



BEN'S  
PURINA FEEDS

# Warning! Lowhead Dams Claim Lives!



Boaters and rescuers caught in the roiling spillway below lowhead dams testify to the effectiveness of these structures to claim victims

Kim Elverum

**I**N LATE SEPTEMBER 1975, a tragic chain of events in Binghamton, New York, taught river users and rescue teams valuable lessons in dam safety. By the time the episode ended a day later, three persons were dead and four had been injured.

An early fall storm had made the Susquehanna River unusually high. One evening, two rafters were swept over the Rockbottom Dam and trapped in the current below the

structure. Witnesses to the accident summoned help, and a rescue boat was launched with three firemen on board. In the turbulent water, the craft capsized. All three were thrown into the river. One fireman drowned; the other two, along with the two rafters, were eventually pulled from the water.

The next day, on a body recovery operation for the lost fireman, the fire chief and two firemen approached the dam from down-

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stream. As their outboard-powered boat reached the base of the dam, the current caught it and the boat turned over in the roiling water. Desperate attempts to rescue the trio failed, including a try with the fire department's extension ladder.

Twenty minutes later, a rescue boat carrying two sheriff's deputies arrived on the scene. By this time, two of the firemen had disappeared, the third was bobbing in the maelstrom.

As if to add horror to horror, this attempt once again ended in tragedy as the third rescue craft overturned in the turbulent water. Luckily, the two deputies and the remaining fireman were swept clear of the dam and eventually rescued.

Why did this tragedy occur? Are these small dams that dangerous? Was this just a freak accident or could it happen in other places, including Minnesota? What can be done to prevent these tragedies?

**Drowning Machine.** Dams come in many sizes and shapes, everything from huge lock-and-dam structures on the Mississippi River to small, "lowhead" dams. Although there are safety problems with larger dams, their size and design do not present the type of threat involved in the seemingly harmless lowhead dams.

Lowhead dams are generally small structures usually no more than 10 feet high, although some are as low as six inches. They have no gates or

water-control devices; water flows constantly over them. Most were built during the late 1800s and early 1900s to provide water for grain mills and early hydroelectric generators and to control lake levels.

Because of their small size, they do not appear to be dangerous, especially when viewed from a boat or canoe upstream. They can be pleasant places in the summer when water drops over them and gently flows downstream.

In the spring and during other periods of high runoff, however, the dams become very dangerous. Torrents of water pouring over the dam create a churning backwash or current. This "hydraulic," as it is often called, is really a recirculating current. The roiling water takes any object — including a person — down to the bottom of the stream, releases it to the surface, sucks it back to the face of the dam, and pushes it back to the bottom again. This cycle can continue indefinitely.

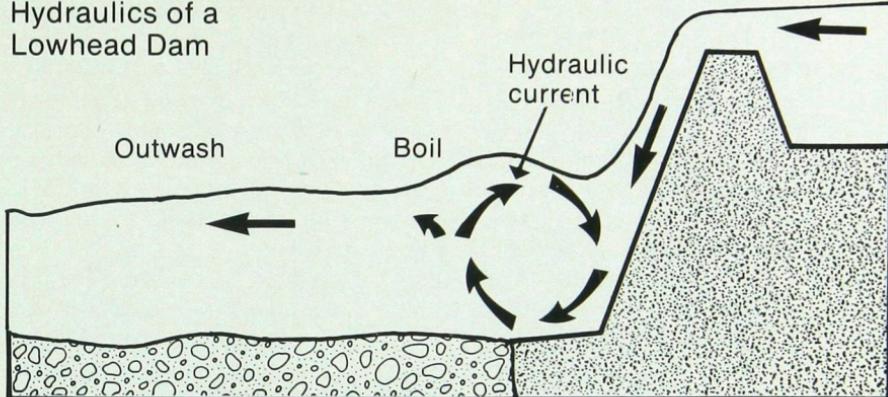
In addition to the current, other hazards are inherent in most lowhead dams:

- Both faces of the dam usually consist of a vertical concrete abutment. Even if a victim struggles to the edge of the structure, chances are poor that he or she will have enough strength to climb the wall.

- Branches and other debris trapped in the hydraulic pose an additional hazard to the victim.

- Temperature of the water at times of high runoff is usually cold,

## Hydraulics of a Lowhead Dam



**The boil is the point at which water flows in two directions, downstream and back toward dam. Objects caught in recirculating current are held against dam.**

which decreases survival time.

- Finally, air bubbles mixing in the water decrease its buoyancy by one-third. The victim has a hard time staying afloat, even with a Personal Flotation Device (life preserver).

In sum, these factors combined with the hydraulic current create a nearly-perfect drowning machine.

**Our Lowhead Dams.** Problems with these dams are not confined to New York. Deaths of victims and rescuers have occurred in nearly every state, including our own. Most of the several hundred lowhead dams in Minnesota were built during the late 1800s and early 1900s. Many have been abandoned or are no longer used.

One such dam is located on the Crow River, which forms the boundary between Hennepin and Wright

counties. In July 1979, events nearly as tragic as the Binghamton incident began with what was alleged to have been a dare.

