

Journeys

*North Dakota's Trail
Towards Disaster Resistance*





This publication is a joint effort of the
Federal Emergency Management Agency and the North Dakota Division of Emergency Management
Public Affairs Offices
January 2001

This publication also is available on the FEMA website at
www.fema.gov/reg-viii

FEMA Region VIII Office of Public Affairs
Building 710, Denver Federal Center
Denver, CO 80225

Table of Contents

To go directly to a story,
click on the title or page number.

Preface	5
Acknowledgments	6
A River Ran Through It— Grand Forks’ Journey from Heartache to Hope	7
Home Away from Home... and the River... Brings Peace of Mind for Grand Forks Couple	11
Bridging the Gap between Disasters and Freedom	14
The Right Prescription... Moving Drayton’s Medical Clinic from Danger	17
Architect Bill Schoen Takes the High Ground on Disaster Prevention	20
Safer, Drier, Higher... Grand Forks County Office Building	24
Standing Up to Ol’ Man Winter... It’s All in How You Plant the Trees	25
Fargo Works to Build a Disaster-Resistant City	29
New Twist on an Old Tale... Historic Phoenix Building in Grand Forks Rises from the Flood	34
Waste Not, Want Not— Barnes County Makes the Most of Flood-Prone Properties	37
Hillsboro Cabin Won’t Log Any More Floods	41
Mind Your Business... North Dakota Entrepreneur Embraces Disaster-Resistance Measures ..	44
Downtown Corporate Center— A Vision and One Bold Step for Grand Forks	47

Continued on next page



Buyout Brings New Life to Barnes County House and Property	50
Living in Harmony with the Land— North Dakota Tribes Set an Example for Disaster-Resistant Land Management	57
An Ounce of Prevention	
Building Disaster-Resistant Communities in North Dakota	58
Building the Ground Up at Alerus Center in Grand Forks	65
Partners in Time Buy Healthy Future for Drayton	66
Fortifying Against Future Floods	
Grand Forks Water Treatment Plant Leads the Way	70
Reshaping the Course of a River’s History	74
Calming the Storm	
Prevention Measures Pay Big Dividends in West Fargo	78
Keeping Disasters in Check	
A Strong Defense for New Hockey Arena	81
Flood Teaches Mekinock Couple A Thing or Two about Prevention	84
Drayton Takes a Stand Against Future Floods	86
A Flood Won’t Stop these Presses	
<i>Grand Forks Herald</i> Builds Back Better	90
Backyard Defense Keeps the Red Away in Fargo	92
Flying High and Dry— Pembina Airport is Better Protected from Floods	96
Steaming Ahead with Disaster-Resistant Measures at the University of North Dakota	99
Historic Building Booms Again in Downtown Grand Forks	102
Celebrating the Past, the Present and the Future— The Grand Forks Town Square	104
Bowesmont . . . The Little Town that Lives in the Heart	107
<i>“My Bowesmont”</i>	113

Preface

Since 1993, North Dakota's weather has been defying imagination.

A greater-than-average number of blizzards, floods and severe storms has brought new meaning to the word "challenge" for the state and its citizens.

So how have North Dakotans fared through these disasters? And what lessons have they learned along the way about creating a safer place to live?

In 2000, the North Dakota Division of Emergency Management and the Federal Emergency Management Agency set out to find the answers to those very questions.

To do that, we journeyed to some of the communities hardest hit in recent years to see their recovery from disasters large and small. We conducted more than 200 interviews with citizens, local officials, business owners and community leaders to learn firsthand about how they've recovered and, more importantly, what they've learned from disaster.

Through their stories, we've found that a new North Dakota is emerging. Its citizens are turning tragedy into triumph. They are creating their own opportunities for change and growth. They're doing more than just repairing the damage. They are finding innovative ways to build safer, more livable communities.

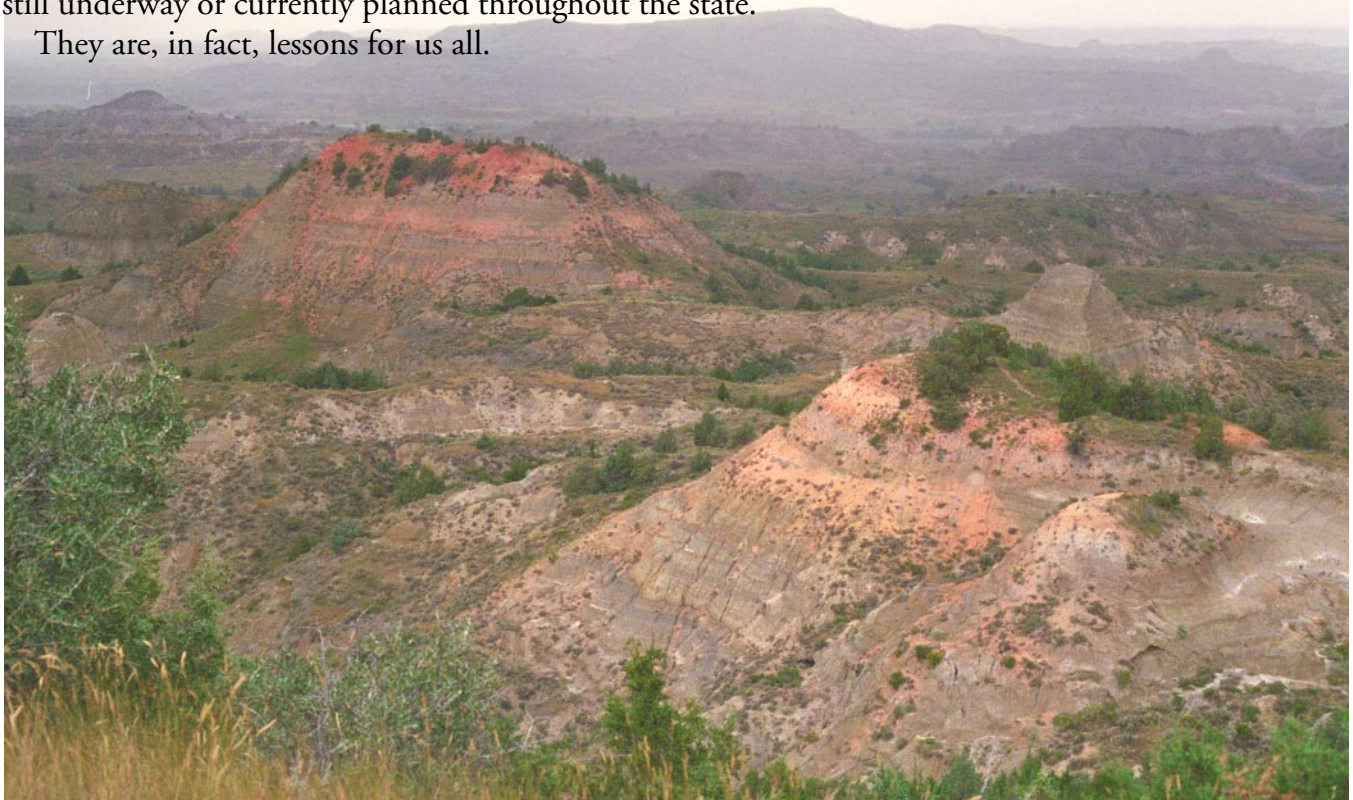
Some of the solutions haven't come easy. There has been both trial and error. But sheer tenacity has changed the occasional failure into both proven and potential success as North Dakotans have utilized new ways to solve old problems.

The lessons learned here are not just important to one state. They are important to every citizen, business and community throughout the country that has or will be impacted by a natural disaster.

History has shown us that no one is immune to disasters. North Dakota is showing us that taking steps before, during and after disaster strikes *can* make a difference for the future.

Here then are some of their stories. They represent a mere sampling of the efforts already taken, still underway or currently planned throughout the state.

They are, in fact, lessons for us all.



Acknowledgments

Our deepest appreciation to the following people who helped in countless ways to make this project a reality:

James Lee Witt, FEMA Director, 1993–2000
Rick Weiland, FEMA Regional Director, Region VIII, 1997–2000
Gov. Ed Schafer, 1992–2000
Maj. Gen. Keith D. Bjerke, North Dakota Adjutant General, 1993–2000
Doug Friez, director, North Dakota Division of Emergency Management
FEMA Region VIII staff
North Dakota Division of Emergency Management staff
Sen. Byron Dorgan Sen. Kent Conrad Rep. Earl Pomeroy
City of Drayton City of Fargo City of Grand Forks
City of Pembina City of Valley City Friends of Bowesmont
Adams County Barnes County Cass County
Grand Forks County Pembina County Traill County
Walsh County Red River Regional Council North Dakota Forest Service
North Dakota Department of Transportation
Natural Resources Conservation Service, Adams County and Grand Forks County offices

And, most of all, to the people of North Dakota...

Thank you for giving us the opportunity of a lifetime... to share your courage in the face of disaster, your vision in the face of recovery and the lessons learned in your journey towards disaster resistance.



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Farmstead in north central North Dakota, Devils Lake area. Photo by Barb Sturner.

Table of Contents Photo

Canola field in eastern North Dakota. Photo by Barb Sturner.

Preface Photo

Theodore Roosevelt National Park, western North Dakota near Medora. Photo by Barb Sturner.

Acknowledgments Photo

Prairie Rose, North Dakota state flower. Photo by Barb Sturner.

A River Ran Through It —



Few neighborhoods in Grand Forks, North Dakota, were spared during the “Flood of the Century” in April 1997. FEMA photo by Andrea Booher.

In April 1997, the world watched as the city of Grand Forks, North Dakota, became a natural disaster war zone.

Extensive efforts to keep the raging Red River of the North at bay had failed. The city’s 52,000 residents were awakened in the middle of the night and told to leave. Water was rushing from one neighborhood to another. In the midst of it all, a fire broke out in the downtown business district, hopping from building to building while firefighters braved rising water trying to get the flames under control.

When the fury ended, 11 buildings downtown had burned and about 90 percent of the city had seriously flooded. An estimated 8,600 homes—75 percent of the total number of single-family units—were affected by the flood, city figures show. More than 1,600 of the estimated 15,000 apartments were impacted. And in the downtown, all of the 315 businesses were affected.

Stunned residents returned to the daunting task of rebuilding their lives. Some thought it hopeless and moved away, leaving their wrecked houses behind.

But it was not hopeless. Instead, a new Grand Forks continues to emerge. Faith, hard work and vision have prevailed. Lessons have been learned. And the city, once termed an “island in a prairie sea,” is poised to show the world that it is back better than ever.

“We’ve come a long way in our recovery,” said Pat Owens who, as mayor, guided the city both through the tragedy and the first three years of recovery. “A key factor was that we formed partner-

ships among our citizens, community leaders, businesses and city, state and federal staff. It was not only important to rebuild our city, but it was important to do it in such a way that we wouldn't be so devastated from another disaster. When your city is on a river, the risk is always there."

Building Back Better

City leaders set the tone for rebuilding almost immediately after the water receded. Under enormous pressure to make exceptions to local floodplain ordinances, city officials instead held firm and enforced local regulations that required building back with special measures to reduce future losses.

"We have a federal government in place," said Owens, "but they cannot come to our aid again and again and again if we do not take care of ourselves. We need to take control of and manage our own lives."

Since the recovery began, a new disaster-resistance philosophy has taken hold.

- ◆ Most significantly, 599 residential and 40 business properties in the floodplain were voluntarily sold to the city through a mitigation buyout program. The program removes vulnerable structures from significant flood-risk areas to prevent future damages. Of the 639 properties, about 350 residences and about a third of the businesses were adjacent to a city dike that lines the river. Because of the buyout, home and business owners have moved out of harm's way to safer areas, the flood-ravaged buildings have been demolished and the resulting green space will remain open and undeveloped forever.

Funding for the buyout came from a variety of sources. Through the Hazard Mitigation Grant Program, the Federal Emergency Management Agency provided about \$12.5 million and the State of North Dakota paid about \$1.7 million. The rest of the buyouts were funded with city monies and Community Development Block Grants from the U.S. Department of Housing and Urban Development.

- ◆ To restore flood protection for the city, an existing dike has been repaired and an interim secondary dike has been built to the level of the 1997 flood. A larger, permanent certified dike, begun in June 2000, will be built by the U.S. Army Corps of Engineers for about \$350 million. It is scheduled to be completed by 2006.
- ◆ Amid the charred ruins of the business district, a new corporate center has been built as a commercial anchor, replacing most of the burned office space. The center, comprised of two multi-story buildings, has been floodproofed and utilities have been located both on upper floors and the roof. There is no basement.



If the Red River (right) tops this dike again, all that will flood is open space instead of neighborhoods.

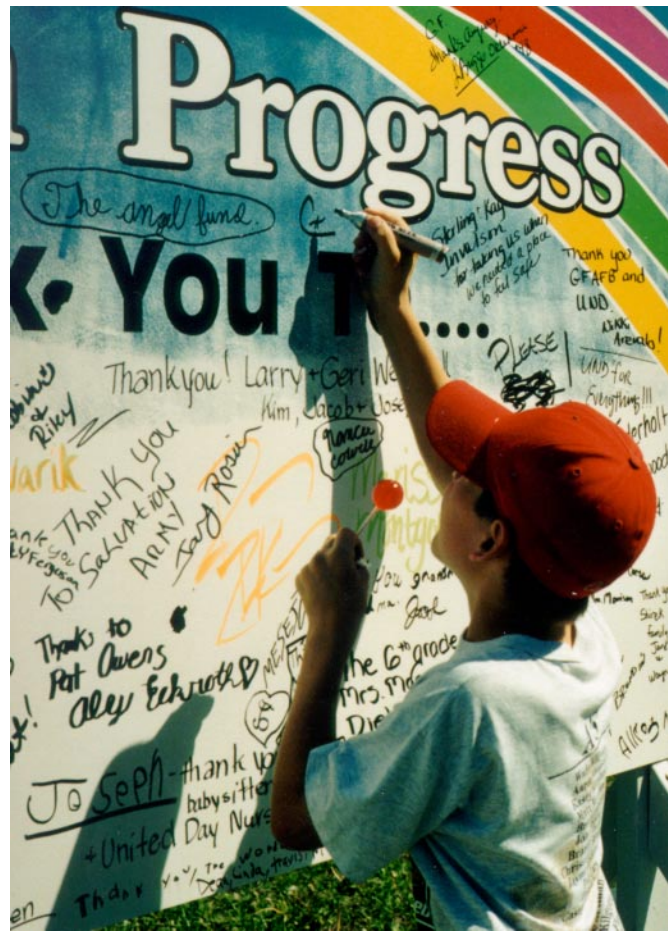
- ◆ Elsewhere in downtown, several blocks of buildings—some of which are historic—have been renovated or restored and new streetlights and brick sidewalks have been installed. A flood memorial park now occupies half a block where burned and flood-ravaged buildings once stood, and a new town square provides a community gathering place. As of December 2000, businesses, government offices and some non-profit organizations occupied about 90 percent of the downtown area. About 75 percent of the businesses that were downtown at the time of the flood and fire have returned to the area in newly redone spaces. The remaining businesses either relocated in other parts of Grand Forks or closed.

- ◆ A new five-story county office building has been built in the downtown area, replacing the old building that was severely flooded. The new site is elevated 4 feet and the utilities have been located on the top floor to keep them high and dry from another flood.

- ◆ The city's water treatment plant has been rebuilt with a number of special features designed to keep it operational not only through floods, but blizzards and severe storms as well. During and after the 1997 flood, the city was without drinkable water for 23 days because the plant's critical electrical and mechanical systems were inundated. Now, the plant's electrical transformers and panels have been elevated above the 1997 record-flood level. Crucial air compressors and important records have been relocated to upper floors. Metal shields have been custom built to fit over the outside of main doors and windows to keep out water. The shields will be attached when the danger of a flood exists.

These measures, coupled with an extensive written flood emergency operations plan, will ensure that the treatment plant can function in a future disaster, even if the buildings are totally surrounded again by water. And finally, no new building will occur at the present site on the banks of the Red River. Forty acres of land were purchased west of town to site a new water treatment facility that will be built when new capacities or technological advances beyond the current plant's capability become required.

- ◆ A new elementary school, which replaces two long-time schools that were substantially damaged by floodwaters, now sits above the base flood elevation. The site was raised 1 foot before the school, named Phoenix Elementary, was built.



One year after the flood, Grand Forks hosts a community celebration to show its “Miracle in Progress” and to thank those who helped in the city’s time of need.

-
- ◆ Businesses are taking disaster-resistive measures as well. One local businessman, who relocated his business and built an adjoining shopping center, spent \$25,000 on fill dirt alone to raise the base of the entire shopping center 5 feet above ground level.
 - ◆ City leaders had a portion of Grand Forks' new 447,000-square-foot events center redesigned to eliminate a potential flood problem, even though the site is miles from the river and outside of the floodplain. The city was in the contract document stage for the facility when the flood occurred. Now the main event space, originally intended to be recessed 14 feet into the ground, has been elevated to ground level to reduce the impact of any possible flooding. The site could be used for a disaster staging area in the future.

Owens says she is proud of the resilience and courage of the city's residents. Recovery from this level of devastation takes time. But so many things are better now, she says, and the extra attention paid to building back in ways that will reduce or prevent future flood damage will pay off.

"We've had floods before but never like we had in '97," Owens said. "Rebuilding with disaster-resistance measures is the best advice we've ever been given and I have the greatest trust that they will work. They've worked in other communities. We feel now that the many measures we've put in place will work here too and that we can manage better if there is another flood."

Home Away from Home... and the River... brings Peace of Mind

Cliff and Eleanora Arntz no longer worry about losing their home to another flood.

They've moved far away now from the river that took the house in Grand Forks, North Dakota, where they had lived for 43 years and raised their six children.

In some respects, the move was hard, they say. They lived in an older, quiet, tree-lined area known as Lincoln Park. They had good neighbors. Cliff was especially proud of his evergreen trees. Eleanora's favorites were the apricot and walnut trees. And, after all, it was their house.

But in 1997, the Red River of the North took the house and the neighborhood they'd loved away from them. The river, a mere block or two away and behind an earthen dike, had gotten into the neighborhood three or four times over the years. Even so, water had never entered the Arntz' story-and-a-half house. Not even in the basement, Eleanora says firmly. When the river crested at 54.3 feet, water was up to the middle of the attic windows.



Cliff and Eleanora Arntz feel safer now in their new home away from the river.



The Arntz's home for 43 years succumbs to floodwaters in April 1997. Cliff Arntz says when he saw this scene, he knew they'd never be able to go back home. Photo courtesy of Cliff and Eleanora Arntz.

Because of that single flood event, Cliff and Eleanora, both 79, say they wouldn't live there again even if they could have saved their home.

"To go back down there now, I'd be more afraid," says Cliff. "Here, I have no qualms about a flood anymore. We are far enough away that we never should be bothered again."

The Arntzes were the first Grand Forks residents to accept a voluntary buyout of their flood-damaged property. The buyout of their entire neighborhood was funded with about \$12.5 million provided by the Federal Emergency Management Agency and about \$1.7 million from the State of North Dakota. The buyouts are part of a hazard mitigation grant program that provides federal and state money to projects that will reduce or prevent future disaster damages and eliminate the need for disaster-recovery funding.



Demolition was the best option for the Arntz's flood-ravaged home. The couple was the first to voluntarily sell their home to the city. Under the terms of the buyout, the land will forever remain as open space. Photo courtesy of Cliff and Eleanora Arntz.

New house, new home

Seven months after the flood, Cliff and Eleanora moved into a new house, in a new neighborhood that the city built to help relocate residents displaced from Lincoln Park and other flooded areas. It wasn't a hard choice to make, they say.

"The first time we saw the [old] house was a week after the crest," Cliff remembers. "The biggest share of it was still filled with water. The garage was still almost submerged. We knew we would never go back down there."

After the water subsided, they found that the house had shifted slightly off the foundation. Inside, there was about a foot of soggy insulation from ceilings that had collapsed. Every possession they hadn't gotten out at the time of the evacuation was water-soaked or caked with sludge.

The couple feels fortunate to have been able to choose a buyout. They wanted to stay in Grand Forks. For both of them, long-since retired, the thought of starting over with a mortgage and living on Social Security was daunting. But with their buyout proceeds, their savings, money from fundraisers by family and friends, donations and gifts, they were able to buy their new \$110,000 house free and clear.

In all, about 350 flood-ravaged properties in their old neighborhood were voluntarily sold to the city. Another 249 properties, farther from the river but still in the floodplain, were bought out, too. The structures have since been demolished, leaving green space behind. According to the terms of the buyout, the land must remain open and undeveloped forever.

The old neighborhood is still quiet. Cliff still likes to visit his trees. But he also likes to go back at night to a home where he knows he is safe. For the two of them, life is still good.

Bridging the Gap

Between Disasters and Freedom

It was the disaster that wasn't.

In June 2000, heavy rains in eastern North Dakota swelled small streams and rivers well beyond their banks. That pushed the Red River of the North beyond flood stage—again.

But this time, those who live and work in Traill County, North Dakota, and Norman County, Minnesota—accustomed to warily watching the river's ups and downs—felt a new sense of freedom.

For the first time in decades, river flooding didn't bring life as they knew it to a grinding halt. Gone were the days of isolation wrought by the Red River when it spilled out of its banks and over access roads to the only bridge for 75 miles that provided a direct link to Interstate 29.

That's because a new, higher and longer bridge, completed just 10 months earlier, worked the way it was supposed to. It remained dry and open.



Large, open support piers provide plenty of room for the Red River to spread out onto lowlands, reducing the threat to nearby public roads.



New bridge now provides a safe crossing over the Red River. Photo courtesy of Randy Aarestad, Halstad, Minnesota.

“I feel pretty good when I see how well the new bridge did during the June flooding,” said Kevin Gorder, an engineer with the North Dakota Department of Transportation (NDDOT) who managed the bridge project. “Before this, it was like an island. People on both sides couldn't go anywhere. This year, they weren't disconnected from the world again.”

The \$6.3 million bridge, which links the two states via ND Highway 200, replaces a lower, smaller bridge built in 1933 that was prone to flooding when the river got too high. More often, it was the access roads to that bridge—lower on the Minnesota side—that would be submerged.

And that created a big problem for residents and farmers from both states who depend heavily on the bridge for access to their homes,

jobs, schools and businesses. Even though there are small county roads that also link the states, Highway 200 is the main crossing within the 75-mile stretch between Fargo and Grand Forks along North Dakota's eastern border.

According to Glen Brookshire, mayor of nearby Halstad, Minnesota, population 625, the access roads would become impassable “any time there was a heavy rain” because the river often overflowed

its banks during those events. And at least four times—in 1966, 1975, 1989 and 1997—river levels got so high that the driving surface of the bridge itself was under anywhere from 2 to 8 feet of water.

Ironically, recurrent flooding wasn't the biggest problem with the old bridge, a steel-truss version. It was safety.

For years, farmers hauling beets to a sugar processing plant in nearby Hillsboro, N.D., and other motorists took their chances that they wouldn't meet head-on while crossing the old bridge. Approaching sight distances reportedly were not adequate and the bridge was so narrow that a modern-day tractor had only 3 feet to spare when crossing—leaving no room for another vehicle to be there at the same time. Miraculously, there were no serious accidents—just four moderate property-damage incidents from 1995–1999, according to North Dakota state transportation records.

So Halstad residents formed a committee, gathered petition signatures and lobbied anybody and everybody for help. It was a lengthy process. In the meantime, the bridge's sufficiency rating, determined by the North Dakota DOT during biennial inspections, was dropping to the point that it would soon require replacement—mainly because of the safety issue. The bridge no longer met current standards.



New bridge (top) is 11 feet higher and three times longer than the old bridge (bottom), which has since been demolished. (Right side of photo is North Dakota.) Photo courtesy of Randy Aarestad, Halstad, Minnesota.

So it was decided. There would be a new bridge. Federal Highway Administration funds were made available to pay 80 percent of the project. The two state departments of transportation shared the remaining 20 percent of the cost.

Because the new bridge would cross a river, federal requirements mandated that flooding issues be considered in the new design. Those who used the bridge on a daily basis wanted the flooding problems solved too.

As a result, Gorder said, the new bridge is 11 feet higher than its predecessor. The span now is 1,500 feet—more than three times longer than the old bridge—to allow more room below for the river to spread out onto undeveloped land. The bridge approach roads on each side are elevated. Now, both the approach roads and the bridge are above the 100-year-flood level, Gorder said.

The safety problem was addressed as well. The new bridge is 40 feet wide, compared with the 22-foot width of the old bridge, and has low, concrete sides so that farm machinery can hang out over the edge if needed.

Although the old bridge, demolished in the fall of 1999, wasn't around for comparison during the June 2000 flooding, Gorder estimated the water in that event was high enough to have run over the top of the old approach road on the Minnesota side.

