COMPLETE TEXT OF INTERVIEWS

Counties

Barbara Berquam, BlackHawk County EMA Coordinator   ***11/6/08***
(319) 291-4373   *bhcema@co.black-hawk.ia.us*

They sent emergency response staff out to do disaster assessment of buildings with hard copy maps generated from the county GIS. There were D scale maps.

The tornado went across the northern tier of the rural part of the county. Staff added addresses to the maps in the field. Upon returning to the office, these maps were matched using ArcView and plotting. The tornado hit Sunday, May 25. They began their effort on Monday morning and had maps ready for FEMA by Tuesday morning. Buildings were categorized as minor damage, major damage, gone. They continued to refine this system. Then the flood hit.

Using GIS saved a tremendous amount of time for FEMA. If the county hadn't done advance mapping, FEMA would have gone around address by address. It would have taken 8 hours to do what took 4 hours. 50 homes in the county were destroyed. FEMA staff (including SBA and some state representatives) numbered 7 or 8. They worked in teams and this group made up two teams.

Having damage information faster at the county level results in information faster to the state results in faster determination of a presidential disaster recommendation. They had a declaration by Wednesday or Thursday (check with the state for exact day). Parkersburg got their declaration first. BlackHawk County had less area affected and the damage was less concentrated.

Flood: Waterloo and Cedar Falls used maps. Everyone working with maps built on the same foundation. The county provided maps to the Red Cross for disaster relief and food deliveries. Waterloo had 100-year and 500-year flood boundaries on its maps.

Next they gathered information on individual houses and buildings. FEMA had this but wouldn't share addresses due to privacy issues. So the county made independent assessments and used these to work with volunteer agencies and coalitions. FEMA probably also used Census Bureau maps. FEMA generalized data very dramatically, which made their maps difficult to use.

IT department: Kim Meter did address matching. Plotted building locations using county real estate. Debris removal was facilitated by plotting call-ins. Red Cross shared data from call-ins. County's primary use of GIS was to plot the location of damages and refer services to those in need of help with debris or unmet needs.

Eric Schrader at City of Waterloo Planning and Zoning 291-4366. He used aerial photography and real estate mapping. County Engineer's office used maps. Lynn Cloverdance 833-3008.

Flood photos: Aerial Services was selling photography but would not allow sharing from one agency to another. The county didn't buy any or have any flood imagery available.

Benefits: communication with helping agencies; use in the operations center for decision making.

They were fortunate to have a good levee system. Cedar Falls used GPS to shoot elevations and Evansdale did this for elevation data on their levees.

Brad Kettles, Linn County Assistant Engineer   *2/19/09*
(319) 892-6404

They did no modeling for sandbag placement. All sandbagging done was inside the city limits. During the flood, their network was down so no computer use at the GIS Department was possible. Brad was at the EOC and computers were available there.

They provided an updated web site for road closures. Auditor's office had a flight done showing extent of the flood. Auditor's office worked evacuations. Talk to Jason Siebrecht.

Craig Hander is in charge of city road maintenance. Sandbagging did not save any property except one pumping station.

Rich Mahaney is no longer their emergency manager. Now it is Mike Goldberg.

Brian Gardner, Linn County Sheriff   *2/20/09*

(319) 892-6100

Their evacuation happened too late to be controlled. They first tried moving up to higher floors and that didn't work. They lost all the contents of their building. There is a team in estimating damage currently and this will be complete in 30 to 60 days.

It took them 2 ½ hours to evacuate 400 inmates and 25-30 staff. The jail is currently being reconstructed. Sheriff's office in a different location.

Chris Atkins, Johnson County Council of Governments   2/20/09
(319) 356-5230

When the county administration building flooded and its website went down, the COG picked up the road mapping efforts and became the prime source for road information. They used GIS to maps roads closed and recommended routes.

They would send emails to city and county engineers regarding what would be closed.

Web site got 40,000 hits/week during its peak. Info also sent to emergency responders and city administrators. Trucking companies used the site.

Before web mapping available, people would get this info by TV, radio, live call-in. They might have reached the obstructions before knowing about it. They might not be within radio range.

The maps provide time lapse record of the stages of the flood, which will be useful or hazard mitigation planning for the next flood. They were the only source for road closures. So many roads were closed, that otherwise it would have been impossible to get an accurate picture of the remaining network. No one could have kept it all in their head.

They did not have a plan in place for this degree of flood, so were starting from scratch. Maps and electronic record boards are their main documentation. They have a handful of traffic counts.

They lacked a decent LiDAR layer. Detailed contours would have helped – for example, they could have said which bridges would have gone under first.

The coffer dam in the river threw off predictions. Beginning in the middle of downtown, it raised the back water by 6 inches. The reservoirs were helpful.

See University Professor in Geography Analysis, Evan Kessler, who is making an analysis of traffic change during the flood event. Also Darrien at COG regarding traffic counts – ask about significant increases in traffic.

COG had no awareness of Shane's data.

Darren Moon, Story County Engineer   **12/16/2008**
(515) 382-7359

Referred by Matt Boeck, Story County GIS, to see what uses Darren made of GIS and imagery.

Their primary flood damage was from rock washed off roads. They mapped problem areas in the GIS, taking data from four or five field staff and consolidating it into one map. From the GIS, he was able to print off each district for the operators, so they would know what to fix. Darren doesn't believe this saved time over paper maps but it did look nicer.

One area where time was saved was in the Google application showing road closures. This helped the public know the status of roads and also avoided the public making calls to the sheriff's office.

Dave Wilson, Johnson County Emergency Management   **2/18/09**
(319) 356-6028

Used HAZUS in modeling for sandbag placement, evacuation planning. This use is clearly why they did better during the flood than Cedar Rapids. Modeling was a huge part of their planning process.

They were able to allocate resources better. 99% of the time, resources such as sandbags were not needed although requested. He turned down 30-40 requests, mostly from businesses. In cases where the business demanded that they fulfill the request anyway, he billed them for materials and equipment used. In the case of the electric utility billed somewhere between $5K and $10K. Got a fair number of requests from the electric infrastructure.

Evacuation planning: 20 areas were modeled that turned out to not need evacuation. There were some surprises, areas with problems that they would not have known about. If these people weren't evacuated, would have had to move them out by boat. Cost for a deputy and a boat and fuel would run on the order of $500/hour.

They did better than Cedar Rapids because they knew elevations and locations for sandbags. To see the difference, just drive through Coralville vs. Cedar Rapids. Johnson County took on more water (42,500 cubic feet/second) than Cedar Rapids.

Modeling significantly helped their response efforts. They used HAZUS for FEMA damage assessments.

Shane did a HAZUS run for Cedar Rapids but it used generic data. Not sure what Cedar Rapids did with it. Ask Shane about FEMA conractor.

Denny Coons, Scott County Public Health   ***12/1/2008***
(563) 326-8244

Public health emergency response plan for flooding.

Used GIS to identify potential problem areas. Used river level data for preplanning, staging of supplies (emergency dispensing area). Developed over a year ago and updated a month before flooding. Used for briefings with county departments. After the flood, river levels were higher than any other recorded time so existing data didn't work. So they remodeled in GIS and identified properties along the Wapee and Mississippi River with potential for loss. Used two foot overwindow to make sure they were not leaving anyone out.

Preparedness saved two staff x two days labor. They would occur annually with each annual review.
Recovery saved one staff X two weeks.

Brought up residents and addresses in GIS. EMA staff saw power of GIS for the first time. They don't have GIS integrated into their plans yet.

Dance hall south of DeWitt sandbagged appropriately. Roger Less is Corps contact in Rock Island office.

Larry Linnenbrink was incident commander regarding buildings. He got supplies out. Larry is their Flood Czar.

Preparedness efforts. Recommendations from report. Used as a communication tool with Board of Supervisors and Public Health.

Joe Biver, Fayette County GIS Coordinator   10/23/08
jbiver@co.fayette.ia.us   563-422-7513

Joe notes he has only been with the county for a year.

The biggest benefit was to have the EOC understand the situation better. Problems developed at night and there was a need to communicate about spatial issues with the flood. Joe gave the EOC address maps of the town and region. Thus EOC could look at a map when they got a call. They didn't have LiDAR or other elevation data. They went through town areas, talked to local officials, found out where high water levels were, used this as input to map by showing the maps to officials. They also drove around looking for evidence of high water levels or roads that washed out. They mapped areas where roads weren't stabile. This information was given to FEMA, including areas affected and residences affected by the flood.

