DAM SAFETY

POLICY MEMORANDUM #6

TO: Dam Owners, Operators, and Engineers

FROM: Sediment, Stormwater, and Dam Safety Program
Water and Science Administration

DATE: May 23, 2019

SUBJECT: Dam Decommissioning

Policy Statement

It is the policy of the Maryland Department of the Environment (the Department) that decommissioning (removal) of dams is appropriate and preferred when the dam no longer provides value to the owner or users. This policy memorandum provides general concepts to be considered when planning and executing a dam decommissioning project. It represents the policies and positions of the Dam Safety Division. Each dam removal project is unique and can involve multiple stakeholder groups and require authorizations or permits from multiple programs within the Department as well as other local and federal entities and coordination with community stakeholders.

Candidate Dams

A dam owner may choose to permanently decommission a dam for a variety of reasons including:

- The dam has a combination of marginal benefits and high dam safety risks that would be very expensive to repair;
- The dam and reservoir no longer fulfill a purpose for the owner;
- The dam or reservoir presents a hazard to public safety or downstream resources;
- Dam repair, operation, and maintenance costs are prohibitive; or
- A desire to return the stream to its natural free-flowing condition.

When considering removal, the owner must be cognizant that dams may have benefits not immediately apparent. For example, the removal of a dam may result in more frequent/severe downstream flooding. This may necessitate the need for enlargement of hydraulic structures downstream including bridges and culverts or to obtain easements from downstream property owners. Reservoirs also provide water habitat for fish, amphibians, water-loving plants, as well as for waterfowl. Some dams may have historical or cultural value. The positive and negative effects of

a particular dam/reservoir should be carefully evaluated during the dam removal decision-making process

Benefits of Dam Removal

Cost Savings

Dams are expensive to operate, maintain, evaluate, repair, and to plan for emergencies. By permanently breaching a dam, the following costs are saved:

- Annual maintenance costs;
- Annual operation costs;
- Annual monitoring costs;
- Examination costs;
- Dam inspection costs;
- Repair costs; and
- Emergency action plan costs.

River/Stream Restoration

Dams create blockage to fish or other living organisms. Removal of the dam allows transport of these organisms between formally segmented stream sections. Some organisms (such as fish) travel along the stream during certain times of the year and dam removal allows these processes to resume. Dam removal can result in a healthier stream habitat.

Landscape Enhancement

Dams are human-made structures within parks and thus are an interruption in the natural landscape. While some dams blend into the surrounding landscape, others are obviously out of place in a natural landscape. Dam removal restores the natural landscape.

Removal of Safety Hazards

The dam may present hazards such as falling, tripping, slipping, getting caught in spillway flows, and being an attractive nuisance to children. Because of these hazards, the area may have to be fenced or signed. The reservoir may attract unsupervised swimmers. Boaters may be drowned by going over the spillway. Dam removal removes these safety concerns with the dam and reservoir.

Design, Permitting and Construction

Planning Considerations

The design of the breach and removal should be performed by a qualified professional engineer. The initial project planning must, at a minimum, consider the following:

- Data collection needs including dam/reservoir sediment soil samples and surveys.

- Development of breach alternatives and selected alternative.
- Control of reservoir waters during dam breaching (commonly accomplished by pumping or siphoning the reservoir down before construction).
- Control and remove groundwater (removal of saturated soils can be problematic and expensive).
- Control of reservoir sediments during construction.
- Disposal of dam materials.
- Returning the stream through the reservoir basin in a stable channel, including provisions to prevent erosion
- Returning natural, non-invasive vegetation to the reservoir basin.

Design Requirements

The Department's Dam Safety Division has the following design requirements for dam decommissioning projects:

- Masonry or concrete gravity dams should be removed entirely. Earthen embankments should be breached by construction of a properly sized and armored channel excavated through the embankment.
- The breach channel location should be selected based on the original stream channel, where known, or the maximum section of the dam. This will reduce the likelihood of a shallow pool of impounded water remaining after the breach is complete.
- The breach channel should be excavated through the embankment fill materials to a natural undisturbed ground surface.
- The breach channel should be sized to ensure that no more than three (3) feet of water is impounded during the 24-hour 100-year storm event. Determining the inflow can often be accomplished relatively quickly using the USGS StreamStats website.
- The breach channel side slopes should be two (2) horizontal to one (1) vertical (2H:1V) or flatter.
- A pilot channel to convey base flow is recommended.
- The breach channel should be stabilized using materials appropriate for the depths and velocities of flow during the 24-hour 100-year storm event. The stabilization should extend at least two (2) feet vertically above the anticipated 100-year water surface elevation.

Obtaining a Dam Safety Permit

The permit application must, at a minimum, include the following:

- Design report.
- Plans for the control of sediment and upstream lakebed.
- Narrative and computations for the method and timing of lake dewatering.
- Demonstration that the breach will not adversely affect downstream flooding during the 2, 10 and 100-year storms, or that necessary permissions/easements have been obtained.
- Where a dam provides stormwater management benefits, the applicant must demonstrate that the decommissioning project provides equal or greater benefits than those lost due to removal of the dam.

- Proposed work schedule and methods.
- Description of the potential effects of the dam decommissioning upon the environment and upon life and property downstream of the dam.
- Erosion and Sediment Control Plans (to be approved by others).

Additional Resources

A number of documents are available online to provide further information on dam decommissioning topics including:

Removing Small Dams: A Basic Guide for Project Managers, American Rivers, 2015

Guidelines for Dam Decommissioning Projects, USSD, 2015

Additional Information

Questions about this policy or other items relating to ponds and dams can be directed to the Chief of the Dam Safety Division at 410-537-3538.