With the new bridge, however, Gorder said that the longer span, with three main columns and 12 support piers, provided plenty of room for the water to spread out and to minimize logjams—a common problem with the old bridge that forced the river level to rise. The result? No water came close to the roads or the driving surface of the bridge. Brookshire agreed.

“If the old bridge had still been around when we got this water in June,” said Brookshire, “we would have had logjams going on. That’s been a problem for us in the past. With the old bridge it would jam up real good and raise the water levels.

“This year, I went down there quite a bit just to see how the new bridge would react,” he added. “My main concern was how much water flow was held back and I was real surprised that I didn’t see any. I was really impressed.”

Brookshire thinks it will take a much bigger flood to provide the ultimate test for the new bridge. But considering the evidence he’s seen so far, he believes the new bridge will likely pass that test.

“I know for a fact that in the 1997 flood (the area’s highest modern-day flood on record), if the new bridge had been in place, the water would have only come to the bottom of the bridge,” Brookshire said. “It would not have gone over the bridge or the roads.”

In the meantime, the new bridge will help to keep Halstad economically viable, Brookshire added, because traffic through town—and business in town—now won’t be interrupted.

“On the whole, that bridge has been just a fantastic thing,” he added. “I’m very pleased.”

The Right Prescription...

Moving Medical Clinic from Danger

Nurse Practitioner Marie Anderson checks the flood level at Drayton's medical clinic in 1997 and wonders if the town's only medical office will ever reopen. Photo courtesy of City of Drayton.



North Dakota's historic 1997 Red River Valley flood nearly spelled death for one small-town medical clinic.

Inside the building, water reached 6 inches high. A thick layer of mud covered the floor. Mold was beginning to grow. Even after scrubbing and disinfecting the building, medical staff thought the health risk for patients with certain illnesses was too high to treat them inside the structure. So instead, the staff treated these at-risk patients in their cars.

But that was only half the problem for Drayton, population 900, a town that faces an almost yearly flood threat. The clinic building, which also housed a local dentist, was at risk to flood again and again—even though it sits about 35 feet above the normal river level. In fact, the river did get into the clinic's crawl space again in the spring of 1999—the 10th recorded flood since 1980 alone.

Also, the riverbank—which had become increasingly unstable because of poor soil conditions—had eroded dangerously close to the back of the building. As a result, there wasn't enough room or stability behind the structure to build an emergency dike that would protect the clinic from a rising river. Even the weight of the one-story building was putting enough stress on the riverbank that some predicted the ground eventually would collapse, sending the clinic tumbling to the river.

In short, it became paramount to do something. The town's small hospital had closed in 1975, making it imperative that the clinic—which had been treating the sick and injured for nearly 50 years—remain operational and safe.

So local officials rolled up their sleeves and went to work to find a solution. They needed a new building, they needed money to pay for it, and above all, they needed to make sure the clinic was

better protected from the next flood. Through a creative public-private partnership, they got it all.

Local officials quickly realized that the city couldn't afford to build a new structure. But with the help of a regional planning council and a local economic development corporation, a financial package was put together to purchase and remodel an existing building on the edge of town. The package included donations from several local organizations, part of a flood-recovery grant to the county from the U.S. Department of Housing and Urban Development, an additional grant from the U.S. Economic Development Administration and flood insurance proceeds from a National Flood Insurance Program policy.



Anderson is all smiles now that the clinic has moved to larger, safer quarters away from the river. The move was possible because of a local, state and federal public-private partnership aimed at keeping medical services in the community.

The project has been a huge success and the clinic's new prognosis is for a long and healthy existence.

Since July 1999, the clinic has been operating from larger, newly remodeled quarters about half a mile from where it once overlooked the river from the city's Main Street. Now, there is no underground space that can fill with groundwater seepage or river water. In fact, before the building was constructed in 1990, the entire property had been raised 1 foot to comply with the city's floodplain ordinance regulating construction in a special flood hazard area.

Roadways border three sides of the property, and because they sit much higher than ground level, the streets can act as dikes to keep flooding at bay. To protect the fourth side, the city could build an emergency dike as needed. The emergency dike only would be necessary if water got past a main, temporary dike the city has to build on Main Street each time the river gets too high.

And finally, to provide financial protection, the city has purchased flood insurance for the building just in case structural protective measures don't work and flood damage does occur.

Because of these disaster-resistant measures, the chances of the facility being damaged again are significantly reduced if not eliminated, according to local officials and clinic staff. And that improves the likelihood that the clinic can remain open for patient care, even if flooding threatens other areas of the city.

"The clinic is in a much better position now," said Carol Gardner, Drayton city auditor. "It's not perfect because Drayton is along a river. But we couldn't protect it where it was before. It was hanging on the edge of the riverbank. Now it's very protectable."

Clinic nurse Shirley Jensen agrees.

“This area here would be easy for them to protect if they had to,” said Jensen, who has worked at the clinic for 20 years and been through more than one flood at the old building. “This facility is so much better than what we had.”

Marie Anderson, a certified family nurse practitioner who runs the clinic day-to-day, says the new space also has many other benefits for staff and for patients—many of whom come from as far away as 40 miles.

Now, there are four exam rooms instead of two. Lab and office space has been expanded. There is a separate room just for instrument sterilization. There’s an actual nursing station. And there is a handicapped-accessible bathroom—a big plus for wheelchair patients who, before, could only get into the bathroom with assistance because the doorway was too narrow for a wheelchair.

“Coming here is like a whole new world,” said Anderson, who vividly remembers watching the old building flood in 1997 and thinking that the clinic’s future was bleak. “I never dreamed we would have this much space.”

Gardner also lauds the success of the clinic relocation, which has kept a vital service in the community.

“Losing the clinic would have been bad,” said Gardner. “As with any small town, a lot of our people are getting up in years. It would have been a very negative impact if people had had to go out of town for medical care.”

Don't Ask This Guy to Design an Unsafe Building...

Architect Bill Schoen Takes the High Ground on Disaster Prevention



In 1997, the city of Grand Forks, North Dakota, was inundated by floodwaters from the Red River of the North. For local architect Bill Schoen, himself a disaster victim, the damage wrought by the river's power and fury has permanently changed his personal and professional outlook.

Schoen, 47, has been designing buildings for 18 years and is president of the North Dakota State Board of Architecture. His mark is all over this town – from the University of North Dakota campus to the downtown to the city's new events center, scheduled to be completed in spring 2001.

Now, Schoen is setting out to prevent damage before disaster strikes. He is incorporating disaster damage-prevention measures in every building he designs. Building by building, Bill Schoen is changing the face of Grand Forks. In a recent interview, Schoen talks about his new design philosophy and the lessons he learned from Grand Forks' Flood of the Century.

FEMA: What impact did the Flood of 1997 have on you?

Schoen: It's unforgettable. I'll remember it for my entire life. It was disastrous... all the bad adjectives you can think of. But it was also a time where neighbors worked with neighbors and friends, everyone helped each other. I saw people's stuff, virtually their lives, out on their front berms. In my home and in every building we own (four commercial properties), the basements were full of water. I'll be making my last SBA disaster loan payment when I'm 75 years old.

FEMA: How has your experience with that flood changed the way you work as an architect?

Schoen: I look at the river differently. I have greater respect for the river. It certainly affects the way

we design buildings. Any client we design a building for in Grand Forks from here on is going to have to talk pretty convincingly in order for us to even consider putting in a basement. If I had to do it all over again I would fill in every basement in every building I own. Floodplain or not, I wouldn't put expensive mechanical and electrical systems in the basement.

FEMA: Has the flood impacted the way you design other buildings?

Schoen: Yes. It is certainly a question you'd ask the client. I would want to know what kind of flooding potential exists where the building might be. The other thing we'll be looking at now, just in terms of disaster prevention, is incorporating reinforced rooms or safe areas in our designs so that people have some protection from tornadoes. We're at risk for those, too, in North Dakota.

FEMA: Let's talk about some of the buildings you've designed in Grand Forks since the flood. What changes have you put in place because of your experience?

Schoen: The first project we received within a month of the flood itself was the new building for the *Grand Forks Herald* newspaper. As you know, the bulk of their building was either burned to the ground or flooded to the point that it was unusable. But their core building, their original historic building shell, survived the fire. That shell was already above the base flood elevation but we added extra protection by locating their mechanical systems at the top of the building. One major challenge was providing handicapped accessibility because the building took up virtually the whole lot. But we worked with the city and ended up sloping the public sidewalk in front of the building to make it accessible. It was a good joint solution.

"I look at the river differently. I have greater respect for the river. It certainly affects the way we design buildings."

We designed the new Grand Forks County Office Building, which is now across the street from the old county building and elevated 4 feet. The elevation, which isn't really even noticeable, puts it higher than the 1997 flood mark. That was important to the county. The old county building was seriously damaged and is located below the base flood elevation. Also in the new building, all the mechanical and electrical systems are on the top level so they are basically out of the way forever.

The First National Bank building downtown was amid some of the buildings that burned. The outside of it was scarred from the fire-retardant chemicals. Because it's historic, we couldn't elevate the building but we did relocate the mechanical systems to the top level of the building and virtually abandoned the basement.

FEMA: You mentioned that you recently began a renovation project of your own downtown. Can you tell us more about that?

Schoen: In December 1999, my business partner and I purchased from the city, three historic buildings and an empty lot that sits between the first and second buildings, because we wanted to make an investment downtown.

We went through a very extensive coordination process with city hall to come up with a plan that would minimize the risk to these properties in the future. One thing we're doing is filling in the basements of two of the buildings to eliminate that flood potential. We're about a foot-and-a-half below the base flood elevation and the last thing I want is a basement full of water. So we're going to get rid of the basements altogether, fill them in with clay, rip out the wood floor structure, and pour a concrete slab. In the third building, which is poured-in-place concrete and very

solid, we'll still have a basement but we're not putting a single thing in it... no elevator and no mechanicals... just the basic sprinkler system and basic lighting system. It'll be available for incidental storage and as a storm shelter.

On the empty lot, we're building a parking garage that will have a small commercial area in the front. When we're done with the project, we'll have four buildings, all with historic fronts. There will be some commercial space on the first floors, apartment units on the upper floors and about 10,000 square feet of parking throughout the garage and the back 70 feet of two of the buildings. In the commercial spaces, we are not putting any furnaces or mechanical equipment on grade. Everything's going to be hung from the ceiling so everything will be at least 12 feet up—all our circuit panels, everything, will be elevated to the point where we will definitely be above the '97 flood levels and hopefully never exposed to that kind of disaster again.

“Any client we design a building for in Grand Forks from here on is going to have to talk pretty convincingly in order for us to even consider putting in a basement.”

FEMA: Did going through the flood influence those design decisions?

Schoen: Yes. Originally the common thought pattern in this area was that basements are relatively inexpensive and great places to stuff boilers, air handlers, all those systems nobody wants to see. Well, you won't see us doing that anymore. Basically, in all our buildings

nowadays, the mechanical and electrical systems will be at the top of the building. It costs a little more, but nobody wants to take a flood risk. Basements are obviously very cheap space, so for many years you didn't really question putting furnaces and water heaters down there. But we sure question it now. We sure wouldn't do it now.

FEMA: Based on your experiences with the Grand Forks flood, what advice would you give to people in other parts of the country?

Schoen: First of all, don't build in the floodplain. Number two, protect your investment by elevating all the mechanical and electrical systems. Also, coordinate closely with city officials. Explore options together and try to figure out the right thing to do. This is the first time we all went through this sort of thing and we're all learning together. Over time, I think we've all learned lessons in terms of reducing the risk and reducing the exposure.

“Over time, I think we've all learned lessons in terms of reducing the risk and reducing the exposure from a flood.”

FEMA: Would you encourage people to look at their own situation before disaster strikes?

Schoen: Absolutely. We didn't really consider flood-prevention measures beforehand. This experience certainly opened my eyes in terms of what the river can do, my gosh. Now, I've even made changes in my own home. I co-located my furnace and water heater on a slab that's on top of the original slab. The new slab elevated the furnace 3½ inches. Even this can make a big difference, especially if you have a proper sump pump or drain tile system. That elevation didn't cost much... one hundred dollars maybe. I also rewired my furnace and put a connection in my garage for an emergency generator so that I'm able to run my furnace and my sump pump, even if the main power goes out. Electrically, all I have to do is plug in an extension cord and start up the generator to keep my house and family warm.

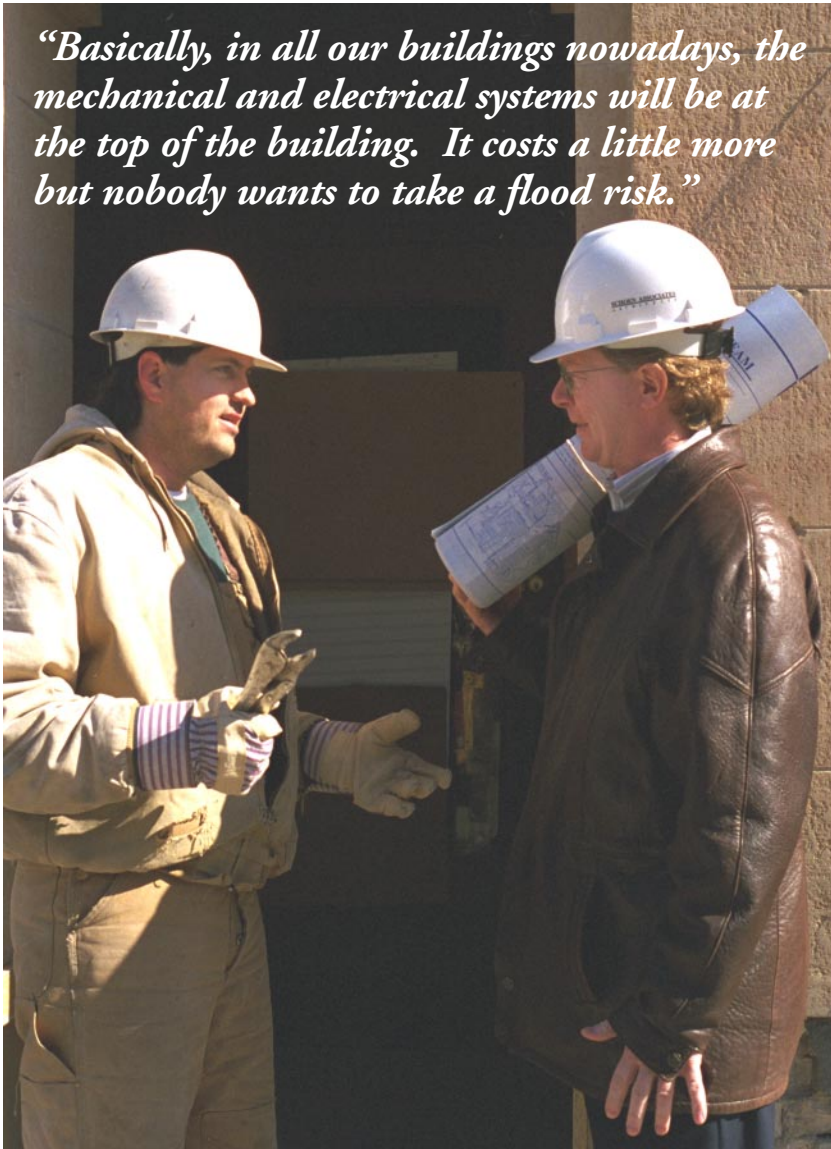
FEMA: What about buildings that are *not* in a floodplain? Do you still recommend taking measures in that case?

Schoen: Yes. We did that with the Alerus, the city's new events center. At the time of the flood, we were in the contract document stage with the city for this facility, which is a 447,000-square-foot building. The city took a good hard look at

the design of the Alerus and decided there shouldn't be any below-grade space in the building. Originally, we had an enormous event space in the middle of the building that was recessed 14 feet into the ground. Because of the flood, the city turned around and drastically changed the design of the building so that all this space is now above grade. I think the building ended up being better. I

“We didn't really consider flood-prevention measures beforehand. This experience certainly opened my eyes in terms of what the river can do...”

“Basically, in all our buildings nowadays, the mechanical and electrical systems will be at the top of the building. It costs a little more but nobody wants to take a flood risk.”



am really proud of the decision the city made. It's a proactive decision. It's a decision that hopefully will take that building out of harm's way for good.

Safer, Drier, Higher...

Grand Forks County Office Building

Record flooding in Grand Forks, North Dakota, in 1997 devastated the city's downtown retail and business district. Among the casualties was the Grand Forks County Office Building, which sustained about \$2.4 million in damage. Two nearby buildings, also housing county agencies, received damage as well.

County officials considered several options before choosing to construct a new building across from the county courthouse and jail. The move now brings county staff and agencies to one general area and contributes to the redevelopment of the city's downtown. State and county social service agencies have co-located in the building as well.



Grand Forks County Office Building that flooded in 1997.



New county office building, completed in January 2000, is better protected from future flooding.

Construction began in June 1998 and was completed in January 2000. Because the new building is in a floodplain, local ordinances required it to be floodproofed. So the building site was elevated 4 feet prior to construction, putting the bottom floor about 13 inches above the 1997 flood level. There is no basement. To ensure that critical components remain dry if another flood occurs, a special "penthouse" level was added across the top to house the building's mechanical and electrical systems. Additionally, the county's computer system now is on the third floor.

"We wanted to build a building that isn't going to be taken out like we had in 1997," said Ed Nierode, county director of administration. "Taxpayer money was spent to build this building and we made every effort to use that money as efficiently as possible.

Part of that efficiency is to prevent this from happening again."

From the street level, the elevation is barely visible. Mulch and landscaping between the ground-level sidewalk and sloping handicapped access ramps leading to the building's main floor provide the only outward indication of the elevation difference.

Cost of the project was about \$18.5 million, Nierode said. So far, the Federal Emergency Management Agency has paid about \$4.3 million and the State of North Dakota has paid about \$475,000—both as part of disaster recovery assistance provided to repair or replace damaged infrastructure. Another \$5.6 million in state and federal flood recovery money was provided through the U.S. Department of Housing and Urban Development. The remaining \$8 million was funded by the state and the county through bonds that were sold to finance the project.



Mulch and landscaping disguise the difference in elevation between the ground level and the building's main floor.

Standing up to Ol' Man Winter... It's All in How You Plant the Trees

When it's winter in North Dakota, there's one thing you can almost always expect—snow.

In and of itself, snow isn't really a bad thing. But combine it with even a moderate wind and look out. The result is blowing and drifting snow that can snap visibility in an instant and clog or even close roads and highways.

There is, however, a remedy for this common winter problem that's catching on in North Dakota. It's trees. Rows and rows of trees.

Formally, they're called "living snow fences." Technically, they're a windbreak of trees and shrubs strategically planted in certain areas to slow down, catch or channel snow.

It's hard to imagine that a bunch of trees and bushes can really make a difference in a blowing, howling snowstorm. But they've been proven effective in improving visibility and reducing the amount of snow that's deposited on roadways, near bridges, at airports or just about any other critical location.

Here's how they work. A combination of trees and shrubs are planted in rows—usually five deep—to create varying layers in density and height. Generally, shrubs are used for the two outside rows, short trees for the two interior rows, and large trees for the center row. The combination creates a camel-hump or mound shape that provides protection from top to bottom.

As snow blows across the trees and shrubs, they act as a filter—catching and dropping the majority of the snow in place before it gets to a road. Not all snow fences are created equal—they vary in size, species and direction of planting depending on what they are designed to protect. Generally, to protect transportation routes, they must be at least 200 feet from the side of the road to be effective.



In 1996–97, a brutal winter of record snowfall and high winds that caused severe blowing and drifting provided the impetus for a statewide effort to plant living snow fences.

When compared with a slatted or picket fence, living snow fences can capture up to 12 times more snow and are up to 90 percent cheaper to install and maintain. Once established, living snow fences need little care and can last for decades.

North Dakota started its living snow fence initiative in 1997 after one of the state's harshest winters on record. It was a season of extreme cold, high winds, and record snowfall that, at times, made travel impossible because of excessive blowing and drifting snow.

State and local road crews, private contractors and the North Dakota National Guard worked 14-hour days for weeks on end to clear roads and highways that sometimes blew shut again within hours of being plowed.

That winter was not only dangerous, it was costly. Seven people lost their lives as a direct result of the blizzards. About \$7 million was spent for plowing, road clearing and snow removal. More than 100,000 head of cattle died. The agriculture industry reported about \$200 million in losses.

The severity of the situation prompted a search for solutions. In March 1997, representatives from a number of state and federal agencies came together to determine what could be done to avoid such a serious impact in the future.



Not all living snow fences are created equal. According to Tom Claeys, North Dakota Forest Service, this snow fence (right) combines rows of trees with a structural fence. The fence is along I-94 just east of Bismarck.

A multi-agency task force, coordinated by the North Dakota Forest Service, quickly formed and a game plan was set. The goal—plant trees and shrubs in documented problem areas to protect 100 miles of North Dakota roads by 2001.

Task force projections in January 2001 show that when the spring planting season begins, the initiative will have blown past its original goal. By spring, trees and shrubs protecting 104 miles already will be in the ground. The plantings will benefit parts of township, county, state and Bureau of Indian Affairs roads as well as the two federal interstates that cross North Dakota.

So far, in three years, 222 living snow fence projects have been planted in 32 of the state's 53 counties at a cost of about \$936,000, said Tom Claeys of the state forest service. Of that amount, nearly \$400,000 has come from the Hazard Mitigation Grant Program, about \$112,000 has come from the state department

of transportation and the balance has come from other state transportation and U.S. Department of Agriculture grant programs.

The Hazard Mitigation Grant Program, funded in large part by the Federal Emergency Management Agency, is administered by the state to pay for projects that will reduce or prevent future disaster damages.

The projects in place so far mean that hundreds of thousands of trees can be used in the fight against Ol' Man Winter. Some benefits can be realized in as little as three to five years, Claeys said. To be effective in a severe storm, the trees usually need from 10 to 20 years' growth.

Although statewide interest in living snow fences grows daily, one county in southwestern North Dakota is on the leading edge of the initiative.

It's Adams County—ranch country, scenic, open, and in the winter, downright desolate in places. With its buttes, rolling hills and winding roads, there are plenty of places for snow to pile up.

But the local Natural Resources Conservation Service (NRCS) office, a partner in the snow fence initiative, has been creating a flurry of activity among the county's 3,200 residents.

In the year 2000 alone, the NRCS worked with area landowners to plant living snow fences at 42 sites that would protect 23.3 miles of roads. In 2001 and 2002, new snow fence plantings at 72 different sites will protect another 65 miles.

That's good news for Dean Erickson, Adams County's highway superintendent. In the wintertime, he's responsible for keeping clear about 314 miles of county roads and about 500 miles of certified township roads.

For more than 20 years, the county has been using both temporary and permanent measures to minimize the impact of blowing snow, Erickson said. As old roads with known trouble spots have been replaced, the county has been adjusting the angle and/or surface of the new roads to minimize drifting. Also, each fall, road crews put up about 4,500 feet of temporary picket snow fence in key trouble spots throughout the county to provide road protection.

With the addition of the living snow fences, the county's work, and cost, to remove snow will decrease even more because additional trouble spots will be minimized or eliminated.

"It's great for Adams County," Erickson said, where 90 percent of their disasters are snowstorms. "We are pretty rural here and there isn't a lot of money for plowing snow. Even though the trees are still young, they are starting to catch some snow. As soon as they get some height to them in a couple of years, it'll really make a difference.

Dave Seifert's living snow fence holds the key to one of the county's problem areas. Some of his land parallels ND Highway 8, including a troublesome curve where snow blows in from Seifert's side of the road and is stopped cold by a butte on the other side. As a result, snow piles up on the curve.

In the spring of 2000, Seifert put in about a mile of living snow fence along that road. Though the trees and shrubs were only a few feet high as of January 2001, he says he's already noticing a difference.

"They had a really good growth year in 2000," Seifert explained. "We've had some pretty nasty winter here so far and even at this young age, these trees are holding some snow. When they grow more, it's going to make a whale of a difference in that curve."

Seifert, a rancher, is a strong proponent of the program not only for the snow-reduction benefits but because he loves trees and wildlife. Snow fences can provide a good habitat for wildlife depending on the variety of trees and shrubs that are used and the purpose for which the fence is planted. (Near airports, vegetation that will repel wildlife is used to keep animals away from runways and other critical areas).



Adams County rancher Dave Seifert checks one of the trees in a living snow fence he planted in spring 2000.



As this young snow fence matures, it will reduce the amount of snow that blows onto nearby ND Highway 8. The black row is a fabric weed barrier that also helps hold in soil moisture around the trees.

Snow fences have other environmental benefits as well—namely minimizing soil erosion, increasing crop production, saving energy, reducing non-point water pollution and beautification.

