

# **Amateur Radio Support during the Cedar Rapids Flood**

***June 10-18, 2008***

During the week of June 10, 2008, Cedar Rapids and the small town of Palo, Iowa suffered the results of a 500 year flood of the Cedar River. The previous record of 20.00 feet was set in 1851 and 1929. The recent flood of 1993 hit 19.27 feet. The current flood was predicted to peak at 21 feet as recently as June 9. The flood peaked out at **31.12 feet** on June 13. This was far over existing levees. 24,000 people had to be evacuated, including the central downtown business district.

The Amateur Radio response in such situations is coordinated with the Linn County Emergency Management Agency. This paper attempts to document the efforts of the Amateur Radio community that assisted during the disaster.

## **Preparation**

Our Amateur Radio Emergency Services (ARES) group in Linn County is fortunate in having an E-mail reflector and a web site with procedures and membership contact information<sup>1</sup>. Unfortunately, the server was hosted in Waterloo, a city upriver from Cedar Rapids. The server was forced off-line because of the flooding in Waterloo. Fortunately, we keep a local copy of the web site at the EOC and shortly uploaded a backup copy of the web site to a personal account<sup>2</sup>. The original server was reestablished on June 12.

During the event, we used several repeaters available in the Cedar Rapids area.<sup>3 4 5 6</sup> We had a surprise when we woke up June 11 and found 3 of our 4 primary VHF repeaters were off the air. Apparently, we had a lightning strike that disrupted a common receive site. Fortunately, two of the sites were immediately resettable by remote control. The last site required a short visit. We used four repeaters and simplex frequencies as conditions warranted. Additional repeaters were available, if they were needed.

## **River Monitoring and Road Closures**

One of the first duties was to set up monitoring stations up river. The closest official river gauge was about 30 miles away, and had to be read manually. Amateur radio set up two monitoring points between Cedar Rapids and Vinton<sup>7</sup>. One was limited by terrain to only measuring if the river was rising or falling. The monitoring station closer to Cedar Rapids was a tree marked with tape. This allowed true measurements to be made, though a second tree had to be established when the flooding exceeded the marking on the original tree. The two trees were cleverly correlated by using a laser level. Reports were radioed to the EOC every half-hour early in the flood, then every hour.

At the same time, other stations were monitoring roads as they began to be covered with water<sup>8</sup>. At the peak of the flood, all downtown bridges were under water. The bridge

crossings in the county typically had flooding of the bridge approaches. The only bridge from one side of the county to the other was the elevated I-380 bridge.

## **Hospital Backup**

We recently completed antenna upgrades at our two local hospitals. Amateurs set up VHF stations at both hospitals in case of communications failure<sup>9</sup>. Fortunately, the capability was not needed. One of the hospitals was eventually evacuated to other area hospitals. The flood waters were affecting electrical power in the area, and the hospital did not want to rely solely on its backup generator.

## **Cedar Rapids Police Department**

The CRPD also requested Amateur Radio as backup<sup>10</sup>. They had to evacuate their downtown offices and set up at the Ice Arena. The CRPD building also held the controller for the city's 800 MHz trunked communication system for Police, Fire, and many city services. The system operated in fail-safe mode for several days until full control was restored.

## **Evacuation Shelters**

During the early stages of the flooding, a Red Cross evacuation shelter was set up at the Roosevelt Middle school. This shelter was quickly closed, as it was determined that raising estimates of river levels would possibly impact the availability of power in the Roosevelt area. Two new shelters were opened at Viola Gibson Elementary School and Prairie High School. Amateurs provided technical and operations support to the week-long, 24 hour efforts at these shelters.

At the Prairie High School evacuation center, Amateur Radio was there as backup communications. All normal communications were available, including internet, telephone, and cell phones. Amateur Radio was used occasionally for logistical support of shelter operations<sup>11</sup>.

In the Viola Gibson Elementary School Evacuation Center, there were approximately 200 evacuees living there for the entire week during which our radio desk was active. We passed a considerable amount of traffic, especially since landlines were inoperable at the school and cell phone coverage from within the building was intermittent or unavailable through several providers. The phone lines at the school were normally supported over a Voice-over-IP based telephone system. When the flooding impacted the downtown school district offices, all internet in the district, including telephones, were lost. Each school does have one conventional analog telephone, but that is reserved for emergencies.

We also provided communications support for the Viola Elementary School Administrative Staff and the school Principal who were helping to coordinate logistic support for evacuees on site as well as relief efforts in the Palo area.