Level of effort for Joe: He made an effort earlier in the year using US Census data to get rural addresses together. This made the flood effort not so labor intensive. He spent 8 hours in the office and 8 hours in the field. Low effort because the four towns affected were so small, only 250 to 600 people in each.

Benefits: Towns had pdf copies to be used by fire department heads, emergency management at the county, county engineers, FEMA. Field time would be much longer without mapping.

Joe was a topographic analyst in the Army for 20 years. He was told 85% of your work must be done before a crisis happens.

Lessons learned: Public health knows about people who need assistance. But they can't provide it to GIS due to confidentiality requirements, so Joe can't map these locations. Budget concerns – it would be nice to have appropriate GIS software available on the EOC's desk for use as a situation awareness tool. As is,

Joe must run back and forth with pdfs.   Main benefits were to FEMA and the EOC.

Jon Lubke, Winneshiek County GIS Coordinator   11/12/2008
563-382-5356   jlubke@co.winneshiek.ia.us

Flood event: It started with lots of rain Saturday night. They had the EOC set up Sunday in the sheriff's office. Jon made large format maps for use in assessing the situation. Monday flood potential was much worse. The Chairman of the Board of Supervisors called Jon for assistance, primarily looking for contour maps. Jon called Jim Giglierano to get LiDAR contours, which Jim could provide quickly but took 45 minutes to download.

Decorah contour information was used in evacuation orders. The LiDAR data confirmed what they pretty much knew. They had a flood study done previously and it was not used. Jon is unsure why. Water comes up and goes down rapidly there vs. Linn and Johnson County conditions.

Benefits: more precise information (2 foot vs. 20 foot contours) allowing them to determine that certain blocks wouldn't have a problem. They have a levee system. They did not really have issues with overtopping or breaching, except overtopping in a couple of spots where farmers were able to pump the water.

Lots of bridge approaches washed out and there were lots of road closures. They put these on the public access website. Jon wished they could have done better using GIS to inventory damage. They gave hard copy maps to FEMA and could have provided information more quickly to FEMA if mobile map units were available. Staff in the engineer's office were more comfortable with paper maps. FEMA never indicated how they would like to receive data. What about FEMA contractors? Are they new to response? Would they understand GIS?

Jon used GIS to print hard copy maps for EOC. They pulled up aerial photos and looked for facilities to worry about in potentially flooded areas. Got everyone on the same page looking at a big screen at the EOC.

Flood imagery? They didn't use any, but their events came up and went down so fast that this was possibly not feasible.

At Cedar Falls GIS Day saw a presentation of hydraulic models. Jon not sure how well the model would do in flash flood events. In upper Iowa, there are not

enough gauge stations or the information is not collected and transmitted fast enough or often enough for use in a flood. It seems like the gauge stations are still using dial-up technology. A reading every 10 or 15 minutes with base elevations in the model would do a pretty good job.

The Turkey River was more of a problem as a watershed, as it is more of a flat river than the upper Iowa. Result was more bridge closings.

They got a report from FEMA, taking LiDAR and stream gauge data and providing high water level polygons. The FEMA data shows the points they used to determine base elevation. The county didn't have county-wide FEMA maps previously. Now FEMA has made these available in less than 6 months from the flood, taking into account the behavior of rivers and streams under flood conditions. The FEMA maps came to the county engineer's office in the form of paper maps and CDs. Jon notes that Mahaska County, where he worked before, also had spotty coverage for FEMA maps.

Decorah couldn't apply for flood insurance because it had no FEMA maps. Also quoted low limits ($35K for a house) on coverage. Decorah had been working on a flood study for 10 years. They had Aerial Services of Cedar Falls do their original orthos. At that time, they put the elevations "in the can." Jon is not sure if they ever got around to using this data.   Jon to check with Jerry Freund, City Administrator, to clarify the flood insurance and mapping issues.

Jon urges his organization to make as much information public as possible.

Everything in central Decorah is built on flood plain. If the levee had breached, they would have had a Cedar Rapids event. They are now looking at a five-year plan to move the EOC and other critical functions to higher ground.

***Kristopher Ackerson, Johnson County Council of Governments   2/20/09
(319) 356-5230***

When the county administration building flooded and its website went down, the COG picked up the road mapping efforts and became the prime source for road information. They used GIS to maps roads closed and recommended routes.

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COG had no awareness of Shane's data.

Larry Linnenbrink, Scott County Public Health   **12/5/08**
(563) 326-8618 x8812   llinnenbrink@scottcountyiowa.com

They already knew the Mississippi River elevation data because of previous flooding, but they didn't know this for the Wapsipinison River, especially as it was to be a record flood. The used LiDAR data for that area, comparing elevations of homes and the river. They applied the projected river levels and used this to estimate for the north end of the county which homes were likely to be affected by the flood. They also did this for the Mississippi because they had the data and it was easy to do.

They printed 100 sheets of zoomed-in images of the area as well as a 4 X 3 reference map for the entire area. They were able to identify homes affected. Without GIS, would have had to drive or walk or use a boat, traveling up and down all those private lanes. **Larry estimated such an effort would have taken three staff members two days of time each, for a total of six staff days saved. Once they collected the information, it would have taken an additional week's worth of work in the office mapping the data. Using GIS, it took one staff person half a day to do the assessment.**

They found a lady who took elevations of flood stages, marking them on a tree. They will go out with GPS to capture these elevations for future mapping efforts. There will be another flyover soon to get better resolution imagery. They will use these images to better identify properties that were affected by the flood.

They did cleanup of entire Wapee area and used GIS to further identify needs, such as bleach for water.

Maps they created were handed to FEMA reps so they would know where to go for damage assessments. FEMA did damage assessment of roads as well as homes. Larry was able to provide property values to FEMA. Ross Berger, Scott county EMA, would have info on FEMA contacts. (563) 344-4054. Maybe Deb Cooper at FEMA?

Lynn Cloverdance, Technician, Black Hawk County Engineer's Office 11/24/08 (319) 833-3008

Flood response: Used 2007 aerial photos as base map to plan road repairs, including stationing on the photos. Therefore, didn't have to send out a surveyor. **Saved 1 days' surveying at $30-40/hour. Also saved 2 to 3 days of Lynn's time creating drawings at $45/hour loaded.** Further, they were anxious to get plans together so the road could be worked on and reopened. Saved at least 1 day in getting the road opened.

They were fortunate to have little damage this year. No bridges were lost.

Tornado response: Used photos through the Assessor's Office that showed property prior to the tornado. FEMA wanted to be able to estimate cubic yards of debris to be removed. Therefore, using photos resulted in better estimates.

2007 flights were low altitude and imagery was clear enough to see traffic signs. They could verify where signs were before the tornado. This affected their claims. Without GIS and imagery, they wouldn't have a good count of signs. There were able to map the tornado and use this to determine which roads to check to missing signs.

Value of claims? 110 signs @ $100/sign. 20% to 25% found using GIS/imagery. Could have used imagery to document loss if requested. Maps given to the sign person for proper placement. They also have GPS positions on all signs.

Contact FEMA (contractor?): (337) 281 4135. Steve Khan, who went back to Florida.

In 1999 flood, asked Aerial Services to fly river at its crest. They've had four floods in past 15 years – 1993, 1999, 2004, 2008. This year Cedar Rapids experienced a crest at 32 feet, vs. previous record at 20 feet.

More widespread flood out in the county than previously but not as severe flooding as in some parts of Iowa. There is a plan for Cedar Rapids to improve their levee system.

Matt Boeck, Story County GIS   ***11/12/2008***
515.382.7327   ***mboeck@storycounty.com***

There were some lessons learned from a flood in the past, 2004 or 2005. Check with Lee Ann Harter, Story County Planning and Zoning (515) 382-7247 about this and about damage assessment thematic maps created. Matt came to the county April 2006.

This year's flooding was not that bad for Story County. They took a low to medium-tech approach. There was flash flooding in rural areas. Creeks escaped from their banks. The county engineer's staff went out and radioed in data to contacts in the engineer's office. Matt would go back and forth from the field to the office, mapping road outages and printing maps for emergency management and the sheriff's dispatch office. Matt took new data from the field back to the office.

The Ames GIS Coordinator started a Google Map application of closed roads. Two sets of people were working the flood – city and county. Matt was not aware of any rerouting done to adjacent counties. Communication could have

been better. It would be good to work with permissions for the future so everyone has access to something like the Google Map application. The key would be to get the process in place when there is no emergency. However, currently GIS is not tightly integrated with emergency management. This year's floods might be able to push that.