Claeys says living snow fences also save money. According to a 10-year study in Wyoming, the cost to store snow with a living snow fence is 3 cents per ton. The cost to move snow is \$3 per ton.

Based on those figures, Claeys says, North Dakota's state transportation department estimates it could have saved about \$1.9 million in snow and ice control costs during that 1996–97 season.

The lesson hasn't gone unnoticed. The transportation department is a major partner in the snow fence initiative—both in identifying problem areas and in funding new snow fences.

“Even though we've been planting trees here for decades, the severity of the '96–'97 blizzards really got everyone's attention,” Claeys said. “In some places, we hadn't seen problems like this before. Then, because of that winter, we were suddenly trying to understand how we could have let Mother Nature get the best of us.

“We learned great lessons from that winter,” he added. “Because of the living snow fence initiative, more people are realizing that we can better protect our state in the future.”

It's all in how you plant the trees.

Fargo Works to Build a Disaster-Resistant City

When a devastating flood hit Fargo, North Dakota, in 1969, it left a pretty strong calling card.

The message on that card was clear. Either give up your city to nature's whims or find a way to coexist with an often unpredictable river.

Fargo city officials weren't about to give in. Instead, they looked at the problem in earnest and set off on a journey that's been going strong for more than 30 years.



Piece by piece, Fargo has been building a defense to keep the Red River at bay during times of flooding. One day, city officials say, the river will just pass them by. FEMA photo by Andrea Booher.



Their quest is to build a disaster-resistant city—a place where citizens and businesses not only can survive but thrive, even when Mother Nature has different ideas.

The city has accomplished a lot in that period of time. Flood-control systems have been put in the place. The city's infrastructure has been shored up, rebuilt and newly built. Building codes have been upgraded. Residential structures in harm's way have been removed. Risk assessments and disaster planning have been continually refined. Public education about disasters and damage prevention is ongoing.

Step by step, piece by piece, Fargo is doing more than standing its ground. In many ways, the city is on the leading edge of smart growth and community viability.

What is perhaps most noteworthy about Fargo's efforts is the sheer tenacity the city has displayed in the face of repeated disasters. While the 1969 flood was one of the worst on record (the oldest was in 1882), it hasn't been the last. The city was hit again by river flooding in 1975, 1978, 1979, 1984, 1989, 1993 and 1997.

There have been other disasters, too. Eight blizzards and five winter storms in 1996–97 dumped a whopping 117 inches of snow on the city, contributing to its highest river level yet. On the Fourth of July 1999, damaging straight-line winds left tornado-like destruction in residential and commercial

areas. In June 2000, about 7 inches of rain fell in seven hours, producing localized flooding. Fargo's annual rainfall is about 20 inches; a 100-year rain event is 5.5 inches in 24 hours.

It's enough to leave any city reeling. And yet, after each disaster, city officials have faced the good and the bad head-on. They've learned lessons and adjusted their short- and long-range strategies—all with the end goal of creating a safe and prosperous community.

The Problem

Fargo was born with some inherent challenges. It is located on the banks of the Red River, a northward-flowing river that begins in the southeastern corner of the state and ends in Lake Winnipeg, Canada. The river basin actually is some 45,000 square miles—47 percent of which is in North Dakota.

When winter comes, the river freezes. When spring arrives, the river's headwaters in the south melt first. Because the northern reaches of the state thaw later, the river melts flows head-on into still-frozen conditions. When the river hits that ice barrier, it can overflow its banks and spread out for miles.

Secondly, Fargo was built on what was once the bottom of Lake Agassiz, an ancient glacial lake that encompassed much of North Dakota and some of Minnesota and South Dakota during the Ice Age. As a result, the city's terrain is flat—in fact, really flat. From the north edge of Fargo to its southern end—about 13 miles—there is only about a 10-foot difference in the elevation. Consequently, natural runoff is inhibited.

Spring snowmelt accounts for much of the rise in the Red River, which also is fed by a number of smaller tributaries. Also, heavy rains can quickly trigger localized flooding, which is exacerbated by the level land and by impervious clay soils.

So what does a city do when factors this big are relatively impossible to change? It finds ways to work with the hand it's been dealt. Here's a look at some of what Fargo has done to fortify itself against the effects of disasters.

The Solutions

Fargo has put in a number of structural and non-structural measures that work both singly and collectively to help the city reduce the impact of disasters.

◆ Permanent Flood Control Structures

Creating flood barriers is one of Fargo's most important floodfighting weapons, given that the flat terrain can cause 1 foot of water to spread a mile. Therefore, it is imperative to guard the city's perimeter against advancing floodwaters.

Fargo built one of its first lines of defense—a dike—in the mid-1960s. First constructed near the downtown business district as a floodfighting measure, the city has worked to make the mile-long earthen structure a certified and permanent means of protection.

Since then, the city has constructed additional flood-control barriers whenever and wherever possible. The barriers include floodwalls, more earthen dikes and a residential landscaping program where homeowners along the river get a financial incentive to raise their backyards to a level even with another nearby city dike.

Now, a large portion of the city's boundary is protected by some kind of flood-control structure. The result has been better-protected homes, businesses and critical facilities, like the city's \$68 million water treatment plant, as well as reduced floodfighting costs.

◆ Property Acquisition

Fargo had a number of homes along the river and, predictably, they flooded over and over again. Many of them were either adjacent to a floodway or in an area that couldn't be defended.

After the 1997 event, residents in five flood-damaged neighborhoods were given the option to voluntarily sell their properties to the city. Fargo purchased 82 properties at a cost of about \$6.2 million and demolished the structures. (In 1997 alone, those properties had sustained about \$2.1 million in damages. About half that cost, or approximately \$1 million was spent on the more than 3 million sandbags that were used to fight the flood).

Now, those properties are open space and most are permanently deed-restricted to prevent future building. Since the acquisition program began, the city has purchased 88 flood-prone properties, saving homeowners emotional and financial costs, and the city repeated floodfighting costs.

Also, the city is negotiating with the owners of high-risk properties who didn't want a buyout to obtain a right-of-first-refusal. That would give the city first option to buy the property whenever it's offered for sale. In those cases, too, the structure(s) would be demolished, creating more open space. To date, the city has recommended purchase agreements on 20 properties.

◆ Infrastructure Improvements

The city's **storm sewer system** has been improved to ensure that it remains operational during floods. To do this, the city has installed protective gates to prevent backup, and built 10 new lift stations to improve pumping capacity. The city now has a total of 56 such lift stations, 20 of which are directly related to flood prevention.

Normally, rain and snowmelt run off into the sewer system and gravity flows to outlets that discharge into the river. When the river level gets higher than the outlet, stormwater can't drain out. The lift stations then take over and actually pump or "lift" the water through pipes to a higher outlet that empties into the river. The protective gates automatically close when the river level meets the outlet, preventing the Red from backing up into the system and causing an overload.

Backup electrical generators have been installed at six of 19 sanitary lift stations and four key city facilities to provide uninterrupted service if Fargo's power supply is compromised for any reason. Portable generator units or emergency pumps are available for those lift stations that do not have permanent generator backup power. The diesel-powered units, initially added in 1999 to handle any Y2K-related emergencies, ensure that the lift stations will continue pumping sewage to the city's treatment facility (without that capacity, the sewage could back up into basements). The four facilities—city hall; the Fargo police station, which also houses the 911 Center; the city's central public works garage; and the water treatment plant—now can continue providing critical services even in the face of disaster.

Fargo has built **stormwater retention basins** throughout much of the city to augment the storm sewer capacity during heavy rains. The basins, built below street level, collect and hold water until storm sewer drains can catch up in removing the additional water volume.



A backup generator enables this lift station (brick building) to operate during a power outage.

Living snow fences have been planted to help protect key areas during blizzards and winter storms. These fences actually are strategically planted rows of trees and shrubs that act as a filter to catch and drop blowing snow before it gets to roadways and other critical areas such as airports. Fargo built its first snow fence in 1986 on the north and south sides of the city's airport. Airport officials report that the fence has reduced drifting by about 70 percent. The city, in partnership with the state department of transportation, has planted a number of other fences in problem areas along its two interstates and highways.

◆ **Flood Insurance**

In 1971, Fargo became the first city in North Dakota to join the National Flood Insurance Program (NFIP). As a result, residents and business owners have been able to buy flood insurance to financially cover flood-damaged structures and personal property. To participate in the NFIP, a governmental entity must adopt and enforce sound floodplain management ordinances. As of Jan. 1, 2001, there were 325 policies worth \$54,394,900 in effect throughout the city.

◆ **Upgraded Building Codes**

After the 1997 flood, city officials upgraded local building codes to better protect new construction in and around the floodplain. The changes require the lowest floor of newly built structures to be 2.5 feet above the base flood elevation (BFE). Previously, the lowest floor only had to be 1 foot above BFE. The change applies to new structures both inside and within 150 feet of the floodplain.

◆ **Digital Mapping**

The city is enhancing its floodfighting capabilities through the use of digital orthoimagery, a specialized system that takes aerial photographs of the city's topography. City engineers can use the photographs and related contour elevation maps to identify low areas that need to be built up during floods to hold back water.



Fargo Public Works Director Dennis Walaker stands among newly planted trees, designed to grow into a living snow fence. The natural fences are built by planting rows of trees and shrubs that, when mature, will reduce drifting and blowing snow from piling on nearby roads. For more than 30 years, Walaker has helped guide the city's efforts to become more resistant to many kinds of disasters. FEMA photo by Andrea Booher.

◆ *Project Impact: Building Disaster Resistant Communities*

Fargo is bolstering its efforts to reduce the effects of disasters by becoming part of *Project Impact: Building Disaster Resistant Communities*. Launched in 1997 by Federal Emergency Management Agency (FEMA) Director James Lee Witt, *Project Impact* promotes taking action to reduce or prevent damage before disaster strikes. Nationwide, about 250 communities and more than 2,500 businesses are not only participating in *Project Impact* but are reporting positive results in subsequent disasters.

The Future

As city growth continues, so will Fargo's efforts to build a safer, more disaster-resistant community, city officials say.

Already, about \$20 million has been spent on the structural projects outlined. Much of the money has come from the Hazard Mitigation Grant Program, administered by the State of North Dakota and funded, in large part, by the Federal Emergency Management Agency.

The program helps pay for projects throughout the state that will reduce or prevent future disaster damages. Up to 75 percent of the project costs come from FEMA, the remaining 25 percent must come from non-federal sources such as state, local or private funds.

Other funds have come from the State of North Dakota, city coffers, Community Development Block Grants, private money and insurance proceeds for repairing disaster damages.

There is no shortage of ideas for Fargo's wish list of projects that will keep nature's impact at bay. And if history is any indication, there will be a great deal more to this story in another 30 years.

Fargo Public Works Director Dennis Walaker, who's helped guide the city's disaster-resistance efforts since 1974, believes there is a light at the end of the tunnel.

"We have reduced our flood risk tremendously in Fargo," Walaker said. "The whole flood problem is like a log chain with a lot of little links. Every link we get eventually becomes a big chain until one day, we will be able to watch the river go by."



New Twist on an Old Tale... Historic Phoenix Building Rises from the Flood

There must be something magic about the name “phoenix.”

In mythology, the phoenix bird dies a fiery death every hundred years and a new bird rises from the ashes.

In downtown Grand Forks, North Dakota, a historic structure rebuilt in 1898 after a fire the year before—and renamed Phoenix as a result—is being reborn after being nearly destroyed by the record 1997 Red River Valley flood.



The Phoenix Building in March 2000 as renovation begins.

This time, the “new” Phoenix will be better able to withstand another flood, thanks to disaster-resistance measures being put in place by owners Bill Schoen, Jim Kobetsky, Todd Mitzel and Mike Kuntz.

The owners, all from the Grand Forks architectural firm of Schoen Associates, are giving new “life after flood” to nearly a block of historic buildings overlooking the river. Considered a significant part of Grand Forks’ commercial development in the early 1900s, the buildings were deemed important to save when this city began rebuilding after the 1997 flood.

“We wanted to make an investment in downtown,” Schoen said, “and these buildings looked

like they could be really great once they’re redone. But we also want to minimize future flood damage, so we’re taking extra steps in the renovation.”

The project includes an empty lot and three buildings: the Phoenix, which originally housed a dry goods store and was the premier commercial structure at the time; a building built in 1931 for the Red River Power Company; and the Panovitz Building, custom-built in 1904 as a furniture store. The empty lot housed a fourth building, rebuilt in 1951 for a department store, which was torn down by the city after the flood because it was too damaged.

To begin the project, the partners purchased the three flood-ravaged buildings and the empty lot for \$20,000. With the help of a \$1.1 million Community Development Block Grant and another \$1.5 million in cash and loans, the partners will spend nearly \$3 million to recreate the historic block.



A contractor installs window framing in the Panovitz Building.

So to protect that investment and to reduce the damage potential from flooding, Schoen said, several special features are being put in.

In the Phoenix and Panovitz buildings, which anchor each end of the project, new structural supports have been added and the existing basements have been eliminated.

“These buildings are about a foot-and-a-half below the base flood elevation and the last thing we want is a basement full of water,” Schoen said. “So we’re going to get rid of the basements altogether by removing the wooden floor structure, filling them in with clay and pouring a concrete slab floor.”

Because the buildings are considered historic, local floodplain ordinances do not require that they be elevated, Schoen said. Raising the buildings would be extremely difficult structurally and cost prohibitive, he added.

“In the Red River Power Company Building, which is poured-in-place concrete and very solid, we’ll still have a basement,” Schoen said. “But we’re not putting a single thing in it, no elevator and no mechanicals. We’re just putting in basic lighting and a sprinkler system. The basement will be available for incidental storage and as a storm shelter.”

A new building is being constructed on the empty lot to fill the space between the Phoenix and the Red River Power Co. buildings. Because the new building has to meet current floodplain requirements, the structure primarily will house a parking garage with a small commercial area in front and two apartments on the second floor. A waterproof membrane will be installed both under the main floor and 24 inches up the walls to floodproof the building. There will not be a basement.

The Power Company and Panovitz buildings also will have commercial space on the main



Restoration of the Panovitz Building is well underway.



The Phoenix begins to take on a new look by August 2000.

floor, apartments on the upper floor and parking in the back 70 feet of the structures. In all three buildings, special concrete-block walls are being used to separate the parking and commercial spaces instead of traditional wood frame and drywall that could be damaged by floodwaters. The inner cells of the blocks will be filled—as high as 4 feet—with concrete to add strength and to prevent water from getting inside the walls.

The Phoenix Building will be returned to its original use with commercial space on the main floor and apartments on the upper floor.

Mechanical equipment for all the first-floor commercial spaces will be hung from the ceiling so that the utilities are at least 12 feet from the floor and away from floodwaters, Schoen said. Electrical circuit panels also will be elevated well above the 1997 flood level.

If Schoen, 47, sounds determined to be flood-resistant, it's because he has good reason. Both the memories and the cost of mucking out the flood-filled basements of his home and four other commercial properties still haunt him. At one property alone—a warehouse converted to apartments—he spent \$250,000 to replace flood-damaged mechanical systems. And, Schoen says, he'll be 75 years old by the time he pays off his flood-repair loans from the U.S. Small Business Administration.



Artist rendering of the Phoenix project as it will look when done. Courtesy of Schoen Associates.

By comparison, the flood-resistant measures for the historic renovation project have added only about \$130,000 to the overall cost. The majority of that expense is related to eliminating the basements.

“If we had another flood, that one hundred and thirty thousand dollars would be a drop in the bucket compared to the cost we would incur if we hadn't done these things,” Schoen said. “There's no question that the money is well spent.”

When the historic renovation project is completed in January 2001, it will join the ever-growing disaster-resistance efforts now throughout a city that was once brought to its knees by a devastating flood and fire.

And the Phoenix will rise yet again.

Waste Not, Want Not

Barnes County Makes the Most of Flood-Prone Properties

Norma Duppler hates to see things go to waste. She'll recycle just about anything—including houses and the land they sit on.

It's a concept that is not commonly done with as much fervor as Duppler employs. But it is one that has been extraordinarily successful for Barnes County, North Dakota, and about a dozen residents who were repeatedly getting flooded.

That's because Duppler has helped those residents move away from a river and the danger it can bring. She has been able to recycle—instead of demolishing—many of their houses. She has helped find innovative ways to reuse the oft-flooded land. And she's done it all at relatively little cost to the county.

Duppler is the Barnes County emergency manager. And since the early 1990s, when much of North Dakota began seeing yearly floods, there has been trouble in her county.

"We had a drought up until the 1990s," Duppler explained. "Then about 1992, it started raining a lot. In 1993, the rainfall amounts started to double and triple. By 1996, we'd already had four disasters in four years. Now, in 2000, the water table has risen in some places to just two feet below ground where it used to be eight to nine feet below ground."

The chronic ground saturation has been only half the battle. There have been floods, too, from the Sheyenne River—usually docile and meandering—caused by excessive snowmelts in the spring and, sometimes, by severe storms in the summer.

During those floods, the river easily found its way to the basements and occasionally the main floors of homes scattered along its banks. And the residents of those homes were not only in peril, they were losing the repeated battles to save their properties as well.

One by one, they contacted Duppler after hearing about the possibility of state/federal buyouts in high-risk areas. And the cycle of recycle was about to begin.

Looking for Help

After the 1996 flood, Duppler turned to the State of North Dakota for help. Through its Hazard Mitigation Grant Program (HMGP), the state awarded Barnes County a grant to purchase flood-damaged houses and properties in the floodplain along the Sheyenne.

The HMGP is funded, in large part, by the Federal Emergency Management Agency (FEMA) under presidential disaster declarations, and is administered by the state. The program funds projects that will reduce or prevent future disaster damages—thereby reducing the human and financial suffering wrought by repeated disasters. Up to 75 percent of project costs comes from FEMA; the remaining 25 percent must come from non-federal sources.



*Barnes County
Emergency Manager
Norma Duppler turns
tragedy into triumph
with a successful buyout
of flood-prone
properties.*



This house, four miles south of Valley City, had flooded in 1993, 1995 and 1996 until a county buyout removed it from harm's way. Photo courtesy Barnes County.

Now the land, restored to its natural habitat, provides a roadside respite for those just passing through.



Normally, the project sponsor—in this case Barnes County—is required to put up some or all of that 25 percent. The state contributed 10 percent of that cost, leaving the county to fund the remaining 15 percent.

But county commissioners took a stand. They did not want to use valuable tax money to benefit so few people. Between natural disasters and a sagging farm economy, times had been tough there.

“Because of all the disasters we were having, we had incurred millions and millions of dollars in county and township damage,” Duppler said. “There was no extra money. The commissioners want to spend their tax money on roads, bridges, culverts—things that benefit everybody.”

So Duppler presented the homeowners with a proposal. Although the buyouts were voluntary, those who participated would have to give up 15 percent of the final payout on their property to cover the local share of the cost. Seven homeowners said yes. Only two said no.

“They really didn’t have a choice,” Duppler said. “They couldn’t sell their houses because no one would buy them. They couldn’t stand to live in flooding conditions anymore. But they did benefit because they got 85 percent of their house (pre-disaster value) when most of the houses, where they were, would be worth nothing.”

Disaster Strikes Again

Before many of the deals could be completed, disaster struck again in the spring of 1997 when the worst flooding in recent history hit much of the state and all of the properties slated for buyouts.

Still, most of the houses were in relatively good shape when the county bought them. And that gave Duppler another idea. Why not find a way to recycle the homes instead of just razing them to meet the state and federal requirements of clearing the property?

“These were beautiful houses and I couldn’t see destroying them,” Duppler said. “All but one of the main floors were okay. They still had good windows, closets, cupboards and carpeting. They had just had repetitive finished-basement flooding. So I offered them for sale.”

And when the county auctioned the properties, she got a buyer for every single one. The county set a minimum bid of \$1,000 each for five of the houses. The new owners also were required to relocate the houses outside of the floodplain at their own expense. The county then sold the salvage rights to the remaining two houses, which were unsuitable for moving.

The buyout effort has been a benefit all the way around, Duppler said.

“Somebody got a house that’s pretty good and was able to move it to a safe location with a new basement,” she explained. “People who were threatened before got to move someplace else. Four of those houses have been placed back in Barnes County and back on the tax rolls. We reduced the county’s cost of demolition by at least half if not more, and we’re not taking up more room in the landfill.”

The fifth house was moved to a neighboring county, Duppler said. By auctioning the properties, Barnes County could return \$53,200 in proceeds to the state for use on other HMGP projects. After that refund, the project cost totaled \$492,271. The federal share came to \$434,357 and the state paid \$57,914.

Putting the Land to Good Use

Though the buyout program had so far been a success, it was about to get even better. It turns out that land in the county, even in a floodplain, has value. And not the way most people would expect.

Instead of sitting dormant, nearly all of the 23 buyout acres have been recycled into a variety of new projects—all in keeping with good floodplain management—at virtually no cost to county taxpayers.

“The land has been in demand,” Duppler said. “People would contact us right away after a buyout and tell us ‘we could use that.’”

Under the terms of HMGP funding, the county is required to maintain those acres. And, it is required to permanently deed-restrict the properties to prevent future building so that damage and repair costs are not incurred.

But the requirements don’t mean that someone else can’t use—and ultimately maintain—the resulting open space as long as the usage is proper, Duppler said. And the idea of enhancing the land in a natural way had great appeal.

The Natural Resources Conservation Service (NRCS) was the first to propose an alternate use for a buyout property in 1995 after the county purchased a house and 2.5 acres near a bend in the river. The NRCS wanted to restore the land to its natural environment and create a roadside respite.

In 1996, when the county bought out a neighboring property, the NRCS requested and received that land as well to further enhance the natural-habitat project.

“They (NRCS) took out the old dike, put in this beautiful wooden fence and planted thousands of trees, restoring it to a natural area,” Duppler said. “Now it’s going to be this neat little roadside attraction where people can stop, access the river there or have a picnic. And when it floods, it will just dry out normally.”



At another buyout property, the U.S. Fish & Wildlife Service is creating an educational site not far from one of its fish hatcheries.

“Now people get to walk there,” Duppler said. “They get to fish from there. Eventually they will have signs that explain the whole environment there. What better way to use land that’s basically worthless except for the beauty and the learning potential?”

At yet another site, the Barnes County Wildlife Club got permission to create two canoe-launching points and a small park. The property had been an unofficial park area for decades before a house was built there in the 1970s and subsequently bought out in 1997.

Two other sites, totaling about 10 acres, are leased to private individuals—one as a pasture and one as a hayfield. In both cases, Duppler said, the property is maintained at no cost to the county and the tenants are able to get some value from the land. The last buyout site, a half-acre, is all that is left for the county to maintain.

In six years, the county has been able to relocate one house and buy out nine properties that have borne the brunt of disasters. Fifteen more buyouts are planned if funding becomes available.

Duppler hopes that someday soon, the disasters in her county will stop. There have already been nine federally declared disasters there in eight years.

Until then, though, she’s sure of one thing...

For at least 10 families, they already have.

Hillsboro Cabin

Won't Log Any More Floods

In the late 1870s, Norwegian immigrant Hans Halvorson built himself a little log cabin in Minnesota on the banks of the Red River of the North.

To Halvorson, a lifelong bachelor, the simple, 16-by-18 one-room structure was home. It stood the test of time — weathering the floods and winter storms that are common in the upper Plains states.

In 1931, the cabin was moved to a city park in Hillsboro, North Dakota, to mark the 60th anniversary of early European settlements along the Goose River. There, too, it weathered more floods and winter storms.



*Halvorson's cabin arrives in Hillsboro in 1931.
Photo courtesy Traill County Historical Society.*

But as the years went by, repetitive flooding took its toll on the symbolic cabin—believed to be one of the oldest in the state. The Goose River, a tributary of the much larger Red River, which forms the North Dakota-Minnesota border, often overflows its banks and floods the park where the cabin sat nestled in a grassy area near a playground and the municipal swimming pool.

More often than not, the cabin flooded too. Parts of it began to rot. When the area was hit with record flooding and a late blizzard in the spring of 1997, the damage caused by both water and ice was even worse.

And that was a big concern for city officials and for county historical society members who had long considered moving the cabin but never had the money to pay for it.

The city's park district owned the structure and used it to store park equipment. Although the city had “mucked out” the structure many times before, the '97 flood had caused some serious structural damage. Historic preservationists wanted to move the cabin to protect an important piece of the area's history.

It was, for all practical purposes, the moment of truth. To save the log house, it had to be moved away from the river where it had lived for more than 65 years. And the move had to be done soon or future floods could easily destroy it for good.

So the city opted to take the \$5,100 in state and federal disaster money it was given to repair or replace the public structure, and use the funds to help relocate the cabin out of harm's way—creating a permanent solution that would stop repetitive flood damage and repair costs.