A 25-year-old man wearing a boat cushion on his back plunged over the Berning Mill Dam on an air mattress. The river was unusually high for the summer and the man was trapped in the hydraulic.

Occupants of two canoes below the dam attempted to rescue him, only to become victims of the current themselves. The first canoe capsized. Fortunately, the canoeist was washed clear of the dam and reached shore safely. The second canoe with two men and a woman was pulled into the spillway. It broke in two throwing all three occupants into the river.

A state trooper arrived on the scene, but was unable to rescue the man wearing the boat cushion trap-

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ped below the dam. Instead, the trooper turned his efforts to the woman from the second canoe who had been brought ashore by two fishermen. He and two bystanders managed to keep her breathing until more help arrived. That evening she died at the hospital.

Two days later, the bodies of the man who had plunged over the dam and one of the rescuers were recovered. The final toll: three deaths.

As tragic as these deaths were, however, they were not unique. Over the past eight years, deaths have occurred below dams on the Buffalo, Cannon, Chippewa, Mississippi, Rum, Red, Red Lake, and Straight rivers. The dam which has claimed the most lives is the Red River's Drayton Dam located on the Minnesota-North Dakota border 40 miles north of Grand Forks. Since it was built in 1964, 11 persons have died in its spillway. The latest fatality occurred in September 1982. Despite warning signs, ordinances, and city and state police officers patrolling the site, fishermen and canoeists continue to press their luck at the base of the dam.

**Rescue.** In 1980, officials of the Ohio Department of Natural Resources were dismayed to learn that, in the past two years, nine firemen and police officers in that state had lost their lives, and others had been injured, in fast-water or dam-rescue attempts. Additional checking revealed the same type of deaths and

injuries had occurred in other states.

These accidents involved rescue personnel who were injured or killed in what had been considered routine water emergencies. Typically, the rescue personnel, like adventuring river users, were confident of their skills, equipment, knowledge, and experience.

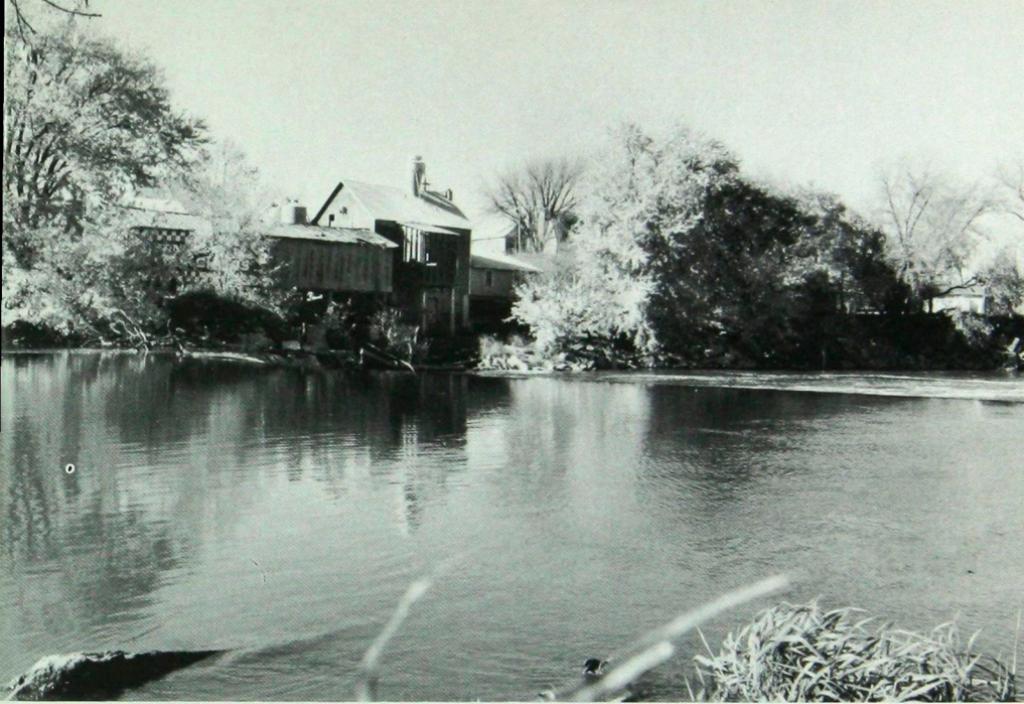
Only a few fortunate rescuers have survived a trip through the current below a lowhead dam. Dennis Lutz, a Miamisburg, Ohio, fireman, described his experience attempting to rescue a teenager:

"You can't believe how powerful the current is. As my buddy and I approached the dam, the boat seemed to rise and move rapidly forward. It's like being caught by a monster. It just won't let you go."

