



Watershed Action Plan & Lowhead Dam Removal

By Kimberly L. Williams,
FACT Watershed Coordinator

Friends of Alum Creek and Tributaries (FACT) is a local nonprofit organization formed in 1998 to preserve and protect Alum Creek. The watershed area that drains to Alum Creek river is the basis for our efforts to bring together many different groups, including city governments and others who care about our community, to work toward this goal. The Lower Alum Creek Watershed Action plan was created over a two-year period by local residents, government officials, business leaders, and scientists. The plan, fully endorsed by the Ohio EPA in 2005, provides a road map to help ensure that Alum Creek meets expectations set forth under the Clean Water Act.

Removal of two lowhead dams in the central part of the Lower Alum Creek river watershed has been identified as the single best way to immediately improve the water quality, aesthetics and public safety of Alum Creek. These two lowhead dams allow water to continuously flow across the reach and provide no meaningful flood control at this time. Other negative impacts of the Wolfe Park and Nelson Park lowhead dams also have been noted for public safety and maintenance liabilities. We believe removal of these two artificial structures from the creek channel environment will benefit the local environment and community in many positive ways.

This Special Edition of our newsletter covers the lowhead dam removal project at Wolfe Park and Nelson Park. Special feature articles provide technical background and reasons for removing these structures from the creek. We hope this information may help to address some related questions and issues or concerns that may arise about the project plans.

FACT is excited to have this opportunity to undertake an action that will benefit not only Alum Creek, but the community as well. If you have questions or concerns about the lowhead dam removal, please call the FACT Watershed Coordinator at (614) 409-0511.

Lowhead Dams on Alum Creek at Nelson Park and Wolfe Park

By Kimberly Williams, Joe Bonnell and David Hohmann

Purpose & History

Both Nelson Park and Wolfe Park dams are lowhead dams which allow water to travel either over the spillway or through a trough at the bottom. Lowhead dams may range from 3 to 15 feet in height; measurements taken at these two dams indicate they are at the low end of that range, just 4 feet. Most likely the dams were built to create lake-like conditions for recreational and aesthetic purposes. Neither dam was built for flood control. Flood control measures would involve diverting some of the water from Alum Creek or building the dams high enough to store additional water flow during a storm event.

Nelson Park dam was built during the era of the Great Depression by the Works Progress Administration. The exact history behind the Wolfe Park dam is unknown, but it was built by the time of a 1938 aerial photo that was taken of the area.

Reasons for Removal

Starting in 2003, FACT convened a series of meetings with government officials, citizens, and agency profes-

sionals to develop a plan to protect and restore the chemical and ecological integrity of Alum Creek. The resulting Lower Alum Creek Watershed Action Plan (WAP) was later endorsed by the Ohio Environmental Protection Agency (OEPA) as the road map to a healthier watershed. One of the key objectives identified in the action plan was the removal of lowhead dams.

The lowhead dams decrease water quality and habitat in the river by creating stagnant, lake-like conditions that support fewer species of organisms. The pooling water enables sediment to fill in the spaces between rocks and reduces the levels of dissolved oxygen available to fish. The lowhead dams prevent fish from migrating upstream in the river channel. The vortex by one of the dams also caused at least two fatalities. This risk was reduced by placing boulders along the dam's downstream face, but serious safety issues may still remain for individuals attracted to climb on the structure.

The lowhead dams at Nelson Park and Wolfe Park are the only ones on this river that are now known to have such

(Continued on page 2)



TECHNICAL APPROACH: Wolfe Park & Nelson

By Mitchel Strain, CPSS, Burgess & Niple



FACT has contracted with the team of Burgess & Niple, Inc. (B&N) and The Righter Company to remove the Wolfe Park and Nelson Park dams on Alum Creek later this year. The design/build project will be led by B&N under the direction of Project Manager Mitchel Strain, CPSS. The scope of the dam removal project includes an assessment phase, identification of design alternatives, construction, and post-construction monitoring.