Our communications desk was well equipped, staffed and maintained. We had dual-band UHF/VHF and independently fed antennas installed both inside and outside the building and were able to quickly shift over to the indoor antennas when inclement weather struck

during the week. We provided simultaneous operation of two independent portable VHF stations (one for simplex use and one for general net use) as well as a UHF unit which was used to coordinate local ham support efforts for the Viola Gibson site. A rechargeable battery back-up power supply was on site for the duration of the Net, but it did not have to be put into use.

On the first day of ham activity at the school, a team of amateurs quickly re-established Internet service to the school environment by working with the local cable ISP and installing ham-supplied wireless and wired routers<sup>12</sup>. It was used extensively by ALL of the support agencies at the evacuation site.

During the busier day/early evening period, from approx 0700-2200, we usually had at least two people 'working the desk' on a scheduled basis. The Viola Gibson site also assumed Net Control duties for several days during the week-long support efforts. These operators staffed the radio desk, provided hardware/technical support, and/or assisted in station set-up and maintenance using both scheduled and ad hoc approaches.<sup>13</sup>

## **HF Backup**

The HF link to the Iowa EOC in Des Moines was a backup for normal communications in case telephone service was lost at the Linn County EOC. The only traffic passed was related to the operation of the HF link between Cedar Rapids and Des Moines. The link was maintained continuously from 1100Z 12 June to 1745Z 14 June.<sup>14</sup>

The Des Moines EOC (KC0EEC) and Linn County HF stations did a radio check about every 30 minutes to maintain the 3990.5 frequency. The Linn County HF stations, in turn, maintained local contact with the Linn County EOC via VHF repeater. The permanent HF station installed at the Linn County EOC was temporarily unavailable, due to antenna repositioning.

## **Severe Weather**

Throughout the flooding, we had severe storms to deal with. Our county normally runs a severe weather spotter network. The spotter information is then sent to the National Weather Service via the Emergency Management EOC. During storm watch, our primary repeater supported storm watch. Communications backup for the shelters was moved to one of the secondary repeaters. Over the period of the major flooding June 10 to June 15, we had four Severe Thunderstorm Watches, one Tornado Watch, and seven Severe Thunderstorm Warnings affecting Linn County. The main threat was high winds and large hail which posed a particular threat to police, fire, public service employees, and people trying to evacuate.

## **Summary**

Amateur Radio became involved with river level monitoring on 9 June. Amateur Radio net(s) went formally active around 0700 on Thursday, 12 June. The net ran continuously until just after 1000 on 18 June. The total time that we had a formal net active was 147 hours. Our logs show that at least 86 Amateur Radio stations participated at some point.

A special thanks to our net controls: N0GUD, WA6GFD, K0ECW, W0MRZ, WA0KHH, NA0IA, N0UUS and KC0UMS.

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<sup>1</sup> Server maintained by KX9Y

<sup>2</sup> Webmaster, KC0OX

<sup>3</sup> 146.745, W0GQ, Cedar Valley Amateur Radio Club, K0VM Trustee

<sup>4</sup> 145.150 and 147.090, Cedar Rapids Repeater Association, W0HUP trustee

<sup>5</sup> 145.190, N0DX, Eastern Iowa DX Association, W0MJN trustee

<sup>6</sup> 443.800, N0MA, "Farmnet" K0DAS, KX9Y, W0IY, KA0YSQ.

<sup>7</sup> Stations that monitored river levels included: WA6GFD, W0IY, K0PAS, and W0IY.

<sup>8</sup> Road closing reports were provided by; KC0OX, K0DPL, N0XZL, and N0KVV.

<sup>9</sup> Hospital communications were provided by: W0AYO, KA0YSQ, KC0RZQ, KD1AC, KD1AD, KD0HF, KC0SCM, KC0WQD and K0ECW.

<sup>10</sup> Stations supporting the CRPD: K0PAS, KC0QWO and W0LJ.

<sup>11</sup> Stations supporting the Prairie High School shelter: KC0RZQ, W1JCM, KF0VF, KD0CFG, WB0UBL (equipment provider) and KD0CGN.

<sup>12</sup> NY0V arranged and installed the internet equipment at Viola Gibson, with help from W0LJ and KD0CQS. Equipment was donated by Best Buy and Mediacom Cable.

<sup>13</sup> Station that assisted at the Viola Gibson Elementary evacuation center: W0MRZ, KA0YSQ, KD0EFL, W7II, KD0EFL, KD0CGN, W0LJ, N0LNO, KC0ODK, NA0IA, KD1AC, KD1AD, K0LYP, NY0V, K0PAS, KD0DOX, KC0UMQ, and WA0KHH.

<sup>14</sup> The HF link to Des Moines were supported by KD0HF, KF0VF, K0PAS, and K0FLY