In the 1950s, Congress mandated the Corps of Engineers to provide relief to communities stricken by floods. Additional laws expanded the Corps' responsibility, authorizing it to provide emergency operations in water-related disasters such as hurricanes and drought. In the regions served by the St. Paul District, the Corps' emergency response was extremely important. The high water tables and severe winters of North Dakota, Minnesota and Wisconsin caused flooding almost every spring, as melting ice and snow poured into river basins in five separate floodplains. In times of disaster, the district's Readiness Branch provided logistical and technical support to incapacitated communities, building emergency levees and supplying equipment and manpower to fight floods. As it participated in these activities in the late twentieth century, the Corps earned accolades from those it aided, which improved its public image and boosted the morale of its employees. The Corps basked in this praise, frequently commenting on the worthwhile service it provided and the good feelings this engendered. As Robert F. Post, chief of the Engineering and Planning Division from 1987 to 1999, related after a 1997 flood on the Red River, "The professionalism and dedication displayed by the more than 200 men and women of the Corps' Flood Emergency Response Team during this event was truly awesome."[1]

The Corps' emergency operations mission was a relatively new development. In June 1955, Congress passed Public Law (PL) 84-99, which created a $15 million emergency fund to be used by the Corps "in flood emergency preparation; in flood fighting and rescue operations, or in the repair or restoration of any flood-control work threatened or destroyed by flood."[2] Subsequent amendments to the act expanded the Corps' authority to deal with hurricane and shore protection, contaminated water and drought. In such instances, the Corps could engage in any action "which is essential for the preservation of life and property," such as strengthening existing flood control structures, constructing temporary levees, clearing channels and removing debris and wreckage once a flood had receded and providing clean water to regions in need.[3]

Supplementing PL 84-99 was the 1974 Disaster Relief Act, which empowered the president of the United States to provide federal assistance during major natural disasters of any kind upon a governor's request. If the president determined a disaster exceeded the capabilities of a state, he would authorize federal emergency operations to begin.[4] To provide a central coordinating agency for this federal response, President Jimmy Carter issued an executive order in 1979 that created the Federal Emergency Management Agency.[5] In 1988, Congress formalized FEMA's role in the Robert T. Stafford Disaster Relief and Emergency Assistance Act.[6] Under the provisions of this law, FEMA reviewed governors' requests for federal assistance and then made recommendations

to the president on whether or not aid was warranted. If the president decided assistance was required, he issued a disaster declaration and chose a federal coordinating officer who supervised FEMA's direction of relief activities.[7]

In order to streamline emergency operations, FEMA developed a Federal Response Plan outlining the responsibilities of different agencies in times of disaster. Under the plan, the Corps became the operating agent for Emergency Support Function #3 (ESF-3), entitled Public Works and Engineering. This made the Corps the lead agency in providing a variety of services, including: technical advice and evaluation, construction management and inspection, emergency repair of water and wastewater treatment facilities, emergency power, inspection of residential and commercial structures to determine damage and the stabilization or demolition of damaged structures or facilities deemed hazardous. In essence, the Federal Response Plan required the Corps to supply both logistical support and materiel in times of disaster.[8]

Whether the Corps acted on its own under the authority of PL 84-99 or under the direction of FEMA depended on the status of the disaster and whether or not it was water-related. If the Corps supplied flood assistance before a presidential disaster proclamation, it used its PL 84-99 authorization and funded the operation in a couple of ways. If the emergency called for strengthening flood control works operated by the Corps, money came from project funds. If local sponsors had responsibility for the flood control works, they paid up to twenty-five percent of the cost. However, in cases where a presidential disaster declaration had been issued and in instances of non-water-related emergencies, the Corps had to wait for FEMA to authorize its ESF-3 function before it could take any action. The Corps then funded these operations with money routed through FEMA.[9] In all cases, Corps' officials emphasized, emergency operations were supplements to local and state actions, not replacements. Local and state officials had to exert "maximum efforts" and officially request aid before the Corps could become involved. In addition, local governments had to "identify specific needs; obtain all necessary easements and rights of ways; provide a local source of borrow material; and coordinate with local landowners."[10]

In the St. Paul District, disaster relief fell under the authority of the Readiness Branch in the Construction-Operations Division. The chief of the Readiness Branch served as the district's point of contact for emergency situations and was responsible for the district's Emergency Operations Center, an administrative support office within district headquarters that provided central logistical guidance.[11] The chief, together with the district's flood executive officer (who was the chief of the Engineering Division and who provided technical advice to the district engineer), ensured the district had a cadre of well-trained specialists that could be mobilized in times of emergency. Among these were the flood area engineers and operations managers who worked in the field to coordinate flood control activities. In order to keep themselves ready for deployment, these employees participated both in annual flood scenario workshops and training in emergency operations and technology such as ENGLINK, an emergency operations software program. Other

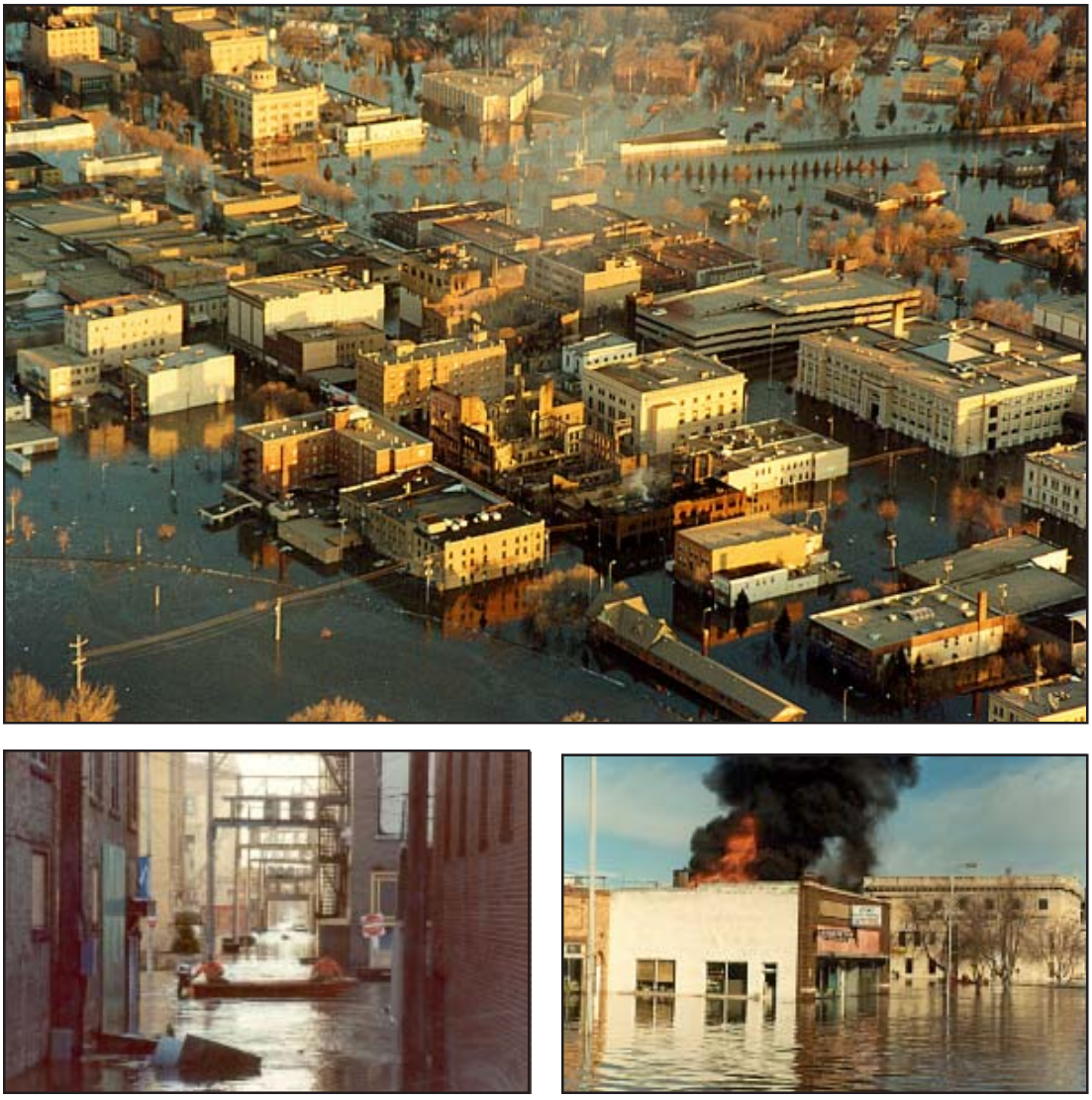
exercises included teaching people about contract negotiations for levee construction, practicing deployment of personnel to sites and establishing communication links between individuals in the field and in the office. Such simulations prepared the district for real emergency situations.[12]