“The flooding was destroying it,” said Mark Forseth, city auditor. “Our choice was to burn it down and build something new or give it to someone. There was never an option to build it up or floodproof it because of where it was located. It was so low, it would have had to be moved regardless. We thought maybe this is the time we could move it out of there.”

The relocation brought its own set of challenges. A suitable site had to be found and an extensive historical and environmental review would be required to ensure that moving the log house wouldn't have a negative impact on the park, the new site or the cabin itself.

Furthermore, the structure—which flooded twice more after the '97 event—was so damaged that it couldn't be moved intact. Instead, it would need to be dismantled, moved and then reconstructed.

Fortunately, Hillsboro resident Duane Nysveen loves that kind of a challenge. A contractor by trade, Nysveen, 69, had helped restore other historical properties in town because of his wife Shirley's involvement in the historical society. Duane liked the cabin and wanted to save it.

So in June 1998, he and five other townspeople took the log house apart the same way it had been built—piece by piece—carefully numbering each of the 61 logs so that it could be correctly reconstructed.

The logs, some bigger than a foot in diameter, then were loaded onto a trailer and hauled about a mile away to the cabin's new home in "Heritage Park," a three-acre tract of land where the historical society has a museum and other significant buildings. The park is well beyond both the 100- and 500-year floodplains.

"First we built up the site so there wouldn't be any water problems and then we built a concrete base," Duane said. "We wanted to get the cabin up enough so we were sure it would stay dry."

But before the cabin itself could be reconstructed, disaster struck again.

"We had stapled tag board with a number on it to the end of each log," Duane said. "Somebody had the great fun of having a beer party and taking all the numbers."

Down but not out, Duane and his daughter Julie began the tedious process of reconstructing the cabin using old-fashioned trial and error.

"We would try a log and it wouldn't fit," Duane recalled. "Each log was notched so they would fit on top of one another. It took us about a month, working every day, to put the whole thing back together. Losing those numbers really slowed us down."



Duane Nysveen (left) gets help taking apart the cabin log by log. Photo courtesy Shirley Nysveen.



After the '97 flood, the cabin had deteriorated even further. FEMA file photo.

To replace the flood-damaged logs—about 20 percent of the whole structure—Nysveen went to rural electric cooperatives and got old, weathered high-voltage power line poles that looked strikingly like the original timbers. Mortar, rather than the original dirt-and-cow-manure paste, was used to fill the spaces between the logs. A new roof was added, the lone window was rebuilt and a new front door was put on.

Today, Hans Halvorson's cabin again stands as a symbol of pioneer perseverance. Trees have been planted around the house to re-create its original wooded setting. Inside, the floor is dirt. And period furnishings, including a rope bed and an old cookstove, have been added to show visitors what life on the prairie once was like.

“It’s a tremendous teaching tool to show the younger generation how their ancestors lived,” said Shirley Nysveen. “It’s made quite an addition to our museum.”

“I’m glad that we were able to acquire it and get the money so we could move it,” Duane added. “Now it’s where people can enjoy it again.”

Forseth agrees, adding that it would take a flood of “biblical proportions” to affect the cabin now.

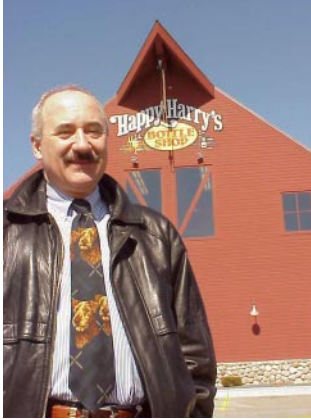
“I think it’s just worked out great,” he said. “Where it’s at now, it’s appreciated. People can see it. It’s well taken care of. And it’s not going to be a problem ever again. We know now, as we are finding out about a lot of things in North Dakota, that putting something close to the river, while very scenic, is not very practical anymore.”



Newly reconstructed outside the floodplain, the cabin now has a chance to live high and dry. Photo courtesy Shirley Nysveen.

Mind Your Business...

North Dakota Entrepreneur Embraces Disaster-Resistance Measures



Hal Gershman says the '97 flood taught him a lot about living and working with a river.

Hal Gershman is a quick study in the classroom of natural disasters.

When the raging Red River of the North flooded Grand Forks, North Dakota, in 1997, Gershman was a victim twice—at his house and at one of his several business properties.

The disaster taught him valuable lessons about floods. In the spring of 2000, when he was ready to build a new liquor store in Fargo, a city 75 miles south of Grand Forks and also on the Red River, Gershman applied the same disaster-resistance principles he'd already learned from the '97 flood—elevate, elevate, elevate.

In June 2000, his hunch was proven right when torrential rains deluged Fargo, flooding many parts of the city. Gershman's new store, under construction at the time, was not affected by the surface flooding on nearby streets. His only surprise was being exposed to a rainstorm-induced flood instead of one caused by a swollen river.

"The flooding from that rain was a shock," Gershman said. "I think everyone was surprised that it didn't drain off quickly. But when I heard

about it, I had no doubt in my mind that my site was going to be dry."

Gershman, 56, joins a growing number of progressive business owners throughout the country who are taking preventive action before disasters strike to better protect their property, inventory and business viability.

Lessons Learned

His disaster-resistance outlook is one of the best outcomes of the Grand Forks flood—an otherwise devastating event that seriously affected better than 90 percent of the city's 50,000 residents and cost more than \$1 billion in public and private money for the recovery.

There, among his two liquor stores and two hotels, just one liquor warehouse was damaged when nearly 2 feet of water got inside. At that same property, floodwaters came within 6 inches of the store's front door. Had the store flooded too, Gershman estimates that he would have lost about \$100,000 in inventory alone.

So when the Grand Forks flood recovery began, Gershman decided to build a new liquor



Elevating this building site in Fargo helped save Gershman's store from flood damage when a summer storm dumped a whopping 7 inches of rain in about seven hours.



Gershman raised the ground before he built this shopping plaza to better protect his investment and his tenants from future floods.

store and a 13,681-square-foot retail complex on a different site. This time, though, he added extra measures to reduce the chances that his investment would be impacted by another possible flood.

“We hauled in a lot of dirt to first raise the base of the entire site,” Gershman said. “That raised the new store and adjoining plaza five feet above the ground level. Elevating saves a property from flood exposure and sets off your project in a much more beautiful way. Also, it helps your drainage. We drain off very quickly now.”

In Fargo, drainage is a problem because the city is virtually void of the natural elevations that facilitate runoff. Even though city government has invested heavily in disaster-resistance measures such as dikes, stormwater retention basins and drainage channels—all with the common goal of controlling water—Gershman still wanted to add his own protection as well.

“That place (store site) was a small island when the flood hit,” Gershman said. “The corner it sits on is naturally higher than elsewhere in that part of the city. But that’s not good enough. We took it up higher yet.”

There, too, he brought in extra dirt to raise the site about 2½ feet before constructing the 12,500-square-foot building. The site is not required by city building codes to be elevated because it is not in a special flood hazard area.

Additionally, a sloped parking lot guides water away from the building and into a couple of large ground-level drains. Around the building, sloped landscaping also directs water away from the structure.

The improvements only added about \$20,000 to the overall project cost of \$2 million. Gershman considers that investment to be “a steal” in the long run.

“I amortize that cost over a period of time, either the mortgage period or the life span of the building,” said Gershman. “Either way, I feel it was a great investment because my property looks so much better and I also have the peace of mind that if there is an event, my store will be dry because I’m high enough.”

At the Grand Forks plaza property, home to nine commercial tenants plus his 10,610-square-foot store, the costs associated with the elevation totaled about \$25,000 of the \$2.5 million project. When he applied the expense to the size of the entire property, Gershman said, the elevation cost came to less than 50 cents a square foot.

Gershman acknowledges that he would have been required by Grand Forks' floodplain ordinances to elevate the new property because it is in a special flood hazard area. But by the time building permits were required, he had already decided on his own to elevate.



The plaza elevation, visible from this back corner, can be effective against floods and attractive, too.

"I would have done it anyway," Gershman said. "We didn't know yet what the requirement was and I just said, 'We have to do this to get it up out of the floodplain.'"

And as a landlord, Gershman had even more at stake there than just protecting his own store.

"Had I not elevated the property, it would have been a very significant problem to get tenants," Gershman said. "The fact that I did it eliminated that part of the discussion. What if I had not done it and they asked the question? What would I have said?"

It's an answer Gershman won't ever have to think about. He says he'll never again build without disaster-resistant measures.

"To mitigate, to have peace of mind and to improve the visibility of my property—why wouldn't I do that? It's a one-time expense that keeps giving back."

Downtown Corporate Center A Vision and One Bold Step

First came a flood of epic proportions.

Then came the fire.

When the smoke cleared and the water receded, downtown Grand Forks lay in shambles.

Everything had flooded and 11 historic buildings had burned. The central business district was ruined.

City officials knew that a bold step was needed to restore the faith that downtown could come alive again. So they decided to take that step and help stage a comeback.

One year after the flood, they broke ground for a \$14.4 million corporate office center that would anchor the new downtown, replace most of the burned office space, revitalize the tax base and keep jobs in the central business district.

Today, a pair of stately buildings provides a powerful presence in the ever-emerging downtown that has refused to die.

“We thought it was one of our anchor projects when we did it,” said John O’Leary, former director of the Grand Forks Office of Urban Development. “We’re more convinced now that’s exactly what it was. We’ve seen it work as a catalyst to bring other private-sector money to the table in large and small projects alike.

“For example, restaurants and little shops have opened up around the corporate center,” O’Leary added. “There was a four-million-dollar investment to redo another building nearby. The owner of that building told me he wouldn’t have had the confidence to spend that amount of money downtown had the corporate center not been there.”

The center consists of two structures: a five-story, 70,000-square-foot building that houses a bank, a major law firm and a major accounting firm; and a three-story, 30,000-square-foot building across the street, most of which is now home to a Medicare claims processing center. The bank, law offices and accounting firm all were located downtown at the time of the disaster. The processing center, which is run by a health insurance provider, is a new business to Grand Forks.

Adding Flood Protection

But building a premier business anchor was not enough. The buildings, both of which are in a floodplain, had to be protected from a possible



Grand Forks' new five-story corporate center features built-in flood protection measures.

future flood. So, in keeping with local floodplain ordinances, several precautions were taken to reduce or prevent future damages. For example:

- ◆ Neither building has a basement.
- ◆ Both buildings are encircled by a special concrete wall that is 1½ feet high and hidden behind a brick façade. The wall serves as a flood barrier to protect the building to the base flood elevation.
- ◆ A rubberized, waterproof membrane was installed as well. The membrane lines the concrete wall and extends below the main floor, creating a bowl effect, to keep water from seeping into the buildings—both from the outside and from below ground.
- ◆ Special flood-protection barriers have been custom-made for all the ground-level doorways. The barriers, which are aluminum panels lined with rubber gaskets, can be slipped into a special track that sits about 2 inches inside the doorways to keep floodwater from entering the structures.
- ◆ Panel boxes for the electrical systems in both buildings are above the base flood elevation.
- ◆ In each building, the mechanical equipment has been located on the roof to keep it above potential flood levels.



Flood protection has been added to this second part of the corporate center as well. Here, boilers are located on the third floor to keep them high and dry.

- ◆ When the elevators are unoccupied, they now “rest” at the top of the buildings instead of the bottom. Traditionally, elevator cabs rest in a building’s basement or on the main floor. Putting the cab at the top reduces the susceptibility to being flooded.
- ◆ At the five-story building, an emergency generator has been upgraded and has been located on the roof instead of at a lower level that could be impacted by floodwaters. Building codes require a certain generator size to provide emergency power for the elevators. But a larger-capacity generator was used for the two-building complex so that it also could power the heating system and additional emergency lighting for a period of time.

- ◆ At the three-story building, a boiler room that houses the hot-water radiation heating system is located on the third floor—again to keep it high and dry from floodwaters. The system is used to heat both buildings via special piping that runs through a skywalk connecting the pair of structures.

According to the project’s architects, the flood-protection measures added less than 1 percent to the total cost of the complex—mainly because so many of the measures were incorporated in the design and construction phase rather than being done after the fact.

Funding for the project came from three main sources: \$5.25 million in federal Community Development Block Grant funds, \$3.5 million in federal Economic Development Administration funds, and a \$5.66 million revenue bond issued by the City of Grand Forks.

Rental income will be used to retire the initial bond debt and to cash flow the upkeep of the building. Any excess income will be used for activities that benefit low- and moderate-income individuals and that create or save primary-sector jobs—both of which are required conditions of the federal funding.

Buyout Brings New Life to Barnes County House and Property

In the mid-1990s, repetitive river flooding in Barnes County, North Dakota, prompted county officials to buy out seven flood-damaged properties that were at risk for future flooding. Four of the houses were moved away from the river into other areas of the county that are outside of the floodplain. Two of the houses were sold for parts and the remaining debris was destroyed. The last house was moved to another county. Barnes County officials wanted some good to come of the land left behind. So they found new caretakers to restore the property to a safer, more natural use.

Here is the story of one of those buyouts. It is told from three perspectives: the man who sold his flood-damaged house and property to the county; the family that bought, moved and restored the damaged house; and the group that has given the old property new life.

It is, in fact, the full circle of it all.



On the move...

John Scott's house once sat in a nice wooded area along the Sheyenne River. But repetitive flooding prompted Scott to seek a government buyout of his property. The house was later auctioned and its new owner was given the task of moving the house out of the floodplain. Photo courtesy of Neal Emery.

A Man and His House

John Scott loved his red house with the small A-frame in Barnes County, North Dakota.

It sat near the banks of the Sheyenne River in a beautiful natural setting with abundant wildlife. Strangers occasionally stopped to visit—telling him stories about the good times they'd had there back in the days when his property was a park.

He could have lived in that house for life. But the river flexed its proverbial muscles one too many times, severely flooding Scott's property.

So he decided to get out. He couldn't take another flood. Meanwhile, Barnes County Emergency Manager Norma Duppler was looking for flood-damaged properties she could buy and remove from harm's way to avoid future flooding. The two situations were a match for one another.

“We feel lucky that there was a buyout and that we are where we are,” Scott said from his home in Lakebay, Washington, about 60 miles west of Seattle. “The buyout enabled us to get out of there and get back to Washington” where Scott, 62, and his companion Karen Sanders, 59, both have children living.

Scott’s family owned the Barnes County house for about 20 years. He and Sanders had lived there the last 12. The house had flooded only once before when his mother Ethel lived there. Scott didn’t think it would happen again.

But in 1996, spring snowmelt swelled the Sheyenne out of its banks and into Scott’s house.

“It flooded right up inside the house, in the floorboards, in the rugs,” Scott recalled. “We had a three-foot sandbag dike around the house and we couldn’t keep the water out. We had pumps going but we just couldn’t control it. There was two feet of water flowing around the house.”

The water stayed in the house for a week. Scott and Sanders cleaned up and began considering whether to seek a local government buyout. The couple thought they had survived the worst. They would soon discover the worst was yet to come.

A winter of record snowfall—more than 100 inches in the area—produced a spring of incredible flooding. It was the worst the state had ever seen.

“We didn’t think it would happen again but it did,” Scott said. “I came home from work and said ‘this is going to kill me this year.’ It was a good thing we had good friends or the house would have washed down the river.”

As the river was rising, Scott and his friends began building a sandbag dike. But in April, a sudden, ferocious ice storm hit—paralyzing floodfighting efforts in much of central and eastern North Dakota. The storm marked the end of Scott’s floodfight too.

“There was no way to sandbag or work in it [ice storm],” Scott said, “and we had nothing but a wood stove there. Water was damn near up to the house. We just had to get out of there and go to town. It was coming into the garage when we left. It stayed that way for about 45 days.”



*Making the climb...
The Scott house is about
to ascend to its final
resting place overlooking
a scenic Barnes County
valley. Photo courtesy of
Neal Emery.*

When Scott and Sanders returned, they found that there had been 2 feet of water in the garage and laundry room. The basement had filled with water again. The main floor was damaged, too.

“Our first thought was to clean up the mess and see if we were going to be able to live there,” Scott said. “But we were getting sick because of the mold after we got back into the house.”



A firm foundation . . .

The Emerys built a full basement (left) that provides both a foundation and extra living space for the transported house. The house was bolted to the foundation to keep the structure from shifting from the brisk winds often found in North Dakota. Photo courtesy of Neal Emery.

Scott applied for and received disaster assistance from the Federal Emergency Management Agency (FEMA). But he needed a different long-term solution.

“We figured a buyout was the best way to go,” Scott said. “I thought it was one of the nicest places in the valley around there. We fed 120 deer there with the state game and fish department. But it would have been hard to sell to someone else after they know it’s in a floodplain.”

Within a year, Scott had sold the four-bedroom house and two-acre property to Barnes County for about \$75,000. The county had been awarded a grant to purchase flood-prone properties through a Hazard Mitigation Grant Program (HMGP), administered by the State of North Dakota and funded in large part by FEMA.

Under the program, federal funds can be used to pay for up to 75 percent of a project—chosen by the state and approved by FEMA—that will reduce or prevent future disaster damages. The remaining 25 percent must come from non-federal sources. The state paid 10 percent of the buyout cost. Scott paid the remaining 15 percent from his sale proceeds, a requirement set by Barnes County.

With the sale done, Scott and Sanders moved to be closer to their children. It is a decision they don’t regret.

“We miss everybody in Valley City and we like to go back and visit,” Scott said, “but we’re glad we’re here. I don’t know what we would do if we were back there now and it happened again. We’ve gotten older. We just can’t take that kind of life anymore. In a flood situation, it’s devastating.”



At home on a hill . . .

Emery now has the best of many worlds . . . a house that can’t be flooded again by the Sheyenne River, a special piece of land and a room with a view. Photo courtesy of Neal Emery.

“Now, we’re way up on a hill,” Scott added. “We wouldn’t have moved anyplace where we would get flooded again. It’s a once-in-a-lifetime experience we wouldn’t have done again.”

New Life Begins for an Old House

Neal B. Emery can remember trick-or-treating at Ethel Scott’s house when he was a boy. Having grown up on a farm across the Sheyenne River from the Scott place, Emery, 26, never thought he would one day own the little red house with the A-frame in the middle.

But in March 1998, he found himself bidding on that house at a Barnes County auction of flood-damaged properties. Emery, together with his dad Blair won the bid for \$2,600. And the real work was about to begin.

The four-bedroom ranch house, built in the mid-1970s in a wooded area that locals considered a park, had to be moved as a condition of a government buyout. That’s because the purpose of the buyout is to permanently remove properties from high flood-risk areas—thereby stopping the personal and financial costs of being damaged, making repairs and being damaged again and again.

Although Emery says he would have loved to live by the river where he swam, fished and canoed as a kid, he knew that wasn’t an option. But he did have another choice for land—a 15-acre section of native prairie with a spectacular view of the valley about three miles away. His grandfather Neal H. Emery owned that land. And to help his grandson realize the dream of buying his first house, Emery sold the property to Neal and Blair.

What followed was a flurry of decisions—how to site the house, what kind of foundation to build, who would move it, how and when it would be moved and what other work would need to be done.

A hill overlooking the valley was chosen for the site—in part because it was near the rural water line Neal’s grandfather had installed years earlier. Locating close to that line saved the Emerys “thousands and thousands of dollars” right off the top by not having to put in water service, Blair said. Also, the hill was high enough to keep the house from being affected by a small, nearby creek that has overflowed its banks during heavy rains.

Once the site was selected, work began on digging a basement. The house movers would need at least a 4-foot-deep space to reset the house so there would be room to withdraw the underneath support beams needed to move the structure, Blair said.

So father and son decided to add another 4 feet, making it a full 8-foot-high basement and thereby doubling the living space. The full 80-foot basement, wood with concrete footings, was dug into the backside of a hill to better insulate the lower space and to create at least one well-protected corner that can be used as a storm shelter.

To prevent water problems during heavy rains, the Emerys put in drain tile and pea rock that will let the water flow away from the house, and then backfilled around the foundation.

With the basement work done, the next challenge was actually getting the house up the hill and then another 8 to 9 feet into the air so it could be slid onto the new foundation. The Emerys hired a three-generation, family-owned house moving company from Lehr, North Dakota, to do the work and the move came off without a hitch.

In all, it took about four days and about \$7,000 to separate the house from the old foundation, transport it and reset it on the new basement. The Emerys went a step further and actually bolted the house to the foundation, Neal said, to prevent the possibility of strong winds blowing the structure off the basement.

“If you live in North Dakota, you know about the wind,” Blair added. “You get too high and you get too much wind, it’s just a pain. We didn’t want to take a chance that the house could shift from high winds.”

The Emerys then concentrated on finishing the basement area first so Neal could live there while he continued to work on the rest of the house. The result is a self-contained apartment that can be used in the future by other family members or rented out.

Throughout the rest of the house, there has been extensive redesign and remodeling—opening up small bedrooms, adding other walls, paneling, repainting, replacing flooring and converting the old garage to a large living area. The remaining interior work should be finished by the summer of 2001.

Both father and son say that the project has involved both more work and expense than they originally expected—largely from adding and finishing off a full, 80-foot basement. But they say their investment is still far less than it would have been to build a new, comparable house.

“In reality, I’m probably in that house for half of what it would cost to build a new 24-by-80 home of the same size, same space, same layout,” Blair said, declining to reveal how much the project has cost so far. “From that standpoint, it’s a good deal but not necessarily a cheap deal.”

For Neal, it is the best of both worlds. He now has the house he liked to visit as a kid. And he has his grandfather’s land—a place where he had hoped he could someday live.

“It was definitely a great move,” Neal said. “Being able to go home and sit on the front deck or the back deck and look out over the river valley and see the wildlife around there, I’m very happy to have a place in the Sheyenne River Valley to call home.”

Old Park Lives Again

Black and white signs mark two openings in an otherwise overgrown area along the Sheyenne River where river enthusiasts can launch a canoe.

Nearby, in a grassy area, there is a picnic table and a three-sided steel barbecue grill. A small restroom stands off to the side. Mature trees, offering enough shade to enjoy a summer picnic, abound.

It is reputed to be a good fishing spot and has become somewhat of a refuge for wildlife and nature-lovers alike.

Once it was John Scott’s home. His house stood among the trees for more than 25 years until back-to-back floods in the mid-1990s prompted him to move out. As far back as the 1930s and long before the house was built, Scott says, the area was a park... where folks stopped by to have a picnic and where young men proposed marriage to their sweethearts.

Now it is a park again—thanks to the care and diligence of the Barnes County Wildlife Club, a non-profit organization that promotes natural resource conservation and wildlife enhancement.

The club, made up of about 700 members ages 25 and older, got involved at the invitation of Barnes County, which purchased the two-acre site and a four-bedroom house from Scott in a post-flood buyout.

The county was looking for a way that the land could be reused, but still meet the conditions imposed by state and federal funding for the buyout. Those conditions require the county to maintain the land and prevent future building there.



Thanks to the efforts of the Barnes County Wildlife Club, the Scott property is a park once again. Two canoe-launching points now provide public access to the Sheyenne, a river that has, until recently, been completely bordered by private land.

So club president Perry Kaupan presented the county's offer to the group's membership, which readily took to the idea of developing and maintaining the site.

The members put together a plan for redoing the area and submitted it to Barnes County commissioners for approval. The county, which retains ownership of the land, gave the club a green light and the project was off and running.

"Our biggest obstacle was to clean the area up," Kaupan said. "There were a lot of dead trees from the flood. We had to get a CAT in there to bury what was left after we burned the dead trees. Then we had to level the land and get it draining in the right direction. With mostly volunteer labor, that all took most of the first summer."

Next, club members put in the canoe-access areas and added the picnic table, the barbeque grill and a bathroom. A wooden-post fence they built keeps vehicular traffic on the graveled areas.

To put in the bathroom, the club first had to meet special permitting and construction specifications because of the deed restriction against new structures on buyout land. The one exception to that restriction is putting in a bathroom, when the open space is used as a park or recreation area. Kaupan said the club worked with the county emergency management office to ensure that the facility met all the necessary requirements.

In all, the project took about two years and \$18,000 to complete, Kaupan said. The club covered 25 percent of the cost with cash and with sweat equity. About 52 members worked more than 250 hours on the project. The remaining 75 percent was funded by the North Dakota Game and Fish Department, which cost-shares projects throughout the state that promote fisheries.



Canoeers embrace the Sheyenne River rapids, near where the Scott house once stood. Photo courtesy of Neal Emery.

Bob Frohlich, fisheries development coordinator for the state game and fish department, said that funding for the North Dakota program comes from federal excise taxes collected on fishing and water-related items such as boats, motors, and fishing gear and equipment. Those taxes are reapportioned to the states for fish and wildlife projects.

