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MAGAZINE

MANAGING EMERGENCY COMMUNICATIONS

**EMS: A DIFFERENTIAL
RESPONSE**

ALASKA AIR CRASH

**BONFIRE COLLAPSE
AT TEXAS A&M**

FLOODS!

- **FORT COLLINS, COLORADO**
- **HURRICANE FLOYD,
NORTH CAROLINA**
- **LAS VEGAS, NEVADA**

TACTICAL MAPPING • INTELLIGENT WORKSTATIONS
OKLAHOMA CITY – FIVE YEARS LATER

FLOODED!

A Night to Remember in Ft. Collins

by Slim Ray and John F. Weaver



"There are several cars underwater, both right side up and upside down, with people in them..."

"A lady in a gray sweatshirt was just swept off her feet on Shields Street and disappeared down Shire Court screaming ..."

"Two mobile homes just erupted in flames in the Johnson Mobile Home Park..."

[two minutes later] "The train has just derailed! The train has just derailed!"

[one minute twenty seconds later] "Johnny's Liquor has just exploded, there is a heavy smell of gas throughout the area..."

[two minutes later] "Attention all units...we have just learned that there may be hazardous materials being transported by the train ..."

"Dispatch, several 40x60 trailers are now moving down Spring Creek toward the College Ave bridge...there is screaming coming from inside some of the floating trailers..."

they almost always spell trouble. Problems include steep runoff gradients, easily saturated soils; and structures and paving in the urban area. There is also a confusing tangle of creeks and irrigation canals which crisscross these drainages. The city was aware of the problem and had made considerable mitigation efforts in the years preceding the flood.

Fort Collins is protected by the Poudre Fire Authority (PFA), a consolidated fire protection and emergency services organization with 111 full-time firefighters, all of whom had undergone some basic flood rescue training. Larimer County also has a 20-man dive team, with volunteers from surrounding communities available as needed.

Fort Collins, in short, had done its homework. They were well prepared for a flood, or so they thought.

By late afternoon on July 27th, the air over the Rocky Mountains foothills had become so warm and moist that it com-

While this sounds like a Hollywood disaster movie, it really happened in Fort Collins, Colorado on the night of July 28th 1997. These incidents are only a small sample from that night, when the emergency services system in Ft. Collins suddenly found itself overwhelmed by the forces of nature. By midnight, five people were dead and sixty-two injured. Many others had barely survived. This is the story of what happened that night and what lessons were learned from it.

At the Ft. Collins dispatch center that evening, the swing shift crew came to work in a steady light, drizzle. Dispatcher Tom Wright, on the graveyard shift, drove in through what he thought at the time seemed like just a little too much rain, arriving at 9:30 PM Then he walked through the door of the Fort Collins dispatch center into "total chaos." There were frantic conversations on seven phone lines, plus chatter to and from two fire channels, three PD channels, an ambulance channel, and a dive channel—all going at once.

Heavy rains are rare in the High Plains. The city of Fort Collins' annual average yearly rainfall is 15 inches, most of which occurs in the late fall or early spring. When heavier rains do come,



PFA firefighters carry a victim rescued from the Johnson Mobile Home Park to safety as a third firefighter turns on water pressure in submerged hydrant. Below the water is a 5" fire line that will be used to douse the trailers burning in the background.

JOHN WEAVER

pared favorably with tropical air masses that Colorado State University scientists had recently measured over the southwest Pacific. That evening a near-continuous rain began, and by noon the next day the western half of the city had received three to four inches, with ten inches reported in areas 8 miles north. Throughout the region, the ground was saturated.

The rain slowed to a drizzle just after noon, but all of the creeks and irrigation canals in the city were now full. The city's new emergency manager, Glenn Levy, alerted the Dispatch Center and Ft. Collins Storm Water Utility administrators. He also talked with PFA, asking that they make their resources available for pumping and sandbagging. Unfortunately, a 3-alarm house fire that afternoon had pulled away many units that would normally have been available.

The rain began to pick up again just after 5:00 PM. A series of individual rain cells formed southwest of the city, then moved slowly off toward the north-northeast, interleaving drizzle with longer periods of extremely heavy rain. The showers were so heavy that during the most intense periods the powerful



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Fire and Flood: Firefighters had difficulty accessing the scene of a flood and burning mobile home park to make rescues. In center, a PFA firefighter lays out a static hand line to prepare a water rescue operation.

roar interfered with normal conversation indoors. One woman said that rains sheeting off her roof looked like she was standing behind a waterfall.