Floods

Most of the St. Paul District's disaster operations occurred in response to spring flooding in the five floodplains under its jurisdiction. One of the major trouble spots was the Red River of the North Basin in North Dakota and Minnesota, a predominantly agricultural area. In geologic times, first a continental glacier and then glacial Lake Agassiz covered the region, creating an immature, flat and poorly drained valley through which runs the Red River, a waterway that begins in the vicinity of Breckenridge, Minnesota, and Wahpeton, North Dakota, and runs north into Canada. In the winter, frequent blizzards and below-zero temperatures cause large accumulations of snow. When spring arrives, snowmelt runoff, beginning first in the southern headwaters, generates high flows in the river. As the water moves north, it collides with ice in the river's still-frozen downstream reaches. These jams elevate flood stages and frequently push the waterway out of its banks. When that happens, water runs for miles in every direction because of the flatness of the valley. Surrounding communities and farmland sustain heavy damage.[13]

In the spring of 1950, for example, the river ran 54,000 cubic feet per second, or cfs, at Grand Forks, North Dakota, instead of the usual 32,000 cfs, causing millions of dollars of damage. Despite several projects constructed to restrain the waterway, the river overflowed again in the spring of 1969, this time inundating Fargo, North Dakota, with nearly three times its normal flow.[14] The problems continued in 1978 when a greater than normal snowpack led the district to prepare for flooding. Thirty employees constructed temporary levees along the Red and its tributaries and gathered pumps, sandbags and polyethylene sheeting for the fight. The district also set up an office to coordinate with local officials.[15]

When flooding began in late March and early April 1978, the river reached record water levels at Oslo, Minnesota, and approached records at Twin Valley and Hendrum, both Minnesota, and at Grand Forks. By the middle of April the water had formed a lake 22 miles long and 5 miles wide over rural farmlands just north of Grand Forks. "The water has been coming up so fast, I don't have any idea how many roads we've got flooded," Norman County Sheriff Herman Lovas related. "It's just running wild."[16] Fortunately, the river soon crested, easing the danger, but the damage had been done. U.S. Senator Quentin Burdick (D-North Dakota) believed the devastation "thoroughly justifie[d]" a presidential disaster declaration, and twenty-three counties subsequently received disaster assistance.[17] Although many farms and ranches suffered from flooding, the district, using a complicated formula that compared peak flood stage/discharge data with existing stage/discharge damage curves, claimed that its emergency preparations and permanent levees prevented an estimated $40 million in additional damages, especially in urban areas.



Flood fighting: Grand Forks, North Dakota, during the Red River of the North flood of 1997. (Photos courtesy St. Paul District, Corps of Engineers)

However, the flood highlighted the need for increased protection in several communities, including Grand Forks and West Fargo in North Dakota, and East Grand Forks, Crookston, Halstad, Hendrum and Roseau in Minnesota.[18]

Before the Corps could take any measures, the basin experienced its worst flood of the century. Initial forecasts in the spring of 1979 indicated that, although flooding was possible along the Red River and its tributaries, water levels would not approach those of 1978. In fact, the National Weather Service downgraded its forecast in April, indicating that, with normal precipitation patterns, only minor flooding would occur. The situation changed in mid-April when heavy rains fell and snow began melting rapidly. In preparation, the St. Paul District established emergency field offices at Fargo and Grand Forks, constructed new emergency levees, and strengthened old ones. In some areas, the water rose too rapidly, and the communities of Warren and Stephen, Minnesota, and Grand Forks, Argusville, Bowesmont and Grafton, North Dakota, were inundated by the end of April. Water spread for 12 miles just north of Grand Forks, topping farmer-constructed dikes and submerging thousands of acres of farmland. By the time the water receded, it had reached heights unseen since 1897 – the worst flood on record – and had caused more than $90 million in damages.[19]

Ninety District employees labored to ease the disaster's effects. The Corps estimated that workers spent 10,186 manhours fighting the flood, serving in one of four units: materials distribution, construction, reconnaissance and communication. The materials distribution group gathered the items necessary for the operation, such as sandbags and pumps, and coordinated the rental of other equipment. The construction unit planned and designed the required levees and negotiated the requisite construction contracts. The reconnaissance team collected field stream gauging data and set high-water marks so that it could better record the peak discharges and stages along the river. The communications unit installed equipment, such as commercial telephone lines and radios, to ensure interaction between the field offices and the emergency centers. These groups also coordinated efforts with other agencies, including the Minnesota and North Dakota National Guards, the Second Coast Guard District, the Air Force, the National Weather Service and the U.S. Geological Survey, among others.[20]

By the end of the fight, the district, in partnership with these entities, had assisted more than fifty communities and constructed 33,470 feet of new emergency levee, while upgrading an additional 42,640 feet of existing levee. It additionally supplied affected areas with 462 rolls of polyethylene sheeting, 104 pumps and nearly 4 million sandbags. According to Corps' calculations, these efforts prevented approximately $40 million in damages, leading the district to claim that its role "was a key one carried out skillfully and tenaciously." The Corps' estimate of damage prevention failed to impress many residents in the Red River Valley who demanded more permanent flood control projects. "More than $300 million of damage has been done by floods in the