Matt believes their maps were helpful to FEMA. Used only existing imagery as background map. Their water was early. It came and went quickly. Polk County should have a lot to say about the flood, especially Ray Willis.

Benefits: Easy to print multiple copies of map revisions. A few people used the Ames Google site. In the future, he can see having links to a single site. In GIS it was easy to add or delete features and time stamp updates.

Who else benefited? Board of supervisors, emergency management, secondary roads, dispatch. Contact the County Engineer, Darren Moon, part of GIS Committee (515) 382-7359.

Ray Weiser, Scott County GIS Coordinator   *11/12/2008*
(563) 328-4137   RWeiser@SCOTTCOUNTYIOWA.com

Scott County is still developing its data layers. They have no parcel layers or street centerlines or address points. They used aerial photos and their GIS system for flood response. Regarding shared imagery programs, they would like to have the option of buying greater detail than comes from the standard state or national flights.

They did not get flood imagery. Ray saw some that was very granular, which wouldn't work at the local level where they need to see individual properties. They used their own imagery, 1 foot and 6" pixels, from 2005 plus one meter state imagery (2006 NAIP). They marked potential flooded sites along the Wapee and Mississippi Rivers. Their Department of Health wanted this information.

They used LiDAR flown in conjunction with the photos, looking at elevations and predicting likely damage. They eyeballed houses, put in points, added LiDAR elevations. They used a Map Book product to print grids with aerial photos used for orientation. These were bound into books which went to the

Health Department, FEMA and other Federal response agencies. They also created pdfs for reprint purposes.

After the flood: They are still working with the Health Department and emergency response. They are taking GPS reads of locations where the flood waters extended. There is a woman who has hourly records of flood heights, marked on a tree or some such. Department of Health collected GPS positions for additional points. They are using mapping grade GPS units so the vertical control is not so great. Ray created a model in Model Builder to use for adjusting to LiDAR reads which have +/- 2-foot accuracy (supporting 4-foot contours).

Scott County is to be flown as part of the statewide LiDAR project spring 2009. Ray went to the East Iowa user group meeting shortly after the flood. The City of Johnston went out with survey grade GPS and integrated these reads with LiDAR data from a surveying project. Johnson used this to plan sandbagging. Ray was impressed with this type of GIS use for analysis and notes that it would be good to have preplanned analysis routines before emergencies occur. Scott County currently is focused on data development. Ray would hope they would then move on to this type of application.

Running HEC or HAZUS is complicated. Would Federal agencies be able to provide support during an event? No one from Federal agencies asked Ray for data from Scott County. Possibly requests were filtered through the Health Department or Emergency Management? Ray figures if Federal agencies aren't asking for data, they must not be using data. On the other hand, many counties and cities don't share data well. They need to start using data repositories.

Ray hopes they can identify partners at state and federal agencies. What do they need from the counties? What help can they provide?

HAZUS issues: You don't use it frequently. Ray has it available for Scott County and flooding does happen in Iowa fairly frequently. You would think FEMA, in the business of disaster response, could provide outreach. The county effort is more at the level of day to day maintenance of data. Could FEMA run HAZUS remotely if the county data was already set up? Having the specialized HAZUS chef come in from FEMA would be helpful.

Linn County emergency management drills involve GIS now. Every county should do this. They should have preplanned analysis routines available. We say all the time that GIS isn't just about mapping, so do the analysis work.

Benefits: Allocation of resources (putting resources in the right spot).

Ray didn't do predictive work for the flood. He did print maps for damage assessors which resulted in better routing and reduced the chances of false claims. This also provided help to FEMA damage assessors, especially in areas where access was challenging.

Address HAZUS issues with emergency management staff at counties as well as with GIS staff. Given that GIS is generally considered a support service, would get more attention from emergency management requests.

Denny Coons in Health Department, Public Health Services Coordinator (563) 326-8244
Larry Leninbrink, Environmental Health Coordinator (563) 326-8618
Both of these Health Department people worked with FEMA.
EMA person is Ross Berger.

City of Davenport did modeling. Kevin James, presented at UNI (563) 888-3385 or at Public Works Department (563) 326-7729. Also Dave Cox, one of Kevin's staff involved in 3D modeling.

Bettendorf also did modeling.

Ray Willis, Polk County Assessor's Office   *11/10/2008*
515-286-3328   *willis@assess.co.polk.ia.us*

They had contracted for spring orthophotography. However, the contractor failed to make the flight before full leaf-on. So by the time of the flood, they still had money for a flight in their budget and thus hired Sanborn to do flood photos. Flight was at the peak of the flood, June 13. Sanborn delivered raw unrectified photos immediately so Polk County would have imagery to work with.

Ray did a warp to fit process to fit the next imagery to previous year's photos. They used flood photos to trace the boundaries of the flood. Polk County was fairly lucky. The Taylorville Dam backed up more water than it did in 1993. This worked will for the Raccoon area in West DesMoines. Their area of greatest damage was Bergland Park.

There was lots of cloud cover on the flood imagery. Even with four overlapping passes they couldn't get a clear view in many cases. Cloud shadows also caused problems.

Ray spent 80 hours on flood boundaries. His efforts were more for the assessor's office. The appraisers used flood boundaries to plan their work regarding property value changes caused by the flood.

Auditor's office – Ken Agee provided GIS support to A.J. Mumm (EOC Polk). amumm@co.polk.ia.us (515) 286-2107. They printed maps to help with response.

They will be getting rectified orthophotos with cloud cover cleaned as best as possible from Sanborn by the end of November.

They give away data in the form of shape files to everyone using Wayne Chizek's repository. For example, data provided to Polk County Conservation Committee for use in a sales pitch regarding use of wetlands for flood relief.

6/25/09

I checked with our first deputy assessor and the supervisor of our residential appraisers just in case they had some ideas on estimating tangible benefits. We are all in the same predicament, we are all certain that our office benefited from having the photography at the peak of the flood but, we can't put a dollar figure on that benefit. We did use the imagery to verify that all assessed residential and commercial properties which we could identify as impacted by the flood were inspected. The photography gave us a short cut to putting that list together. Using GIS to select assessed polygons that intersected with the flood polygons, we were able to ensure that an appraiser inspected each property that was within the flood waters. The biggest benefit was having the "raw" unrectified imagery within weeks of the flight. The final rectified imagery was not delivered until December (some of which was rejected, reprocessed, and redelivered in April). Had we not been able to get the raw imagery, the December delivery would have been too late for us to have made those inspections prior to our assessment notices being sent. Our board of appeals tracks changes in value due to a variety of reasons but, none of the reasons include flood impact. There would be no way that I know of to put a dollar amount to the loss of property value for assessment purposes due to the flood.

In terms of other agencies that used the preliminary flood boundary shape file or

the raw imagery that we distributed, I have had virtually no feed back on how the data helped those agencies in their efforts. That is the one big draw back of giving the data away, we don't really know who uses the data or whether it is of significant value to them.

After discussing the question of time savings to our office, we think we probably saved two of our appraisers a day of work or 16 man hours. Our normal practice would have been to "walk" the area impacted by the flood in the weeks following. In this case we spent less time because we knew before going out to the area which properties to concentrate on. This year we received just under 7,500 protests to our valuation notices. The consequences of not having made the inspections prior to sending out the notices would have been a small increase in the number of protests (maybe 70 additional at most).   This would have added no additional cost for our board of review but would have required more staff time to review. Our best guess at the staff time needed to review an additional 70 protests is 32 man hours. The bigger issue for our office is that we try to be proactive so that the property owners don't need to go through the protest process.

Rick Havel, Johnson County GIS   11/10/2008
319-356-6080   rhavel@co.johnson.ia.us

On June 9, they started ramping up for flooding. Their ECO at the Sheriff's office requested that the GIS Department participate. At first, it was wait and see. First activity was to produce maps of closed roads. They put them in pdf format and pushed the maps out to their website. Next, this was expanded to interactive Arc IMS site to give more detailed info, including aerial photos. They didn't track hits to the site. It was an easy site to put together, using out of the box functionality and the same layers as for the pdfs.

Putting up road changes was fast and furious. Later in the week, the focus was more on evacuations. Some were based on history of evacuations from 1993 flood. There's a small subdivision by Lake McBride, far from the river but their road access got shut off. Using GIS with FEMA 100-year floodplain overlay, helped them look at what roads would be inundated.