To be considered for the state program, Frohlich said, local entities have to submit a plan and site map for the proposed project. The project must be open to the public and be free of charge and the local entity must cover its share of the project with non-federal funding sources. The state does a follow-up inspection and takes photos of the sites to document the work.

"The local entities play a big role in whether a project is successful or not," Frohlich said. "The Barnes County Wildlife Club's track record with us is really exceptional. They've proven that if they say they are going to do something, they do it, and that's a big factor" in choosing the projects.

"Another factor is if the project opens up new areas that are traditionally not developed, especially the smaller rivers and streams," Frohlich added. "The Sheyenne River and some of these other branches have been restricted for public access because it's mostly private land along the river."

The Barnes County site now provides that public access, Frohlich said, which enhances fishing and canoeing on the Sheyenne, a river that begins and ends in North Dakota.

Kaupan said the club will maintain the property—including grass cutting and other needed maintenance—as part of its agreement with the county to use the land. So far, the area hasn't flooded since the work was done. But even if it does, Kaupan estimates there won't be much damage.

By all accounts, the canoe-access project has been a success.

"It's turned out real nice," said Roger Berntson, chairman of the Barnes County Commission. "As a community, we're happy with it. You see too many of these places that are just pushed up into a pile and left. But this is attractive and useful."

Kaupan said the project has been so well received that plans are underway to do another canoe access point in the north end of the county at Baldhill Dam in 2001. Some of the club's other projects include an annual deer-feeding program, promoting area fisheries, holding conservation and fishing youth camps, and hunter education programs.

"We've had a real good response from our members," Kaupan said. "And people around here, they love it. For people just going on a picnic, they really like it because it's not crowded. It's just a nice spot to get away."

John Scott and Neal Emery agree.

"The way it's turned out is just exactly what I would have wanted to happen," said Scott.

Said Emery, "I think it's really neat. Canoeing the Sheyenne has been overlooked by people living in that area, but a lot of people like fishing there. I'm glad it's a park now where people can do that."

Living in Harmony With the Land

North Dakota tribes set an example for disaster-resistant land management



FEMA photo by Andrea Booher.

American Indian tribes in North Dakota have a long historical relationship with the land. Today the knowledge that comes from centuries of living with the land is being applied to disaster resistance efforts.

“It’s a mutually beneficial partnership,” said Del Brewer, a FEMA tribal relations specialist. “FEMA and the State have programs with technical expertise to assist the tribes, and the tribes have historical knowledge, unique skills and a commitment to natural resources management from which we can benefit. Together we are embarking on a new partnership towards a disaster resistant future.”

Anita Blue, emergency manager for the Turtle Mountain Band of Chippewa, says that the tribe is taking steps to protect lives and property. “You really have to get at the mitigation end of it to help prevent these disasters from happening,” Blue said.

Partnerships and relationships form the building blocks of a safe community. In September 2000 representatives from the Spirit Lake Sioux, the Standing Rock Sioux, the Three Affiliated Tribes of Fort Berthold and the Turtle Mountain Band of Chippewa joined tribal officials from around the region in a summit with state and federal emergency management officials. Attendees discussed ways in which all levels of emergency management could better work together to reduce the impacts of natural disasters on tribal lands.

The establishment of a Tribal Emergency Management Coordination Council (TEMCC) at the conference will help North Dakota tribes to work closely with other tribes and neighboring communities towards building disaster-resistant reservations. The council features tribal representatives and will serve as a communication link between the tribes and FEMA Region VIII, resulting in enhanced tribal preparedness.

Preparedness before a disaster is always more important than response after it’s already too late, tribal officials say. As a result, all four North Dakota tribes are now participating communities within the National Flood Insurance Program, offering insurance protection from floodwaters to those living on tribal lands.

Turtle Mountain became one of the first reservations in the region to participate in the Hazard Mitigation Grant Program. The money can be used to fund projects that minimize the impact of future disasters on tribal lands.

Richard LaFromboise, past chairman of the Turtle Mountain Band of Chippewa, remembers the words of his grandfather. “As the sun sets, we know one thing. It’s going to come up tomorrow. Now, what are we going to do to be prepared for it?”

An Ounce of Prevention...



Building Disaster-Resistant Communities in North Dakota

It goes without saying that North Dakota has seen its share of disasters in the past decade.

But instead of being repeatedly victimized by Mother Nature's fury, communities large and small are fighting back. They are looking at ways to better withstand the effects of natural disasters so that future floods, blizzards and severe storms won't be as devastating. They are, in fact, working to protect the very lifeblood of their towns—those who live, work and play there.

In four North Dakota communities, those disaster-resistance efforts are becoming a community-wide endeavor through a program known as *Project Impact: Building Disaster Resistant Communities*.

Project Impact, first launched in 1997 by the Federal Emergency Management Agency (FEMA), is a nationwide initiative to change the way America deals with disasters. Its premise is that individuals, businesses and communities can take steps to reduce or prevent damages *before* disaster strikes, thereby reducing the human suffering and financial costs of those life-altering events.

Since then, the momentum to embrace disaster resistance has continued to grow—in large part because of reported successes in *Project Impact* communities and because more and more local leaders are recognizing the importance of disaster resistance to their own community's long-term survivability.

As of December 2000, nearly 250 communities and more than 2,500 businesses in all 50 states, Puerto Rico, Guam and the U.S. Virgin Islands had joined *Project Impact*.

The *Project Impact* initiative has four major components: 1) identifying a community's risks and vulnerabilities to disaster; 2) building public-private partnerships to further the community's disaster-resistance goals; 3) taking actions that will reduce or prevent damages; 4) communicating the success of those efforts with the community at large.

Specialists from FEMA and state emergency management agencies provide technical expertise and support, as needed, to *Project Impact* communities throughout the four-stage process.

Already, in just three years, countless stories of damage prevention have been reported throughout the country. In North Dakota, many disaster-resistance efforts already are underway in hopes of reversing the trend of escalating disaster damage from recent years.

Here is a look at the four North Dakota *Project Impact* communities, their disaster risks and what they are doing to build safer communities:

City of Fargo

North Dakota's largest community, population 77,000, Fargo is on the eastern side of the state in the Red River Valley, considered one of the most fertile farming regions in the world. The valley also is home to the Red River of the North, which begins in the southeastern corner of the state and flows north to Canada.

The Red River is a flood source for the eastern part of the state, including Fargo, when spring

snowmelt and excessive precipitation swell the river beyond its banks and into neighboring communities.

Since 1969, Fargo has experienced six major spring flood events from the Red River. During the winter of 1996–97, the city was pummeled with a record eight blizzards, five winter storms and 117 inches of snow. In July 1999, straight-line winds damaged residences, businesses and some public facilities during a pop-up storm. And in the summer of 2000, parts of the city were swamped when 7 inches of rain fell hard and fast in about seven hours.

In addition to riverine flooding, Fargo’s disaster risks include flash flooding, blizzards, and severe storms, including tornadoes and damaging straight-line winds.

In Fargo, these trees and shrubs, also known as a living snow fence, have reduced blowing and drifting snow by about 70 percent since they were planted in 1986. FEMA photo by Andrea Booher.



Fargo has long worked to reduce the effects of disasters in the community and, as such, was chosen by the state in 1998 to be North Dakota’s first *Project Impact* community. In 1999, the city received a national award from FEMA for having actively applied land use planning to new growth and better landscape management since becoming a *Project Impact* community.

“In Fargo, the idea of *Project Impact* is to encourage sustainable community hazard mitigation [disaster resistance] in whatever way we can,” said Jessica Thomasson, the city’s *Project Impact* coordinator. “We have explored new mitigation options. We have stronger and more integrated partnerships with people in the community and the public continues to see the value of supporting mitigation policies.”

The city has participated in the National Flood Insurance Program since 1971 and, after the 1997 floods, adopted stronger local building codes for new construction in and near floodplain areas.

Since joining *Project Impact*, the city’s disaster-resistance actions have included:

- ◆ Developing and instituting educational campaigns for all ages on disaster risks and prevention measures. A special program called “Fargo Ready Kids” was developed for third-graders throughout the city to get children involved in family disaster planning.
- ◆ Conducting a citywide risk assessment and hazard analysis.

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- ◆ Continuing a variety of mitigation efforts such as property acquisition and drainage improvements to minimize overland flooding throughout the city.
 - ◆ Installing storm warning sirens.
 - ◆ Building stormwater retention basins.
 - ◆ Adding a stormwater lift station.
 - ◆ Planting living snow fences or shelter belts to reduce the amount of blowing and drifting snow on key roadways.
 - ◆ Incorporating *Project Impact* and disaster-resistance principles in the city's growth and land use plans.
 - ◆ Helping to plan tornado storm shelters in mobile home parks to provide protection for park residents in the event of a severe storm.
 - ◆ Upgrading the city's Emergency Operations Plan.

City of Valley City

Valley City, population 7,100, is located in the scenic Sheyenne River Valley in the plains of south-central North Dakota. It is a community with a long history of flooding and with a great deal at stake when the river rises—all of its public buildings, all of its downtown businesses (about 75) and about 360 of its homes are either in the floodplain or the floodway.

In 1999, Valley City became the state's second *Project Impact* community. Having had four floods in the last 10 years alone, it is a community that is determined to change the course of its disaster history. After a devastating flood in 1993, Valley City sponsored a voluntary buyout of 47 homes in the floodplain. Today, the area is open space.



Valley City Mayor Riley Rogers is helping to build a disaster-resistant community.

The city is at risk for other disasters as well, including blizzards and winter storms, hazardous materials accidents (an interstate and a major railway border two sides of the city), dam failure, tornadoes and other severe storms.

To combat the impact of these types of disasters, Valley City's *Project Impact* efforts include:

- ◆ Installing a permanent backup generator at the city's water treatment plant to provide uninterrupted power—and therefore continuous water service—even during a disaster. The water treatment plant had failed during past disasters.
- ◆ Working with the city's school system to add disaster-resistance education to its regular curriculum.
- ◆ Developing a community education program that provides citizens with how-to information on protecting their homes and businesses from disasters.
- ◆ Installing sluice gates.
- ◆ Working with a local seniors organization to help develop a neighborhood watch that would assist older residents during a disaster.
- ◆ Relocating police and fire radio systems to a higher floor to make them less susceptible to flooding.
- ◆ Partnering with the county emergency management office on a local Emergency Plan and Resource List.

According to Valley City Mayor Riley Rogers and *Project Impact* Coordinator Mary Lee Nielsen, the initiative has created a synergy within the city.

"*Project Impact* has given collaboration and networking new meaning to the citizens of Valley City," said Nielsen. "It's like the floodgates have been opened. This kind of energy flow cannot be extinguished and is easily passed to others."

Added Rogers, "*Project Impact* is going to eliminate a lot of problems we've had in the past. We are going to move buildings out of the floodway. We are not going to allow structures to be put in the floodway. We are going to be a city that will be as disaster resistant as we can be and *Project Impact* will be a part of Valley City's existence from now on."

City of Jamestown

Jamestown, population 15,500, also is located in south central North Dakota along Interstate 94. There, the Pipestem and James rivers meet—providing a number of recreational opportunities for south central North Dakota.

Since 1993, Jamestown has been part of eight presidential disaster declarations for flooding and one for a severe winter storm.

The city faces two major disaster threats—flooding and hazardous materials accidents. For more than six years, the city's water tables have remained high, causing ground saturation and overland flooding. As a result, damages have occurred to homes, the city's infrastructure and roads.

Jamestown elementary students learned about disasters the fun way... by coloring pictures of floods, tornadoes and other types of disasters. Here, one student receives a certificate of appreciation for her work from FEMA Regional Director Rick Weiland. FEMA photo by Brian Hvinden.



Because of its proximity to the interstate, a major U.S. highway (also the city's main street) and a key railway system, Jamestown faces a high risk of a hazardous materials accident. Moderate disaster risks include severe storms, high winds, rural fires, drought and dam failures.

Although Jamestown just joined *Project Impact* in 2000, the community already has begun working to improve its disaster resistance. The city's efforts so far have included:

- ◆ Providing disaster-resistance information to visitors at the Stutsman County Fair.
- ◆ Installing a backup generator at the city's Civic Center to provide emergency power so that the center can be used as a shelter during disaster events. The generator and its installation was provided by Jamestown Hospital, a local *Project Impact* partner.

Other planned projects include:

- ◆ Conducting a citywide study to determine appropriate stormwater projects.
- ◆ Developing a 24-hour Skywarn system for emergency communications.
- ◆ Preparing a multi-hazard school safety plan that outlines procedural steps for emergencies.
- ◆ Improving the community warning system.
- ◆ Enhancing the community's public awareness program for emergency preparedness of all hazards.

“*Project Impact* has changed our approach to dealing with vulnerable conditions in our community,” said Project Impact co-coordinator Joe Kroeber. “It has changed our thoughts to looking more ahead to see what steps we can take now.”

Pembina County

Designated as the state’s 2001 *Project Impact* community, Pembina County is home to the oldest settlement in North Dakota and the upper Midwest. The county, population 8,741, is located in the state’s northeastern corner along the borders of Canada and Minnesota. The international border at Pembina is the main access for the Interstate 29 International Trade Corridor.

Pembina County and many of its smaller communities are located along the banks of the Red River of the North. The City of Pembina, northernmost in the county, sits near the confluence of both the Red and the Pembina rivers.



New mobile home park in Pembina offers residents a safe alternative to living along the river. Through a voluntary buyout, the city purchased 27 properties along the river to move the residents from harm’s way and to prevent future flood damages.

The county is particularly vulnerable to flooding because of the Red River’s unusual characteristic of flowing north. In the spring, the river normally thaws first in the southern part of the state, causing excess water to flow northward where thaws have not yet occurred. When the water hits frozen areas, the river overflows its banks and causes widespread flooding.

The county has had eight presidential disaster declarations for flooding and one for blizzards since 1993. Along with flooding, winter storms and severe summer storms, including tornadoes, pose the greatest disaster threat.

Despite the repeated disasters in recent years, the county and many of its communities have made great strides in disaster resistance. In the past decade, nearly \$10 million in federal, state and local funds have been spent on disaster repairs and on reducing or preventing future damages.

Those disaster-resistant efforts throughout the county have included:

- ◆ Voluntary buyout of 27 flood-prone properties in one community and the subsequent development of a mobile home park outside the 100-year floodplain.

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- ◆ Relocating a city maintenance facility outside the 100-year floodplain.
 - ◆ Moving a primary sewer lift station and a medical clinic off an unstable riverbank.
 - ◆ Voluntary buyout of several residential and commercial properties off an unstable riverbank and subsequently out of the floodplain.
 - ◆ Relocating a city sludge pond out of the floodplain.
 - ◆ Re-channeling a portion of the Red River that runs through one of the communities.
 - ◆ Using special measures, including elevation and flow-through doors, to protect a general aviation airport.

Planning and identification of new efforts as part of *Project Impact* will begin in 2001.

“Through the *Project Impact* initiative, we hope to work to develop a more integrated approach to disaster resistance,” said Sandra Simonson, the county’s *Project Impact* coordinator. “By working together to reduce damages and costs associated with natural disasters, we hope to not only protect the individual towns but also our county as a whole.”

For more information on Project Impact and disaster prevention, call FEMA at 1-800-646-4600 or visit the FEMA website at www.fema.gov/impact.

Building the Ground up at Alerus Center

It began in 1995 as a vision. It was to be a state-of-the-art arena and convention center that would attract visitors from throughout the region to the city of Grand Forks.

But two years later, during the contract document stage for the facility, Grand Forks was hit with a flood that would heavily damage this eastern North Dakota city. The record-level flood would forever change the way the city thinks about the dangers of disaster.

With the massive task of rebuilding underway, city leaders took a second look at the preliminary design of the new 447,000-square-foot events center. There was a potential problem. The main event space originally was intended to be recessed 14 feet into the ground.

Because most of the belowground spaces in Grand Forks had filled with floodwaters, city leaders opted to raise the main event space to ground level in an effort to reduce the impact of any possible flooding.

As a result, the main space can be used in the future as a disaster staging area because of its size, easy ground-level access and safe distance from the river. It is beyond the city's 100-year floodplain area.

The \$71 million project, financed by municipal revenue bonds that will be repaid by retail sales and entertainment taxes, is expected to open in the spring of 2001.

The Alerus features a main arena that will be used for athletic events, concerts and large trade shows, and an adjoining convention center that includes a 25,536-square-foot grand ballroom and 12 meeting rooms.



Artist rendering of the new Alerus Center, scheduled to open February 2001. Courtesy of Schoen Associates.

Partners in Time

Buy Healthy Future for Drayton

Many disaster-stricken communities find themselves facing the difficult job of helping residents and businesses put the pieces of their broken dreams back together.

But there is another challenge as well. It is economic survivability. And it's a problem for which there often are no easy solutions.

One northeastern North Dakota town, in the aftermath of the staggering 1997 Red River Valley flood, conquered that challenge by parlaying ideas and money into a successful public-private venture.

As a result, the local medical clinic has been saved, a growing apparel company has remained in town, a large, vacant building has been given new life, and new dollars have been generated for future business growth. No small order by anyone's standards.

The town is Drayton, population 900. It sits on the banks of the Red River of the North and faces an almost yearly flood threat. And after the '97 flood, the city had a big problem.

The town's only medical clinic, located high on the banks of the river, had flooded. Despite extensive cleaning, sanitizing and disinfecting, the building was sick with mold. Townspeople knew the building would flood again. Moreover, the riverbank was becoming increasingly unstable because of poor soil conditions. It could no longer hold the weight of an emergency dike that could protect the building. It was just a matter of time before the clinic, too, would likely fall.

Floodwaters rose to a level of 6 inches inside Drayton's medical clinic during a record flood in 1997. The clinic could not be protected by this emergency plywood floodwall because there was not enough ground behind the building to construct a dike. Photo courtesy City of Drayton.



Faced with a Dilemma

So the city found itself in a dilemma—how to find a new home for the clinic and an adjoining dental office—and, more importantly, how to pay for it. Though the clinic operation is part of a larger medical system in Grand Forks, some 50 miles away, the city owned the building and therefore needed to find a solution to keep medical services in town.

At the outset, the city had just slightly more than \$4,000 from a small flood insurance policy to put toward the cost of a new home for the clinic. That put them a long way from doing anything viable, according to Drayton City Auditor Carol Gardner.

So they enlisted the help of the Red River Regional Council, an area planning organization that assists governmental entities in four northeastern North Dakota counties with rural development and community survivability for small towns. Through a variety of grants and programs, the council helps fund and manage projects that support economic growth, job development, natural resource conservation and development, residential rehabilitation, businesses and public facilities.

The city had worked closely with the council on various projects for years and, once again, a new successful partnership was in the making.

“We knew we needed to buy out the clinic because of the conditions inside and because it couldn’t be protected from flooding where it was anymore,” said Sandra Simonson, the regional council’s economic recovery coordinator. “And we knew there were dollars out there.”

The council had already secured a special \$1 million disaster grant from the U.S. Department of Housing and Urban Development for hard-hit Pembina County to help with the 1997 flood recovery. Saving the Drayton clinic seemed a perfect use for some of that money. Pembina County commissioners agreed and gave Drayton \$150,000 toward the cause.

But that still left the city short of money—either to build a new building or to buy and renovate an existing structure.

Building Public-Private Partnerships

So the council pursued a grant from the U.S. Economic Development Administration (EDA) to relocate the clinic, the dental office and other at-risk downtown businesses. EDA agreed with the request and awarded \$441,000 to the Drayton Economic Development Corporation (DEDC) to relocate flood-impacted businesses.

But there was a catch. The grant needed a 25 percent local match. So the DEDC went looking for help. What they found was a partner who could help them cover the match and who they, in turn, could help as well. It was the city of Drayton.



Relocated to safety: The Altru Clinic (left) and a local business, Originals Casual Wear (right), have moved to larger, safer quarters on the edge of Drayton where they can be better protected in the event of another flood. The entire site was raised 1 foot before the buildings were even built.

“We talked the city into combining their grant money with our grant money,” said DEDC board member Ardis Olson. “We would then do the first phase of the renovation, which was the north end of the building, into the clinic. It was ideal.”

The city agreed. In the summer of 1998, the city purchased a 19,000-square-foot building on the edge of town for \$289,000. The building, well-built but vacant and for sale, had once been a large furniture store with a lot of open space, which helped keep renovation costs down.

An even bigger plus was the fact that the entire property, surrounded by a 100-year floodplain, had been raised 1 foot above the base flood elevation before the building was built in 1990. That feature, coupled with the fact that elevated roads on three sides could act as natural dikes, meant the building could be better protected from another flood. All the city would have to do was construct an emergency dike on the fourth side and the property could be shielded from advancing floodwaters.

Renovation for the clinic portion began and attention was turned to leasing the remaining space. Suddenly, there was another roadblock. DEDC officials discovered that higher-than-expected electrical costs would require an additional \$40,000, Olson said. Because the clinic would only occupy a third of the building, the DEDC didn’t want to use more of the EDA grant to cover the costs—leaving a shortfall for finishing the larger space.

So the DEDC contacted other organizations in the community and within a couple of weeks, the money was raised. Donations came from a local gaming organization, the hospital association board (still in existence even though the hospital was long gone) and a civic group made up of individuals who once owned a local business.

Later, an additional \$20,000 to cover more costs was provided by the Drayton Growth Fund, which uses a 1 percent city sales tax to pay for economic development projects.

With that settled, the focus returned to filling the building. The dental office had already relocated to another building in town. The DEDC was considering a mini-mall of small shops and businesses. But renovation costs for that type of project were too high and most of the downtown-area businesses weren’t interested in relocating anyway. Except for one. And it was a big one.

Keeping Business in Town

The business, known as Originals Casual Wear, is a local apparel company that was quickly outgrowing its space and looking for larger quarters, Olson said. Other communities were interested in luring the business away from Drayton because they recognized the benefits the company could bring to a local economy. The DEDC wanted to keep Originals in town. And so did the company’s owner, Cheryl Gjevre.

“I heard that the city was going to be getting the building and it would be for economic development and that if there were any businesses affected by the flood, there was still space available,” Gjevre said. “We wanted to expand at that point and we absolutely needed a larger building. But there was no other building in town that could have housed us.”

Gjevre’s company, which was located about a block west of Main Street, was not physically flood-damaged but did suffer an economic impact from being idle for a time during and after the disaster. Her company screens apparel that is sold in seven Originals stores throughout the upper Midwest and by catalog nationwide. The company, which has been in business since 1987, employs 30 workers year-round and adds staff during the fall holiday season.

“The fact that we could rent as opposed to having to build something was a very big plus for us,” Gjevre said. “We’re a growing business and we needed to put our capital back into our company to expand.”

Now Originals is aggressively boosting its catalog business. With continued sales growth comes the possibility of even more jobs. And Gjevre says she's very happy she could stay in the town she loves.

Drayton is a winner as well. The project, which has totaled about \$651,000, continues to give back to the community in many ways, local officials say.

Both the clinic and Originals continue to grow. And so does the city's ability to fund future economic development. Because there is no debt service on the building, rental income from both businesses—minus some maintenance expenses—is put into a special fund that is earmarked for future projects.

Also, the city has contracted with the DEDC to manage the leases and the day-to-day operation of the building, Gardner said, which takes a workload burden off of her—the city's only full-time administrative staff person.

Many in Drayton believe the project has been great for the community.

“This is a 100-percent success story,” added Olson.

Fortifying Against Future Floods... Grand Forks Water Treatment Plant Leads the way

At 6:30 a.m. Saturday April 19, 1997, the long, desperate fight to save the Grand Forks Water Treatment Plant was over. The plant was flooding beyond control. Operationally, it was failing. The Red River of the North had been too formidable an enemy.

That moment of defeat, however, marked a new beginning. Hazel Fetters-Sletten, water treatment plant superintendent, vowed that things would be different the next time the Red River came calling. She was going to find a way to better protect that critical facility in the future.

“My first thought was, ‘Let’s move it. I’m tired and I don’t want this to ever happen again,’” said Fetters-Sletten. “But this isn’t a facility that can just be picked up and plopped down in a short period of time. Building something of this magnitude would take four or five years.”

So she did the next best thing. With the help of staff, engineers and contractors, she figured out how to restore the damaged plant so that it would be more disaster resistant, paying particular attention to the operation’s most critical components.

What stands in the shadow of the river today is a water treatment facility that has undergone major changes to minimize the impact of future flooding and other disasters. In addition, there now is an extensive written flood contingency plan. And future building will no longer occur at the present site but far from the floodplain in which it currently sits.



Floodwaters inundated the Grand Forks Water Treatment Plant in April 1997. The city was without drinkable water for 23 days because of the damage to the facility. Photo courtesy of Advanced Engineering, Inc., Grand Forks.