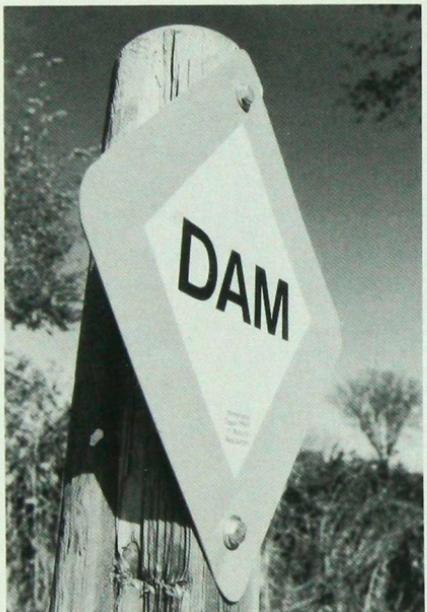
The rescue boat filled with water and capsized as the strong current sucked it into the dam. Lutz was dragged down into the hydraulic, battered along the bottom, caught in a submerged tree, wrenched free, and pushed to the surface, only to have the cycle repeated. Lutz was finally rescued, but his companion and the teenager drowned.

In response to these tragedies, the Ohio DNR Division of Watercraft, with the assistance of firemen, the Red Cross, and canoeists, developed techniques that can help anyone faced with a fast-water rescue problem.

"In any rescue operation, we first reassure the victims," says James French, Ohio DNR. "Next we try



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rescue from shore. As a last resort, we attempt direct rescue from a boat. But we would never take the boat into the hydraulic of a dam. The risk is simply too high."

The techniques that Ohio devised have been put into practice across the U.S. During the last five years, the Minnesota Department of Natural Resources has briefed fire departments, DNR Conservation Officers, sheriff's deputies, and state troopers on the rescue methods developed by Ohio.

Lowhead dam rescues are either shore- or boat-based. Shore-based rescues are used on dams up to 300 feet wide which have accesses at both ends. If rescue by throw-line is

not possible, a line with a rescue buoy in the center is placed across the river. This can be done with a line gun, or by using a boat downstream from the dam. Rescuers on both sides of the river then work the line up to the victim and pull him to the nearest shore.

Dams where access to both ends is not possible, or dams that are wider than 300 feet, generally require a boat-based rescue. This method requires two boats which are connected by a safety line.

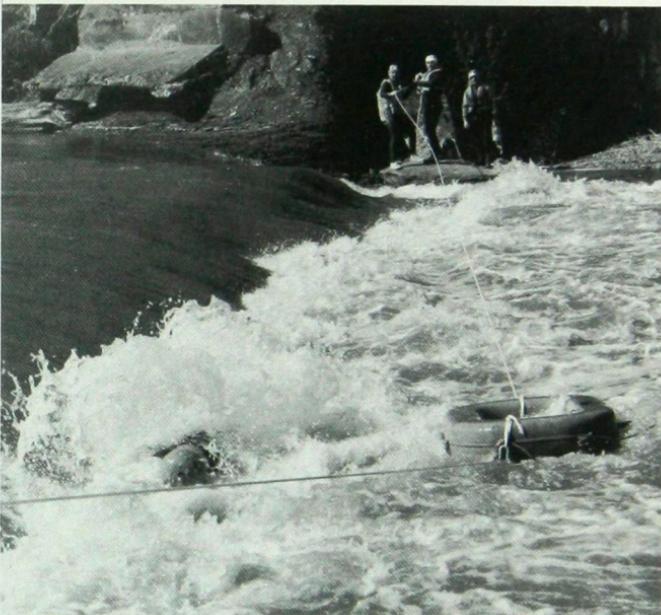
The first boat approaches the dam from downstream, being careful not to enter the hydraulic. A flotation device on a line is then cast to the trapped person. The second boat remains 100-150 feet downstream. Its purpose is to assist in the rescue and keep the first craft from being pulled into the dam.

Other techniques have also been used successfully, including specialized watercraft and a coupling which allows an ordinary fire hose to be inflated with compressed air and pushed out to a victim.

The basic premise of the Ohio approach, however, is that rescue techniques must be realistic and simple. In addition, they emphasize that rescue agencies know the dams in their area, take measures to prevent accidents, and plan and practice rescue methods.

**Films.** Although this article is by no means a complete guide to low-head dam safety and rescue, it does

**Ohio DNR teaches rescue techniques at Fast Water Rescue School. In drill, shore-based rescue team pulls float through boil. Person caught in boil could hang onto float, be pulled free. Far left: New sign required by Uniform Waterway Marking System is being erected along rivers across U.S. To boaters, sign's diamond shape indicates danger in stream ahead.**



provide some basics. Persons interested in more information on dam rescue are urged to contact the Department of Natural Resources, Boat and Water Safety Section, Box 46, Centennial Bldg., St. Paul, MN 55155.

The DNR also has two 16mm films for free loan which review fast-water and lowhead dams: *The Uncalcul-*

*lated Risk and Water: The Timeless Compound.* For information on borrowing these films, contact the DNR Film Library at the above address. □

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### *Before a Fish, All Men are Equal*

“FISHING IS A CHANCE to wash one’s soul with pure air, with the rush of a brook, or with the shimmer of the sun on the blue water. It brings meekness and inspiration from the scenery of nature, patience toward a fish, and a quieting of hate. And it is discipline in the equality of men — for all men are equal before a fish.” — *Herbert Hoover*