Sheriff's office made an attempt to go out and notify homeowners of problems. They were proactive. There was more time to plan in Johnson County than in Linn County, primarily due to their reservoir. They didn't experience true 500-

year flooding in the southern part of Johnson County. Biggest GIS activities were related to 1) road closures and 2) areas to be evacuated.

Pictometry flew on June 17th, two days after the crest of the flood. Water had dropped by only a foot. Having this data helped tremendously. Pictometry turned data around in under a week. FEMA was very interested in getting this imagery. Also cities, university, local agencies, FEMA contractors.
When FEMA community relations people came, they used Johnson County maps quite a bit, especially parcel data with addresses. Used in their planning exercises, where to send people and for activity tracking.

They received a fair amount of redundant queries from multiple FEMA contractors. Johnson County Council of Governments ended up taking over maintaining road closure maps within the cities and Johnson County continued out in the county. At that point, Rick was the only GIS person at the EOC. Their administration building was closed due to flooding and there was no room for more staff at the EOC. The building was sandbagged.

Benefits: Sheriff's office, cities, local responders. Decision making: do I need to sandbag? Could show people 500-year floodplain relative to their property.

FEMA had updated their maps in 2007, using 2006 orthos. Rick used the HAZUS model, with help from Shane Hubbard. Shane is a meteorologist. Shane was there the Monday before flooding. They had some discussion of hazard mitigation plans for the county. Shane had to acquire data from the county beginning that week, which he used to help build and refine the HAZUS model during the week. This was also used to help verify the FEMA data. The model generated a grid to show what depth of water was predicted in certain areas.

The problem with HAZUS is lack of need to use it on an ongoing basis and it is hard to maintain that level of skill in between emergencies. Also, the modeling was slow, three hours to generate output. Rick believes that Linn County also requested help from Shane for HAZUS support. Rick thinks task teams providing HAZUS support would be more helpful than hiring state employees to do this. Possibly Federal level help would be appropriate. Havel would not envision being the local HAZUS resource but he could become open to the idea. He is unsure how time consuming developing that capability would be. Shane had to work with Rick regarding details of the local data. That relationship was critical to modeling success. Johnson County is very unusual in its openness

regarding sharing of information. They provided very few hoops for Shane to jump through.

Johnson County didn't try to access critical population data, so Rick doesn't know about privacy issues with that data.

They had no imagery issues. They had available what they wanted. Regarding the Pictometry data, they were able to push it out to any agency that wanted it. Need for this imagery was more at the city than the county level as they didn't have a ton of rural land covered in the flights. The Pictometry flights worked will because they had a contracting mechanism in place, had worked with Pictometry before, and the assessor's office had funding for the flight. Also there was something in the contract for 2008 flights providing advantageous pricing in the case of emergencies. Pictometry will collect 2008 data for Johnson County this fall.

Pictometry was working all over Iowa and was frustrated with FEMA asking for flights of areas where the imagery was no longer needed. In some cases FEMA took its data away and would not give access. Counties did their own negotiations for Pictometry flights.

Rick loves Pictometry imagery but their software is not user friendly. There is a desktop product for navigating. He doesn't feel he can push it out to the public and have viewing go well. Johnson County is one of a few counties pushing such data out to the public. Microsoft Live is pushing out 2007 imagery with good viewing tools.

Dave Wilson – man in the know at the time of the floods. Strong supporter of GIS.

Level of effort: Rick's time about 70 hours. County assessor spent something like $6K for the flight.

Rick Havel, HAZUS benefits for Johnson County   2/17/09
319-356-6080 rhavel@co.johnson.ia.us

Using HAZUS helped them determine outputs from the reservoir. Shane took estimates daily and created a model of the output, projecting flooding and depth. This was based on what the Corps said they would open floodgates to. They

used this output with 2007 FEMA DFIRMS (contrasted with Linn County using older Q3 based data). They used the DFIRMS more than HAZUS output.

It would take Shane three hours to crunch the data. They would meet with Corps staff on the phone during the modeling efforts. Output affected sandbagging.

Ask Dave Wilson about benefits.

Iowa City Engineers Office was big in determining sandbagging efforts and monitoring bridges. There was an Iowa City rep inside the EOC. There were issues with sandbagging efforts causing problems, flooding the next property and the like.

Ryan Lafrenz, Jones County GIS Coordinator   *11/7/2008*
(319) 462-5303   *ryanl@co.jones.ia.us*

He created maps to show who was affected by flood and who would be affected. Mapped all homes, creating 22 maps depicting location of each home layered with the 100-year flood plain and aerial photos. EMA (Brenda Leonard, ema@co.iowa.us) worked with these maps along with FEMA. Created simple road maps for use for response logistics. Maps for some subdivisions in rural areas. Idea was to map the majority of people affected by the flood.

Who used the maps? County and city officials (police, etc.), FEMA, EMA.

How much time to create maps? Didn't have planimetrics already built. Ryan had to create individual points for houses. The focus of their effort moved over time. At least a week of solid effort spent on GIS for response. Ryan's only connection to the county is through EMA.

He had started to plan to be involved in EMA training exercises. Every time (three times now) they start to plan this, there is an interruption and it doesn't happen. It would have been good if this had been done before the flood. He would like to make sure everybody who needs GIS knows about its availability. He wishes more data was captured during flooding. It would have been good to take GPS points but this did not happen due to lack of manpower and training. They would have used GPS elevations to help with sandbagging decisions.

Olin was 60-70% flooded. Anamosa had major sandbagging for water and sewer plants and businesses. Wapsipinicon River got hit hard.

Imagery: Ryan doesn't know if Aerial Images flew Jones County. He used MODIS which was satellite imagery. They were 250 meter resolution. You could see that water levels were higher but they were lacking in precision compared to 6" photography they usually have. Jim Giglierano sent out an email about the MODIS data.

Imagery used with maps was useful to keep EMA staff aware of what was going on. Ryan set up a time series KML for viewing using Google Earth and weather links. He showed USGS water level reads and meter locations. This was the easiest way to get current GIS technology in their hands. It is ready to go for the next event. Ryan notes that Jones County is concerned with forecasts for heavy snow this winter, which could result in spring flooding.

Ryan created rough map sketches, especially in Olin, of where the water went, to what level, and which houses were affected. They used existing 2005 B&W 6" aerial photography to check this data. USGS also provided 1 or 2 foot resolution products.

Ryan notes they've had tornados, floods, ice storms. Enough!

Shane Hubbard   Johnson County HAZUS runs   2/20/09
(319) 335-0150 Cell: (608) 215-6059 shane-hubbard@uiowa.edu

Shane was at a meeting yesterday regarding the floods and met the new Linn County EMA, who had been their Operations Officer for the past three years. Shane did a preliminary HAZUS run for Linn County.

Linn County flood different from Johnson County in that it got 10 inches on rain of top of the crest. Typical Iowa experience is slow rise riverrine flood which can be predicted. Linn County got an additional flash flood which is difficult to predict. 1993 flood was previously their highest flood experience (500 year flood). 22 foot crest was what was planned for and 33 foot crest was what they got in 2008. This is really unprecedented flooding. No one had ever taken the modeling curve out to 33 foot crest. HAZUS modeling would not have done much other than to quantify damage.

Johnson County experience on the other hand was that the heaviest rain was to the north. They were able to anticipate change in the crest as it came down from the north. Additionally, they had some protection from their dam combined with some gauge of what would be coming, the lag in time for it to come, and no additional rain to create flash flooding.

Typically Iowa has slow rise riverine events. Flash floods in Iowa are atypical.

Factors that prevented sandbags from working well: 1) Water may pond on the other side of sandbags due to high water table. 2) Water backs up from drains.

Johnson County sandbags placed without using HAZUS still helped keep down the velocity of flood water, resulting in less damage.

Benefits of using HAZUS: 1) two buildings that took on water in 1993 were preserved. Early in the 2008 flood perceived they would be in jeopardy. One was the Johnson County Administration Building, which houses the commissioners, auditors, assessors. Many servers housed there and county operations. HAZUS modeling answered the questions: how close will the water come? How deep will the water be?

Shane concerned with uncertainty around modeling efforts. Asked the county if they would be OK with sandbagging buildings even if flooding to them not certain. County reply was yes, because these were critical buildings. They ended up cresting a little lower than the peak of forecast. Water came right up to the sandbags. Maybe they would have taken on a small amount of water without sandbags.   ***Shane to send orthophoto of water lapping at the sandbags.***

Other buildings affected include those held by sheriff's department for equipment. In this case sandbags were placed based on HAZUS modeling and held back 3 to 4 feet of water. ***Ask Sheriff's Department about this and about evacuations.***

Shane took HAZUS boundaries and overlaid them on road network to forecast closed roads. LiDAR would have helped but the HAZUS results were fairly accurate. This helped provide justification for evacuating people ahead of time. Used a combination of historical perspective plus common sense plus modeling. Human behavior regarding evacuations is variable. People more willing to leave if they can remember a recent flood event.