Assessment Phase

B&N will conduct a pre-project biological monitoring and channel survey in the project area. During the pre-project biological monitoring, B&N biologists will collect samples of fish and

macroinvertebrates. The information collected in the pre-project survey will form a baseline against which improvements to the aquatic habitat will be measured after the dams are removed.

The channel survey information will determine the quantity and type of sediment that has accumulated behind the dams. It also will determine whether there are original channel features, such as riffles, still present under the current dam pools. Low-head dams like the Nelson Park and Wolfe Park Dams typically do not accumulate large buildups of fine sediments like higher dams used to make large lakes and reservoirs.

Baseline measurements of dissolved oxygen in the project area also will be taken. Dissolved oxygen is the primary water

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Lowhead Dams on Alum Creek at Nelson Park and Wolfe Park

significant negative impacts that appear to outweigh any possible benefits. The best available information suggests removing the lowhead dams will enable the river to support more diverse habitat for fish and other aquatic life, and decrease safety hazards for canoeists and anglers.

Reaching a Successful Outcome for the Creek & Community Environment

In 2006, FACT received a valuable state

grant from the Ohio EPA to support removing the Nelson Park and Wolfe Park dams in late 2007. FACT then assembled a technical advisory committee made up of FACT board members, university faculty, city officials, and conservation professionals. The Dam Removal Advisory Committee solicited proposals

from a number of consulting firms from Ohio and surrounding states. Burgess & Niple, a respected local firm, was selected to work on the project. FACT continues to involve the public in our efforts to protect Alum Creek as a community resource as we move forward with this important community project.

LOWHEAD DAMS IMPACT ALUM CREEK

Environmental	<ul style="list-style-type: none"> • Low dissolved oxygen levels • Sediment accumulation impacts habitat structure
Social	<ul style="list-style-type: none"> • Impairs access by canoe • Poses drowning threat
Economic	<ul style="list-style-type: none"> • Maintenance cost

Park Dam Removals

quality parameter that will be measured for improvement after the dam removal. Impounded water, like the water in the dam pools, tends to be low in dissolved oxygen. This limits the diversity of fish and macroinvertebrate species able to live in an impounded area.

The dams also are a physical barrier to the upstream and downstream movement of fish, especially smaller species. The biological assessment work will take approximately six weeks. During this time, samplers that collect macroinvertebrates will be left in the stream, allowing certain types of macroinvertebrates to colonize inside.

Identification of Alternatives

Once the baseline assessment work is completed, B&N will identify potential alternatives for removing the dams.

Although the dams will most likely be completely removed, it could be beneficial to leave parts of one or both dams in place, depending upon the results of the channel survey.

One alternative could potentially include the installation of cross vanes (see picture) or artificial riffles in the stream after the dams are removed. This will make up for the abrupt drop in elevation created by the existing dams. Cross vanes are upstream-pointing horseshoe-shaped structures constructed of large, close-fitting boulders. They can be used to control the grade of the stream bed and direct channel flows toward the center of the channel and away from banks. Cross vanes are attractive to fish because they provide several different kinds of habitat, ranging from swift water in the center, to a plunge pool downstream, and slower, shallower water upstream of the vane "arms" near the banks.

Artificial riffles would be another alternative for redistributing the dam drops, but typically require considerably more material than cross vanes. It is possible no artificial structures will need to be installed if suitable natural riffles are buried under the dam pools. If artificial structures are needed, the existing large boulders piled against the Nelson Park Dam could be reused.

FACT will be involved in the formulation and evaluation of the alternatives, and will invite input from stakeholders and the public. Once an alternative is selected, B&N will prepare plans for the dam removal and installation of any replacement structures. The Righter Company, the contractor selected to remove the dams, will prepare plans to ensure that considerations like equipment access, safety, erosion, and sediment controls are taken into account.

