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HOW LOCAL INGENUITY AND FEMA MONEY BUILT ‘A BETTER MOUSETRAP’

Disasters Fueled Better Construction and a Unique Fish Screen

Mother Nature can be awesome, and not always in a good way. Just ask the Farmers Irrigation District in Oregon’s Hood River County. Mother Nature has taken out their structures and, in 1996, led them to the brink of bankruptcy.

What saved them was a combination of FEMA mitigation money, keen observations of what works, and a commitment to “let fish be their guide.”

Located north of Mt. Hood—Oregon’s highest peak—and east of the City of Portland, the district draws water from the glacier-fed Hood River. They provide irrigation water to 5,600 acres of commercial orchards and electricity to more than 20,000 people.

Flooding on the Hood River is a fact of life for the district.

During the first week of November 2006, a “pineapple express” of warm, moist air dumped more than 13 inches of rain in the Hood River watershed—even at higher elevations of Mt. Hood. The result was a catastrophic failure of the Eliot Glacier.

Snowmelt, boulders, trees and debris came thundering down the Hood River. By the time it reached the Farmers intake structures, the water was 25 feet high and moving fast.

Like a gigantic grinder, the debris torrent completely took out Farmers intake flume, headgate, spillgate and everything else in its path. Even the hillside surrounding Farmers’ structures was washed away.

Every time the President declares a major disaster, the Federal Emergency Management Agency sets aside money for hazard mitigation. The money is used to help the state, local government and private nonprofit agencies such as the Farmers Irrigation District, to rebuild safer and stronger.

The process really works.

When FEMA asked the district about mitigation, the engineers started scratching their heads. “How do you mitigate against that kind of destruction?” asked Jerry Bryan, Farmers Irrigation District Manager at the time. “If we just rebuilt,” said Bryan, “we knew we’d be back in there again—especially given some of our recent flows.”

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Part of the answer came from a single section of the old structure that withstood the onslaught. This rebar-reinforced slab of concrete also was clad with ½ inch metal plating.

That lone section of concrete became the basis for rebuilding the new diversion canal. When the district rebuilt, it made the new walls two-feet thick and reinforced them with ¾-inch rebar. Half-inch thick steel “armor” is welded together and bolted to the canal’s outer concrete walls.

The job used 1,670 tons of concrete, 4 1/4 miles of rebar and 140 tons of steel. The district completed the work in the summer of 2007—just in time for the winter 2007 floods.

Did it work?

“Absolutely,” said Bryan.

The district’s new structures withstood not only the December 2007 floods, but those in 2008 and, most recently, the January 2012 ice and floods—all of which resulted in federal disaster declarations.

That’s mitigation success. But it’s not the end of the story.

Creating a Fish Screen that Really Works

Farmers Irrigation District learned even more from Mother Nature.

The Hood River is home to several endangered fish species, including salmon, steelhead and bull trout. As a small scale hydroelectric producer, Farmers Irrigation District is required to protect the river’s fish population at its water intakes.

For years, district engineers had been mulling over ways to improve the fish screening process. They knew that fish were being killed, stranded or injured on existing screens and intake structures. Maintenance costs were significant, including repairs, removing trash, and adjusting the equipment for changes in stream conditions.

Furthermore, storms repeatedly wiped out the district’s existing fish screens.

On a trip to Canada, Bryan spoke about the problem with a woman from the Haida tribe, one of Canada’s First Nations. “Why must you try to dominate Mother Nature?” she asked. “Why not get out of the way and see what Mother Nature can do on her own?”

Bryan took her words to heart.

After he got home, Bryan organized a roundtable forum that included district board members, an engineering contractor, farmers, ditch walkers, technical staff, fish and wildlife personnel, environmentalists, and concerned citizens.

The goal was to develop a screen that would be fish-friendly, self-cleaning, and require very little maintenance or manual adjustment. The fish would be their guides.

The group believed the answer lay in a new, and relatively untested, design for fish screens called a horizontal flat plate screen. With a horizontal screen, diverted water flows slowly to the bottom of the channel through an array of small holes.

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Fish and debris move harmlessly above the screen and then are channeled back to the river. As long as the proper water velocity is maintained, the water sweeps debris and sediment along so the screen does not become clogged or blocked.

The screen design automatically adjusts the water level without the use of power so a constant, fish-friendly flow is maintained over the screen. The diverted water is free of debris, minimizing potential damage to hydro power, pumping stations and other downstream control structures. The screen also works for a wide range of flows.

The district then patented their device. To honor the collaborative effort of farmers, agencies and nonprofits that supported the screen's success, they licensed the technology to the nonprofit Farmers Conservation Alliance (FCA) with the condition that profits be used for the united benefit of fish, farms and families.

The project was so successful it earned the American Council of Engineering Companies (ACEC) "Engineering Excellence" award for 2006. The Oregon Department of Fish and Wildlife and National Marine Fisheries Service praised the performance of the screening system.

The district also received the 2005 Water Resources Commission Water Management Award from the Oregon Water Resources Department, and a Certificate of Appreciation from the Oregon Trout organization.

Last year, Jer Camarata, who has been working with the district since 2003, stepped in as the new Farmers Irrigation District's General Manager.

"Every time I hear or read the story of our district, I feel humbled," said Camarata.

"I respect the power of water and the tenacity and perseverance of the farmers and water purveyors that come before me," he said.

"Because this is where we live, we have to keep adapting and finding different ways of coexisting with something truly greater than ourselves...that's my greatest challenge."

Camarata looks at history to help chart the district's future. He noted that since 1896 there have been 18 peak flows on the Hood River. Fifteen of those flows—83 percent—have taken place since 1964.

"Mitigating is becoming more urgent and critical," said Camarata.

With help from FEMA's Hazard Mitigation and Public Assistance grant programs, the Farmers Irrigation District will continue to invest in their future by rebuilding stronger, safer, and in harmony with Mother Nature.

To learn more about the screen or see the new diversion canal, visit the Farmers Irrigation District website at: www.fidhr.org. Check out the district's webcams that show the fish screen and diversion canal in real time. You can even manipulate the cameras to zoom in for a closer view.

To see diagrams and photos of the fish screen, go to: www.farmerscreen.org/HowItWorks.

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