Flood fighting: (Above) Flood responders fight the onslaught of the Minnesota River with sandbags and pumps in Granite Falls, Minnesota, in April 1997. (Left) Bonnie Greenleaf, Dave Haumersen and Josh Cress prepare for a flood fight in Montevideo, Minnesota, in April 1997. (Photos courtesy of St. Paul District, Corps of Engineers)

last 10 years," U.S. Representative Arlan Stangeland (R-Minnesota) declared. "I am tired of facing this devastation every year."[21] The Corps acknowledged that some communities, such as East Grand Forks, required additional flood protection and promised to pursue these projects further, especially after Congress held hearings in the summer of 1979 on Red River flooding problems and solutions.[22]

Throughout the 1980s, however, the Corps had difficulty finding projects in the area with favorable benefit-cost ratios. When it did, local communities, such as East Grand Forks, sometimes balked at paying their share of the cost (see Chapter Four). Because there were no major floods for most of the decade, the public clamor for projects on the Red River subsided, highlighting the obvious connection between disasters and flood control projects. If flooding occurred several years in a row, the public and its congressional delegation pleaded for projects. If weather patterns produced no flooding for an extended period of time, it was difficult for the Corps to convince communities of potential danger, even if its figures showed a significant flood potential.[23]

In the spring of 1989, the relative lull in the Red River Valley ended when ice jams once again caused the Red to flow out of its banks. The Corps began preparing in March after National Weather Service forecasts indicated that minor to moderate flooding would occur in the Red River Basin. In April, large slabs of ice clogged the river at Breckenridge, Minnesota, and Wahpeton, North Dakota, quickly elevating water levels to dangerous heights. Before the Corps or the cities could act, water flowed into the streets, pouring into Breckenridge's sewer system and flooding more than three hundred houses. "I've been here over 20 years and people just can't believe it," Butch Stollenwerk, a city worker for Breckenridge, related. "They haven't seen anything like this before." Craig Hinton, a St. Paul District engineer, agreed. "You look at the little old Red River during the summer and it's just a little stream," he explained. "Now it's something else."[24] The water forced many citizens to evacuate their homes, leaving behind empty neighborhoods and mobile home parks. "It gives you a spooky feeling," Gary Ferguson, a resident of Breckenridge, commented. "From what I can see, it's pretty deserted."[25]

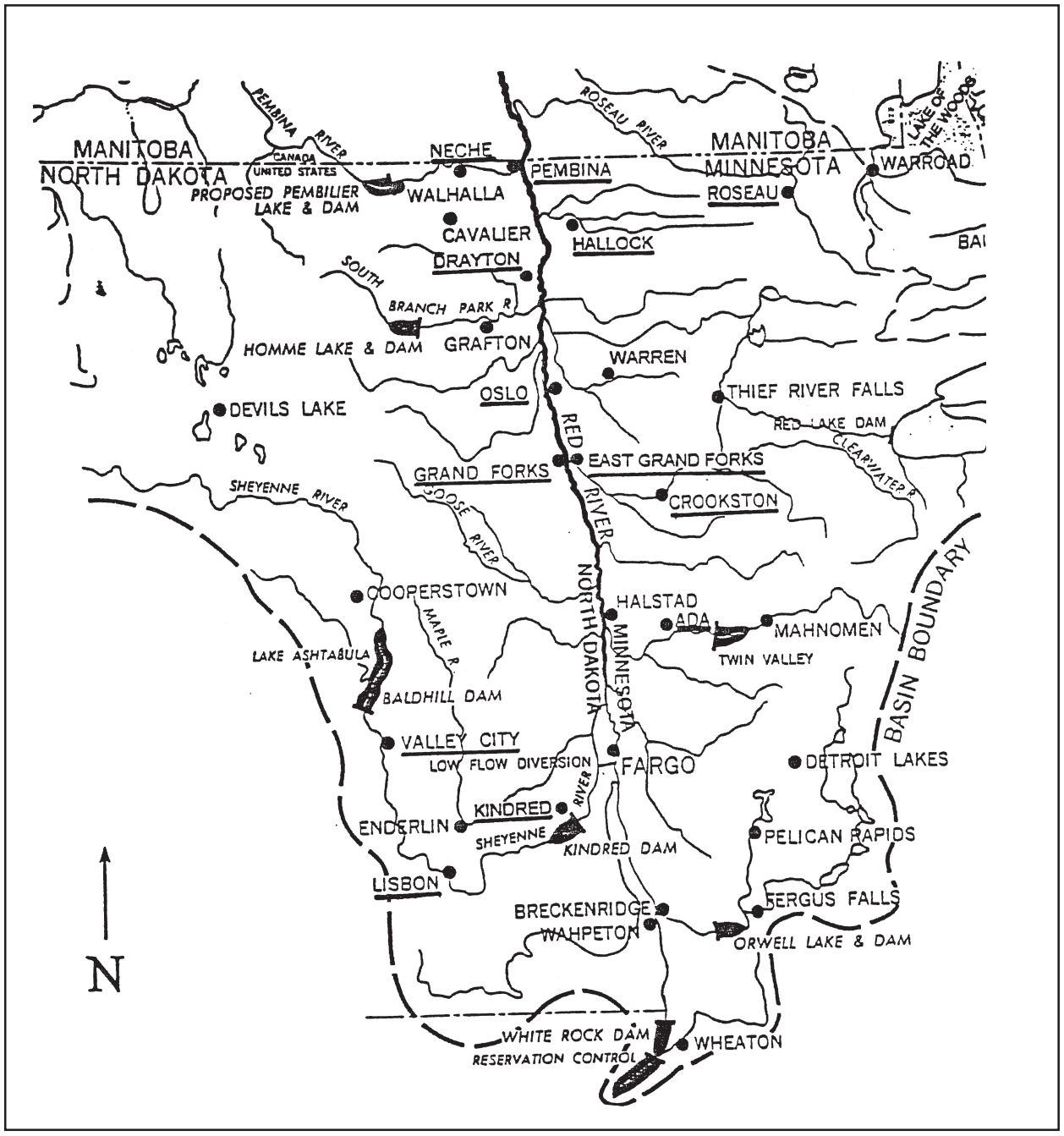
Although little could be done for Breckenridge and Wahpeton, the St. Paul District quickly set up operations in communities downstream. From these bases, the Corps constructed emergency levees for Fargo and Grand Forks, as well as for East Grand Forks and Moorhead, Minnesota. At the same time, hydrologic teams inspected the Red and its tributaries to develop forecasts for the river's maximum stages. According to the district's After Action Report, sixty-five members of the St. Paul District worked in the Red River Basin "during the peak of operations" in the first two weeks of April. Fortunately, normal temperatures and little precipitation together diminished the flood threat, and many of these workers were able to return home after only a few days in the field. The staff expended a total of 10,117 man hours, and, as with earlier floods, cooperated with several different agencies, including the Minnesota

and North Dakota National Guards, the Second Coast Guard District and the Air Force. Breckenridge and Wahpeton experienced serious damage, but few other cities saw drastic flooding, and rural areas, overwhelmed in previous floods, escaped relatively unscathed. In its After Action Report, the district estimated its work prevented $25 million in damages to twenty communities.[26]

