

A river flows through them

Managing millions of gallons of water is year-round challenge for hydro crews

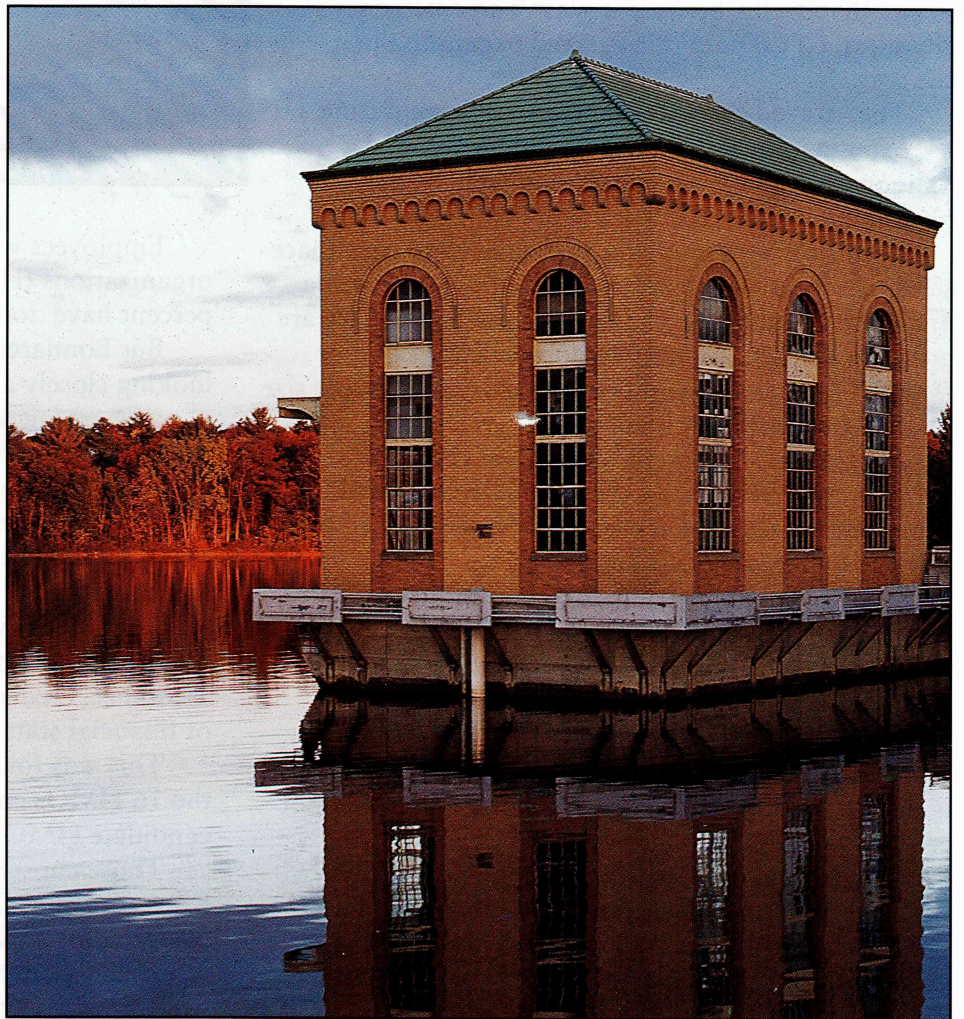
*Campers and fishermen
have long gone.*

*A frosty whiteness cloaks
the leafless trees, as a
jagged margin of ice forms
along the frozen shoreline.*

*Gone are the rowboats
and rubber rafts, the
wafting smell of fresh
trout on the grill and the
soft plinking of a guitar
accompanied by the
crackle of a campfire.*

*But while the picture has
changed since summer,
one thing remains the
same:*

The river flows on.



Hardy Dam's intake tower.

Story by Parri Shahmanesh
Photos by Rob Johns

At Hardy Dam on the Muskegon, winter is anything but the "off season." It is a time of careful monitoring of snow depth, ice formation and, most of all, the ever-changing level of the vast reservoir—a body of water that stretches 18 miles beyond the dike and plunges to a depth of 110 feet.

"A lot of people picture these ponds as lakes, but they're not," says Charlie Smith, superintendent of CPCo's seven hydros on the four rivers on the western side of the state.

"They're reservoirs that sometimes have a large volume of water flowing through. We have to be prepared 24 hours a day to keep that river flowing or the reservoir becomes dangerously high."

Millions of gallons of water can accumulate in Hardy pond in the space of a few hours during a mid-winter thaw.

"It takes a lot of skill and dedication on the part of the crew to manage the changing levels of water," Smith says. "Without their dedication, people downstream could be flooded out of their homes. Roads and bridges could be completely wiped out. So could the Croton dam downriver."

Winter months are a critical time for CPCo's 13 hydro facilities. Operators and crew stretch dedication to its outer limits as they keep turbine blades spinning and electricity generating, even in the most treacherous weather.

"There's a perception that things slow down in the winter and the workload is less," Smith says. "Our workload is extremely heavy year-round. We just have different responsibilities."

In January, for instance, operators at Hardy are already preparing for potential flooding in the spring. They begin "drawing down" the reservoir in anticipation of snow and rain runoff in late March and April. Operators lower the water level in the reservoir by taking a higher volume of water through the plant each day.