Unlike other public and private facilities, water treatment plants were traditionally built near rivers on purpose. In Grand Forks, water is drawn from the Red River and the Red Lake River, both of which meet near the plant. The water then is treated in a three-phase process and sent through a citywide distribution system of water lines to homes, businesses and other end users. Average daily consumption for the city and the Grand Forks Air Force Base, located about seven miles away, is approximately eight million gallons.

The water treatment plant itself is a complex of three buildings, three large underground finished-water clearwells and a large aboveground water storage tank. Inside the main building, there are multiple levels of rooms with large equipment and thousands of feet of water-filled piping. When the river began invading all three buildings, the plant became a complicated nightmare. The buildings remained flooded for 10 days. As a result, the city was without drinkable water for 23 days.

In deciding how to make the facility more disaster resistant, Feters-Sletten and the engineers first targeted the three components that would be essential to keeping the plant operating, even if as much as a foot of water were to get inside.

Primary attention was focused on protecting the power supply, wiring and the massive amount of electrical equipment needed to run just about everything in the plant, Feters-Sletten said. So electrical transformers and equipment such as motor control centers and electrical panels throughout the complex were elevated, some as much as 10 feet. The power “nerve center” for the plant now is located on a newly built earthen berm. Individual transformers and switchgear on the berm are elevated higher yet.

Next, two large air compressors were moved from the lowest level of the plant to a higher floor, greatly improving the chances that they would stay dry in the event of a future flood, Feters-Sletten said. Losing the air compressors—as happened in the 1997 flood—presents a critical problem for the plant.

“We need compressed air to operate the valves,” Feters-Sletten said. “Without it, the valves fail in an open position and we can flood ourselves internally. So we moved them upstairs out of the boiler room. Now, in effect, they’re about 30 feet higher than they were before.”

The third key component involved disaster-proofing the water intake system, Feters-Sletten said. Without the ability to draw raw water into the plant, there is no way to provide treated water to the rest of the city. So a concrete wall was built around one of three pumphouses and the electrical components inside were elevated. Additionally, a 250-kilowatt portable generator was purchased to provide a backup power source. This ensures that at least one raw water intake will work even if the city’s power goes out.

In the main building, critical records such as blueprints, equipment information, and vendor lists have been relocated to a room on an upper floor of the plant. Safeguarding this kind of information is essential, Feters-Sletten said, to reducing the amount of downtime that any facility or business could experience from a disaster.

For all three buildings, metal shields with rubber gaskets have been custom built to fit over 24 major doors and windows. In advance of a flood, the shields can be attached to special frames that are permanently affixed to the doors and windows to keep water from entering the plant.

When a flood is imminent, a clay dike can be built around the plant as a secondary means of protection. The use of the dike will be determined from the river crest forecast, Feters-Sletten said. Although attaching the metal shields will work for most floods, a higher water level could exert too much pressure on the building walls, causing a collapse. The dike will help prevent those high levels from reaching the buildings.



Ken Vein, former Grand Forks city engineer, helped guide the changes that will enable the treatment plant to better withstand future flooding.

With the ground-level measures in place, engineers and staff then looked at protecting the underground elements of the system because floodproofing this type of facility involves more than just stopping the spread of surface water, Fetters-Sletten noted. By the plant's very nature, there are several ways that water can get in below ground. So numerous shut-off gates and valves have been installed within the plant's underground utilities to block floodwaters from backing up into the facility from the city side.

To date, the disaster-resistant features have cost about \$1.8 million, which is in addition to the nearly \$4.3 million it cost just to repair the plant's flood damage. The funding came from the Federal Emergency Management Agency and the State of North Dakota through a disaster-recovery program that repairs or replaces disaster-damaged public facilities.

Given the almost yearly river flood risk and a continuing wet cycle, Fetters-Sletten wholeheartedly believes the cost for the extra protection measures has been worthwhile to protect a facility currently worth about \$40 to \$50 million.

A key electrical transformer (right) has a new home atop this concrete platform, built to keep the equipment high and dry in a future flood.



Multi-Hazard Protection

Besides floods, the plant now can operate in the face of other kinds of disasters as well, in large part because of a special 1500-kilowatt generator that can provide power at any time for any reason.

The \$350,000 generator, installed just months prior to the 1997 flood, ran the plant during an ice storm that preceded the April flood when the rest of the city was without power. Although it succumbed to the flood just days later, the generator has since been rebuilt and reinstalled, the fuel line fill spout has been elevated 5 feet and contingencies have been added to protect the room in which the generator is housed so that the equipment can be kept dry.

The generator investment more than paid for itself just two years later when, during a nearly identical April ice storm, the plant remained operational after the power went out in the rest of the city. Now, plant operators often switch to generator power when the city is in the path of a severe thunderstorm as a precaution against surges that may occur in the regular power supply. That precaution virtually eliminates the risk of costly damage to equipment from those power surges.

With an eye to the future and mindful of the lessons learned from the record-setting 1997 flood, the city is determined not to take any more chances with one of its most critical facilities. So the entire water treatment complex gradually will be moved to a 40-acre site the city purchased for \$540,000 located west of town, outside the floodplain and far from the floodwaters' edge.

The new location does mean abandoning the downtown site on which a treatment plant has stood since 1897. The current facility was built in 1956 and since then four additions have been made. But to build a new, technologically current facility would cost from \$80 to \$90 million. And it is just too



In addition to elevating electrical equipment (left), engineers also outfitted 24 major doors and windows (right) with special metal shields that can be attached ahead of time to keep out floodwaters.

big a risk to locate an expensive new facility like that close to a river with a long history of flooding, Fetters-Sletten said.

The disaster-resistant measures and contingency actions now in place will enable the plant to operate in a future flood, even if it's totally surrounded by water, Fetters-Sletten said. Those changes probably would not have occurred if the plant hadn't been through the 1997 flood, she added.

"We're in a lot better shape now, definitely," Fetters-Sletten said. "We've relocated our critical components, we have our contingency plan in place and our staff is ready. We're not doing it on the fly."

Reshaping the Course of a River's History



August 2000: After five years and countless floods, this riverbank (right side of photo) still holds the line against major erosion that was threatening a nearby county road. Photo courtesy of Rich Axvig, NRCS.

When torrential storms hit Grand Forks County, North Dakota, in June 2000, they did more than touch off destructive flooding.

The storms waged a war of nature versus nature. Two worthy opponents—a raging, rain-swollen river and a vegetation-laden riverbank—battled one another head on.

When that war was over, the riverbank had won a surprising, yet important, victory for the county and for the practice of bioengineering—a technique that combines structural and vegetative elements to stop riverbank erosion.

“The riverbank held up just great,” said Richard Axvig, district conservationist with the Natural Resources Conservation Service (NRCS) in Grand Forks. “There was an awful lot of water flowing pretty hard and fast at that riverbend. We weren’t sure how it would hold up.”

But thanks to a lush growth of willows and straw grass, first planted in 1995 to thwart erosion along a meandering section of the Turtle River, the riverbank survived the assault.

River Eating its Way

The summer storm wasn’t the first time that flooding caused problems along that section of the river. Since the 1980s, the river had been slowly eating its way toward a major east-west county

highway every time rain and snowmelt increased the water level. In 10 years, the riverbank had moved 40 feet, putting the water's edge about 150 feet from the center of the two-lane road.

The county water resources board, highway department and the NRCS needed a solution. So they turned to Linda Kingery, environmental coordinator with the Red River Regional Council, a non-profit agency that manages grants for governments in four northeastern North Dakota counties.

Kingery had been looking for a problem area in North Dakota that was suitable to use bio-engineering techniques rather than the more traditional—and expensive—method of stabilizing a riverbank by lining it with mesh and tons of rock.

Kingery thought a 330-foot section along the Turtle River could be a good test site. So she brought in three NRCS bioengineers from Michigan to conduct a riparian workshop that combined classroom instruction on how to restore natural vegetation with a hands-on application. The restoration design for the site was developed by Roger Thompson, a project engineer for the NRCS in Grand Forks County.

The 67 participants represented a number of agencies, including the NRCS, the North Dakota Forest Service, the North Dakota Game and Fish Department, the State Water Commission, the North Dakota Department of Health, the University of North Dakota and the Minnesota Department of Natural Resources.



September 1995: A backhoe, sitting on the newly reshaped riverbank, places large rock along the toe of the Turtle River to provide some protection from the river's ebb and flow. Afterwards, the bank was planted with willows and straw grass to begin restoring natural vegetation. Photo courtesy of Rich Axvig, NRCS.

Reshaping the Riverbank

Prior to the hands-on phase, the riverbank first had to be moved back from the road and reshaped because erosion had carved out a sheer, 12-foot-high cliff. So heavy machinery was brought in to cut down the cliff and re-create a sloping bank that would increase the distance between the river and the road.

Next, rock was laid along the bank both 2 feet above and below the water level to protect the soil from the river's constant wave action.

Workshop participants dug a trench behind the rock above the water level. They made bundles of willows and laid them into the trench to begin rooting. A second trench was dug farther up the bank where additional bundles were placed.

Brush mattresses, fashioned from more willows, were laid on the riverbank and switch grass was planted—both to help form a natural cover that would protect the soil. Willows and switch grass, indigenous to the area, were used because they are hardy, especially around water, and have good, fast-growing root systems.

At the top of the bank, three rows of trees were planted to provide an additional buffer and to shade the river, which helps lower the water temperature and improve the oxygen supply for fish.

Kingery estimated that about 800 volunteer hours were put in to complete the project. About \$15,000, part of a larger project grant from the state health department, covered the contractor cost of the reshaping and rock placement. Had the traditional rock layer method been used, the project cost would have been substantially higher and the benefits to plant and fish life would not have been realized, she added.

The project has clearly provided the expected environmental benefits in the past five years, Kingery said. And, it also has provided some important lessons.

Learning Lessons the Hard Way

In the spring of 1996, less than six months after the initial work was done, ice chunks slammed into the bend of the riverbank, tearing the brush mattress. Americorps volunteers helped to replace the section with new willows.

There were several damaging events in 1997, again causing erosion at that bend. High water events in 1998 and 1999 shaved off a little more soil. Every year, Kingery and other natural resource managers went back to the site and made repairs, trying a different technique each time to fix the nagging problem.

“One of the lessons we learned there was that we had squeezed the radius too tight for that river,” Kingery said, when the riverbank was brought back away from the road. When high-flow events occur, the river cuts into the bank because it can’t navigate the shortened bend.

“We didn’t have room to spread the riverbank out,” Kingery said. “That would have meant a lot more excavation that we didn’t have the time or money to do. We were going to deal with what was there. At that point, we didn’t think a lot about the radius of that curvature.”

Now, she said, they do. And though some would view the repetitive damage as a setback, Kingery doesn’t see it that way. The erosion has been minor—only about 2 feet in five years compared with 40 feet in 10 years.

“It would have been neat to get it right the first time,” Kingery said. “But that’s the nature of working with a natural system. Sometimes it all works out great but a lot of times it doesn’t. And it’s the times that it doesn’t work out perfectly that you have to pay attention. If we don’t do that, we really haven’t learned anything.

“If that erosion hadn’t happened, we probably wouldn’t pay so much attention to radius curvature and we wouldn’t pay so much attention to how those things progress,” she added. “Watching things over five years, because it didn’t work perfectly, gave me a lot better understanding of what’s going on there.”



May 2000: High-water events beginning in 1996 scoured out a curve on the riverbank because the radius curvature was too tight for the river to easily navigate.

Kingery said she, too, is pleased with how well the riverbank fared in the June flood which she termed as “way off the charts” in magnitude.

“When we addressed that site, what we really wanted to do was stop the erosion,” Kingery said. “This performed marvelously under a big test. We didn’t see any new erosion. There were quite a few people who were involved in building that thing who were really amazed that it didn’t really show any negative effects.”

New Solution to an Old Problem

Even more encouraging is the fact that a new technique put in about two months prior to the flood may solve the long-standing erosion problem.

About 100 willows tied to small wooden stakes were planted within the erosion area to spur new growth, Kingery said. Wire cages were placed over stakes in six sections of the area to protect the young plants from resident beavers—long suspected of stunting the growth of the willows closest to the water.

When floodwaters hit the riverbank, the cages were crushed. The willows, on the other hand, survived.

“By August of 2000, there were only three stakes that hadn’t grown,” Kingery said. “Virtually all of them had new growth. They’ll continue to branch out and probably hide that erosion in a year or so. In time, it will fill in by itself.”

Since the Turtle River site was done, interest in and requests for riparian projects (restoring natural vegetation) has skyrocketed, Kingery said. And though not all erosion is a suitable candidate for bioengineering techniques, Kingery hopes to meet the goal of completing 100 river miles of riparian projects by the end of 2002.

So far, about 30 miles already have been done in eastern North Dakota within the Red River basin. About 40 miles are planned for completion in 2001.

And along the way, no doubt, more lessons will be learned.

More information on the North Dakota riparian sites and projects is available on the following website: www.health.state.nd.us/rrbrp.



September 1995: A dozer moves dirt to begin reshaping the riverbank that had been eroded into a sheer cliff about 12 feet high. In 10 years, the riverbank had eroded 40 feet. Photo courtesy of Rich Axvig, NRCS.

Calming the Storm...

Prevention Measures

Pay Big Dividends

Growing up on a farm in rural North Dakota, Terry Styf learned a lot about keeping water out of where it doesn't belong. Like out of grain bins. And machine sheds. And houses.

It's a lesson that has paid him big dividends over the years. But none more so than in June 2000 when about 7 inches of rain bombarded his West Fargo neighborhood in little more than six hours.

The storm filled the streets—and many basements—with water. In front of Styf's house, water 3 feet deep covered the street. In fact, the water came as close as his front sidewalk.

But Styf's house was relatively unscathed thanks to a number of disaster-resistance measures he had put in place throughout the year before the storm.

"I saw people carrying flood-damaged things out of their houses just a few blocks from here," says Styf, 35. "We didn't have that problem. I didn't have to call FEMA and have an inspector come over to my house to look at damage."



Terry Styf installed pavers with a slight angle to drain water away from his house.

Risk of Flooding

Styf, a West Fargo police officer, says he knew the flood threat heavy rains posed in his neighborhood, an area lacking the elevation needed to help water quickly run off. He had lived next door to his current house for seven years. So when he bought his multi-level residence in June 1999, he immediately began using the same techniques that had successfully protected his personal property and kept water out of his previous house.

First, he added shelving in his basement to elevate all of his storage. Now, extra shoes, Christmas decorations, toys and off-season items sit 12 to 18 inches off the floor. Styf and his wife Tara chose to forego permanent wall-to-wall carpeting and instead use a carpet remnant that can be rolled up and pushed to one side as a precaution during heavy storms. He also added another floor drain plug and replaced an old sump pump.

Then Styf turned his attention to the exterior of the house. He added plastic window-well covers to keep water from getting inside through the windows. He added extensions to the downspouts so that water wouldn't run down the foundation walls. And he extended the sump pump discharge hose another 10 feet to the street and then buried it. Moving the hose below ground enabled him to angle it downward, improving the gravity drainage away from the house, and reducing the chances that the hose would accidentally be disconnected, pouring water down the foundation.

Styf did extensive landscaping as well. Soil around the house had settled about a foot over the years, leaving the foundation exposed. So he hauled in 16 cubic yards of dirt, built the soil around the foundation back up a foot and then sloped it away from the house. A top layer of mulch helps hold the soil in place.

About 100 square paver blocks were put in around the house and slightly tilted so that water moving across the yard first hits the pavers and then runs down toward the street. A curved and sloped concrete extension was added to the side of the driveway to carry water away from the garage and to prevent the yard from eroding.

Spending a Little Saves a Lot

Lastly, Styf added what appears to be just an attractive sitting area with a bench atop a mound of soil and mulch and bordered by two wooden privacy fence panels. In reality though, the fence panels and the mound help guide rainwater overflowing from the roof during heavy storms away from the house and into nearby flowerbeds.

So far, Styf says he's invested about \$4,000 in cash and a lot of labor for all the work done to the house. He has been able to cut costs by borrowing equipment and by bargain shopping for materials such as the paver blocks, which he found for 50 cents each at a garage sale. The money he's spent, Styf says, has saved thousands in damage many times over.

"The mitigation has been worth it," Styf said. "We've gotten four- to five-inch rains and flooding hasn't been an issue. But what I've learned is that flooding is an ongoing risk. You always have to be willing to look at things and continually upgrade."



An attractive sitting area catches roof runoff and channels it away from the house.



Styf secures hoses into a basement drain.



More pavers outside Styf's garage also help direct water away from the structure and foundation.

Styf now is making even more changes to correct three small problems that occurred during the June storm. Water was able to seep into the house from one of the window wells because the metal well wasn't sealed around the outside. Now, he'll waterproof the exterior of all the wells.

There was slight seepage underneath one of the shelving units in a corner of the basement through a crack that wasn't sealed. Now, Styf has sealed the crack with a vinyl cement patch and checked the rest of the basement to ensure there were no more possible entry points.

A small amount of sewage backed up into the basement through one of the floor drains because Styf forgot to put the temporary plug in place. Now, he'll install a permanent plug in the drain similar to the other plug already in place so the drain is protected full time. As an added precaution, he'll put a second sump pump with a battery backup power source in another corner of the basement.

All in all, Styf says, the work he's done has protected the investment of his house and freed him from worrying about future storms.

"When the storms of 1993, 1997 and 2000 hit, I was working, helping other people," Styf said. "I couldn't come home. Now, I can just tell my wife to roll the carpet up and push it to one side. I'm not concerned now every time rain comes through."

Keeping Disasters in Check...

A Strong Defense for New Hockey Arena

To the University of North Dakota (UND) ice hockey team and its fans, scoring a new state-of-the-art ice arena is as exciting as winning multiple national hockey championships.

The new facility, named Ralph Engelstad Arena, will be a breakaway success for sure. When it opens in Grand Forks, North Dakota, in the fall of 2001, it'll be big, beautiful and have amenities galore.

But what most people won't be able to see are the number of built-in features that will better protect the arena in the future from the kinds of disasters that have hit Grand Forks in the past.

It was a \$100 million gift from former UND hockey goaltender Ralph Engelstad and his wife Betty that made the new \$80 million arena a reality. But it was the eight blizzards and record flooding that pummeled Grand Forks in late 1996 and early 1997 that influenced the decision to add disaster-resistant features, according to Jim Kobetsky, architectural designer for the project.

"These special features are definitely a result of Grand Forks being flooded in 1997," said Kobetsky of Schoen Associates, the architectural firm that designed the project. "If we hadn't flooded like that, we wouldn't have designed it to the extent that we did to protect it from future flooding and other types of disasters."

The facility, more than 400,000 square feet spread among five stories, will have a seating capacity of 11,400 and will be used for UND hockey games and other ice events. It will include a premier, recessed ice rink; a second practice rink; locker and weight-training rooms; 48 luxury suites; two large club rooms; a press area; and several concession and souvenir areas.

Better Defense Along the Blueline

The site of the new arena, on 50 acres along the north side of the university's campus, is not in a floodplain. But it's close enough for discomfort. And there is a naturally high water table below ground.

So several flood-proofing measures are being added to protect the facility. Before construction began, the entire site was raised 4 feet. The new level puts the arena's main concourse above the 1997 flood level in that area. And, because the concourse encircles the recessed rink, the difference in elevation creates a "self-supporting dike system" inside the building, Kobetsky said. Outside the arena, the site also is slightly sloped to help water drain away from the structure.



The new Engelstad Arena will better weather future storms because of several added disaster-resistant features.

Beneath the facility's 100,000-square-foot foundation an extensive "dewatering system" has been installed to keep groundwater from seeping into the structure. The system uses thousands of feet of hard-plastic, perforated piping covered with a fine, mesh screen and set in 2 feet of rock. As groundwater rises, it is intercepted by the piping and drained by gravity flow to sump pumps in each corner of the facility. The water then is pumped into the city's stormwater system. The mesh screen keeps silt and other foreign materials from clogging the pipes and interfering with drainage.



Artist rendering of the new arena, scheduled to open in 2001. Courtesy of Schoen Associates.

The dewatering system already has been proven to work as designed, Kobetsky said. Periodic rainfall in the spring of 2000 during the rink excavation enabled the architects and contractors to actually see the drainage system handle the water. The impromptu tests were a success.

To further protect against seepage, a rubber membrane is being added to the foundation walls around the entire facility. The membrane will extend 18 feet up the walls to waterproof the structure, but will not be visible from the outside.

For added wind resistance, a heavier metal is being used for the roof to minimize the chance of damage from high winds.

"We know there have been problems with roofs on other buildings of this nature," Kobetsky said. "They've lost the metal protection of the roof and that's expensive. So we used a more stringent roof material that is designed to remain intact even in the case of very strong winds."

And to handle the big snowfalls common during North Dakota winters, extra features are being added to the roof. Because of the roof size, there is a danger of "snowslides"—large amounts of snow sliding down the roof and dropping onto passers-by. So a 3-foot-high galvanized steel fence has been added around the roof edge to catch the snow. Just inside the fence is a trough, 6 feet wide and 2 feet deep, which is lined with an electric melting system. Once the snow hits the fence, it drops into the trough where it melts and then drains into the building's gutter system.

Playing to Win

The disaster-resistant features are important to Engelstad, who made his fortune as a contractor and real estate investor. In fact, they're so important that Engelstad ordered a design change after the arena construction had begun when he learned that flash flooding in the city of Fargo caused about \$10 million in damage to a public sports/events center there.

That facility, the Fargodome, filled with about 8 feet of water in June 2000 when heavy rains poured down a wide service ramp that led to the bottom level of the building.

The new arena has the same kind of ramp, Engelstad said. And even though the initial ramp design utilized a naturally higher ground elevation to prevent flooding, another flood barrier is being added for more protection. Steel posts will be set into concrete on each side of the ramp. If there is a flood danger, double-thick plywood forms can be slipped down into the posts to shut off the ramp and prevent water from running down into the building.

Engelstad says he's successfully used that same technique 10 to 15 times at his hotel in Las Vegas during past flash flood events in that city.

"We've held back water up to about four-and-a-half feet high at the Imperial Palace," Engelstad said. "And that's water flowing about 20 to 25 miles per hour."

According to Schoen Associates, the extra disaster-resistant features have added about \$1.5 million to the overall project cost. It's an investment that Engelstad wouldn't dream of forgoing.

"We've tried to do everything we know within reason to protect the facility," Engelstad said. "There are certain things you can't stop. But it's cheaper to spend money now than to spend a whole bunch later. You can do it for pennies compared to what it's going to cost to do it afterwards or to repair the damage."

UND officials say they, too, are pleased with the added disaster protection. The campus sustained about \$40 million in damage from the 1997 floods, making it a painful but worthy lesson.

"The flood gave us a much better appreciation for how we build things and how we look at infrastructure," said Peter Johnson, university spokesperson. "We know there is a potential for another flood in this area. So these extra design features mean a lot. As a steward of the public's property, we want to make sure that property is protected. We'll sleep better, not only because that building is state of the art, but because it's protected in a state-of-the-art way."

For that, credit a former goaltender who still can make a spectacular save.

Flood Teaches Mekinock Couple a Thing or Two about Prevention



Mark Wakefield takes a break from cleaning out the flood-damaged home he had owned for just 10 days when disaster struck. He and his wife had no flood insurance because they were told the town hadn't flooded for 50 years. Now, the couple has rebuilt with disaster-resistant measures and purchased flood insurance to protect them financially if a flood ever strikes again.

Mark and Heidi Wakefield hadn't even made their first house payment yet. They'd lived in their house in Mekinock, North Dakota, for 10 days. Heidi was five months pregnant with their second child. And Mark was on an airplane to Florida for temporary military duty.

And then came the rain. A surprise June 2000 storm dropped more than 17 inches of rain in northwest Grand Forks County. The usually docile Turtle River swelled well beyond its banks and was moving overland, flooding everything in sight. The Wakefields' house was in its path and Heidi didn't even know what was about to hit her.

The nighttime storm had come and gone. By the next morning, the only visible water was in a nearby ditch. But by the next afternoon when Heidi returned from work, their road was inundated. Neighbors were sandbagging in front of the house. Frightened, and frantic to rescue their dog, she waded through knee-deep water with her 3-year-old on her hip to get to the house.

Inside, the house was still dry. But within 15 minutes, the carpeting in their living room began bubbling. Moments later, water was rushing into the lower half of their split-level home from beneath the baseboards. Outside, floodwaters had blown a hole through the outer drum of their only working sump pump, seriously compromising its effectiveness.

When it was all over, the water in the Wakefelds' lower level was 4 feet deep. The couple's living room, a bedroom, bathroom, utilities and storage space were soaked. Personal belongings, including clothes, baby items, every pair of Heidi's shoes and her grandmother's antique sewing machine, were lost.

