordinator at the DNR. “Dam mitigations can be a responsible thing to do, especially as aging dams begin to fail.” Iowa’s first dam was built in 1829.

Low-head dams—essentially walls across rivers or creeks—cause water to fall uniformly over it to create recirculating currents that can even pull boats upriver into the boil and keep an unfortunate soul swept over the dam trapped in the same rolling currents long after life has ceased. Mitigating such hazards can involve simply removing a dam, or creating a safer,

fish- and paddler-passable rapids.

More than 30 dams have been removed or converted to rapids since 2008, when the Iowa Legislature created the Low-head Dam Public Hazard program to assist communities with safer, more ecologically friendly alternatives to dams. Today, concerns for safety and environmental health stir conversation and action among local communities.

In the 1800s, dams were constructed to generate energy, milling and economic growth for settlements along rivers. By 1870, more than 1,000 dams existed in Iowa. When the Great Depression struck the country in the 1930s, government programs such as Works Progress Administration formed to employ unemployed masses. One common project was to build “beauty” dams, mostly for recreational purposes of creating a fishing spot or a pool to row a boat. About 50 more dams were added during this era.

More than 160 people have drowned below Iowa’s low-head dams since 1900. Dam failures can result in devastated ecosystems and cost millions of dollars to repair. Iowans have taken initiative to remove or modify dams in their communities for beauty, safer recreation and to let the rivers run for better fisheries.

## LEARNING TO LET RIVERS RUN WILD

Two goals that forefront dam removal or modification is to meet recreational uses of the river and to restore natural in-stream habitat conditions. The serene beauty created by these projects often is a draw for tourism and visitors.

“A lot of dam owners have a major decision on their hands when they approach us,” says Hoogeveen. “Sometimes there’s a crack in the dam, other times water may be flowing under the dam instead of over.”

Complex dam removals and modifications require intensive research and surveying before any finalized decisions. Given the wide array of dams, each effort must be customized. Projects typically take a few years to complete. The DNR is currently working on about a dozen projects.

“When we start a project with a community, we always say as long as safety and fish passage can be goals, we will always be open-minded and make sure we listen to people before decided what type of project is right, if any,” Hoogeveen says. “That said, we’re knowledgeable about the array of solutions, and usually there is a fit found after discussions happen at the local level.”

One method for replacing low-head dams involves placing various rocks in a horizontal arch pattern throughout the stream. Rock arch rapids are built for long-term stability. Engineers make sure there is a right mix of stone types for longevity. Boulders used need to be large enough to sustain strong currents and floating debris. Rock arch rapids eliminate dangerous recirculating waves by spreading out the original displacement of the height of the dam while providing upstream fish passages. These types of projects can be cost-effective by leaving the actual dam in place, but filling in below it with rocks, thus making the dam seem to vanish and creating, safe, open channels for paddlers and fish movement while ridding deadly recirculating currents. What was once a concrete drowning zone can become a place of serene beauty, approachable and useable by locals and visitors.

Fish ladders, designed for fish to leap up a concrete maze as a way to bypass the dam, were early attempts to allow fish passage. However, leaping fish like salmon are not common in the Midwest, and the installation of the ladders were merely an empty promise to the fish. Today, projects are better adapted to fish native to Iowa.





In 2014, a 110-year-old dam in Manchester was removed on the Maquoketa River. Six in-stream drop features were created along with better fish habitat, bank restoration, terracing and river access.



Primary whitewater features create waves or holes for paddling, rafting and tubing fun. Built with large, grouted rocks anchored into the bed and bank of the river, the structures have a gradual slope to allow fish passage.

Impacts are being noticed in rivers across the state. For example, flathead catfish typically were rare to find on the Des Moines River and its forks upstream of Fort Dodge. However, since a dam in Fort Dodge was mitigated, waters again flow freely without barriers to fish. Anglers now catch flathead catfish 20 miles upriver in Humboldt (where a dam blocks further fish passage) and even farther up the East Fork of the Des Moines River. Large walleyes in the Wapsipinicon were known below Quasqueton, and after a rock arch rapids was constructed at the town's dam, they are now are found as far upstream as Independence, where a low-head dam blocks fish movement higher up the Wapsi.

Hoogeveen believes dam projects like this have been successful because of willingness to work with communities to serve their needs and address their concerns. Dams fragment rivers, but communities along rivers are interconnected.

"If one community upstream had a good experience with a project, a community downstream may be interested as well," says Hoogeveen.



In Howard County, a dam at Vernon Springs near Cresco on the Turkey River was transformed into an approachable and safer river for all ages and a variety of uses.

## TOURISM FLOWS IN

A unique spin to dam removals has gained popularity in river-centered communities. Adventure-seekers, anglers and locals alike flock to the shores of once-dammed rivers modified into whitewater parks. This form of dam removal boosts local economies while increasing safety of recreational activity. Where waters below dams were once dangerous locations, now people can play, fish and recreate safely in riffles and rapids.

In communities that opted for whitewater facilities, they report enhancement for their town's quality of life and tourism, which has also provided a new form of river recreation statewide.