"It takes approximately two months to pull the pond down 12 feet," Smith says.

"We start at the first of the year and draw it down about 2/10 of a foot every day," explains Don Everling, who has worked as a hydro operator at the Croton and Hardy dams for 17 years. "If we did it faster, it would flood the people down below."

A slow drawdown also gives fish a chance to swim to deeper waters.

Drawing down the Hardy pond means less water gets wasted. Instead of waiting until the spring thaw, then running flood water through spill gates and

spillways, that water gets channeled through the plant to generate power.

The winter drawdown is unique to Hardy due to the size of the reservoir. There would be little advantage to drawing down CPCo's smaller reservoirs since they would re-fill so rapidly.

Also in anticipation of possible spring flooding, hydro superintendents survey snow levels throughout winter.

"We go to various locations within the watershed and measure the depth and water content of the snow," explains Richard Ellerman, superintendent of the eastern hydros. "Snow can be in various states: granular, powdery, hard and compacted. We look for how much moisture is in it, and then we equate it to inches of water."

Snow surveys also measure any ice in the snow and frost in the ground. Operators can compare survey results with data collected over the past 30 years.

"This helps us estimate how much runoff we can anticipate in a given year," Ellerman says.

Operators at hydros along the AuSable River survey the watershed twice in the winter at six different locations. For the Muskegon watershed, surveys are done twice each winter at nine different sites. And in the Manistee watershed, one or two surveys are done each year at seven different sites.

Ice control is another big winter job.

Because the possibility of flooding looms year-round, spill gates must constantly be monitored to make sure they're ice-free.

"It's a federal commitment to have these gates operable, even in zero-temperature weather, in case we have a rapid winter thaw," Smith says.

Operators use several mechanisms for de-icing spill gates.

"We have a system of electric de-icers that we put in the water," explains Manuel Contreras Jr., general repair worker in charge at the Croton plant. "They're motor-driven propellers that keep the water churned up so ice doesn't form on the gates."

The water agitators hang directly in front of the gates.

"They bring warmer water on the bottom of the pond up to the top," Ellerman explains. "The warmer water melts the ice near the spill gates."

The system is the same used for ships and large sailboats and power boats left in the water in the winter.

Downstream from the spill gates, operators use heat tape to keep ice from forming. Heat tape is cable

that runs along the seams of a spill gate. When an electric current is run through the cable, it gets warm, melting any ice that can cause the gates to freeze shut.

At some plants, heat lamps are also used to keep spill gates warm.

Despite the best prevention efforts, the gates can still become heavily coated with ice. A crew member might then have to be lowered in a safety harness over the side of a dam to use steam cleaners and high-pressure washers to remove ice.

If all else fails, Smith says, "we have to get down there with spuds—metal rods with sharp ends—and chop ice off by-hand."

Hydro teams also watch for ice formation on trash racks—the gratings in front of the intakes where water enters hydro-electric plants.

"They keep out logs, bottles and other debris that comes floating down the river," Ellerman says. "Ice can form on the racks, which can cause problems getting water through the plant."

This "frazzle ice" forms on units being used. One of the simplest solutions is to turn off a unit and let the ice melt off the gate.

Head water gauges, too, must be kept ice-free. These gauges alert operators to the level of water in the reservoir.

"It's very critical that we know the levels of these reservoirs at all times—that we don't get a false reading," Smith says.

For safety reasons, there are federal and state restraints on how much the reservoir can fluctuate.

Keeping within these guidelines can be especially challenging in the winter when operators are faced with hindrances such as ice jams.

"Ice will come down the river and hit a shallow spot and jam up," explains Dennis Greene, a relief operator for the Rogers, Croton and Hardy dams. "That backs up the water behind it. It lowers the reservoir."

When enough pressure builds up to break an ice jam, water comes rushing through.

"All of a sudden you get this gush of water, and the level of the pond goes back up," Greene says.

"You can't control it. You just have to react to it."

"You have to be prepared for when that ice jam breaks, so you can deal with the water," Ellerman

agrees. "We might pull down the pond about a foot to account for that water."

Sometimes, the biggest challenge of working at a dam can be simply getting into work. Most hydros are located way off the main highways, down winding country roads that become treacherous or impassable in bad weather.

Still, for hydro operators and crew, there is no such thing as a snow day.

"We've used everything from snow shoes to snowmobiles to get operators into plants in inclement weather," Smith says. "Our employees are very, very dedicated."

Ellerman adds, "We've had blizzards so bad we've had to send our snow plows to plow people out so that they can come in."

CPCo's 13 dams include Rogers, Hardy and Croton on the Muskegon River; Hodenpyl and Tippy on the Manistee; Webber on the Grand River;

Allegan on the Kalamazoo River; and Mio, Alcona, Loud, Five Channels, Cooke and Foote on the AuSable.

About 28 employees work the seven western dams; about 18 work the Au Sable dams on the east side of the state.

Because they are so removed from the rest of the company, hydro employees say they feel a real sense of stewardship over the hydros.

"Being in a smaller headquarters, we take more of a personal ownership of the job," Everling says. "We almost feel like a separate company in ourselves."



Hydro operators keep close tabs on water levels.