

Lowhead Dam Removal

Ohio EPA, in conjunction with local, state and federal partners, has worked to remove many lowhead dams from Ohio streams and rivers over the past several years.

This fact sheet highlights many of the problems associated with lowhead dams and the benefits of dam removal. There are many environmental and public safety concerns associated with lowhead dams. Some of these include:

Disruption of Natural Flow

In a naturally flowing river system, river flows fluctuate during the year according to the season, with larger flows in the spring following snowmelt and spring rains, and lower flows during the drier summer months. These naturally occurring fluctuations in flow enable a wide diversity of species to thrive in the river ecosystem. Dams significantly alter a river's natural flow by blocking a river's passage and storing water in artificial reservoirs. By altering a stream's flow, dams can limit the diversity of aquatic species to a few generalist species.



Creation of Reservoir Ecosystem

Dams can transform portions of a river into a lake or reservoir-like habitat, which favors species that are adapted to lake-like bodies of water. Removal of a dam can enable the return of native aquatic species by restoring a more natural habitat. In addition, dam removal can improve streamside areas by improving habitat and increasing vegetation, and lead to the return of animals and birds over time.

Disruption of Sediment Flow

Sediment transport is a vital part of a river ecosystem as it helps create a variety of habitats for feeding, spawning and breeding. Dams block the movement of sediment within a river, thus altering the river's habitat. Dam removal can redistribute sediment previously blocked behind a dam, restoring the river to its pre-dam conditions. After a dam is removed, gravel and cobble from behind the dam may become re-exposed as rocky materials that were previously covered by fine sediments are uncovered when the sediment is washed downstream. Re-exposing these larger rocks often provides new colonization habitat. Dams also block the movement of logs and other debris, which could be used as habitat downstream.

Dam removal can result in a short-term increase in muddiness (turbidity) and water quality problems can occur if sediment accumulation is not addressed. However, studies have shown that re-suspended sediment from dam removal typically has a temporary effect on rivers.

Disruption of Fish Migration

One of the more obvious problems with dams is their impact on fish movement. Dams disrupt river connectivity and block fish from moving up- and downstream. Dam removal can improve fish reproduction, as fish will be able to migrate upstream and spawn in areas previously inaccessible due to the physical barrier of the dam. Many dams have no built-in structures to enable fish passage. Even where fish passage structures exist, smaller fish often have difficulty working their way over a passage designed for larger fish.

On rivers with several dams, such as Ohio's Olentangy River, simply removing one dam may not significantly restore river continuity. When working to improve fish migration, rivers need to be restored as entire ecological units.

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Boating and Swimming Hazards

In addition to the impacts on fish ecosystems and aquatic diversity, dams also create a boating and safety hazard for humans, thus limiting the recreational potential of a river. The presence of dams on a river can severely limit boating opportunities for both large and small watercraft. Dams have been responsible for several boating accidents in Ohio that have resulted in serious injury and even death, as dam hydrology creates a significant risk of drowning. Removal of dams, particularly those in highly populated areas, can greatly improve recreational opportunities and increase safety.

Success Stories

More than 50 dams have been removed from Ohio streams and rivers during the past 30 years. This gives Ohio EPA and Ohio DNR a significant body of data with which to assess the benefits of dam removal on both water quality and aquatic ecosystems.

In 2006, the River Street dam was removed on the Olentangy River in the city of Delaware. One year prior to the dam removal, Ohio EPA sampled the dam pool and found 54 types of aquatic bugs and 16 species of fish. Three years after the dam removal, Ohio EPA sampled the same area and found 94 types of aquatic bugs and 23 species of fish. In particular, five pollution-intolerant species of fish were found after the dam was removed. These sensitive fish include black redhorse, silver shiner, stonecat madtom, brindled madtom and banded darter (pictured to the right). The presence of pollution-sensitive fish and aquatic insects is an indicator of high water quality and stream improvement.



In 2008, the Central Avenue dam in Delaware was removed as well. In 2005, Ohio EPA sampled the Central Avenue Dam pool and found 53 types of aquatic bugs and 21 species of fish. After the dam was removed, Ohio EPA sampled again and found 81 types of aquatic bugs and 27 types of fish, including several pollution-intolerant species.



Former Munroe Falls Dam

In 2006, the Munroe Falls dam was removed as part of ongoing efforts to improve the Cuyahoga River in northeast Ohio. Along with the dam removal, nearly three miles of stream bank and riparian areas were restored. Funding for removal of the 12-foot high dam was provided by a partnership including the cities of Munroe Falls, Kent, and Stow; Portage County; and Ohio EPA. Initial post-removal sampling found that macroinvertebrate communities have improved dramatically in all segments of the stream and the former dam pool. Further improvements are expected in the next few years.

These case studies, as well as several others, are strong evidence that removal of lowhead dams can improve water quality and increase biodiversity.

Contact

More Ohio dam removal case studies can be found at dnr.state.oh.us/water/tabid/3347/Default.aspx. Information about nonpoint source pollution and related Ohio EPA grant programs can be found at:

- epa.ohio.gov/dsw/nps/index.aspx
- epa.ohio.gov/dsw/nps/319Program.aspx
- epa.ohio.gov/dsw/nps/swif.aspx