One reason for the district's effectiveness was the availability of new technology that facilitated communications between emergency operation centers and field workers. In the 1970s and 1980s, America experienced a technological boom, especially in computing and communications systems.[27] By 1989, the Corps was reaping the benefits of these innovations. During the flood fight, the Corps used technology not available in the 1970s, such as laptop computers, which expedited contract negotiations and reconnaissance reports; facsimile (FAX) machines, which quickly transported contracts, situation reports, correspondence and newspaper articles between offices; and portable radios and beepers.[28] "The development of high technology in the last decade," an article in the district's newsletter explained, "made a significant difference in communications and record keeping operations from the floods of '78 and '79."[29] According to one report, this technology would only "expand in the future," enabling the Corps to further "increase the speed and efficiency of administrative control of emergency operations."[30]

For the next few years, the Corps enjoyed a reprieve from serious flooding, but in the late spring and early summer of 1993, major rainstorms inundated the Midwest, overflowing numerous rivers. Although states such as Iowa bore the brunt of the storms, North Dakota and Minnesota also experienced problems. In May, the town of Marshall, Minnesota, flooded after receiving nearly 10 inches of rain in one day, and this was repeated in June. Meanwhile, Valley City, North Dakota, experienced a seven-inch rainfall in three hours on July 15. In order to mitigate the resulting floods, St. Paul District officials made a risky but innovative decision: they closed the gates of the Lake Ashtabula reservoir a few miles upstream from Valley City, thereby shutting off its discharge. The closure meant that water overtopped the reservoir's gates by six inches, exerting a significant amount of pressure on the structure. Despite the risk of collapse, the overtopping was necessary because it reduced the amount of water flowing into Valley City, preventing significant damages. Had another large rainstorm passed through the region, the district would have had to release the water, causing even more flooding, but the gamble paid off and the city survived.[31] "If we had . . . stayed within the absolute technical bands in which we were supposed to work," District Engineer Colonel Richard W. Craig explained, "Valley City would be [completely] flooded right now."[32]

As rainstorm after rainstorm pummeled the Midwest in the summer of 1993, the soil in the area became saturated, causing heavy runoff into the streams and rivers feeding the Mississippi River. This started a chain reaction of massive flooding on the Mississippi, especially from the Quad Cities of Illinois to St. Louis, Missouri.[33] Throughout the summer of 1993, Corps' person-



Map: Red River of the North Basin in North Dakota and Minnesota.

nel fought to keep the river in its banks. Working in concert with FEMA, the Coast Guard, National Guard units and the American Red Cross, the Corps constructed emergency levees and strengthened existing structures. It also used gage readings to develop numerical models of river stage forecasts – a difficult task because of the wide fluctuations in water levels caused by levee breaks and overtoppings – and supplied sandbags and pumps to local governments. By August 9, more than five hundred Corps' employees were involved in the fight, including a hundred and seventy-one from the St. Paul District. In the district itself, most of the damage occurred when the Minnesota River spilled into towns and farmland before reaching the Mississippi River. Although the Mississippi reached an all-time summer record of 19.2 feet at St. Paul, flood control structures in the Twin Cities prevented major destruction. Unfortunately, flood control structures in other regions, especially privately constructed agricultural levees, were not as strong and water broke through in numerous places outside of the St. Paul District's jurisdiction. By the time the water receded throughout the whole Mississippi Valley, the Great Flood of 1993 had killed fifty-two people, injured 2,300, left 56,000 homeless and caused more than $10 billion in property
damage.[34]

Although the flooding sparked a national debate about the effects of the Corps' levees on the Mississippi River (see Chapter Three), the major lessons learned by the St. Paul District focused more on its flood response efforts. An After Action Report explained that accessible basin maps and project locality maps would facilitate staff discussions of future operations. It also called for blackboards, flip charts or other ways to display current hydrological data, location of district personnel, summaries of pertinent events and important telephone numbers. Fighting the flood had demonstrated that cellular telephones were an effective way of communicating during some emergency operations and district officials advocated their future use. Finally, the flood had convinced the district that if local governments would prepare emergency situation guidelines, including emergency notification contacts, inventories of supplies and maps of the region, damage could be reduced.[35]

The lessons of the 1993 flood served the St. Paul District well four years later when the Red River of the North inundated Grand Forks, East Grand Forks and several other communities. During the winter of 1996 and 1997, six to eight feet of snow accumulated in the Red River basin, breaking records in several places. In February 1997, the huge snowpack caused the National Weather Service to issue a forecast of major flooding, and the Corps began to prepare for the fight. In March, the district initiated approximately twenty-two advance measures in several communities, spending $5 million. When warm temperatures at the end of March hastened melting, swelling the river and its tributaries, District Engineer Colonel J. M. Wonsik authorized the beginning of emergency operations.[36]

During the first week of April, the Corps established emergency operation centers in Fargo and East Grand Forks and worked from these locations throughout the month. Based on a flood

Cleanup: Corps' contractors cleanup the aftermath left in Grand Forks, N.D., by the devastating Red River of the North flooding in 1997. (Photo courtesy St. Paul District, Corps of Engineers)

stage forecast of 49 feet at Grand Forks, the district constructed emergency levees around the city to a stage of 52 feet and transported sandbags to the area. Then, on April 6, Blizzard Hannah, one of the worst snowstorms in fifty years, hit the region, causing whiteout conditions, heavy wind gusts and wind chill temperatures of forty below zero. The storm dropped an additional 3.5 inches of precipitation on the already-saturated ground.[37]

After the blizzard ended, temperatures escalated again, producing vast quantities of meltwater. During the third week of April, the Red rose to 54 feet, nearly 40 feet above its normal level. Water spilled over the emergency levees, pouring water into the downtown areas of both Grand Forks and East Grand Forks and forcing massive evacuations. Not long after, broken gas pipes ignited a fire in downtown Grand Forks. Because the water prevented fire fighters from reaching the blaze, eleven buildings burned. In the words of Lisa Hedin, project manager of the Grand Forks/East Grand Forks Flood Control Project, the situation "was like a bad Sunday night movie." By the time the river crested at 54.2 feet, significant damage had occurred. On April 22, President Bill Clinton visited the two communities, declaring them disaster areas and commented that the people of America "could never imagine facing a flood and a fire and a blizzard all at the

same time."[38] By the time the water receded, eight people died, tens of thousands had fled their homes and property destruction approached $2 billion.[39]

But Grand Forks and East Grand Forks were not the only communities waging battles in 1997. Breckenridge, Minnesota; Fargo, North Dakota; and Ada, Minnesota, also experienced flooding, as did areas along the Minnesota River and the Mississippi River. More than a hundred district employees provided emergency services to more than forty communities in the spring of 1997, winning the fight in all but four of them – Grand Forks, East Grand Forks, Breckenridge and Ada. In total, the district estimated it spent $14.8 million and prevented an additional $100 million in damages by supplying state and local governments with 4.5 million sandbags and 235 pumps. "Every flood executive officer hopes that during their career they won't have to deal with any flood, much less a flood of this magnitude," Robert Post, chief of engineering, commented. "Thank God we were prepared and trained for this emergency."[40]

