KATHRYN HERZOG: In 1991, a pipeline near Grand Rapids broke, and within an hour, 1.7 million gallons of crude oil spilled into the prairie river, a tributary of the Mississippi. It was early March and snow was still on the ground, helping emergency response workers recover virtually all the oil. The event exposed a weakness in how cities respond to spills on the river. It also showed the vulnerability of drinking water supplies.

State and local governments responded by creating the River Defense Network. It's a coalition of local governments, emergency workers, and community groups working to prevent spills on the river while preparing for the day one happens. David Brunnstrom is the River Defense Network's project coordinator.

DAVID BRUNNSTROM: Spills do happen. And first of all, by raising awareness on the part of all of us permitting agencies, water users, communities in which these chemicals are transported and stored, that in and of itself diminishes the risk of a spill because we can start making plans.

KATHRYN HERZOG: There are more than 3,300 potential spill sites between the Mississippi River headwaters and St. Paul. Agricultural chemicals, oil tanks, pesticides and hazardous wastes are all stored on or near the river. The sites also include the hundreds of bridges and rail lines which cross the river and often serve as transport for hazardous materials. The River Defense Network began by listing all these sites in an immense database.

Spill responders can quickly find directions to the sites and emergency contacts. They'll also find details about hundreds of chemicals and how they'd react with the river. Emergency workers can also run computer simulations of spills to practice their response.

DAN WILCOX: I'll fire this up on the computer here.

KATHRYN HERZOG: Dan Wilcox is with the St. Paul District Army Corps of Engineers. He's simulating a 5,000 gallon gasoline spill near Clearwater, Minnesota. The concern is how long it takes for the gasoline to reach the Minneapolis water utility.

Wilcox enters the chemical spill simulation database and types in the word "gasoline".

DAN WILCOX: We have to enter information in about river flow. Or optionally, we can just say we'll use the average monthly flow rates. And then we have to enter in the month of the event, August. Day of the event, the 21. Hour of the event, 11:00. Minute of the event, first minute.

KATHRYN HERZOG: Wilcox then enters the river mile of the spill and the mile marker for the Minneapolis water utility. He also enters wind speed and air and water temperature, all information available at an instant via the internet.

DAN WILCOX: So the model ran and it came up with these results. First, the travel time information, which indicates that the surface current carrying gasoline would arrive in one day and 10 hours and 58 minutes from the time of the spill, you know, down to the Minneapolis water intake.

KATHRYN HERZOG: If the spill really happened, an emergency response team would use the data to make decisions about deploying people and equipment. Quick response time is vital after a spill. And somehow it seems unsettling to watch Wilcox slowly type away as gasoline supposedly floats down the river.

Wilcox agrees the program is detailed and requires a lot of number plugging. But he says the results should be impressive, saving ecologically sensitive areas of the river while telling water utilities when to shut down their intake.

DAN WILCOX: The time that it takes to do a chemical spill simulation or a travel time simulation is really pretty short. So rather than deploying people to the wrong place, if a spill response manager runs this program in less than five minutes, I can save people a lot of time and trouble and be much more effective in spill response activities.

KATHRYN HERZOG: Communities throughout the country and Europe have requested copies of the spill simulation program to apply to their own rivers. So far, the program has not been used in an actual spill. But when a spill does occur, Wilcox says communities with the program will be better prepared. Even if emergency responders get to the spill, it's estimated only 10% of the material can be recovered.

Many chemicals would dissolve instantly and become part of the river. Still, David Brunnstrom says locals have to be experts about the chances of a spill in their community.

DAVID BRUNNSTROM: So it's very important that the community-based focus of the River Defense Network is clear because communities, not only more than anyone, have the local knowledge of chemical use and chemical storage in their communities, but they're also in the best position to respond to a spill and protect the resource.

KATHRYN HERZOG: Emergency responders and communities along the river have welcomed the spill prevention program. Fire and police departments are receiving training on the fastest and most efficient ways to deal with an environmental disaster and how to protect the Mississippi.

Molly MacGregor is director of the Rivers Council of Minnesota in Walker. The council joined the River Defense Network to help increase citizen involvement. MacGregor says she's met many people who don't know where their water comes from or how their actions could affect water quality.

MOLLY MACGREGOR: You need to think about all the things that your city does to the river. And of course, many of those activities are regulated, but they're not necessarily coordinated. So the River Defense Network is trying to do that kind of coordination where people in industry are talking to people who are running the wastewater municipal treatment plant. And obviously, somebody's got to be kind of translating all of that and getting it out to the public.

KATHRYN HERZOG: MacGregor says improving water quality on the Mississippi requires every resident of river communities to take personal responsibility. And she says the best way to do that is by getting people out on the river. MacGregor and others at the River's Council have trained people to sample and monitor water quality along their stretch of the river. The idea has been a great success in Minneapolis and Walker, and training should begin soon in St. Cloud and Little Falls. The River Defense Network will request state funding to continue its community outreach and purchase spill response equipment for more communities along the Mississippi River.

In Collegeville, I'm Kathryn Herzog, Minnesota Public Radio.