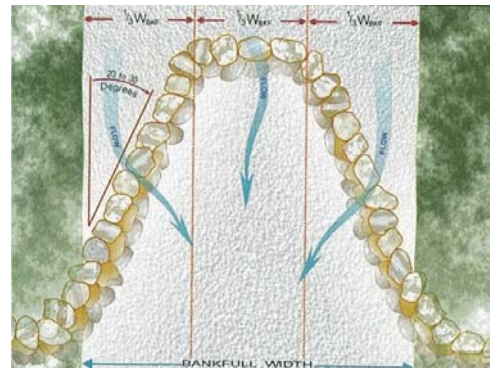
The plans include stabilizing and planting on the bank areas that will be exposed after the dams are removed. These areas will look bare after water levels are lowered, but will be mulched and seeded with quick-sprouting grasses, flowers, trees and shrub seedlings. J.F. New, a native plant and restoration landscape firm based in Indiana, will be responsible for the landscape plan and the plant installation.

Construction & Post-Construction Monitoring

A small opening, called a notch, will be made in each dam to allow the water level to lower gradually. Once the water level has lowered, the concrete that forms the dams will be broken up and removed from the stream. Then replacement structures will be installed, if needed, and the exposed areas will be seeded and mulched. Tree and

shrub seedlings will be planted when the weather permits.

Beginning in the summer of 2008, B&N will conduct post-project monitoring for a period of three years in order to measure improvements in the biological community and water quality.



Top: Existing conditions
Middle: Cross vane schematic
Bottom: Rendering of cross vane



Columbus Recreation and Parks Department is pleased to partner with FACT on the removal of the lowhead dams at Nelson Park and Wolfe Park. The removal of these dams will greatly benefit the community and users of these parks.

These dams historically have been a safety hazard, resulting in at least one death attributed to the Wolfe Park dam. Currently, Columbus Recreation and Parks does not have funding to maintain these dams. Removal is needed to protect our park users from the drowning dangers of lowhead dams.

Making Parks Safer &

By Elayna Grody, Natural Resources Manager, and Maureen Lorenz, Planning Manager for Columbus Recreation and Parks Department

Greener

The dams also have had a negative effect on the quality of the natural environment by decreasing water quality, impacting fish migration and altering flow. The environment is vital to our citizens' quality of life. Columbus Recreation and Parks understands that removing the dams will improve the water quality, fisheries, fish habitat and fish movement as well as restoring the stream bank and in-stream habitat.

Creating a free-flowing Alum Creek also will benefit recreational opportunities. The improvements will increase the quality of sport fishing in the area and allow for a free-flowing Alum on which people can canoe and kayak without the need to portage. Without the dams, people can explore the shores of Alum, skip rocks and discover the natural beauty of the creek in Nelson and Wolfe Parks. The improved water quality will make all the recreational uses of the Creek that much more enjoyable.

The benefits of removing the dams speak to the mission and vision of the Columbus Recreation and Parks: To enrich the lives of our citizens and to provide leisure opportunities for all...something for everyone...naturally. The Columbus Recreation and Parks looks forward to the project getting underway and making these parks "safer and greener."

For additional information, please contact:
Elayna Grody - (614) 645-3304
Maureen Lorenz - (614) 645-3306

Possible QUESTIONS or CONCERNS

What about flooding?

No changes or impacts are expected after removing the dams, since they haven't served as flood control structures. Flood control dams are designed to store excess water during storms, or to divert water to a holding area (these don't). The Alum Creek State Park Reservoir Dam at Lewis Center Road in Delaware County is the primary means of flood control for the watershed.

What about the water level?

Water level is controlled by a variety of factors such as topography and geology of the surrounding region, and by flows released from the State Park reservoir dam by the US Army Corps of Engineers. Alum Creek as a whole is not expected to become significantly wider or narrower, although some shallower areas may develop as natural riffles form in the channel.

Who will own any “new” land that is exposed as waters recede near the project?

Descriptions of property boundaries found in deeds and titles for land parcels along Alum Creek define the ownership of areas along the creek.

What about property value?