Flood fights continued in the twenty-first century, when the Red River and the Minnesota River overflowed again in 2001. Likewise, after heavy rainstorms in the summer of 2002, the district faced flooding from the Wild Rice River at Ada, Minnesota; the Roseau River at Roseau, Minnesota; and Lake of the Woods at Warroad, Minnesota. As with other floods, the district aided local communities with levee construction, water stage predictions and cleanup efforts. At Lake of the Woods, the district employed a new flood fighting device: geo-cells, which were plastic grid systems filled with dirt and stacked four-feet-by-four-feet. The Corps worried about their cost, but because they were recyclable for up to six floods, officials hoped they would prove to be cost-effective. Using such technology, the Corps protected streets, residences and businesses in the three communities. "The entire district supported the flood fight," David Christenson, chief of the Readiness Branch, stated, "and they did it very effectively." A note from a family in Roseau concurred with this assessment, expressing "a sincere thank you" to Corps employees for "a job well done."[41]

Drought

Although flooding was the major natural disaster the St. Paul District routinely faced, other emergencies occurred as well. In 1977, Congress amended Public Law 84-99 to mandate the Corps provide services in times of drought, such as offering emergency supplies of water and constructing wells in affected areas.[42] To fulfill this mandate, the Corps developed several plans of action. If the National Weather Service issued a drought alert forecast in the vicinity of the Upper Mississippi River, for example, the Corps could use its locks and dams to conserve water in its reservoirs, and then release the stored flow at later dates. If the drought became severe, the Corps could restrict the number of lockages on the Mississippi in order to preserve pool elevations. It could also conduct emergency dredging operations if water levels became too low. When local, county and state resources became exhausted, the Corps could supply emergency drinking

water assistance by providing water tank trucks, bottled water, temporary filtration, mobile purification units, temporary pipelines and well-drilling equipment. In such instances, the Corps would cover the transportation costs while the community would pay for the water charges.[43]

The St. Paul District used these plans in 1976 when severe drought conditions affected the Midwest. When the Mississippi River's water flow dipped to 532 cfs between Minneapolis and St. Paul, District Engineer Colonel Forrest Gay and Minnesota Governor Wendell Anderson called an emergency news conference to ask Minnesotans to conserve as much water as possible. Within two weeks, residents of the Twin Cities had curtailed their water consumption by fifty percent. The district also restricted the number of recreational lockages at St. Anthony Falls and Lock and Dam 1, thereby helping navigation interests on the river. Because of these actions, Minnesotans successfully outlasted the drought until rain finally fell.[44]

Another drought occurred in 1988 when water flows on the Mississippi again declined dramatically. During an unusually dry June, water levels at Anoka, Minnesota (upstream of the Twin Cities), dropped to 1,280 cfs, dramatically lower than the normal 10,000 cfs average for June. Throughout the month, Ed Eaton, chief of the district's water control unit, met with representatives from the Minnesota DNR in a series of technical drought meetings. At the same time, the district's emergency management team prepared a situation report on the conditions in North Dakota, Minnesota and Wisconsin. When water levels continued to fall, the district advised recreational boaters that they could face either locking delays or restrictions on the Mississippi, and the state of Minnesota asked its residents to conserve water.[45]

Conditions worsened in July when no rain was forthcoming. The Minnesota DNR informed the Corps on July 6 that if water levels dipped below 1,000 cfs for three consecutive days, it would request the district release water from its headwaters reservoirs. During the last week of July, three consecutive days of sub-1,000 cfs flows occurred. In response, Governor Rudy Perpich asked the Corps to release 300 cfs of water from the Lake Winnibigoshish Reservoir. The Leech Lake Band of the Chippewa Indians protested the plan, concerned that a release of water at that time would have adverse impacts on its wild rice and fishing operations later. At the same time, St. Paul District officials, including Colonel Roger Baldwin, who had only recently assumed the position of district engineer, did not believe the release would materially affect the low water levels. But because there was no conclusive data to support these claims, the district was reluctant to reject the request. While district officials considered the best course to follow, the river's flow dropped to 842 cfs at Anoka on July 30. Fortunately, only three days later, rain began falling. Using the rainfall as justification, Baldwin informed Perpich, the Leech Lake Band and Minnesota's congressional delegation that he would not release water from Winnibigoshish. For the next two weeks, intermittent heavy rains soaked the area, and, by August 16, the Mississippi's flow was at 2,690 cfs, convincing state officials to rescind water conservation requirements.[46]

Although the August rains meant that no emergency water supplies were necessary in Minne-

Lake Winnibigoshish Reservoir at the center of controversy during the drought of 1988. (Photo courtesy of St. Paul District, Corps of Engineers)

sota, other communities were not as fortunate. In North Dakota, two small towns, Pembina and Edmore, had inadequate supplies after the Pembina River's flow dropped to nearly zero. In need of aid, the cities turned to the St. Paul District. In September, the district installed a 1,100-foot temporary pipeline connecting Pembina's water treatment plant with the Red River of the North. In October, Assistant Secretary of the Army for Civil Works Robert Page declared Edmore drought distressed after the city's main reservoir dried up. When Edmore officials found an old reservoir containing an estimated 4.5 million gallons of water, they called on the St. Paul District for help. The district installed a temporary pipeline and pump that drained the reservoir in November. At the same time, district employees, in cooperation with the Omaha District, investigated more than ninety individual water supply requests from farmers in North Dakota and recommended that the North Central Division approve ten of them. The authorization was never given, but when autumn rains began falling, the worst of the drought was over.[47]

These episodes in 1988 taught the Corps several important lessons about drought in general. For one thing, conditions on the Mississippi River demonstrated the necessity of revising the district's thirty-year-old low flow headwaters plan and drought contingency strategy. In the words

of Gary Nelson, a Corps' sociologist, "The drought told the staff we had severe information deficits."[48] The St. Paul District immediately began working with state and federal agencies to correct these plans; and by 1991, according to Colonel Roger Baldwin, employees had a better understanding of "the physical nature of the basin" and "the physical nature of the water flows." This enabled the Corps to produce a low flow headwaters plan that was "far superior" to the previous one.[49] The drought also allowed the Corps to conduct water quality studies on the Mississippi River, thereby gaining information on how drought affected the river's basic characteristics and how dam operations could improve water quality. The Corps' Waterways Experiment Station, located in Vicksburg, Mississippi, assisted the St. Paul District with this study, taking samples from Pools 1 and 2 on the river and testing them for dissolved oxygen, pH, conductivity and temperature.[50] Finally, the Corps developed a drought management team, similar to its flood management team, and studied Indian water rights. As Baldwin concluded, "a lot of education took place among all agencies and all players."[51]

Disasters Outside the St. Paul District

For the most part, the St. Paul District's emergency operations focused on disasters within its own boundaries. However, in accordance with the Stafford Act of 1988, the district responded to emergencies in other regions as well. On October 17, 1989, for example, a magnitude 7.1 earthquake known as Loma Prieta rocked the San Francisco Bay area in California. The quake, which was the worst one in the United States since 1906, killed sixty-two people, injured 3,775, left 12 thousand homeless, knocked out San Francisco's power and caused $7.1 billion in damages. President George Bush declared San Francisco and other communities a major disaster area, and on October 20, FEMA requested Corps' assistance in conducting residential inspections to determine whether people were eligible for FEMA's individual assistance program. Normally, FEMA contracted out such inspection work, but because Hurricane Hugo, which had occurred the year before, had depleted the supply of available contractors, FEMA turned to the Corps for help, asking for three hundred people.[52]

