

The Center Street Dam is a popular spot for fishing in Des Moines.



It's a terrifying way to go.

Trapped below a dam, victims find themselves fighting currents from both upstream and downstream. Typically, they are sucked under water, pop back up and are carried back toward the face of the dam. This can happen repeatedly until the victim succumbs.

For many family members and friends of these victims, the circumstances seem completely random. In fact, though, drownings at low-head dams are completely predictable. That is why a low-head dam is commonly

known as "The Drowning Machine." In the past 10 years, low-head dams killed 1.4 Iowans per year. They accounted for approximately a quarter of the documented drownings on Iowa's rivers during that period.

Low-head dams are where the vast majority of dam-related deaths occur, not at large reservoir dams with intimidating outflows. Survivors say the drop looked tiny, and the forces at play came as a complete surprise.

Rescue professionals have known about this hazard for decades. Translating that knowledge into wider public



THE DROWNING MACHINE

STORY AND PHOTOS BY NATE HOOGEVEEN

policy has taken longer. In a 1981 article for the Iowa Conservationist, written after a wave of rescue personnel nationwide drowned while trying to rescue people from dams, Water Safety Coordinator Betsy Maleug estimated that five Iowans became trapped in dams every year. There were approximately 30 more low-head dams on Iowa streams at the time.

Public education continued through the 1980s and 1990s, but no standard signage system was developed to warn the public about dams. Dam owners were not

encouraged to post warnings. No inventory of drowning-hazard dams had been conducted since 1979. No clear policy toward dams existed, other than to periodically warn the public.

In 2007, the number of dam-related deaths statewide spiked to six, catching Iowans' attention. In 2008, the Iowa General Assembly established the Low-Head Dam Public Hazard Program, which put into law a program the Iowa DNR had begun two years prior. The program provides funds for warning signs, portages around dams



ABOVE: Paddler Dick Howard launches his kayak a safe distance downstream of the dam at Adel on the Raccoon River. Eddies can pull small craft upstream into the face of the dam if launched too close downstream. **LEFT:** Thousands of native fish attempted to migrate upstream during the Floods of 2008. These fish became trapped in the emergency spillway at the Saylorville Dam north of Des Moines. Except for several large catfish that were relocated by DNR staff, all these fish eventually ran out of oxygen and died. **RIGHT:** Warning signage installed at the Boone Waterworks dam after the drowning of Megan Pavelick, pictured opposite lower right. Learn more about low-head dams and safety at www.iowawhitewater.org.

and cost-sharing to make the structures safer or remove them where possible.

The legislature also instructed the DNR to launch a statewide planning process to prioritize water trails and low-head dam safety with input from the public and various experts, including rescue personnel, engineers, river scientists and fisheries biologists. Dams are being inventoried for whether they still serve their original functions, and for any additional functions they may perform.

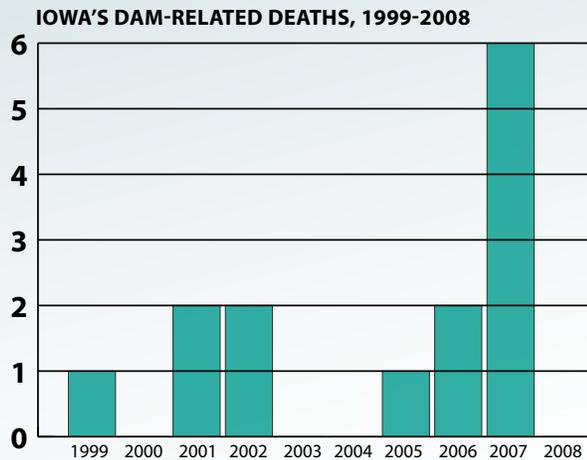
Beyond safety, a number of issues surround dams. Many of them limit biological productivity by separating streams into smaller, less diverse ecosystems. Then again, some dams act as important barriers to invasive species. For example, silver carp, a leaping fish with a voracious appetite, recently invaded the Missouri River. Dams on the Little Sioux River are likely the primary reason these fish haven't entered the Iowa Great Lakes system, where they could be

a serious nuisance. Other dams, with the pools they create, may assist the downstream spread of invasive zebra mussels.