Red Cross may be able to provide metrics. They set up a field office.

HAZUS was part of daily briefings at the EOC. Shane would push the bar up next time. Put up inundation maps every day.

They had DFIRMs for Johnson County, use of which resulted in some issues for modeling 2008 flood effects. The purpose of DFIRMS is risk estimation, including areas suspected to be at risk. But they did not correctly model what happened. Not everything in the county flooded to the 500 year level. The 2008 flood was really along the Iowa River, due to the crest moving along it. Tributaries were backed up somewhat but not all that much. The need for this flood response was event analysis vs. risk analysis; for example, show the result of branches blocking flow. Thus issues with use of MapMod and RiskMap within FIRMS. People wanted to use the DFIRMS to say where floods would be and this couldn't be expected to work well.

Shane to forward email from Jon Paoli saying how the HAZUS runs helped Iowa Homeland Security.

FEMA Community Relations Cadre Staff? These are prepositioned staff who come in a couple of days before the crest. Shane gave them a list of 600 names, addresses, phone numbers. ***He will forward FEMA contact info.*** The FEMA contact told Shane that no one had every provided this to him before and that the information was spot on.

The difference between using DFIRM boundaries and HAZUS is modeling quantity of water through different damage curves. How much water a structure takes on can make a lot of difference regarding level of damage.

Shane asked the Linn County EMA (Tom?) if they ever received Shane's HAZUS runs and the answer was no. Possibly too much into the heat of the emergency.

Activity of setting up shelters. Dave Wilson asked Shane what forecasts in HAZUS looked like. Shane's response was that these calculations not often used in the Midwest but got the output for Dave. Dave said this helped him know how many people likely to show up for shelters. ***Ask Dave about this.*** Feedback from 2008 may help know how many to forecast next emergency.

Mid American Energy, contact possibly named Terry Longo. Issue was a large power substation south of Iowa City supplying power to half of Iowa City.

There was concern that it would flood and require backup generation be brought in on a semi. Shane ran HAZUS to see if the substation was in jeopardy and to see what elevations in Iowa City would be safe for locating backup on semis. There were areas where the water table came up.

Shane spent 60 hours running HAZUS. County paid him $1300, which he did not ask for but they thought it was the right thing to do.

6/4/09

Inquiry to Shane regarding use of HAZUS to estimate potential losses for 20 year study. He has done runs for Johnson County for 100 year flood (using 1993 event) and 500 year flood (using 2008 event). Both runs are in 2008 dollars and will show risk to building stock.   He is currently out of his office but will forward these values to me early next week.

Shane also mentioned that FEMA Headquarters contracted out 100 and 500 year HAZUS runs for the entire state. These are in draft format and he doubts that results will be available by the end of June.

Steve Dolezal, Johnson County Sheriff's Department   **2/20/09**
(319) 356-6030

Shane provided projected flood lines, which told the sheriff's department who needed to be notified. Evacuations were often due to road closures. In some cases, rescues would be required anyway due to noncompliance.

1993 was a 100-year flood, so there was a tendency to underestimate the potential effects of the 2008 flood as it approached. Had they known it would be a 500-year flood they would have sandbagged differently.

Sheriff's office building used HAZUS modeling combined with having their elevations shot to determine if evacuation would be necessary. HAZUS project that they have 5 feet more to go before flooding.

Linn County had to evacuate its prisoners, a real mess.

EOC was running out of the sheriff's department building and the National Guard was using it to stage materials for response. There was no contingency plan if the building had to be evacuated. At the time of the flood, they were

housing 100 prisoners. They would have had to relocate them as well as office staff. They could not have done this all in one day. Cedar County was cut off from its jail. Linn County had closed its jail. Washington County was cut off from its jail. To transport, assuming there was a place they could get to, would take a prisoner transport van taking 10 at a time. Would take 4 staff X 2 hours X vehicle costs for 10 runs. Also would have required staff to watch the prisoners while they were in another county. In some cases would have to transport bedding as well. During flood, staff moved to 12 hour shifts. To evacuate, would have called on assistance from other agencies.

Linn County evacuated its jail. Sheriff Zealor did this but has since retired. Sheriff Gardner was deputy at the time.

Shane's forecasts were better than the Corps forecasts.

Not that many rescues. Had to bring out a man with medical issues. Some people had a boat come for them through knee deep water but they could have waded out.

Cities

Andy Rocca   Iowa City Fire Department Chief   3/5/09
(319) 356-5256   andy-rocca@iowa-city.org

Andy believes they used Johnson County Council of Government GIS analysis for road closures. They got first person notification of this at the EOC. Used this analysis to clear properties, make assessments, clear blocks by house number. Their planning was done based on map overlays that could then be field verified.

The fire department staff was cut in half by the river, isolating each group from the other. They had to determine response routes at intersections as well as evaluate property damage.

Andy estimates that GIS analysis described above saved them 6 – 7 days X 8 hour days X 3 – 4 staff. Use $40/hour for loaded salaries. They used 2 – 3 support vehicles at $100/hour. Result is 52 hours X 3.5 staff @ $40/hour = $7280. Vehicle cost is 2.5 vehicles X 52 hours X $100/hour = $13,000. Grand total = $20,280.

They learned so much from the 2006 tornados regarding city operations, plus they learned the FEMA process and forms. As a result of the Homeland Security Presidential directive and HIMS, many local government staff were provided with training that helped in the flood response. More staff were prepared than ever before.

Public Works Director, Rick Fosse, was initial EOC. (319) 356-5141

Jeff Davidson, Community Planning and Development, is involved in mitigation efforts for residential property (319) 356-5232

Finance Director is Kevin O'Malley (319) 356-5053

Andy points out that people working well together is what was essential in making the flood response go well.

David Cox, GIS Specialist, City of Davenport Public Works **11/26/08**
(563) 327-5154   dac@ci.davenport.ia.us

He created a 3D flood model of the downtown area for a council meeting for advance flood planning. Shortly after this, they experienced the flood. It was created in ArcScene and includes extruded buildings. He used two TIN surfaces – one representing the ground and one the Mississippi River. He used it for modeling and it turned out to be fairly accurate. The river slopes five to six feet from up to downstream so assumptions regarding elevation could be incorrect. This model may provide something similar to HAZUS.   It took him one week to create the model. He didn't spend extra time on GIS during the flood response, as the model was available as a tool. He used 3D Analyst, software they already had purchased and which was previously underused.

They had meetings every morning and sometimes also in the afternoon during the flood. The Public Works Director would have David show the current level of water, one day out, three days out, one week out. Davenport has a very passive flood control system, with no flood wall. They do lots of sandbagging to build levees, for public areas as well as helping private citizens. They help individuals by providing materials for sandbagging. David answered the desk for calls coming in requesting sandbags. In the past, they just sent sandbags wherever requested, but the modeling made it possible for David to tell them whether they needed to sandbag or could wait.

They had surveyors going out with GPS to check the levees and mark buildings. Davenport doesn't have lots of residents in the downtown area. They get flooded every three or four years, so flood response has been well established. What David's done regarding modeling could really benefit places that rarely flood. For example, Cedar Rapids got water well beyond what anyone could have planned for.

David to find the sandbag request list to help quantify requests where he determined sandbags were not needed. They probably send sandbag materials to 30 or 40 locations and he said no to six to ten requests. Lots of people benefited intangibly from reassurance regarding whether sandbagging was needed at their location. What do sandbags cost? A ton of sand would be the size of load they would deliver to a site for packaging. Instructions are to fill a bag up to 40 pounds, which means a load would will 50 sandbags.

Sandbags can only be stacked four to five feet tall. Beyond that, they won't hold. They had up to five foot of sandbags by the stadium, which were just able to hold. This was the first time they've saved the stadium in a flood.

Post-flood aspects: Used 3D image to create an inundation map. FEMA response to losses benefited from David creating polygons to show where the water had gone. They queried the polygons on address points to establish a contact list. The Planning and Economic Development Department saved time using these lists. Contact is Scott Koops 328-6701. Scott may know of other benefits.

GIS helped them be more proactive about detouring, although they knew some about detouring from previous floods.