On October 21, Corps' headquarters in Washington, D.C., transmitted FEMA's request, asking that divisions send only their best employees since they would be dealing directly with the public. Two days later, ten volunteers from the St. Paul District arrived in Sacramento, California, along with approximately three hundred other Corps' personnel. Two of the district's representatives were Clyde Giaquinto and Arne Thompson, who spent their time inspecting houses in Redwood City and Oakland, California. One of the problems they faced included people fraudulently claiming the earthquake had damaged structures actually destroyed by other means. At one address, for example, Giaquinto found "nothing more than a chain link fence in front of a vacant lot." The applicant claimed the earthquake had destroyed his house, but after interviewing a neighbor and a postal worker, Giaquinto discovered the house had been torn down months before. Although damage claims investigations were not as glamorous as other engineering jobs,

employees such as Thompson and Giaquinto understood that such work ensured that assistance only went to those truly in need. Thompson insisted he was glad to help in the situation, especially because the Corps' efforts refuted general criticism levied against federal disaster relief in the aftermath of Hurricane Hugo. Unlike those efforts, the Loma Prieta earthquake response was, according to Thompson, "excellent."[53]

Rebuilding: The St. Paul District provides emergency operations support around the world. Here, Mark Koenig, and General Robert B. Flowers, Chief Engineer, survey the area at Pol-E-Charkhi Army Base in Afghanistan, 2003. (Photo by Captain Taylor Hwong, courtesy of St. Paul District, Corps of Engineers)

Other relief assignments allowed the Corps to focus more on engineering. At the end of the Persian Gulf War in 1991, several members of the St. Paul District traveled to Kuwait to help the nation rebuild Kuwait City after its invasion and short-lived occupation by Iraq. The Corps had the responsibility of performing damage surveys, participating in emergency and long-term recovery efforts in public works, utilities, transportation and coordinating the reconstruction of key government and defense facilities. More than 2,000 Corps' members volunteered for the response, including nineteen from the St. Paul District. James Ruyak, who served as chief of construction for the district from 1973 to 1979, worked as the resident engineer at the Ali Al-Salem Air Base. He surveyed damage, planned construction projects and mediated between the construction contractor and Kuwait's Air Force. "The city's entire infrastructure [was] pretty well destroyed," Ruyak observed, but the Corps' emergency response experience and its resources helped to restore much of Kuwait's water, power and defense networks.[54]

In 1992, four representatives from the St. Paul District aided the city of Chicago in its recovery from the "Great Chicago Flood." On April 13, 1992, a piling driven into the bottom of the Chicago River caused a small leak in a network of tunnels 50 feet underneath downtown Chicago. Water spread throughout the system, flooding basements in a number of businesses, causing power outages, closing subway routes and forcing thousands to evacuate. Initially, the Corps supplied only technical assistance to the city; but when the city could not stop the leak, FEMA authorized the Corps to assume command. Led by the Chicago District, the Corps set up

three emergency operation centers around the city to coordinate repair and water removal. Lieutenant Colonel Mike Mahoney, deputy district engineer for the St. Paul District, supervised the effort to pump water from the tunnels, while Captain Mark Miller of the district's Construction Branch served as chief of the Corps' night shift team at the interagency command center. Dan Reinartz, from St. Paul's hydraulics section, examined water conditions during the pumping operations, while Ken Gardner, chief of the district's Public Affairs Office, aided in media response.[55]

In August 1992, district employees were sent to southern Florida after Hurricane Andrew, a Category Four hurricane, caused $20 billion in property damage and left 160,000 people homeless. To facilitate the cleanup effort, FEMA assigned two major tasks to the Corps: providing temporary roofing to residences and collecting storm debris. In response, more than 1,150 Corps' personnel went to South Florida, including ten from the St. Paul District. Upon completion of its duties, the Corps had covered 43 thousand damaged roofs and extracted 13 million cubic feet of storm debris. "It is amazing how the Corps of Engineers can organize," Greg Porycky, an engineering technician from the district, remarked.[56]

The Corps also played a significant role in disaster response after terrorists destroyed New York's World Trade Center towers and part of the Pentagon on September 11, 2001. At the time of the attacks, District Engineer Colonel Robert L. Ball and Deputy of Programs and Project Management Judith L. DesHarnais were conducting their annual congressional visit with U.S. Representative Ron Kind (D-Wisconsin). Although neither Ball nor DesHarnais were injured in the attack, the St. Paul District became involved in another way. Michelle M. Shafer of the St. District's Operations Branch, who was working at Corps' headquarters in preparation for the upcoming hurricane season, was immediately mobilized along with two other employees as an Emergency Support Team for FEMA, and they spent the next nine days coordinating missions between FEMA and the Corps. The Emergency Support Team sent structural safety assessment teams, debris subject-matter experts and Emergency Support Function leaders to New York City and Washington, D.C., and also responded to telephone calls offering help. "I will never forget the numerous strangers, recognizing the Corps' castle and emergency operations shirt I was wearing, that approached me just wanting to say thanks," Shafer recounted. "It was probably one of my proudest experiences as a Corps' employee."[57]

Conclusion

Whether in the district or outside, St. Paul personnel assisted in emergency operations. Through the leadership and coordination of the Readiness Branch, the district responded to a variety of disasters, including floods, earthquakes and drought. This effort comprised several tasks. In some cases, the Corps provided technical assistance, equipment and coordination of operations; in other instances, the Corps helped in cleanup efforts and structure inspection. Each disaster gave the Corps an opportunity to refine its operations, making it more efficient the next

year. Ironically, the suffering of others gave the Corps some of its most positive publicity as it assisted those in need. As Colonel William Badger, district engineer from 1979 to 1982, stated, emergency operations gave the Corps "the highest marks, the highest visibility. That's where we help people the most."[58] Colonel J. M. Wonsik, district engineer from 1995 to 1998, expressed it in a different way: natural disasters provided circumstances where the Corps "had no choice but to excel." Because "each and every member of the district accepted that challenge personally," the St. Paul District displayed its ability to combat emergencies effectively throughout the last quarter of the twentieth century.[59]

Chapter Eight Endnotes

1 "District Puts in Herculean Effort Against the Flood of '97," *Crosscurrents* 20 (Summer 1997): p. 7.

2 Act of 28 June 1955 (69 Stat. 186).

3 Quotation in Public Law 84-99, Emergency Flood Control Work, copy at <http://www.orn.usace.army.mil/pmgt/customer/Water%20Supply/pl84-99.htm> (10 May 2003); see also Act of 7 March 1974 (88 Stat. 12); Act of 20 June 1977 (91 Stat. 233); U.S. Army Corps of Engineers, St. Paul District, "Fact Sheet: Emergency Operations Overview," 23 March 1999, document provided by David S. Christenson. Christenson succeeded Ben A. Wopat as Chief of the Readiness Branch in 1986.

4 The Disaster Relief Act of 1974 (88 Stat. 143).

5 Federal Emergency Management Agency, "FEMA History," <http://www.fema.gov/ about/history.shtm> (6 June 2003). FEMA was not the first emergency office; the Office of Emergency Preparedness predated the creation of FEMA.