At the dispatch center, hints of trouble began to show up by 7:00 PM, but the situation really began to deteriorate until just before 8:00. There were several

calls about flooded basements, and at first dispatchers sent PFA engines to help with pumping. Within a half hour, however, the number of flooded basement calls vastly exceeded resources. Dispatchers now had to inform callers that there was nothing the city could do.

The number of calls continued to

Environmentalism: Rescue's Friend... or Foe?

By Nancy J. Rigg

The work of search, rescue, and recovery, is a noble cause that stands in a shining light. So are most efforts to preserve our environment. But even the brightest lights cast an occa-

sional shadow. While emergency services agencies must routinely contend with an array of political agendas during budget debates and planning sessions, certain environmental pressures are

becoming increasingly unwelcome intruders during rescue and recovery missions.

Fragile Environment: Fragile Human Heart

One of the most heartrending examples of colliding agendas occurred over the Memorial Day weekend in 1999 on the Chatooga River, a federally protected waterway that borders South Carolina and Georgia. When 16-year old Rachel Trois, who was boulder hopping across a seemingly calm area of river,

Lewisville (TX) Fire Dept Paramedic/FF Russ Clark rescues a teenager who stole a canoe for a joy ride during excessive spring rains in Texas and soon became stranded in the floodwater. The Two teenagers were rescued by Clark and EMT/FF Wayne Davis.



LINDA GHEEN

increase. Just after 8:00 PM, the average call rate increased from 6-8 calls every 15 minutes to about three per minute. Fire and police radio traffic “segments” (a short radio communication between a responder and dispatch) jumped from 2

between 8:00 and 8:14, to 16 in the period from 8:15 to 8:29.

Until now dispatchers had been holding their own. But the call volume increased, calls stacked up, and the situation began sliding out of control.

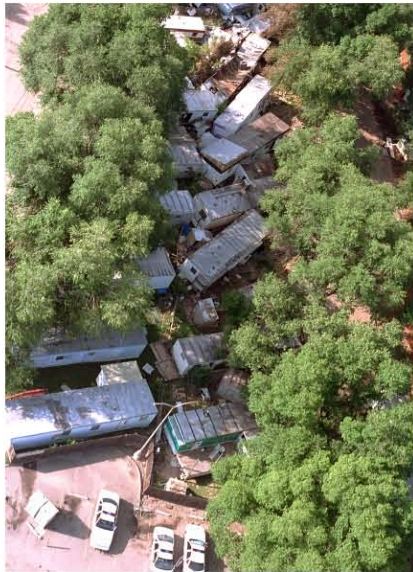
Reports of flooded intersections and basements now became mixed with other calls that seemed more ominous. One caller reported a 20 acre field in front of Hughes stadium was full to overflowing; another that the basement was flooded and her daughter was trapped; another that kids were playing in the dangerous water; and another that sewer lids were blowing off and water spewing out. The water was also setting off automatic fire alarms all across town. Just before 8:30 PM, a caller from a stable near Spring Creek reported that the normally 8’ wide, 6” deep waterway was now running 8’ deep, flooding the barns. Firefighters arrived on scene to find the creek more than a hundred feet out of its banks, and spent the next half hour helping to move horses to safety.

For the most part, though, PFA spent their time during this period checking on fire alarms and responding to basement calls that now included walls ready to

collapse, pilot lights out with a smell of gas, and “sparking” electrical outlets. Police tried to keep the public out of deepening water on roads and intersections. Traffic and road problems, however, were actually increasing. College students and others began showing up with inner tubes and boogie boards to play in the runoff. Some drivers with SUVs came out to “test” their vehicles.

Still, the situation, though chaotic, seemed manageable. But Mother Nature wasn’t finished yet. A large storm, some 40 miles to east, suddenly produced a dome of cold air that deflected and accelerated the air on its northern fringe by nearly 50%. Now the warm, moist air – the fuel for thunderstorms – raced westward in a narrow jet, ramming the richest air across the southern half of Fort Collins and into the Spring Creek Basin. Rain rates nearly doubled, and what had been a series of slow-moving cells now became a single, large and very intense tropical rain storm.