Email update:

As far as the amount of sand and bags, what I found out was that we delivered to 52 locations (private businesses and residents) from 6/09/08 to 6/15/08. 844 tons of sand were used for those locations and the cost was $7.00 per ton. Total Cost of Sand = $5908. There were 82 loads of sand delivered each one taking about a half hour each. That means 41 hours were devoted to this at an approximate cost of $25 per hour (driver wages normally are $20 per hour but most were working 15 hour days and half of the time was at time and a half). The cost of delivering sand to residents then was $1025 in wages for the 3 days. The price of sandbags is unknown because they were provided by the state. I also have no idea what was the cost of gasoline. There was quite a bit more sand

and bags used for city built levees, but GIS was not needed for analysis on those as they were carefully planned for in the flood plan. I estimate that by using GIS 6 business/ residents were told they didn't need sandbags. The usual amount was a 10 ton dropoff with 1000 bags and the time taken 30 minutes for the delivery. That would add up to a savings of $420 for the sand and $75 dollars for the labor. That is not a huge number by itself, but it is one of the few areas which are quantifiable.

David Croll   City of Johnston GIS Coordinator   12/30/08
515-727-7780   dcroll@ci.johnston.ia.us

Use of LiDAR was primarily older data, 3-4 years old, with derived contours.

Monday of the flood, Dave went out to take field measurements but it took forever. He was measuring on the spillway and that night flood water started coming over it. He discovered that hydraulic modeling was being done by the Corps.

City of Johnston's primary concern was a subdivision that had been built at one foot over 500 year flood levels. Dave was convinced these houses would get wet basements. Tuesday afternoon they prepared for a neighborhood meeting that evening. Some residents had already begun to sandbag. (They made good use of Walla Walla, WA Corps three-page documents on sandbagging.)

Public meeting held at 6 PM. Media showed up. Highest water was predicted for 3 AM of the next day. At 10 PM that night, water went over the emergency spillway, which had been put in place to provide an extra six feet of protection. Result was that the Corps activity bought Johnston time although ultimately they did a controlled deflate of the bladders.

The neighborhood made the decisions with Public Works to participate in sandbagging. Got emergency sand stockpiles from three concrete companies and hauled with city trucks. Dave designed five-foot by twelve-foot sandbag wall on the back of a napkin. Two hundred volunteers built the wall from 7 to 10:30 PM Tuesday evening. Water was licking at the bottom of the wall by the time they were finished. Good news – they built the wall high enough and it held. The neighborhood was very happy with the city staff. This flood turned out to be about the same volume of water as the 1993 flood. Dave's design was for this volume of water.

Later in the week he went out to take shots with the GPS. He used old LiDAR data and fudged meters to feet and set a different color regime for different elevations. He correlated this data set with measurements from the field and found it was spot on. This increased his confidence that the LiDAR data was accurate +/- 6" as claimed. He used LiDAR in predictive capacity, taking live data and predicting water levels. Used LiDAR data to flood back to elevations.

This modeling was used by city officials for decision making. Johnston was an isolated inland in 1993 due to roads flooding. LiDAR served as a large source of topo data to use for prediction. It was also used to allocate sandbagging efforts.

They potentially saved 11 homes valued at $350K and up. Basements could have been total losses and the majority were finished basements. This flood the city went door to door notifying people of the danger. In 1993 property owners did not heed warnings and it was devastating.

Saylorville reservoir was a very effective flood control measure but downstream properties saw the effects immediately when the reservoir failed.

Savings in sandbagging effort via calculation of number of bags needed. They needed over 5000 sandbags. They made them at Public Works and at a soccer complex using a bucket brigade. ***Two hundred citizens plus 40 city staff @ 3 ½ hours work. How much longer would they have worked without modeling telling them they could stop? At least two more hours, possibly more.***
Originally they were going to sandbag each house for redundancy. Of the 11 houses, some were already sandbagged when they started Tuesday evening's effort. Three homeowners removed their sandbags and contributed them to the single wall effort.

Johnston was hit relatively lightly. Cedar Rapids is still reeling from the flood now months later. Dave worked in the Polk County EOC and noted that the difficulty experienced in attempting to share data was amazing.

As a result of flood response activities, Dave knows better how to use LiDAR for stormwater studies. He has a lot more confidence in the use of modeling. ***Getting ready to submit for a grant to do delineated subbasins using LiDAR. This would take approximately 16 hours of work, with the risk that without good data they could end up building something that wouldn't work.***

A major benefit of using GIS for flood response was the ability to make accurate split-second decisions. It took 40 days to drain the basin in the 1993 flood. This time, Dave calculated drain time using LiDAR data and hydraulic computations. The conclusion was that it would take eight days using pumps. ***This calculation helped them make the decisions to let it drain naturally rather than spending a lot of money to bring in big pumps.*** The modeling effort helped with reducing the time to drain, as they went in with a backhoe to open up plugged drains. The inlets were mapped and available to model. Dave could not have calculated the amount of water in the basin without LiDAR data.

Luke Swains at Camp Dodge Army Base provided GIS extensions for surface calculations. Dave recommends talking to University of Iowa hydrology department, IIHR.

Reduction in recovery time? If a concrete plant goes down, obviously it will lose income. Ray Willis had the Polk County contract for imagery waiting to be flown. This provided the ability to fly at the peak of the flood. Now they will have this data for use going forward. Dave shot high water marks in concrete plants from the 1993 flood.

They were able to save concrete plant labor to build walls by providing modeling saying they didn't need to pull electric out or build more walls. One plant is right by the Public Works Department. This plant used stackable J barriers to build an eight-foot high wall. One concrete plant that was inundated ultimately folded.

FEMA pays $16/hour for volunteer labor, but the agency must show a signup sheet. FEMA also pays for people answering the phone, overtime police hours, and the like. Dave presumes rates differ by job category.

Dave could tell building inspectors the 45 buildings that needed to be inspected before power could be turned back on. Otherwise, a field survey would have been required. There was also cost avoidance regarding injuries from field inspections. ***Dave to ask building official about this area of savings.***

Dave to send notes and graphics, including LiDAR and FEMA flood maps. He notes they should have improved FEMA maps due to better modeling. Good input data for hydraulic models is all that has been missing.

Eric Schrader, City of Waterloo Planning and Zoning   11/24/2008

(319) 291-4366   referred by Barbara Berquam

Most of their basemap data comes from Black Hawk County—aerial photos, property lines, road lines. The City Engineer's Department used base maps and other information to produce flood maps of affected areas. He is not aware of any analysis being done.

Jana Diehl, secretary for the Black Hawk County Long Term Recovery Committee, used maps. Probable use was to deploy staff for assessments.
(319) 272-2244

Maps were used as a backdrop for the mayor's press conference regarding the flood.

Kevin O'Malley, Director of Finance, Iowa City   *3/9/09*
(319) 356-5053

They have 84 PWs (Project Worksheets to define the scope of individual projects) from FEMA. This part of the process is 98% complete. FEMA sets breakpoints for large projects (which are funded on actuals only) and small projects. Some of both their large and small projects have already been funded. They are 10% to 15% complete on financing.

FEMA staff and contractor used GIS in working on descriptions of damage to public infrastructure. Sylvia Henry is their key contact. She will be leaving soon and is the last FEMA contact in place in Iowa City. (540) 597-0209 is her cell phone. She is designated as a Public Area Coordinator. Ask Sylvia about mapping issues and about NFIP vs. FEMA funds.

Comparing this response with the 1993 flood, they only had 44 PWs written for that flood, which was a smaller event. FEMA staff and contractor have become more professional, procedures have been streamlined. The entire process seems faster. Iowa City's Category B submission was facilitated by FEMA processes.

Because of Katrina, FEMA is trying to move funds faster. The State has also been very good regarding expedited funding. 90% of their funding is to be up front.

Mark Warren, MAGIC Administrator (Muscatine Area GIS Consortium)
(563)262-3328   mwarren@mpw.org   11/20/2008

MAGIC is a little two-person operation. It's a 28E entity and not quite part of any other government agency. Thus easily forgotten. Their response tended to be after the fact.

2008 Flood maps: They tried to establish flood plain forecasting on the Cedar River. Tracked buildings (cabins) on leased land. He doesn't know if data handed to FEMA helped. He also delivered maps in the form of pdfs to:

1) Zoning administration. They were involved in putting placards on houses and other post-flooding activities. Eric Furnas (563) 263-0482 x 112 has FEMA contacts, or ask Dixie, his secretary.