6 Act of 23 November 1988 (102 Stat. 4689).

7 Saundra K. Schneider, "FEMA, Federalism, Hugo, and 'Frisco," *Publius: The Journal of Federalism* 20 (Summer 1990): p. 99; Senate, *Disaster Relief Act Amendments of 1988*, 100th Cong., 2d sess., 1988, S. Rept. 100-524, p. 4. Schneider estimated that it usually took a governor fourteen days to request federal aid and the president ten days to approve or reject it, although the response time could be accelerated if urgency and need required it.

8 U.S. Army Corps of Engineers, "Emergency Employment of Army and Other Resources: Civil Emergency Management Program," Engineer Regulation [ER] No. 500-1-1, 30 September 2001, p. 2-1 (each section has its own page numbers), <http://www.usace.army.mil/publications/eng-regs/er500-1-1/entire.pdf> (6 June 2003); Federal Emergency Management Agency, "FEMA History," <http://www.fema.gov/about/history.shtm> (6 June 2003); Federal Emergency Management Agency, *Federal Response Plan*, 9230.1-PL (Washington, D.C.: Federal Emergency Management Agency, 1999), pp. ESF #3-1 – ESF #3-8.

9 See U.S. Army Corps of Engineers, "Emergency Employment of Army and Other Resources: Civil Emergency Management Program," pp. 4-6 – 4-7, Glossary-10; Public Law 84-99, Emergency Flood Control Work; Act of 23 November 1988 (102 Stat. 4689); St. Paul District, "Fact Sheet: Emergency Operations Overview"; Federal Emergency Management Agency, *Federal Response Plan*, pp. 1-2; David S. Christenson, personal communication with the authors, 25 June 2003.

10 St. Paul District, "Fact Sheet: Emergency Operations Overview."

11 David S. Christenson, personal communication with the authors, 7 March 2003. Before the 1990s, the Readiness Branch was its own division under the District Engineer. Christenson described the Emergency Operations Center (EOC) as "an office area with work stations for EOC staff that provide support to field operations. It includes a briefing room, operations center, storage area and project team area. . . It provides computers [and] communications separate from the personnel normal work area. It is the central location for District Command Staff to manage the emergency response." In

times of flooding the Corps also set up field EOCs to perform similar functions. Christenson, personal communication with the authors, 25 June 2003.

12 David S. Christenson interview by John O. Anfinson, St. Paul, MN, 23 November 1993, p. 9, Oral History File, St. Paul District, St. Paul, Minnesota; "Flood Preparations Start Early at the District," *Crosscurrents* 25 (March 2002): p. 1; "District Readies for Spring with Flood Control Exercise," *Crosscurrents* 15 (May 1992): p. 6.

13 U.S. Army Engineer District St. Paul, *Red River of the North and Souris River Post Flood Report: 1979* (Washington, D.C.: Government Printing Office, 1979), pp. 2-6 – 2-12.

14 Raymond H. Merritt, *Creativity, Conflict and Controversy: A History of the St. Paul District U.S. Army Corps of Engineers* (Washington, D.C.: Government Printing Office, 1979), pp. 348-349; United States Army Engineer District St. Paul, *Red River of the North Post Flood Report: 1978* (Washington, D.C.: Government Printing Office, 1978), p. 5.

15 United States Army Engineer District St. Paul, *Red River of the North Post Flood Report: 1978*, pp. 38-39.

16 "Some Homes Abandoned as Rural Flooding Spreads," *Minneapolis Tribune*, 8 April 1978.

17 "Crest Moves North," *Minot Daily News*, 14 April 1978. Burdick's remark highlighted a growing belief in America that people were entitled to federal assistance in times of natural disasters even if they lived in areas at high risk. For more information on this subject, see Richard Reeves, "Hurricane$, Earthquake$, and Flood$: If People Want to Build Their Houses in Dangerous Places, Why Should the Rest of Us Pay When Disaster Strikes?" *The Washington Monthly* 26 (April 1994): 10-13.

18 United States Army Engineer District St. Paul, *Red River of the North Post Flood Report: 1978*, pp. 13, 51, 59-64; "Flood Danger Eases at Grand Forks," *The Forum* (Fargo, ND) 14 April 1978; "20-Mile Long Valley Sea," *Grand Forks Herald*, 14 April 1978.

19 United States Army Engineer District St. Paul, *Red River of the North and Souris River Post Flood Report: 1979*, pp. 3-1 – 3-6, 5-1; "1979 Red River Flood Set Records for Damage," *Minneapolis Tribune*, 10 May 1979; "Red River Flood Threat is Decreased," *Grand Forks Herald*, 27 March 1979.

20 United States Army Engineer District St. Paul, *Red River of the North and Souris River Post Flood Report: 1979*, pp. 3-4 – 3-6, 3-22, 4-1 – 4-2.

21 "Staying in Touch! Congressman Arlan Stangeland," *Benson Monitor*, n.d., clipping in File 870 Red River of the North Flood 1979, Box 3858, SPDAR.

22 Quotation in *Crosscurrents* 2 (May 1979): p. 3; see also United States Army Engineer District St. Paul, *Red River of the North and Souris River Post Flood Report: 1979*, pp. 3-9 – 3-10, 5-7 – 5-8, 7-5; U.S., Congress, House, Committee on Public Works and Transportation, Oversight and Review Subcommittee, *Flooding of the Red River of the North and Its Tributaries: Hearing Before the Subcommittee on Oversight and Review of the Committee on Public Works and Transportation*, 96th Cong., 1st sess., 1979, pp. 1-2.

23 For an example of this, see Edward McNally interview by Matthew Godfrey, St. Paul, MN, 22

October 2002, p. 5.

24 Quotations in "Three Rivers Flood Breckenridge: Red River Hits Record Level, Hasn't Peaked," *St. Paul Pioneer Press*, 5 April 1989; see also "Worst Flood Ever: Wahpeton-Breckenridge May Top Record by 2 Feet," *The Forum*, 5 April 1989.

25 "Perpich Calls Up Guard in Breckenridge Flood," *Star Tribune*, 6 April 1989.

26 Quotation in U.S. Army Corps of Engineers, St. Paul District, *Spring Flood 89: Red River of the North After Action Report* (St. Paul, MN: U.S. Army Corps of Engineers, St. Paul District, 1989), pp. 3-1 – 3-4, 4-1, 5-1; see also "Red River of the North Flood of '89," *Crosscurrents* 12 (May 1989): p. 1; "Drayton is Ready for Red's Crest," *Grand Forks Herald*, 19 April 1989.

27 John M. Murrin, Paul E. Johnson, James M. McPherson, et al., *Liberty Equality Power: A History of the American People. Volume II: Since 1863*, concise 2d ed. (Fort Worth, TX.: Harcourt College Publishers, 2001), p. 821.

28 U.S. Army Corps of Engineers, St. Paul District, *Spring Flood 89: Red River of the North After Action Report*, p. 5-3.

29 "Floodfight Snapshots," *Crosscurrents* 12 (May 1989): p. 4.

30 U.S. Army Corps of Engineers, St. Paul District, *Spring Flood 89: Red River of the North After Action Report*, p. 5-3.