Ft. Collins now found itself well outside the box – far beyond what any training had covered. Resources were being spread too thin. PFA had seventeen units in service (11 engines, 2 “mini’s,” 2



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Four days after the flood, this aerial shot shows what's left of the Johnson Mobile Home Park, where trailers have been washed together by the floodwaters.

slipped and fell into the water, the current carried her downstream into a whitewater rapid where she got snagged on a submerged tree limb and drowned. What should have been a routine, if complex, recovery operation turned into a sixty-day long ordeal for the girl’s family. Local environmental and special interest groups fought to block any effort to temporarily divert the river’s flow long enough to allow swiftwater rescuers and divers to perform a safe body recovery.

According Rachel’s father, Joseph Trois, “If the swiftwater rescue experts and divers, whom I trusted, had said that there was nothing to be done, I would have said okay. But it was other people telling me that we couldn’t install a temporary, portable dam in the river that became the stumbling block.” Trois described one of the early planning meetings. “There were rafting companies sitting at this meeting, who make money off this river. There are the U.S. Forest Service and a bunch of other government people. There are the swiftwater rescue folks and divers. And there’s a

bunch of people from some kind of environmental coalition. One guy from this coalition gets up and starts making a speech about the ‘wild and scenic river that was set aside in 1968’ and how ‘extraordinary means’ cannot be used to get Rachel out of the water. He then adds that ‘it won’t help the family to get her back’, and that’s when I stood up and said that I was not going to sit here anymore and listen to this. These environmentalists were acting like we wanted to drill into Mother Teresa’s heart with a chainsaw.”

By the time permission to install the temporary dam was granted two months after Rachel disappeared, her remains “had deteriorated and fallen apart,” Trois said in a voice infused with rage and sorrow. With no skull, DNA had to be used to make the official identification. “One thing that absolutely has to change,” Trois said emphatically, “is that I don’t ever want to hear another thing about a tree or rock or fern that you have to walk on in order to get somebody out of another river. In a situation like this,

there’s only one thing that’s important. Getting that person in the water back to their family, so that they can have rest.”

Where A River’s Past and Future Collide

Colliding agendas are not exclusive to wilderness or rural areas. In Los Angeles County, there are 470 miles of “flood control channels” that quickly evacuate floodwaters during torrential rainstorms. Although the channels are an engineering wonder, allowing for development in areas that would otherwise be inundated whenever it rains, the cement-lined channels represent potential deathtraps for anyone who gets swept downstream. And according to environmental activists, they also have a negative affect on wildlife habitats. Environmentalists have been putting increasing pressure on politicians to allow the Los Angeles River, one of the most crucial links in the flood control system, to return to a “more natural” state. While this sounds good in theory, there is a hidden danger that is not being factored into the debate.

trucks, a search and rescue squad, and 1 tender), with 36 firefighters on duty, and forty-one who came in on 2nd and 3rd alarm page.

It wasn't even close to what they needed.

As the water deepened, college students playing in the water had to be rescued. Dozens of drivers were pulled from cars, and a police officer rescued a woman who was holding onto a bus bench with one hand and a baby with the other. According to the officer, the baby was "bouncing up and down on the top of three-foot-deep white water rapids." The water surged onto the campus of CSU, inundating the student center and campus library and soaking nearly a half-million books.

City dispatch consoles now lit up as communications nearly tripled again. Phone calls were now coming in at a rate of one every 8.5 seconds, and radio traffic was nearly continuous. There were 104 incoming calls to the E-9-1-1 and non-emergency police phone lines, and 109 separate radio "segments" on police and fire radio channels between 9:45 and 10:00 PM alone.

There was no way to accept, triage,



JOHN WEAVER

Mobile home debris being cleared from the College Avenue overpass the morning after the flood.

and assign calls at seven per minute, much less find available rescue units to handle them. In fact, field units were having problems of their own. The water had blocked many access roads, cutting the city in half, then in half again. Radio batteries were wearing down, police cars were stalling in the deep water, and com-

munications in general were deteriorating. Double and triple radio traffic became the norm. Firefighters would stumble onto emergency situations on their own more urgent than the calls they were on, and couldn't report the change in mission to dispatch.