   2) E911 management.

This flood, the Cedar River was more a problem than the Mississippi.

2007 tornado maps: They identified affected electric distribution lines. Tim Reed could talk about this use (563) 263-2631.

They are supposed to be putting together a flood plain model. They have a levee system with 500-year flood protection. They have been directed to work with the Corps to create a time series study. They will need to build TINs working with ESRI 3D Analyst and running GeoHEC.

Coordination of emergencies – would expect Paoli's office to contact counties for data vs. FEMA doing so vs. everyone scrambling for data. It would be great to get emails from one office requesting data and providing a site for uploads. They have agreements in place regarding sharing for emergencies.

Ron Knoche, Iowa City Engineer's Office   ***2/26/09***
(319) 356-5138

They didn't use HAZUS modeling much for sandbagging, as it came along too late to be all that helpful. Used it more for recovery, to estimate extent of damaged material going to the landfill.

In 2006, they worked with Johnson County and Coralville for an aerial survey which resulted in elevation contours. They used these, along with river profiles, to create flood plain mapping. This was used to plan sandbagging, with some updates to data made on the fly. Its usefulness was limited by not being able to

safely sandbag high enough for protection in some cases. Greater than 10' would be dangerous for those placing the sandbags.

They started sandbagging in rural areas known to flood from 1993. Modeling helped them focus on saving water wells inside the city limits in parkland areas. Otherwise, they would have lost production from these wells. In some cases there were issues with power to the wells. Without the wells they would not have been able to refill reservoirs for city water supply. As a work around, they would have started taking surface water from the river, which would have resulted in poorer quality water that was still safe to drink.

HAZUS modeling helped the landfill with planning and helped the FEMA debris management team work though their project worksheet. Contact from FEMA is Pat Buchanan (540) 597-0403.

Biggest benefit was from flights made by Johnson County on Monday and Tuesday, showing crest of the flood. This gave them the ability to monument the extent of the flood and thus know where to look for infrastructure damage. Ron figures ***this saved 5 people X 1 week of time = 200 hours.***

Steve Cooper, Infrastructure Management Specialist, Public Works 2/19/09 Maintenance, City of Cedar Rapids 319-286-5823 Scooper@cedar-rapids.org

His background and tasks are in infrastructure management rather than GIS. They have base data for GIS – aerial photos, plat maps, water and sewer lines. They would not model while in disaster triage mode. Their people know what to do, they have a procedures book that says what to do when the river is at 18', 19', etc. Regarding flood models – they have been trying to get their FEMA maps updated for the past 10 years. Stanley Consultants and the Corps did recent modeling of the Cedar River.

They have limited electronic resources in the field, laptops for water/sewer workers running static version of ArcReader. These were used during the flood the same as they would be for more routine maintenance.

The GIS community is hoping decision makers will go to GIS for the next emergency. But decision makers don't get this technology yet. They just want answers. GIS pros remain technicians supporting the decision makers.

Every department in Cedar Rapids used oblique imagery. It was used to draw maps of the flooded area, to generate printouts and graphics, for communication, visualization of what happened.

Department of Development for the City would have damage records.

GIS gives definitive answers. Often people don't want to touch that. People want to keep things gray for a reason, and this is the case in areas besides emergency management. People sometimes don't want answers or good information because then they'd have to do something with it. He thinks GIS may become obsolete because it is too revealing.

Best contacts regarding flood experience would be:
Department of Development, Cedar Rapids – clearinghouse for flood info
City assessor
City and county GIS departments

Steve Long, Iowa City Planning Department   *3/17/09*
(319) 356-5250

They will acquire and demolish 40 homes this May and June. Plan is to get everyone out of the 100 year flood plain. Require flood insurance of any property owners to receive loan funding with lien on property. Five year forgivable loan requires 500 year floodplain insurance for length of loan.

Iowa City/Coralville FIRMs are being redrawn. Hydrology study also being done, with live modeling capabilities. For example, show change in flow if they remove a structure, if University wants to add a structure, if levees are built. Partners in this effort are Iowa City, Coralville and the University.

One success was working with local homebuilders association to do damage assessment for affected homes. This was used to justify funding.

127 households applied to the city for assistance out of 280 affected. This would include funding for down payment, mortgage, and rehab assistance. Coralville had 500 plus affected households, including many apartments. This is State and Federal funding but not part of the FEMA applications. The FEMA estimate of 1500 applications should include rent assistance and rebuild assistance. Recently, there was authorization of $2500 per household State funding for unmet needs grants.

Another contact is the Long Term Recovery Committee (made up of Iowa City, Coralville, United Way, FEMA).

City outreach to residents through website, neighborhood contacts, walking door to door). They used GIS, including county HAZUS runs, to develop maps showing affected population. Once in recovery mode, developed their own analysis for the city. Particularly useful for buyout issues, looking at boundaries of 100-year floodplain, 500-year floodplain, where the water actually went using HAZUS output). This helped them focus on which property to concentrate on for buyouts. 40 homes will be demolished in buyout, which will have immediate impact on risk to that property. 200+ homes will not be bought out.

Steve to send email with amount of property damage to date, amount of individual assistance administered by city, value of buyout property, thoughts on time saved for city staff in having maps of affected property.

State agencies

Bill Cappuccio, State Floodplain Coordinator, Iowa DNR   1/15/09
(515) 281-8942   Bill.Cappuccio@dnr.iowa.gov

Response to my comments to Jim regarding use of imagery from the flood to update DFIRMS: DFIRMS are intended to delineate 100 year floods. Citizen's understanding of the size of 2008 floods is not technically correct. Having a flood of unknown magnitude won't help calibrate flood maps. Generally, accurate stream gauge data at the time of the Iowa floods is not available. He knows that Cedar Rapids saw 141,000 cubic foot/sec at the peak of the flood. It might be possible to use this type of data to calibrate the models. Then there is the issue of whether you'd want to use coarse-resolution imagery vs. two-foot LiDAR. LiDAR would be more accurate in modeling where flood water would go.

However, is imagery taken during the flood useless? No, it should be used to show inundation for the greatest flooding known to an area. The mistake would come in trying to assign images to 100 year or 500 year floods. Bill sees the imagery as a historical document and affirmation. He notes that resolution for satellite imagery is not as good as with lower level aerial photos. Even with good resolution imagery and known discharge, using it for DIRM calibration

would be difficult. For example, 94,300 cfs is 100 year flood level for Cedar Rapids, based on 160 years of gauge records. But 29,900 cfs is 100 year flood level for Iowa City. Ideally, they would look at peaks of stream gauge records and do an annual statistical analysis.   By UGSG calculations, crest was 140,000 cfs in Cedar Rapids.

They're done permitting relative to flooding since 1957. Early on they worked without maps, much less digital maps. Maps are obviously of benefit to anyone doing development, planning, flood response. The advantage of a digital flood map is ease of use. It becomes possible to superimpose the DFIRM on other images to determine areas of risk.

Current digital flood maps are static. What would be best would be flexible flood inundation mapping. ***I am to send Bill a list of Iowa agencies that attempted this for 2008 flood response.*** Static FEMA-derived flood maps from stage inundation will be helpful to communities for planning, but they are of limited use compared to more precise modeling. You could also put in stakes to show the extent of flooding and geocode the stakes.

When someone puts together a response plan, they'll use what data is available, paper or electronic. With electronic data it is easier, more efficient, to identify structures by attributes.

There are not that many digital flood maps in Iowa, only 20 out of 99 counties. Delivery began late 2005.

Regarding benefits of digital FIRMS: Bill uses the digital products rather than looking up paper maps. He gets an average of 10 calls/week needing map lookup, saving 25 minutes/call. Five others in his office are in the same situation. ***This gives 25 hours/week benefit for time saved by six staff at DNR. Presumably savings will increase as more digital FIRMS become available – would be good to show this ramped up over time.***

Additionally, some of the citizens calling want a copy of the map. Getting them a DFIRM is a five minute job and can provide immediate response by email. This allows a conversation to continue with each party having a map in from of them, rather than delays in the conversation while the citizen waits for a paper map to arrive in the mail.

The above discussion is all on the regulation end. For hazard mitigation, I would need to talk to a different set of people. Linn County is thinking of taking its DFIRMs, doing query on property within 100-year flood boundaries, and using this to send out notification to residents.

Out of 50,000 flood prone structures in Iowa, 13,000 are insured. The average nationally is under 20%. We discussed the possibility that mortgage lenders are not doing due diligence in requiring structures in flood plain to be insured. That Congress is considering increasing penalties to mortgage lenders seems more and more reasonable.