In conversations with the Franklin County Auditor's office, the property values would most likely stay the same since the acreage would not change.

What impact will removing the lowhead dams have on wildlife?

Several improvements are expected. For many years, the section of Alum Creek river containing the lowhead dams has not met water quality standards for warm water habitat aquatic life. The number and variety of aquatic species have been suppressed due to a lack of dissolved oxygen from the pooling water behind the dams. Removal of the two dams should enable dissolved oxygen levels to increase and support a greater variety of aquatic species. This has been found in other dam removal projects around Ohio. For example, when the St. Johns Dam was removed from the Sandusky River, the diversity and number of fish species increased – particularly those types that have a low tolerance of pollution. The common carp, which thrive in various pool areas of Alum Creek, will continue to be found at many locations, but other native species should have a much better chance to thrive in this section of the

creek after the dams are removed. Overall, the quality and quantity of aquatic life should increase.

Who will pay for the lowhead dam removal work?

Friends of Alum Creek and Tributaries received a 319 Nonpoint Source Implementation grant from the Ohio Environmental Protection Agency to pay for the removal of both the Nelson Park and Wolfe Park lowhead dams. The grant budget for the lowhead dam removal is approximately \$250,000. The City of Columbus and City of Bexley will support the project with some in-kind assistance.

Sources:

1. Wildman, Laura, P.E. (2005). Dams and Flood Control. [Power Point] American Rivers.
2. Lindloff, Stephanie (2004) Selective Dam Removal: A Fact Sheet. [PDF file] River Alliance of Wisconsin.
3. FACT, Alum Creek Action Plan Steering Committee & Watershed Community. (2005) Lower Alum Creek Watershed Action Plan. [WWW document] <http://www.friendsofalumcreek.org/sitev2/action%20plan%2005>
4. Gable, Bob. (2006) Ohio Dept. Natural Resources (ODNR) Scenic Rivers Program: St. Johns Dam Removal [Power Point] ODNR.





1998

FACT was formed by local citizens.

2003

Concerned citizens, professors, water management professionals, municipal officials and other stakeholders began working with FACT to draft the Lower Alum Creek Watershed Action Plan (WAP). Removing two lowhead dams was one of the primary actions identified during this planning process.

2005

The Watershed Action Plan was endorsed by the Ohio Environmental Protection Agency (OEPA).

Neither Nelson Park nor Wolfe Park dams serve as flood control, and therefore became the focus of lowhead dam removal efforts.

FACT representatives obtained verbal permission to remove the Nelson Park Dam from the then-owner of property abutting the lowhead dam structure.

The City of Columbus Recreation and Parks Department, owners of Wolfe Park dam and part owners of Nelson Park dam, grant permission to remove the two lowhead dams.

2006

FACT received a grant from OEPA to remove the Nelson Park and Wolfe Park lowhead dams.

The FACT Dam Removal Technical Advisory Committee, comprised of FACT Board members, university faculty, city officials and agency professionals, solicited proposals from consulting firms. OEPA provided and will continue to provide guidance on the project.

2007

Burgess & Niple was selected for implementation of the dam removal project.

The Columbus Recreation and Parks Department and the City of Bexley will support the project with in-kind assistance.

New owners acquire the property that abuts the Nelson Park lowhead dam.

Work will proceed in late 2007 or sometime in 2008 depending on resulting data, Burgess & Niple's recommendations, required permitting, weather and water conditions, etc.

Damming a Public Resource

Vince Mazeika, Division of Surface Water
Ohio Environmental Protection Agency, Central District Office

In common parlance, Alum Creek is viewed to be a “public resource.” A consistent legal definition of the term is elusive, but we all have a fair idea of its meaning. We know it when we see it, enjoy its values and benefits, and often sense when those values have been or may be reduced or devalued. But if that reduction occurred in the long past, we may assume the values are irretrievably lost. That’s the case with Alum Creek and the lowhead dams to be removed by FACT, along with its community and state agency partners.