"Iowa's whitewater parks are world-class facilities and a major accomplishment," says Dave Hillman, president of the Iowa Whitewater Coalition. "They are success stories of significant importance as they represent improved river safety, reestablished river ecology and reenergized economic benefit."

Charles City created a whitewater park by modifying a dam in the heart of the city. The city estimates the whitewater park brings an annual economic impact of \$764,000. Designers and architects have the ability to add unique features like standing waves for

a safe but challenging endeavor. Whitewater parks create an opportunity to revive and bring together river communities.

Manchester is another community that developed a whitewater course to replace its dam.

"Having the whitewater park, river trail and bike trails in the community allowed us to be a destination for people to come and experience our great city," says Tim Vick, Manchester city manager. "This had to have had a positive impact on our local retailers."

## BENEFITS TO THE RIVER

Sediments, sand and silt flowing downstream are trapped behind the impermeable wall of a dam. This creates silted-in pools above the dam which become shallower over time and also starves streambanks below the dam of sediment to replenish banks and sandbars. Dams also restrict river denizens—fish and freshwater mussels—from moving as nature intended.

Most people just think about the fish. But DNR biologists look at the river as a whole system. Mussels, or freshwater clams, are important parts of this system, too.





Where dams once stopped migration of fish and freshwater mussels—vital to water quality—river systems after dam mitigation flow free. Shown here are plain pocketbook mussels (*Lampsilis cardium*). Their life-cycle depends on host fish—smallmouth bass and walleye—that carry mussel larvae to new areas. There, they drop off and mature to create new mussel beds to filter and clean water.

“About 54 species of native mussels were once found in Iowa. Now, there’s about 42. Nine are endangered. Another six are threatened and several more species are very hard to find anymore in Iowa,” says Scott Gritters, DNR fisheries biologist.

Mussels are a good indicator of river health. The better the water quality, the more mussels. Mussels are filter feeders, and produce a pellet of compact filtered algae, then kick out the crushed pellet to waiting fish, much like how fish are fed at a fish hatchery. Native mussels generally do not do well in soft substrates or fine sand. Dams, which block migrating fish, also are a major hindrance to native mussels which are transported by hitchhiking on the fish.

“The whole river ecosystem runs better with native mussels living in it. Fish and mussels depend on each other,” says Gritters. “Our fish populations and the opportunities people have to enjoy clean water improve when mussels are present.”

### FREE RIVERS TO FREE THE FISH

The Iowa DNR’s Interior River Research Team has monitored fish and fish habitat upstream and downstream of several dam modification and removal projects. According to team leader Greg Gelwicks, “Some fish species previously only found downstream of dams are now returning to upstream habitats. Populations of other species once found in low numbers upstream of dams have improved since these projects were completed.”

Mitigation of dams allows natural processes to take over. With removal of Rockford’s concrete barrier across the Shell

Rock River, water once again freely gurgled, bubbled and flowed again as nature intended. And it transformed the environmental landscape of the river. Streambank restoration immediately followed dam removal with plantings of visually appealing native vegetation to help dissipate stream energy, provide habitat and protect bank soils. Each streambank restoration is very individualized, given the different landscapes at each site.

Now, this scenic part of the Shell Rock River is home to refreshed habitat, improved navigation for boats, canoes and kayaks—plus fish—and safer for all.

Fish habitat monitoring shows the project improves river habitat upstream of the former dam. Additional species now use this area with an increased abundance of channel catfish, smallmouth bass and other native species. When the dam was removed, stored sediments above the dam were released. This impacted fish habitat immediately downstream of the former dam after the removal. However, the area recovered within a few years. Given a chance, nature can cleanse itself.

“When we remove a dam, we have learned we need to be very careful,” says Hoogeveen. “We stage dam removal so we’re not allowing too much sediment to flow through at a time.”

That careful approach in dam mitigation helps communities once hindered with dangerous low-head dams experience the benefits of new and revived rivers. These new areas are a showstopper, attracting not only new visitors, but fish moving upriver where they once were blocked. 🐟



ABOVE and BELOW: Where a dam once blocked migrating aquatic life, creation of rock rapids below an 8-foot-high dam in Quasqueton allowed for habitat connectivity for migrating fish, amphibians and mussels without increasing flood stages. To create rock rapids, a 300-foot series of eight weirs were built below the dam, which remains in place, to allow fish to pass over the submerged 8-foot high dam. Weirs were spaced irregularly to give the final project a natural look. The area is now safer for recreation. By re-establishing fish passage and restoring aquatic habitat, downstream fish species can recolonize or be re-introduced upstream. Bank grading with native vegetation also addressed bank erosion upstream of the dam.

### GET INVOLVED

Learn more about the important economic, safety, recreational and fishing opportunities of dam removal and mitigation at [iowadnr.gov/Things-to-Do/Canoeing-Kayaking/Low-Head-Dams](https://iowadnr.gov/Things-to-Do/Canoeing-Kayaking/Low-Head-Dams) or email Nate Hoogeveen at [nate.hoogeveen@dnr.iowa.gov](mailto:nate.hoogeveen@dnr.iowa.gov).