The combined flow of Spring Creek,

In cement-lined channels that have earthen bottoms, including the Los Angeles River, the growth of thick vegetation has been embraced by environmental organizations as a habitat for birds and other wildlife. Unfortunately, this same vegetation also poses a tremendous hazard for any victim who may get swept downstream and swiftwater rescue personnel trying to save someone. Battalion Chief Craig Fry, Swiftwater Rescue Coordinator for the Los Angeles City Fire Department, noted that "vegetation in the channels creates a big danger and makes it a lot harder for us to make rescues." When storms drench the city, the force of the runoff frequently uproots trees and bushes growing in the channels, adding to the amount of dangerous debris barreling downstream. And sturdy vegetation that stays in place serves as a "strainer" that can trap victims and rescuers alike. "The force of the water will pin us up against anything that is in the channel," Fry added, "and this can be a death trap for victims and rescue personnel alike."

The Los Angeles County Department of Public Works maintains the majority of flood control channels in Los Angeles County. Brian Sasaki, Deputy Director of Flood Maintenance, explained that in addition to the risks to rescue personnel and victims in the water, vegetation in the channels also poses a threat to homes and businesses that are protected by the flood control system. "The channels were designed to function with their bottoms clear of obstruction," Sasaki said. "Growth of thick vegetation inhibits the flow and may cause the water to rise higher than the channel was designed for, which could create a potential flooding problem."

While engineering and emergency services agencies nationwide strive to fulfill their missions against a backdrop of special interest pressures, environmental advocacy groups continue to attract articulate, if not fully informed, proponents. Blake Gumprecht, a former reporter with the *Los Angeles Times*, recently published an impressive book about the history of the Los Angeles

River. While *The Los Angeles River, It's Life, Death, and Possible Rebirth* is beautifully written and appears to be meticulously researched, the need for swiftwater rescue personnel to rescue victims caught in the river is conveniently never mentioned. Gumprecht does devote a lot of space to the activities of the "Friends of the Los Angeles River," however, an organization that continues to lobby for the "rebirth" of the "natural river," regardless of the potential human toll.

As political and special interest groups become more polarized and less willing to compromise or strike some kind of sensible balance, rescue personnel, the families who lose loved ones, and victims who get swept down environmentally sensitive waterways may find themselves trapped in more than raging rapids or rising flood waters.

Nancy J. Rigg is a writer, filmmaker, and consultant with an extensive background in swiftwater rescue, public safety education, and disaster preparedness. She is a frequent contributor to 9-1-1 Magazine.



During the flooding in Fort Collins (CO), a 16-foot high pile of mobile home debris jammed against the College Avenue Bridge near midnight on July 28, 1997.

general runoff, plus water from the Canal Importation Basin, sent a total of 8,250+ cfs (cubic feet per second) of water directly into a 50 acre detention pond. The eastern side was bordered by a 19' high railroad embankment with several culverts that allowed excess water to move eastward. This facility had been designed to collect and hold nearly double the predicted 500-year flood overflow.

Word of the final phase of the disaster began to filter in to dispatch around 10:30 PM. Callers from homes just east of the railroad tracks reported that Spring Creek was beginning to flood nearby houses. Only one fire engine was available, and it headed toward the scene at 10:44. While it was still on its way, with most rescuers working furiously in a three-to-four square mile area to the west, severe turbulence and enormous water pressure caused the 12x14' culvert under the railroad bed to literally blow out (the first call came in at 10:50:43 PM after the water was already 3' deep and flowing fast). A few minutes later, the water (which had continued to rise despite the release of 3,300 cfs through the failed culvert) began overtopping the railroad embankment. In a near-perfect example of Murphy's Law, a freight train had just begun crossing this section of track.

The roaring water derailed the train and surged into two trailer parks beside the tracks, blowing one mobile home to pieces and flooding the rest. By 11:00 PM, 8' deep waters were floating trailers and sweeping victims into the 12' deep Spring Creek channel. Broken gas lines ignited three mobile homes that burned fiercely in the midst of the flood. A nearby store exploded from leaking gas

at 11:01:22. Four women in the trailer park drowned, and downstream another woman died as she entered the flow to try to rescue a pet.

By the next morning, the waters were gone, and the city and its residents began cleaning up and assessing the damage.

The Fort Collins flood taught a number of hard lessons—foremost that “weather awareness” in the emergency response community leads to better short-term preparation. By the time reports of flash flooding have filtered in through the normal reporting system, it's almost always too late for evacuation



and rescue efforts to begin. There are too many incidents, units are blocked by flood waters from many locations, and there is no time to deploy. The critical link between warning and rescue is the E9-1-1 dispatcher.