Worse yet, the young couple had no flood insurance. They had inquired about buying a policy when they purchased the \$76,500 home. But they decided against it after area residents told them they didn't need insurance because the house wasn't in a floodplain and because the last bad flood to hit the town was 50 years before. The couple didn't know how unfortunate that advice really was.

Rebuilding with Future Protection

Now it is a different story for the Wakefelds. New insulation and drywall have been put in. Paneling has been replaced. And changes have been made to reduce the impact of a future flood.

"We have done everything we can think of to do this right," said Heidi, 24. "Our main concern is to fix things so this doesn't happen again. Granted, it costs more but this has been hard. We just can't go through this again."

New drain tiles and two new sump pumps have been put in. The old drain tiles had been broken by the floodwaters and weren't low enough to work anyway, the couple later found out.

Even though there was no sewer backup damage in the house—they had pumped their septic system totally dry before moving in—Mark now has added a shutoff valve to the sewer line outside to prevent the possibility of sewer backup in the future.

The water heater and furnace have been replaced and now are elevated 4 inches off the floor. The couple added carbon monoxide detectors and smoke detectors after they discovered that there had been a hidden leak in the old furnace.

"Our main concern is to fix things so this doesn't happen again. Granted, it costs more but this has been hard. We just can't go through this again."

The Wakefelds say the lessons they learned from this disaster came with a steep price, but that the money they've spent will be worth it in the long run.

"When we started tearing things out and started figuring out how much money we were talking about, we were quite nervous and scared at first," Heidi said. "The dollars were ringing up like crazy."

Damage estimates totaled about \$17,000. But with grants from the American Red Cross and the Federal Emergency Management Agency, and a low-interest loan from the U.S. Small Business Administration, the couple was able to repair the damage and add the special disaster-resistance features.

And for further protection and peace of mind, they've bought flood insurance.

"We talked about flood insurance before the flood happened and we felt we were okay by not having it because we weren't in a floodplain," Heidi said. "But because we've had the flood and the things we've had to go through since then, we decided it's not that much more to pay to be prepared, whether a flood happens again or not."

Drayton Takes a Stand Against Future Floods



The city of Drayton fights to keep floodwaters at bay during record flooding in 1997. Photo courtesy City of Drayton.

What does a small town do when its master sanitary lift station—critical to protecting public health—is in danger of falling into a river?

Move it, of course. And the farther from harm's way, the better.

That's what the City of Drayton, North Dakota, did to get ahead of a problem that has steadily worsened over the years. Its riverbank, slowly but surely, is collapsing.

What makes it such a problem is that the eastern edge of the city is on that riverbank, which is composed of such poor soil that it actually “slips” down toward the river about 35 feet below. Various engineering analyses have described the soil consistency as “pudding” or “like toothpaste,” according to city officials.

The danger doesn't stop there. Drayton, located about 35 miles south of the Canadian border, also is subjected to frequent flooding by the Red River of the North—a northward-flowing river that marks the boundary between North Dakota and Minnesota.

Because the river's headwaters are in the southern part of the state, which thaws first in the spring, northern communities like Drayton often flood when the flow hits still-frozen waters,

causing the river to overflow its banks. Runoff locally and from nearby tributaries often hits the Red River about the same time, increasing the water levels. Since 1980, there have been 10 recorded flood events in Drayton.

As a result, the city has mounted an aggressive effort to remove properties along Drayton's eastern side—both to stabilize the riverbank by removing the weight of the buildings, which some say hastens the slippage, and to reduce future flood damages.

The lift station is one such example. When record flooding in the spring of 1997 began to subside, the city found that the lift, housed in a round, one-story brick building, was in even greater peril than before.

“Our master lift was hanging right on the riverbank,” said Carol Gardner, Drayton city auditor. “In the 1997 flood, we did manage to keep it dry but it was encircled with eight feet of sandbags.”

Moving Lift Station to Safety

Eager to eliminate the danger of losing the lift station—either from flooding or from further riverbank collapse—and to improve floodfighting capabilities, the city decided to build a new master lift in an area that could be better protected.

The city purchased a corner residential lot about two blocks from the river, and in September 1999, the lift station was put on line. The \$320,000 project was funded with part of a special 1997 disaster grant to Pembina County from the U.S. Department of Housing and Urban Development, with disaster-related Community Development Block Grants and with local money generated by a \$3 monthly charge on residential and commercial water and sewer bills.

“To be better prepared for the next flood we had to get that lift station off the riverbank,” Gardner said. “Moving it was something we wanted to do so we didn't have to worry in the future and with it out of that original spot, we can now take emergency protective measures to protect the whole town. Where it was before actually threatened the whole town because there wasn't room anymore to build a dike.”

Now when floods threaten, the lift station itself can be better protected—either by an emergency dike for the whole town or by building a ring dike around the lift station itself. The old lift station will be demolished after pumping equipment is removed.

Eliminating Other Trouble Spots

The city has gone after other “trouble spots” as well, Gardner said, such as the east side of its Main Street, which also is starting to shift and settle in places because of the soil instability.

From there, the city purchased and subsequently removed a six-unit apartment building, a dental clinic, an old creamery and a hardware store. The properties were damaged in the 1997 flood because they were on the wet side of an emergency dike, which had to be built in front of the buildings to be on firm-enough ground.



The old master lift station sits dangerously close to the edge of the riverbank.

Additionally, seven residences north of the downtown but also along the river, were purchased because they, too, were in repetitive-flood areas that were difficult for the city to protect, Gardner said.

Now, after both buyouts, all that remains is open space—thereby eliminating future flood damages and improving the city’s ability to fight a flood. The land also is now deed-restricted in accordance with the buyout requirements so that future building there cannot occur. The restriction, designed to protect lives and property, helps eliminate spending public and private money to repair structures that are likely to flood over and over again.

The \$569,000 buyout was funded in large part by the state-managed Hazard Mitigation Grant Program (HMGP), which provides money for selected projects that will reduce or prevent future disaster damages. The state’s money for the program comes from the Federal Emergency Management Agency as part of a presidential disaster declaration. HMGP funds can be used to pay 75 percent of eligible costs on approved projects. The remaining 25 percent must come from non-federal sources such as state, local or private funds.

For this buyout, the federal share provided \$426,752 and the state paid \$56,900. The remaining \$85,350 came from the city.

Waging Battles to Win the War

These disaster-resistance actions represent just a part of what Drayton has done for more than 20 years in an effort to win the war so often waged by the Red River.

- ◆ In the late 1970s, special flapgates were installed in culverts west of Interstate 29, which borders the city’s western side, to block overland flooding from getting to Drayton. The interstate itself sits high enough to hold back much of the overland water, but without the culvert protection, water could still get into Drayton. The flapgates, still in place today, continue to protect the town, city officials say.
- ◆ Since 1980, when the city first adopted a local floodplain ordinance, new development and substantial improvements to existing structures in the 100-year floodplain, have been restricted. About one-fourth of Drayton is in the 100-year floodplain; a significantly greater part of the city is in a 500-year designated floodplain.
- ◆ The city participates in the National Flood Insurance Program, enabling its residents and business owners to purchase flood insurance to cover property and contents. Drayton joined the program in 1974.
- ◆ In 1984, the city formed a Flood Hazard Mitigation Committee to develop a long-range plan that would outline the steps needed to lessen the impact of future flooding. Since then, many of these actions, such as property buyouts and protection or relocation of critical facilities, have been taken. The plan is being updated for 2001.



A new master lift station has been built away from the river in an area that now can be better protected from flooding. Removing the old lift station from the edge of the riverbank also enables the city to construct temporary dikes to keep floodwaters getting into town.

-
- ◆ A new, more flexible water intake pipe was installed in 1995 so that shifting soils wouldn't break the pipe as had happened before. The intake pipe draws water from the Red River and feeds it to the city's water plant for treatment and re-distribution throughout town.
 - ◆ The city continues to investigate ways to stabilize the riverbank so the encroachment won't further compromise its borders.

Plans for 2001 include relocating the city's secondary lift station in southeast Drayton away from the river, and buying out another group of flood-prone residential properties, Gardner said.

In the meantime, the city will continue its efforts to improve Drayton's resistance to the effects of natural disasters, Gardner says. It is an increasingly important task in light of predictions that a wet cycle, which has plagued central and eastern North Dakota since the early 1990s, may continue.

"The thought is to continue to remove structures that cannot be protected and are involved with the unstable riverbank," Gardner said. "It may take a little bit of time, but at this point all we can do is get out of the way of the riverbank and the flooding river."

A Flood Won't Stop these Presses...

Grand Forks Herald

Builds Back Better

The *Grand Forks Herald* daily newspaper didn't just report on the "Flood of the Century" that inundated Grand Forks, North Dakota, in April 1997.

The *Herald* struggled for its own survival after the newspaper's offices and printing plant succumbed first to floodwaters and then to a devastating fire that also claimed 10 other downtown buildings. When it was over, the *Herald* had lost the irreplaceable —118 years of photographs, almost as many years of news clippings, and many historic books and documents.

The paper did not, however, lose the will to survive.



Ravaged by fire and flooded by water, the Grand Forks Herald offices lay in shambles in April 1997.

Even before floodwaters receded, representatives from the *Herald's* parent company, Knight Ridder, traveled by boat to see whether anything remained of the newspaper's offices. Most of the complex had been reduced to smoldering ruins.

That day, in a show of faith that Grand Forks would come back, newspaper executives vowed to lead the downtown recovery by rebuilding. They chose the same site, constructing a new building among the remains of two historic portions of the old complex that escaped the fire.

"When we stood up on April twenty-second and said, 'We are going to rebuild,' that sent a signal that is still resounding today," said *Herald* Publisher Michael Maidenber. "The downtown is just blossoming block after block."

Construction began in the summer of 1997 and the offices were completed in July 1998 at a cost of \$3.9 million.

To lessen the impact of a future flood, the main floor of the new building was constructed 1 foot above the base flood elevation. The mechanical and electrical systems now operate from an upper floor, keeping them above potential flood levels. Newspapers and some photos are electronically archived and stored remotely out of state. And in March 1998, the printing operation was relocated to a new 50,000-square-foot building on the western side of the city, far from the floodplain. The plant cost was an additional \$4.5 million.

By design, the downtown offices feature more than the disaster-resistant measures that will better protect it in the future. Several unique architectural features added to the building symbolize the past and the valiant fight to save one city from one flood.

And in a place of honor stands a gold medal—the 1998 Pulitzer Prize for public service awarded to the newspaper for excellence in community journalism after beating nearly impossible odds and continuing to publish daily during the fire and flood, even when its own offices were devastated. The Pulitzer is recognized as journalism’s highest honor.

For the paper that described the Grand Forks fire and flood with the now-famous headline, “Come Hell and High Water,” the decision to rebuild was worth it, Maidenberg said.

“We are proud to have taken a leadership role, but it wasn’t only us,” said Maidenberg. “The historic heart of the community was rescued from oblivion and brought back to life to the credit of all the citizens of Grand Forks. I feel very proud about it.”

In spite of “hell” and high water, Grand Forks is coming back after all.



A new Grand Forks Herald building rises from the ashes a year after the flood.



A historic section of the Herald’s old offices that escaped the fire was incorporated into the new building.

Backyard Defense Keeps the Red Away

In 28 years, Jim and Pat Papacek of Fargo, North Dakota, never laid one sandbag in defense of their home—even with a river some 350 feet from their back door.

But in April 1997, they broke that record. A winter of eight blizzards, five winter storms and 117 inches of snow gave way to a spring of monumental flooding. And suddenly, the Red River of the North became a formidable enemy.

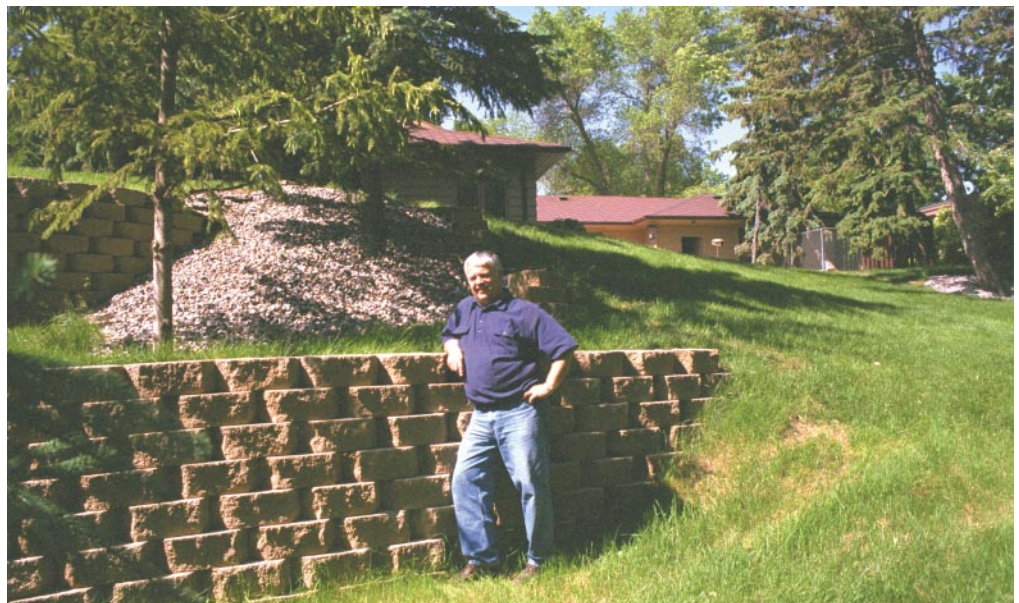
The Papaceks were determined to give it all they had to protect their home. They built a wall of sandbags to stave off raging floodwaters. They helped their neighbors sandbag too, knowing that just one breach in the defense could flood their own properties as well as the whole neighborhood.

When it was over three weeks later, the Papacek's home had survived. The house was not, however, unscathed. Water had spilled over their basement window wells, leaving about an eighth of an inch on the floor. The ground below the basement heaved, cracking the concrete floor.

Though the damage to their house could have been worse, the Papaceks were scarred by the experience. Their feeling of safety had been shattered. If the river could come close once, it could happen again. They had to find a permanent solution.

So they attended neighborhood flood-recovery meetings sponsored by the City of Fargo. There, the couple learned that one solution to their problem wasn't any farther than their own backyard.

Jim Papacek literally built up his backyard to provide a defense against the Red River which flows by his house about 350 feet from his back door. The stone wall helps support the extra fill dirt he added to guard against a river height of 39 feet.



Better Flood Protection

City officials offered a landscaping program to residents, like the Papaceks, who lived in the Belmont Park neighborhood on Fargo's east side. The program was simple. By raising the elevation of the land behind their house, the Papaceks could create better flood protection for their home and get the city to help pay for it.

It was a deal they couldn't refuse.

“We didn’t want to leave our house,” said Pat Papacek, “and we knew as we approached older age we couldn’t do what we did in 1997. We wanted to ensure our house would be safeguarded the next time.”

The city could benefit from the program, too. The Belmont Park neighborhood is between the Red River, which runs the entire length of Fargo’s east side, and the city’s \$68 million water treatment plant. As such, it is a vulnerable area where the city needs some method of permanent flood protection—both for that critical facility and the neighborhood.

Many residents wanted the city to just extend its nearby dike behind their homes. But doing so would create both problems and liabilities for the city, according to Dave Johnson of Fargo’s engineering department.

So Johnson helped develop the Belmont Park Flood Protection Assistance Program for properties that adjoin the riverfront. To qualify for funding, property owners had to create an elevation that would protect them to at least a 39-foot-high river level. The landscaping could not encroach into the floodway. If the improvements extended into the 100-year floodplain, homeowners had to obtain floodplain development permits.



Papacek sloped the center portion of his backyard to provide drainage for rain runoff. The area is all he will have to sandbag if the river gets close to his house again.

Also, before beginning any work, homeowners had to submit their landscaping plans to the city for approval. When the work was completed, the city then inspected the project to ensure that the proper flood-protection elevation had been achieved. Finally, the property owner had to sign a legal document assuring the city that the elevation would be maintained for the life of the property.

In return, the city funded 50 percent of the cost of the landscaping materials (homeowner labor was not eligible for reimbursement). If residents chose to raise their property to 40 feet, the city’s share increased to 60 percent. The city’s share of the costs—about \$30,000 for six properties—was paid with Community Development Block Grants.

“The program was conceived to encourage the property owners to take their own protective measures,” said Johnson, “and to reduce the city’s liability of working and trying to build a dike in

people’s backyards. Doing the landscaping still doesn’t remove them from the floodplain but it does provide enhanced protection.”

The Real Work Begins

Papacek began designing his project in the summer of 1997, even before he was approved for the cost-share. To him, the issue was protecting his home and he was willing to do it regardless of whether the city reimbursed some of the expenses.

By the summer of 1998, Papacek’s design began taking shape. He started at the home of a neighbor who was physically unable to do the work, but willing to pay for materials if Papacek would landscape his yard, too.

One wheelbarrow at a time, Papacek hauled in yards of fill dirt to create a new elevation. It not only helped his friend, but the elevation provided an important element in Papacek’s own protection plan.

“I could not protect my property if his corner wasn’t raised,” Papacek said. “So I raised the elevation of his yard to 39.9 feet and then I terraced it into my yard.”

In that same corner, Papacek added a sump pump, with drain tiles on his property and a 4-inch pipe on his neighbor’s property to carry water away from the houses.



Standing at the back boundary of his yard, Jim Papacek knows that the river which flows close behind him will one day come calling again.

Next, he built a terraced wall of London stone and added fill dirt above and around the wall to a height of 39.9 feet. Below the wall, he added crushed granite, instead of soil, to provide better drainage for a tree he wanted to keep. Surrounding the tree with several inches of soil could have killed it.

Papacek then added more dirt and a second stone wall about 5 feet below the first terrace. The second wall helps bolster the wider base needed to support a nearly 40-foot elevation.

In the summer of 1999, Papacek raised the other corner of his yard to 39.4 feet and helped the adjoining property owner elevate his own backyard as well.

To ensure that rainwater didn’t pool between his house and his backyard—now higher than

the foundation itself—Papacek put in a slight dip in the center of the yard to create a drainage channel. The low spot meets the project’s 39-foot requirement.

Since then, there have been several heavy rains and the new landscaping has successfully channeled the water away from the house.

Fewer Emergency Measures Needed

Now, if there were a flood threat, Papacek estimates it would only take about 50 sandbags to build up that low spot—a much more manageable number than the hundreds of sandbags they used in 1997.

In all, the project took approximately 124 yards of fill dirt, 32 yards of crushed granite, 32 yards of topsoil and about 400 London stones. The materials cost him about \$8,800; the city reimbursed him for half of those costs.

Johnson says the flood protection program provides a number of benefits both for the city and the property owners.

“It’s going to make a big difference when the river significantly exceeds flood stage,” said Johnson. “It obviously reduces the manpower needed to fight a flood. We can cut down on the number of sandbags, labor involved in hauling them there, and cleanup afterwards. By doing this, we eliminate some headaches and some worry areas. Also, this now provides additional flood protection in the area.”

Since the time Papacek finished the project, the river has not threatened his property. But, he says, it is just a matter of time before another flood hits Fargo.

“The fear of flooding is always there,” Papacek said. “We know that a little bit of water on a flat plane like we have here magnifies quickly. From what we see happening in North Dakota in general, we think subsequent flooding will be higher and higher and faster and faster.”

Still, he adds, the effort and expense of the landscaping has been worth it. He believes without the increased elevation, another flood could easily damage his house.

“We definitely have a better comfort zone now because of the way the dike is made and the way the drainage is,” he said. “The city has been very accurate with its predictions and they told me 39 feet and 40 feet would be a safe level. I’m going on their expertise.”

Flying High and Dry, Airport is Better Protected from Floods

North Dakota aviator Tom Nord can remember at least five floods in his 45 years as manager of the Fort Pembina Airport.

But none was so devastating as the flood of April 1997, which ravaged countless communities throughout the eastern part of the state, including the airport, where Nord worked and lived.

Tucked away in the northeastern corner of North Dakota, the airport has been an aviation legend.

Built in about 1930 on the site of Fort Pembina, the oldest settlement in the state, the airport was designated as a port of entry for the United States. Northwest Airways built a hangar there in 1932 to support its airmail service and small passenger planes that flew between Canada and the U.S. From the 1930s until about 1945, it housed a regional weather observation station.

But in the spring of '97, floodwaters extensively damaged the facility. Five feet of water filled the wooden hangar. Powerful river currents had pushed through the building, bulging out the lower part of the back wall. Water scoured out the soil beneath the structure, causing the concrete floor to break and the building to shift. Mud and debris soiled everything in sight.

In Nord's office and living quarters, originally built for the airline's flight crews, the water came up 4 feet after filling a 1,300-square-foot basement where the water heater and furnace were housed.

Across the runway, floodwaters wrenched two 2,000-gallon aircraft fuel tanks from a protective berm and carried them away. Nearby, 50 inches of water filled a smaller hangar, used as a maintenance and repair shop.



Tom Nord says he's glad the airport has been rebuilt. Now, it has a future and a better chance of surviving another flood.



This new hangar has been built with special features that will help minimize future flood damages. Large overhead doors in the front (shown open) and the back of the building now should allow floodwaters to flow in one side and out the other.

It took weeks for the water to subside. When officials assessed the damage, the news wasn't good. Estimated repair costs were staggering—more than 50 percent of the buildings' market value. The hangar was in such bad shape that the county condemned it.

The only way to keep the airport from permanently closing was to replace the hangar, office and living quarters. And in doing so, special flood-protection measures would have to be added to comply with local ordinances governing new construction in a floodplain.

The new buildings, finished in the summer of 2000, have become a welcome sight for those who feared that the flood of the century would spell the end of a legend.

"The new facility is terrific," said Nord. "I only wish I could have had it 20 years ago. The way they've built it with the added features is the only way to go."



The main floor of the new office and living quarters is 5 feet above the ground level to reduce the chance of flooding again.

The hangar, a 120-by-80 metal structure, features a wide overhead door that can be raised well above expected flood levels. The old hangar had two doors that each slid sideways on metal tracks inlaid in the concrete floor. Because the doors were at ground level, they were easy targets for damaging floodwaters.

In the back of the new hangar, two 10-by-10 overhead doors were installed as well. Now, in the event of a flood, all the doors can be raised, which allows floodwaters to easily flow through the building and reduces the possibility of structural damage.

Elsewhere in the hangar, all mechanical and electrical equipment has been elevated a foot above the '97 flood level—again to reduce the chance of flood damage. Also, heavy metal chains now hang from the ceiling so that light aircraft, such as gliders,

can be raised if flooding occurs before the planes can be moved out. (In '97, Nord and his son Terry, also a pilot, were able to move all the planes out of the hangar before the flood hit).

The new office and manager's living quarters have been protected, too. The main floor now sits 5 feet above the ground level. There is no basement. Additionally, the land across the front and on one end of the building has been sloped to channel water away from the structure. At the other end of the building, a concrete ramp provides handicap accessibility.

The old fuel containers have been replaced with new steel-reinforced tanks. The tanks, each with a 2,000-gallon capacity, now sit 5 feet above the ground on special concrete bases. The tanks are bolted to the bases so they will remain in place during a flood.

Rebuilding costs are expected to be less than \$300,000, much of which will come from the Federal Emergency Management Agency and the State of North Dakota through a program that repairs or replaces disaster-damaged public facilities. The Federal Aviation Administration helped pay for the runway repairs.



New 2,000-gallon aircraft fuel tanks now are elevated and secured to concrete bases to ensure they don't float away in another flood.

Nord, who is among the handful of aviators chosen for the North Dakota Aviation Hall of Fame, retired in the summer of 2000 just as workers were putting the finishing touches on the new facility. Wistful at times, he recalls the floods he fought and survived—and the one he didn't beat.

But he is pleased to see the airport that has been his life, now has a future.

“If we hadn't gotten this building, the airport never would have reopened,” Nord said. “All it would have been was a landing strip. This way, at least we saved the airport. The things we've done here to protect against future floods are definitely worth it.”

Steaming Ahead with Disaster-Resistant Measures

Imagine 11 miles of mineral wool-insulated underground steam lines. Then add millions of gallons of really dirty floodwater that hung around for days on end. The result was a mess of epic proportions.



University of North Dakota steam lines now are better protected from future flood damage.

Like most of the people in Grand Forks, North Dakota, Larry Zitzow, director of facilities for the University of North Dakota (UND), says he was in stunned disbelief as he began tallying the damage from the city's massive flooding in April 1997.

The toll on campus buildings and equipment—an estimated \$40 million—was bad enough. Of the university's 230 buildings, 72 were damaged. Half a million square feet of building space had to be scrubbed and sanitized. School for UND's 11,300 students was cancelled for the remainder of the semester.