Other dams back up large reservoirs, such as Red Rock Lake or Coralville Lake, which serve flood control and major recreation functions. Many of them form popular local fishing holes.

It's sometimes assumed that simply removing dams is the preferred solution. Maybe, maybe not. Sediments locked behind the dam may be a problem if released. Infrastructure like bridges or water supplies may be upstream. Careful analysis is needed before settling on a solution.

In some cases, the best scenario may be re-designing dams with a rapids downstream, to eliminate the "Drowning Machine" effect and restore biological connections that fish and mussels need to access habitat, feeding areas and nurseries. This does little for silty pools



upstream, but may be the most acceptable solution for a given community.

Midway through the planning process, it has become apparent that individual dams will require unique solutions. In some cases, proposed safety solutions will be warning signs and other measures such as cabling or railings. In others, physical modifications to the dams with accompanying river restoration will be preferred. But it's increasingly clear that many communities are interested in mitigating the hazards and restoring rivers where possible.

Nate Hoogeveen is the River Programs Coordinator for the Iowa DNR.

We'd love to hear what you think. Send us your input for our statewide plan at http://creekcommunities.design.iastate.edu/Water_Trails.html. 🐾

OUT OF SORROW, SURVIVORS WARN OF THE UNKNOWN TRAP

BY ANN CANNON

It was supposed to be a fun Sunday afternoon on the river. Three sorority sisters put their tubes on the Des Moines River. What they didn't know was that a trap lay ahead.

The drop-off was slight—a little more than a foot—and didn't look dangerous. But the roiling water below the dam pulled the young women under and held them in its current. Two escaped with their lives; Megan Pavelick did not. She never regained consciousness. She was this dam's latest victim.

Megan became a statistic. But I knew her as so much more. She was my roommate and my sorority sister. All of the young women tubing that day are my sorority sisters. Megan graduated from Valley High School in West Des Moines in 2002. In May 2006 she graduated with a marketing degree from Iowa State. She loved cheering on the Cyclones at basketball and football games, and traveling with her many friends. She had a tight-knit family. Megan and I had movie marathons. We spent hours talking about boys, classes and parties. Megan was full of life and love and laughter. July 9, 2009, marks the third anniversary of her death.

People often conclude that dam victims are drunken. But Megan hadn't been drinking. Her primary mistake was simply being unaware of the dangerous underwater currents dams create.

I learned that her death was not just a fluke. This tragic event happens across the state with heart-breaking regularity. I knew I needed to get informed and get involved. I've taken the responsibility to become a board member of the Iowa Whitewater Coalition, which advocates new solutions at low-head dams.

It also made me more aware of other cases. There was the Waterloo businessman on RAGBRAI who drowned at a small dam at Independence in 2007. In 2002, there was Steven Nourse who kayaked over the Scott Street Dam in Des Moines and drowned. The hydraulics of the dam were so powerful that his body was too dangerous to retrieve from the dam and was held fast until almost a week later, when the body was recovered several miles away. His family and friends were finally able to end their weeklong vigil at the site and held a funeral. He was the brother of Julie Mankel, a fellow board member of the IWC.

Imagine our horrified surprise at seeing two college students on television in an inflatable raft rescued after 30 harrowing minutes struggling against the hydraulics at the same Des Moines dam. Or at an additional drowning there later in the summer of 2007.

Now with Megan's death, there is more potential to make a case for dam renovation and possible changes in the regulation of these dangerous dams. We've come a long way in understanding this problem, education and addressing safety problems at some dams. My hope is that more people will get involved, and that in the future, this hazard will be a distant memory.



Ann Cannon formerly served with Iowa DNR's AmeriCorps program, and worked as an interpreter at Maquoketa Caves State Park and as an assistant with the wildlife diversity program.

Ann Cannon, left, with Megan Pavelick.