The Fort Collins Office of Emergency Management has now formed working partner-

ships with agencies such as the Federal Emergency Management Agency (FEMA), the National Weather Service Office in Boulder, Colorado, and several others. The goal is to try to mitigate the effects of disasters in advance and streamline communications before, during and after actual catastrophic events. Some issues include:

Awareness

- Improved communications with the National Weather Service (NWS) during dangerous weather situations. The city has installed an NWS Emergency Manager's Weather Information Network (EMWIN) that receives weather data automatically. The system can send messages via electronic mail, to a printer, or can trigger electronic pagers based on “keyword” cues.

- Fort Collins has also installed a prototype system called Local Area Data Acquisition and Display (LDAD) that allows Fort Collins to transmit stream and precipitation data back to the NWS.

- Installation of electronic precipitation and stream flow gauges across the city, especially within flood-prone areas. Information from this network is transmitted automatically to the Emergency Operations Center, giving a real time view of rainfall and stream levels.

- Development of a real time flood inundation mapping and notification system, which integrates newly acquired, high-resolution topographic data with weather forecasts; hydrology experts; and stream and precipitation data. It uses the combined

(continued on page 79)



Left: PFA dispatchers Teresa Clancy and Joy Simmerman. Right: Dispatchers Tom Wright, Kati Brown, Jacque Triplett. During the height of the flooding, phone calls were coming in at a rate of one every 8.5 seconds, and radio traffic was nearly continuous.

Oklahoma City...

continued from page 38

cue Task Force members from around the country, and all the others who came to Oklahoma City's aid to assist in the rescue efforts.

"The term hero is a difficult title for a person to live up to," he says. "These people have not asked to be heroes, and many do not believe they are heroes. They are just public safety workers doing what they are supposed to do: focus on the positive. Out of everything comes something positive. If you focus on the negative, you remain a victim. If you focus on the positive, you become a survivor." ■

Associate Editor Dave Larton is a dispatcher for the city of Gilroy, California. He is also the Deputy State ACS Officer for the California Governor's Office of Emergency Services, Telecommunications Branch, the webmaster for several public safety organizations, and Communications Group Manager for FEMA's Urban Search and Rescue Task Force 3 based in Menlo Park, CA. He can be reached at assoced@9-1-1magazine.com

9-1-1 Magazine's original coverage of the Oklahoma City bombing, which included reports from each of the city's PSAPs – Police, Fire, EMS – as well as the first USAR Team to be deployed, have been archived on our web site, at www.9-1-1magazine.com

Ft. Collins...

continued from page 38

information as input to a computer-based runoff model, and provides real time flood forecast information to emergency managers as an event unfolds.

The city now has a paging "tree" that brings various city officials and response organizations-including the E9-1-1 dispatch office-to readiness when hazardous weather threatens.

Communications

• Natural Disaster Information Cards have been designed that cover a variety

of natural disasters. The cards are similar to those used for EMD. Designed locally, they have been reviewed and edited nationally and include input from NOAA, FEMA, and the American Red Cross. These cards allow dispatchers to quickly sort out the serious incidents from the trivial and obtain information vital to rescue units. The cards can be found on-line at: www.ci.fortcollins.co.us/C_SAFETY/oem/overview_ndic.htm

• A Reverse 9-1-1 dialing system that allows the emergency management office to send a pre-taped message to upwards of 200 homes per minute over the telephone. The specific threat area within the city is selected from a computer map at a dispatch console, allowing city personnel to 1) quickly warn residents in endangered areas, 2) direct the resident to public sources of information 3) help control call volume by specifying when and when not to call 9-1-1.

• A new, low-power AM radio station designed to help keep the public informed during disasters. This will be

advertised locally at regular intervals, and mentioned as an information source on the Reverse 9-1-1 message.

For dispatchers, the importance of these last two measures can't be overstated. On the night of July 28th there were 1211 incoming calls between 6:30 PM and 12:30 AM. Nearly 700 of these were reports of flooded basements, roads, fields or detention ponds, and even requests for road information. Less than 25% turned out to be real life-threatening calls. Some method of reducing the number of non-emergency calls on emergency lines would have allowed more time to deal with the real emergencies. ■

Slim Ray is an internationally recognized authority on flood, swiftwater, and white-water safety and rescue, with 20 years experience. He last wrote about the disastrous aftermath of flooding in Kansas City, KS, in our Jan/Feb 1999 issue. John Weaver is a meteorologist with Colorado State University in Fort Collins who has done an extensive study of dispatch call volume related to the flood.

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