And then there's the matter of those steam lines. Floodwaters had soaked the insulation surrounding the lines, causing it to fall off. As a result, intense steam heat was transferring from the lines, through a large-diameter steel encasement and up into the ground. The heat was killing trees and grass. It was causing pavement to break up. Portions of the lines were literally blowing up out of the ground as university maintenance workers tried to re-pressurize the system.

Protecting an Investment

So UND officials decided to undertake the mammoth task of replacing the entire system. Because of the enormous replacement cost, UND decided to make changes that will reduce or prevent damage if another flood hits Grand Forks, a city with a long flood history.

"This is a \$25 million investment and we want to protect it," Zitzow said. "We could never afford to totally abandon using steam" to provide heating, cooling and hot water to campus buildings. The steam system also supplies 16 fraternities and sororities, two additional schools not connected with the university, the city's only hospital, and a large, adjacent medical office complex.

The replacement project involves digging new trenches, laying new steam lines and new condensation-return lines, and putting in 43 new-and-improved manhole stations with flood-resistant features, Zitzow said. Additionally, several isolation shutoff valves are being added throughout the system.

Most of the disaster-resistant measures hinge on one key premise: keeping the mineral wool insulation dry to avoid a repeat of the problems from the '97 flood. Choosing a different insulation that wouldn't be so impacted by water wasn't an option, Zitzow said, because mineral wool provides the best protection from the intense radiant heat that steam lines produce under normal conditions.

Keeping the lines dry

So UND built new manhole stations with a series of features to provide the greatest level of protection. Each station, a concrete room approximately 12 feet by 16 feet in size, is mostly recessed into the ground and houses shutoff valves, drip legs, pumps and control valves. But the upper portion of each station now extends 12 to 18 inches above ground. The added height provides a first-line defense against overland flooding. With the old system, the manholes were ground level and easily flooded even with a few inches of water.

Then they added a curved vent pipe that extends another 12 to 18 inches above the top of the manhole. For water to get inside the manhole, first it would have to get up into the curved pipe, which is at least 2 feet above ground. Even if that happens, the pipe has a valve midway down into the manhole that can be closed to keep water from reaching the steam lines. At the bottom of the manhole, a drain has been added to remove any water that gets into the station.



New manhole stations feature a number of disaster-resistant measures that are designed to better protect the new steam lines. One measure (far right) is a ground hole drain that keeps water from building up inside the manhole.

2001. The old system was repaired wherever possible to allow the university to function until the new system was installed.

The project is being funded in large part by state and federal disaster recovery money that was made available by a 1997 presidential disaster declaration. The funds can be used to cover eligible costs associated with the repair or replacement of disaster-damaged infrastructure.



New trenches were dug and new lines were laid as part of the total steam line replacement.

To prevent belowground seepage from getting into the system, an impervious sealant has been added to the exterior of the manhole stations. Years of above-average precipitation in much of North Dakota have created high water tables and, therefore, seepage problems.

The university also wanted to better handle repairs to the steam system, regardless of the cause, without impacting a large number of users. Under the old system, workers would have to shut down large sections of the lines to fix even a small problem. As a result, many more buildings than necessary would be without heat and water while a problem was being fixed. Now, with the additional shutoff valves, the lines can be isolated at each building and at each manhole as needed, allowing the rest of the system to function normally while repairs are being made.

Work on the new system began in spring 1999 and will be completed by early summer

Protecting the Water Supply

In a separate but related disaster-resistance project, the university also has created a backup water supply for the steam plant should the city's water plant or distribution system fail for any reason.

During the flood, the Grand Forks water treatment plant had to be shut down after it was inundated by water. As a result, the university had to shut down its entire steam line system because there was no water to heat into steam. The steam system remained down for about two weeks.

Now, if the city water supply is compromised again, the university can pump water from its Olympic-size indoor swimming pool into a condensation-return line that goes back to the steam plant to be heated and redistributed. The pool can supply as much as 500,000 gallons of water, which would enable the steam plant to operate for 10–15 days. The pump installation, completed in December 1999, was done in conjunction with the university's Y2K readiness activities.

Zitzow says he thinks this is the first time that any university in the country has had to replace its entire steam system.

With the disaster-resistant measures now in place, university officials hope it'll be the last time for UND.

Historic Building Booms Again

For more than three years, the “Boomtown Building” has been looking for a home.

It is but one casualty of the devastating 1997 flood in Grand Forks, North Dakota. It is one of the city’s oldest and historically important structures. And it had to move—to make way for a new \$350 million dike that will be built along the Red River to protect the city from the threat of flood.

The problem, though, was where to put it. After all, you can’t just pick up a 112-year-old building and plop it down anywhere.

So local urban development and historic preservation officials worked... and worked... and worked to find a place where the Boomtown could live out its second century.

Their perseverance finally paid off. A new site was found across and down the street from the Boomtown’s original home on the banks of the Red River. The building already had been moved once to a vacant lot to allow for construction of a temporary levee that will be in place until the permanent dike is completed. Once the Boomtown’s new home was found, it took only about two hours to actually move the structure.

Built in 1888 on Third Street, Grand Forks’ main commercial area at the time, the building got its name because of its rectangular “boomtown” façade.

Since its construction, the building has been used for a variety of small businesses including offices (1888), a china and fancy goods shop (1892), a harness shop (1897–1901), a hairdressing shop (1906), a tobacco shop (1912), and a lunch counter (1916). Several other businesses have occupied the building in the following years. Just before the flood, it was a laundromat. In 1982, it earned a designation on the National Register of Historic Places.



The Boomtown Building, one of Grand Forks’ oldest structures, rests on a pallet base until it can be relocated to the site where it will begin its second century.

Preserving the Past

“The Boomtown was always an important building to the community,” said Peg O’Leary, coordinator of the Grand Forks Historic Preservation Commission. “We are really looking forward to getting it settled and rehabilitated. It can be both a beautiful old building again and usable.”

Even in its new location, the building remains in the floodplain. Normally, building or moving a structure into a floodplain only can be done if certain disaster-resistant actions are taken. But historic structures can be exempt from those requirements if special local variances are secured.

To preserve the Boomtown’s historic register designation, officials could not elevate the building or set it back from the sidewalk. Nor could they move it far from the original site. They could, however, build a new foundation without a basement. And so they did.

The city spent about \$80,000 to acquire the needed real estate, a package that included the site and an adjoining lot with a building. Additional costs will be incurred to pay for the move and to rehabilitate the structure. The project is being funded with special flood-recovery Community Development Block Grant funds. The city then will sell the building with the intent that there be a first-floor office or retail use with an upper floor apartment.

Preserving and protecting historic properties from future damage is but one of many issues facing a disaster-stricken community during the recovery process. Other historic structures in Grand Forks also need new locations outside of high-risk flood areas and efforts to re-site these structures are ongoing.

*Celebrating the Past, the Present
and the Future...*

The Grand Forks Town Square

A larger-than-life paddlewheel beckons visitors into a spacious open-air square in downtown Grand Forks, North Dakota. Fountains of water on both sides of the stainless-steel wheel give the illusion that the large paddles are turning and churning, much like the riverboats of yesteryear.

Inside the square, brightly colored playground equipment entices children to... just be kids. Nearby, concrete tabletops inlaid with checkerboards await the next game between friends.

The features all are part of the city's new Town Square, a community gathering place that overlooks the Red River of the North, considered to be both friend and foe to this city of 50,000.

In the late 1800s, the trade brought by paddlewheel steamboats gave Grand Forks life. In the late 1900s—1997 to be exact—that same river overwhelmed much of the town, leaving destruction in its wake.



John O'Leary sees a great future for the Town Square, designed as a year-round community gathering place for the city that has learned to respect the river.



A stainless-steel paddlewheel, reminiscent of the steamboats that came to the city more than a century ago, frames the entrance to the Town Square.

Afterwards, when Grand Forks citizens were given the chance to envision a new downtown, they wanted to create positive spaces.

So urban planners, on loan to the city to help with the recovery, suggested a town square where the community could come year-round to enjoy a variety of activities. In October 2000, that vision became reality.

The square fills downtown's prime corner, the gateway to Grand Forks for those crossing the river from Minnesota. Along one side, there are several square booths topped with alternating red and yellow canvas canopies. The spaces can be used for Farmer's Markets or other vendor-style activities.

In another corner, a covered stage equipped with electrical service and a sound system, can



ArtWise, a local non-profit organization, extended special invitations to elementary students to create a design that would reflect activities in the community throughout all four seasons. ArtWise promotes children's art along with art education in Grand Forks.



A little grout here, a little grout there helps finish off the installation of these tiles, designed by Grand Forks elementary students and inlaid into a wall bordering the playground area.



Out of 1,100 entries, 82 were chosen by a panel of judges to be reproduced for the special wall. The original drawings then were commercially etched into the tiles.

host open-air concerts or plays. The center of the square, inlaid with bricks, is large and open to allow a number of activities. In the wintertime, city workers can turn the center area into an ice rink by adding temporary walls, a ground mat and water. When the rink is taken down, the water can be channeled into several nearby ground drains.

In short, it is a place that offers something for everyone all four seasons of the year, says John O'Leary, the city's former urban development director. O'Leary was heavily involved in the planning of the Town Square, funded with about \$1.1 million in Community Development Block Grants. The playground equipment was donated by Lafarge Dakota of Valley City, North Dakota.

"When the town square was first being discussed, downtown was a pretty grim environment," O'Leary said. "There were piles of brick and twisted steel and a lot of empty storefronts. One by one, these storefronts are filling up with antique stores and gift shops and candy stores and bookstores... a kind of friendly place."

The square replaces a flood-damaged clothing store, drug store and café—all razed after the disaster. Mindful that the square is in a 100-year floodplain, project designers incorporated many features that will minimize future flood damage.

The vendor booths, tables and benches all are concrete. The stage is concrete and 3 feet high. The electrical service and sound systems are elevated another 4 feet above that. Several openings allow water to flow through end to end.

“When we designed this town square, we wanted to tie it back into our original heritage of what the river meant to us and how we treat the river today,” O’Leary said. “We really can’t blame what happened to us in ’97 on the river. We made some unwise choices about where we were going to build and how we were going to build.

“Now, we’re trying to re-establish downtown to create a sense of space,” O’Leary explained. “Downtown is a reflection of our hearts... the architecture, the history. It’s the core of our community.

“The legacy of our central business district after the flood shouldn’t be the buildings that burned,” he added. “Instead, it should be that this is a unique place. It should be that this is a place of social and historical significance. It should be a place that we can be proud of... that we not only recovered from the flood but that we brought the downtown to a point where it can survive and prosper.”



“When we designed this town square, we wanted to tie it back into our original heritage of what the river meant to us and how we treat the river today.”

— John O’Leary

Bowesmont ... The Little Town that Lives in the Heart

It is a bright, hot morning in Bowesmont, North Dakota. An occasional breeze carries the scent of freshly cut grass. Pots of light pink roses are arranged in a semi-circle around a rock monument bearing a simple brass plaque. Nearby, an American flag on a makeshift flagpole flutters now and then.

One by one, cars drive up in front of the Bowesmont United Methodist Church. Old friends, neighbors, school chums warmly greet one another. Some stroll into a field next to the church to get a closer look at a newly planted grove of trees. Others climb the steep church steps and venture inside where the smell of old polished wood abounds.

For some, who now live as far away as California and Texas, coming to Bowesmont on the second Sunday of July has become an annual pilgrimage.

They come for one reason: To celebrate the town where they lived, learned and loved.

What makes this reunion so unique is that Bowesmont doesn't really exist anymore... physically that is. The houses and buildings that made up this little town in the northeastern corner of the state are all gone. Now, grassy fields and a few narrow dusty roads keep a silent vigil. The lone survivors are the Methodist Church and, about half a mile up the road, the Bowesmont Cemetery.



A historical marker and the Methodist church mark the spot where the town of Bowesmont once lived.



In 1997, record flooding seized Bowesmont for the last time. The homes in this photo now are gone, leaving the Methodist church (center) as the sole building that remains. Photo courtesy of City of Drayton.

In the spring of 1997, Bowesmont was home to about 25 residents. The town's businesses were already gone. In fact, there hadn't been any commerce there for years. But it was a nice place to live—quiet and affordable. And up until the year before, a handful of families still went to church there every Sunday.

There was, however, one problem. It wasn't far from the Red River of the North. And that meant one thing: it flooded.

In April 1997, the worst flood of all robbed Bowesmont of its last breath. Residents, already weary from a flood the year before, had petitioned the county for a government buyout of their damaged homes. But before that buyout could occur, the raging Red River smacked them again. Now there really was no doubt. Bowesmont would never recover. Or so it seemed.



Friends from near and far gather at the church for the daylong Bowesmont reunion.



Richard McConnell (left) and Dean Young are among those who refuse to let Bowesmont die. Several times a week, they are in town doing what is needed to maintain the church and surrounding grounds.

More than 100 people are crowded inside the little brown church, which dates back to 1909. Strains of organ music signal the opening hymn of the community church service, always the first official activity of the daylong reunion. They begin singing “America the Beautiful” as box fans whir in the background.

The crowd reflects generations of Bowesmont residents, neighbors and friends. Some are direct descendants of the town's pioneers. Some were born there but grew up in another town. Some grew up, married and raised their families there. Some lived on area farms and attended church or school there in the days when the Bowesmont Blue Jays were all the rage. Regardless of how they are linked to Bowesmont, nearly everyone shares one common bond—they all have a piece of their hearts there.

Bowesmont's ties to the river stem from its early beginnings. In 1879, it began as a small Dakota Territory settlement along the banks of the Red River on the old Ox Trail, used to transport agricultural products, furs and settlers from Minnesota to Canada. William Bowes, a New York pioneer, and his partner Edward Brooks opened the first store there, relying on steamboats to bring lumber and groceries.

In 1887, the town relocated a few miles inland to an expanse of land adjoining a Northern Pacific Railroad line that had just been built. There, it was renamed Bowesmont and soon thereafter, began to flourish.

But in 1897, a massive flood hit, nearly wiping out the entire town. The community subsequently recovered and, by 1907, had grown to about 200 people.

Winifred Halcrow Bloomquist's parents were among the early families in Bowesmont. She was born and reared there. It was a good place to grow up, she says, fondly recalling her school days, the little red chairs in her Sunday school room and the special picnics they'd have near her family home. When she went away to college in 1944, the spirit of Bowesmont was deep in her soul. To this day, it still is.



Winnie Bloomquist admires the tree she purchased in memory of her family, among the early settlers of the town.

The invocation... Scripture passages... personal reflections of the Bowesmont that used to be... Organist Muriel Paulson, 87, plays the next hymn, "Rock of Ages," a prelude to the featured moment: dedication of the Memorial Tree Park. Richard McConnell tells the story of the park, planted this year on three sides of the church. It is an important moment for this community of friends because of what the trees represent—the roots of the town that was and the future of the town that is.

Though Bowesmont never grew much beyond about a five-block area and 200 or so residents, it had a plethora of businesses to support the needs of the railroad and area farmers. For a while, life was good.

Then in 1948, a long-lost foe came calling. It was a flood. And Bowesmont was in the way again.

Two years later, the "flood of the century" swamped the town and surrounding areas.

For more than three weeks, townspeople struggled to survive. Able to travel only by boat, they temporarily moved their families out of town. The water spread more than 18 miles, prompting one resident to write that the landscape looked like an ocean. The flood was a blow that some say spelled the beginning of the end for Bowesmont.

Whatever the cause, Bowesmont was slowly declining. One by one, businesses were moving out. The number of school students was dwindling. Buildings were becoming vacant.

By 1959, the last high school "class" graduated one student—Leo Stellon. Grade-school classes continued until 1967 when the two-story schoolhouse, Bowesmont's seat of learning for 37 years, closed its doors.

In the mid-1960s, the Bowesmont Town Hall, cornerstone for community social activity, was torn down after falling into disrepair. In 1977, the post office closed. And two years later, another big flood.

By 1985, there was only one business left—Walker's Garage. It closed in March of that year after proprietor Randall "Butch" Walker died at the age of 93. In 1996, the Methodist Church finally closed its doors, unable to be fully supported by its congregation of four families.

Dean Young joins the others in singing the last hymn of the service, “God Bless America.” He clearly loves being in the church where he worshipped for 59 years and, to this day, still takes care of two to three days a week.

After the service, many pause as they leave the church to sign the guest book that for years has kept track of all who enter. Others venture to the memorial trees, eager to find “their tree.” For many of them, there is something good and whole about spending time in the grove that now memorializes many Bowsmont families.

A few wander down the main road to read hand-painted plywood signs... “Oscar Thomson’s Store”... “Ida Bjork House 1903”... “Brosseau Lumber”... “Bill Homer’s Blacksmith Shop”... all staked into the ground for reunion day to mark the place where pieces of the town once stood and where memories were made.



Bowsmont Hall was the center of the community’s social activities.

In the spring of 1996, darkness descended upon Bowsmont when the Red River came to town and flooded everything in sight. It was another bad event—keeping some residents from their homes for three weeks.

For the dozen or so families still living there, it was time to decide... stay and fight more floods, or seek a voluntary buyout from the government that would enable them to permanently move from harm’s way.

They chose buyout. At the request of the residents, Pembina County put the buyout process in motion and applied to the state for funding through a Hazard Mitigation Grant Program. The program, administered by the state, is funded in large part by the Federal Emergency Management Agency to help pay for projects that will reduce or prevent future disaster damages.

In all, 16 properties were purchased for \$397,004. Through the grant program, FEMA paid 75 percent of the cost. Of the remaining share, the state paid 10 percent, the county paid 7.5 percent and the property owners contributed 7.5 percent.

Though the buyout meant removing all the buildings in town except for the church, a handful of area residents with strong ties to the community vowed that it would not mean the end of Bowsmont.

“We decided Bowsmont hadn’t died,” said Richard McConnell, who grew up on an area farm but went to school in town. “Bowsmont is alive and well in our minds. To us, Bowsmont is a community, not a town.”

McConnell, Dean Young and several others began a revival of sorts. In May 1996, when the church held its last service, the group decided to form the Bowesmont Heritage Preservation Society, Inc., a non-profit organization dedicated to preserving the church building and the community's heritage.

That summer, they brought back a tradition—the Community Hall picnic—which had been held annually from 1920 to 1965 (the years the hall was in existence), and a few times since. Sixty people attended and enthusiastically endorsed making it an annual event that has since drawn as many as 200 people.

“In years past, it was a tradition to have a Hall picnic in the summertime,” Young said. “Everyone would bring food and play games. So we just decided it would be nice to have a get-together in the summertime for all the people who formerly lived there.”

A mile down the road from the church, there is a bustle of activity in and around a large Quonset building on Leo Stellon's farm. Tables upon tables hold hams and a feast of potluck salads, side dishes and desserts. Gallons of lemonade and fruit drink sit nearby.

Friends are breaking bread together and swapping stories about their days in Bowesmont. Some are taking photos of one another in front of the Community Hall pillars, salvaged when the building was demolished, and now permanently stored in the new unofficial town hall—Stellon's Quonset. Still others are playing old-fashioned bingo.

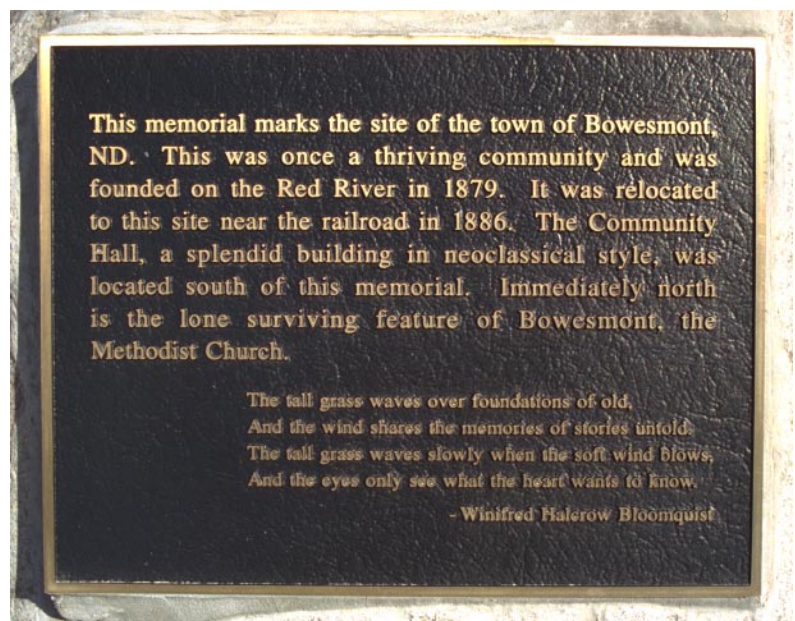
Since the buyout, the picnic has become a celebration of the town as a whole, McConnell said. Twice, the event has included “guided tours”—attendees were driven around town (the first year on a flatbed trailer with couches for seating, the second year in a limousine), stopping at each sign marker to hear the history of the business, house or building that once stood there.

To Bloomquist, one of the town's most ardent supporters, the reunions are priceless.

“These reunions are helping to keep the spirit of Bowesmont alive,” she said. “There's this feeling of closeness. People are happy to see one another.”

The sentiment is moving forward in other ways, too, because so many are eager to create a lasting tribute to the town. In 1998, attendees dedicated a historical marker, erected near the church and provided by the government as part of the buyout. The marker contains a brass plaque with one simple theme... the town of Bowesmont once lived here.

In 1999, at the suggestion of a Bowesmont school alum, the heritage society launched the Memorial Tree Park. Trees were sold for \$40 each to anyone who wanted to leave a lasting legacy in honor of a friend or family member. Three special trees were planted to recognize the town's founding pioneers. Forty trees were sold outright and with demand still high, another 29 are planned.



In 2001, the society is planning a book that will chronicle life in Bowesmont through the eyes of the families who lived there.

Bloomquist, 76, is one of those who will share her family story. She has been telling the tales of Bowesmont for years in a local newspaper column. Because of people like Bloomquist, McConnell and Young, Bowesmont will live, in some form, for generations to come.

It is the end of that hot July day. The tables have been cleared and the bingo cards put away for another year. The last goodbyes are being said before friends again part.

Down the road in Bowesmont, stillness is settling in. The flag is barely flying. A setting sun is turning the open fields, dotted by wildflowers, a darker shade of green. A lone car drives slowly down the dusty road that leads out of town. And the sentiments of Winnie Bloomquist can be heard in the occasional breeze...

“Bowesmont will not be forgotten. It will live on in the smiles and the handshakes and the hearts of the people who were drawn into the bond that grew and touched each one at the church and the picnic that Sunday.

“Bowesmont has become... a family.”



My Bowesmont

In 1985, Winnie Bloomquist wrote a poem about her beloved hometown, Bowesmont, North Dakota. The occasion was that year's Bowesmont School Reunion, where schoolhouse chums would gather to renew old friendships and reminisce about their days of reading, writing and 'rithmetic.

Twelve years later, a devastating flood robbed the town of its last breath. The face of Bowesmont changed after a government buyout of flood-ravaged properties. But the heart of Bowesmont—and Winnie's poem—did not change. In fact, her poem has become the anthem for the town that lives on... in the hearts and minds of those who loved it.

Here then, is the story of Bowesmont and the lesson it teaches us all.

My Bowesmont

by Winifred Halcrow Bloomquist

The tall grass waves softly over foundations of old.
And the wind shares the memories of stories untold.
Little towns like people, become old, perhaps die,
Only memories remain brushed by the wind and the sky.

When the children come back, seeking, looking about,
They find yesterday's dreams died in yesterday's doubt.
But memory is kind, for it saves only the best,
With love and with laughter, thoughts can be blest.

So, my Bowesmont lives on in my heart and my mind,
It's peopled with family and friends who were kind.
It is filled with memories so bright and so clear,
That loved ones walk closely whether far or near.

My Bowesmont lives on in my heart and my mind,
There are sidewalks and store fronts with houses behind.
There are street lights, only three, that shine in the dark,
And gardens and back yards kept nice as a park.

There's a snowbank by the barbershop so white and so high,
And a drugstore with a dresser set I wanted to buy.
There's a hall where music still plays in my ears,
And a church with a window that calmed all my fears.

There's a depot and a train whistling far down the track,
And a big white school with a playground out back.
There's a windmill making power for ironing on Tuesday,
And ladies at coffee making society notes for news day.

My Bowesmont lives on in my heart and my mind,
There the sun warmed the green grass and the kittens I'd find.
The snow trimmed the evergreens and the sled by the door.
With chocolate cake and warm bread, one needed no more.

My Bowesmont lives on and will always be there,
There will be memories and happy thoughts even to share.
For the tall grass waves slowly when the soft winds blow,
And the eyes only see what the heart wants to know.

*Reprinted with permission by
Winifred Halcrow Bloomquist, January 2001.*