Many dams are constructed with a focused, narrow purpose in mind. Flood control and maintenance of a large pool of water for industrial purposes are two. During the period of a dam’s useful life, there may be recognized tradeoffs between these purposes (or values) and other values lost or reduced. Presently there is an international discussion taking place regarding tradeoffs that would

occur if the world’s largest dam, proposed by the World Bank for the Congo River basin, is constructed. Over time, the rationale for a dam may disappear, but the dam remains - along with the reduction in public resource values it brought about. That is the case with the Alum Creek dams at both Nelson and Wolfe Parks.

The reduction of public resource values which occurs when a stream is dammed accompanies adverse physical, chemical and biological effects observed in the dam pool. Increases in water temperature, accumulation of sediments, reduction of oxygen content, and reduction of stream velocity result in cumulative impacts to the fish, mussel and aquatic insect communities that would normally inhabit a free flowing stream. The diversity of species declines as those species that are intolerant of lower water quality, higher temperatures, and silt embedded

substrates leave the site. Terrestrial species and birds are affected too, as their food sources include these same aquatic life forms.

The devaluation of the public resource for human visitors to a dammed stream is evident in the unpleasant mucky accumulations enveloping a bare foot, higher risk of illness due to concentrations of harmful bacteria, and reductions in more desirable sport fish populations.

The participation of the Ohio Environmental Protection Agency’s Surface Water Division in removal of the Alum Creek dams stems from its mission to ensure compliance with the Federal Clean Water Act. The act addresses protection and maintenance of the nation’s surface waters as a public resource. The participation of FACT and the Alum Creek watershed community is rooted in a commitment to the Federal Clean Water Act and a firm realization that good stewardship of public resources results in higher quality of life, and more life of higher quality.

For additional information, please contact:
Vince Mazeika - (614) 728-3855

Thank You to the FACT Dam Removal Technical Advisory Committee

Undertaking a lowhead dam removal project requires knowledgeable and willing partners to understand both the ecological and engineering elements of removing a structure from a stream in order to improve water quality, wildlife habitat and public safety. FACT would like to thank members of the FACT Dam Removal Technical Advisory Committee for donating their time and expertise.

Thomas Ruedas



- Columbus Recreation and Parks Maureen Lorenz
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- Ohio Dominican University Chad King
- Bexley Recreation Department Doug Jackson

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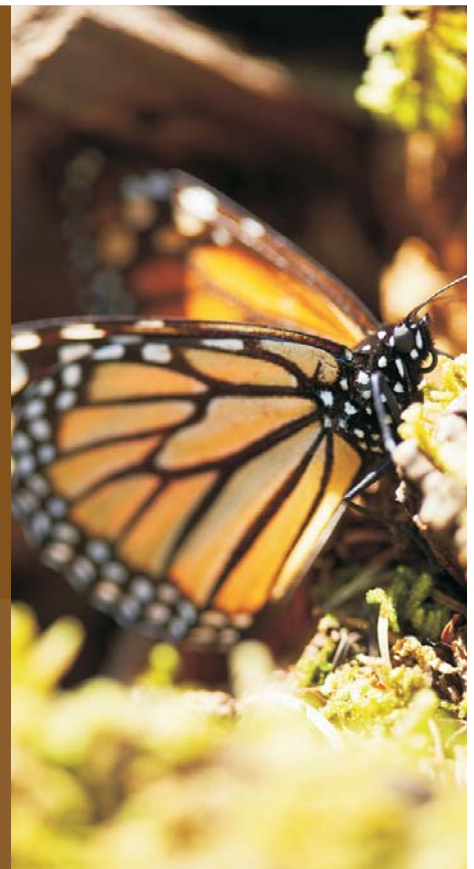
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Kimberly Williams	Watershed Coordinator
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The mission of Friends of Alum Creek and Tributaries (FACT) is to preserve and protect the quality and beauty of Alum Creek watershed and promote environmentally responsible recreation, educational opportunities, and citizen participation at many levels.



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