31 Tim Bertschi interview by John O. Anfinson, St. Paul, MN, 1993, pp. 1, 3-4; Christenson Interview, pp. 1-2.

32 Colonel Richard W. Craig interview by John O. Anfinson, St. Paul, MN, 20 July 1993, p. 15.

33 Lt. Col. Gary M. Koenig, "The Great Flood of 1993," File 1993 Flood, Cultural Resource Management Files, St. Paul District, St. Paul, Minnesota; David McConnell, "Mississippi River Flood: 1993," <http://enterprise.cc.uakron.edu/geology/natscigeo/Lectures/streams/Miss_Flood.pdf> (6 June 2003).

34 Michael C. Robinson, "Nightmare in the Heartland: The Great Midwest Flood of 1993," *APWA (American Public Works Association) Reporter* 60 (September 1993): pp. 6-7; "1993 Reviewed," *Crosscurrents* 17 (January 1994): p. 4; Koenig, "The Great Flood of 1993"; David Tenenbaum, "Rethinking the River," *Nature Conservancy* 44 (July/August 1994): p. 11.

35 U.S. Army Corps of Engineers, St. Paul District, *After Action Report: Summer 1993 Flooding in the Upper Mississippi Basin and Red River of the North Basin* (St. Paul, MN: U.S. Army Corps of Engineers, St. Paul District, 1993), pp. 22-23.

36 "District Puts in Herculean Effort Against the Flood of '97," p. 2; U.S. Army Corps of Engineers, St. Paul District, *After Action Report: Spring 1997 Flood in the Red River of the North Basin, Minnesota River Basin and Mississippi River Basin* (St. Paul, MN: U.S. Army Corps of Engineers, St. Paul District, 1997), pp. 4-5; *Congressional Record*, 105th Cong., 1st sess., 24 April 1997, p. H1866, <http://80-web.lexis-nexis.com.weblib.lib.umt.edu:2048/congcomp/document?_m=cfec99d7fffd8c93d0d4c2edf6534444&_docnum=12&wchp=dGLbVzz-lSlAA&_md5=

b90242eb6e5e744703d50b29ff1e2954> (6 June 2003). According to Major General Russell L. Fuhrman, Deputy Chief of Engineers and Deputy Commanding General of the Corps , the District's preparations were some of the best advance measure work that the Corps had ever performed.

37 "District Puts in Herculean Effort Against the Flood of '97," p. 6; U.S. Army Corps of Engineers, St. Paul District, *After Action Report: Spring 1997 Flood in the Red River of the North Basin*, pp. 5-13.

38 "Transcript of Clinton Remarks April 22 in Briefing on Flood Damage by Local Officials," *U.S. Newswire* (23 April 1997), <http://80-infoweb.newsbank.com.weblib.lib.umt.edu:2048/iw-search/we> (6 June 2003).

39 Quotation in "District Puts in Herculean Effort Against the Flood of '97," p. 6; "After Action Report: Spring 1997 Flood in the Red River of the North Basin," pp. 5-13.

40 Quotation in "District Puts in Herculean Effort Against the Flood of '97," p. 7; see also "After Action Report: Spring 1997 Flood in the Red River of the North Basin," pp. 14-17; U.S. Army Corps of Engineers, St. Paul District, "Flood of 1997," <http://www.mvp.usace.army.mil/disaster_response/default.asp?pageid=61> (6 June 2003).

41 Quotations in "District Supports Flood Fight in Northwestern Minnesota," *Crosscurrents* 25 (September 2002): pp. 3-10; see also U.S. Army Corps of Engineers, St. Paul District, *Spring 2001 Flood in the Red River of the North, Minnesota River and Mississippi River Basins: After Action Report* (St. Paul, MN: U.S. Army Corps of Engineers, St. Paul District, 2001).

42 Act of 20 June 1977 (91 Stat. 233).

43 "The Corps and Drought: What Can Be Done," *Crosscurrents* 4 (April 1981): pp. 1-2.

44 "The Corps and Drought," p. 2; Raymond Merritt, "New Directions: Transitions in the St. Paul District, Corps of Engineers, 1976-1982," unpublished manuscript, St. Paul District, pp. 3-4.

45 "The Drought of 1988: A Chronology," *Crosscurrents* 11 (September/October 1988): p. 4.

46 "The Drought of 1988," p. 5; Colonel Roger L. Baldwin interview by John O. Anfinson, St. Paul, MN, 1 July 1991, p. 9; "Annual Historical Report for 1988: St. Paul District," n.p., File 870 Annual Historical Report (90), Box 1560, SPDAR.

47 "Two Emergency Water Projects Completed," *Crosscurrents* 12 (January 1989): p. 3; "Annual Historical Report for 1988: St. Paul District," n.p.

48 Quoted in "Drought of '88 Offers Lessons for Minnesota of '89 and Beyond," *Star Tribune*, 26 April 1989.

49 Quotation in Baldwin Interview, p. 9; see also "Annual Historical Report for 1988: St. Paul District," n.p.

50 "Drought Provided Opportunity for Water Quality Study," *Crosscurrents* 12 (April 1989): p. 3.

51 Baldwin Interview, p. 9; see also "Drought of '88 Offers Lessons for Minnesota of '89 and Beyond."

52 Schneider, "FEMA, Federalism, Hugo, and 'Frisco," p. 109; Janet A. McDonnell, *Response to the Loma Prieta Earthquake* (Fort Belvoir, Virginia: U.S. Army Corps of Engineers, 1993), pp. 27-28.

53 Quotations in "Earthquake Team Returns to District," *Crosscurrents* 12 (December 1989): pp. 4-5; see also "Earthquake Update: Corps Responds with Pride and Professionalism," *Crosscurrents* 12 (November 1989): p. 12.

54 Quotation in "Minnesota Engineer Among Those Who Volunteered to Rebuild Kuwait," *St. Paul Pioneer Press*, 3 March 1991; see also Janet A. McDonnell, *After Desert Storm: The U.S. Army and the Reconstruction of Kuwait* (Washington, D.C.: Department of the Army, 1999), pp. 37-39, 210-211.

55 "Great Chicago Flood: St. Paul District Helps Plug Subterranean Flood," *Crosscurrents* 15 (June 1992): pp. 1-2.

56 "Ten from St. Paul District Work Hurricane Andrew Relief Duty," *Crosscurrents* 16 (January 1993): pp. 1, 3.

57 "Shafer Assists FEMA on Pentagon, NYC Recovery," *Crosscurrents* 24 (October 2001): pp. 3, 8; "St. Paul District, Congressional Visits by Colonel Ball and Judy DesHarnais, 10-11 September 2001," File Record of Congressional Visits, St. Paul District, St. Paul, Minnesota.

58 U.S. Army Corps of Engineers, Office of the Chief of Engineers, *Engineer Profiles: The District Engineer, Interviews with Colonel William W. Badger*, by Frank N. Schubert (Washington, U.S. Army Corps of Engineers, 1983), p. 71.

59 Colonel J.M. Wonsik interview by John O. Anfinson, St. Paul, MN, 20 January 1998, p. 8, Oral History File, St. Paul District, St. Paul, Minnesota.