Des Moines is downstream of Saylorville Reservoir. Iowa City is downstream of Coralville Reservoir. These are major Corps reservoirs and both cities experienced horrendous flooding. Reservoirs are no guarantee of protection.

Advance planning benefits: 1) more effective evacuations; 2) more effective activities such as sandbagging.

Iowa State is putting together stage inundation maps for Ames using student labor. Fit profile to stream centerlines and project out inundation area. Project out rating curves. They are using 2 foot LiDAR contours with shape file outputs. Bill is working with the National Weather Services to create more projects like this to cover more areas of the state. ***Discuss with Jim the desirability of creating an individual spreadsheet of this project.*** Bill estimates that they need $15M to create flood maps and hydraulic models for the state.

Chris Ensminger, Iowa DNR GIS Manager   ***11/18/2008***
(515) 281-4216   Chris.Ensminger@dnr.iowa.gov

147 hours staff time at senior GIS analyst on flood response. This includes Kathryn Clark's time.

Homeland Security received flood inundation model from ESRI.

They created hazardous chemical maps for use in knowing what should be sandbagged. They pulled data out of One Stop program. Georeferencing effort came in here.

They set up ftp site. Satellite imagery came in through the Charter Program. 32 hours SPOT image classification + 8 hours download imagery = 40 (part of above total)

Collected aerial photos from historic imagery library.

Photo rescue at Iowa Map Library.

Coordination with LiDAR collection. Got data to Corps and National Guard. Served as middleman between vendor and agencies. Prioritized order of data processing by Sanborn. Andy Lucero, Sr. Project Manager (719) 264-5645 alucero@sanborn.com

City of Hamburg has been flooded many times. With Corps, determined they need a levee study. Community to provide 25% matching funds to Corps 75%, but that would be $250K which the City didn't have. Corps and DNR worked out arrangement for Corps to accept State's contribution to LiDAR flight as City's contribution. Levee study Randy Behm, Corps Project Lead. Ask him about details of financing. Randall.l.behm@usace.army.mil (402) 995-2322 Hydrologic Engineering Branch, Chief of Flood Risk and Flood Plain, Omaha office.

Flood plain guys use LiDAR routinely to make determinations. For example, you can't site feedlots in the flood plain. Use of LiDAR could provide $50K savings to landowners vs. having a survey.

Biggest property claim from Iowa flood is crops, not buildings. $250 to land owners in special easements in 650 applications to be paid for returning crops to wetlands (which serves to mitigate flooding). To date, only $21M from Feds has been received.

FEMA wanted to get lists of flooded property owners for damage assessments. Counties wanted to charge for their parcel maps at 25 cents/parcel. If there was a statewide database, Jon Paoli would not have had to negotiate this during a flood.

Water quality monitoring. IHL, University Hygenic Lab, did this for FEMA while EPA did their own analysis. Lots of money was spent. Mary Skopec in Jim's office should know about this. David Kroll quote, "I was out surveying by hand and realized we had LiDAR data I could use." What if we went back now

and developed plans for sandbagging, other response? Part of pushing for flood plain mapping.

Hazardous chemical maps were at different levels of accuracy. What's the cost of having bad data? $1M project for geocoding. What's the return on this if it makes sandbagging go better?

Tony Spicci regarding HAZUS.

Paoli for FEMA contacts.

Ask Giglierano about Rock Island Corps staff seeking LiDAR.

Dee Clausen, Iowa Department of Agriculture   11/17/2008
515/281-8236   Delores.Clausen@Iowaagriculture.gov
Also participating were Dr. Schmidt and Dr. Wheeler

Oakville area was under water after the levee broke. There were swine operations in the area. They took registered premises and mapped locations of swine farms. Then used contact info to reach farmers. 37,000 hogs were evacuated. Six buildings were not evacuated.

Clean Harbors, a 3D (depopulation, disposal, decontamination)USDA contractor, came in to do cleanup. GIS was a component of info provided to the individual contractors on location. Premise registration is normally focused on disease prevention. Flood response was outside the scope of the animal ID system.

Benefits: knowing who the landowner is, as well as the secondary contact. They sorted facilities by area affected by the flood and mapped all facilities in the flood area. Tri Oaks had contracts for all swine in the area and also knew where they were. The flood was this group's first opportunity to use GIS in a real situation.

Lessons learned: what was used to geolocate premises should be consistent.

They have all fairgrounds in their GIS. These were used for shelters and info regarding fairground contacts was helpful.

Dee sorting out info – within 8 hours got requested info to another office.

Wildlife Services from USDA contractor did flyover for swine on a levee. Dr. Don Otto, Vet. Services office, used imagery and maps. 515-284-4140.

Dennis Harper, Iowa Homeland Security   *2/17/09*
515-979-1832   *dennis.harper@iowa.gov*

Joyce Flinn of Iowa Homeland Security referred me to Dennis, saying he manages field efforts for public infrastructure.

Homeland Security does loss estimation modeling for flooding annually. They use a NWS database, which is also used in the National Report to Congress on Flood Damage, NCDC. From this database, it is possible to pull a more complete data set regarding damages by county. Everyone uses this data. It is not split out by 100-year, 500-year floods. It is duplicative regarding separation by county and by event (he says this will be obvious when I look at the data).

Iowa has good data used for disaster mitigation and for its mitigation plan. This is associated with $50M to $60M in disaster funds so it better be good. The plan is modified about every three years. We downloaded the current Iowa Hazard Mitigation Plan for review and its date is 2007. Iowa is one of eight states meeting the criteria for mitigation planning.

Be aware that raw data regarding private property won't be released for confidentiality reasons. But public property will be released.

Reviewing the plan, start on page 193. Loss estimation table is on page 183, County Annual Loss Estimation by Natural Hazard.

Jon Paoli should be able to provide the state side of the equation regarding benefits from mapping.

Dennis preceded Paoli and created Paoli's position.

Russell Colon (540) 270-1047 at FEMA developed and used risk maps related to rural water and electric coops based on the 2008 flood. This work was specific to Iowa utilities. He used the map to look at potential for structural failures in the future. This work will likely become a FEMA best practice. It totally changed their work processes.

Harper used GIS for the Parkersberg event. The work he did would have been impossible without the ability to overlay assessor data with the area of damage.

Des Moines County EMA used GIS in response. Talk to Arden.

Eric Abrams, DOT   **11/14/2008**
515-239-1949   **Eric.Abrams@dot.iowa.gov**

Flood response: He wasn't involved. The DOT user base for GIS is weak regarding skills, although they have a good infrastructure in place.

They had a request for LiDAR data for road flood analysis. But the area hadn't been flown yet. If data was available, they would have been able to work with it.

They have a 511 system which had so many hits it had to be shut down. There are plans to make this system more robust.

DOT is starting to focus more on GIS. They plan to make data available to the new EOC put in place after spring 2008 snow event, but are not yet integrated with EOC data.

Snow and flooding events have exposed weaknesses in data sharing internally and with the public.

Integraiton of systems with counties? IGIC efforts might be able to help with this.

Minnesota 135 bridge collapse: Office of Transportation Data could put out Iowa bridge information to the public quickly using KML. This is a success story. Was possible to easily use maps to calm public fear.

John Wageman, State Hazard Mitigation Officer   ***6/2/09***
Iowa Homeland Security & Emergency Management
515-251-3676 (Joint Field Office)

I contacted him with questions about the use of the 2007 Hazard Mitigation Plan for estimation of weather risk over the next 20 years. John had provided Jim Giglierano with a link to this document recently.

His primary comment was that their loss estimation uses old data and they will make the estimation differently for the 2010 update. He would recommend that we look at what's inside the floodplain and use those stats. What about use of HAZUS for damage modeling?

John referred me to Mike Raes, State Mitigation Planner, (515) 725-3215.

Joe Paoli, Iowa Homeland Security & Emergency Management   **12/18/08**
(515) 323-4384   jonathan.paoli@iowa.gov

Will provide information on what could have been done for optimization, such as needed mechanisms for information sharing, as well as what actually took place for this flood event.

Will provide introduction to Mary Meade from FEMA Region 4, who knows a lot about the FEMA process in general and for damage assessments. She knows a lot about Wapalo and Cedar counties.

I should talk to Jason Siebrecht (Linn County Auditors), Rick Havel and Steve Cooper about this year's flood response. They were in the thick of it.

Reflecting on using GIS data to provide better info to FEMA, it seems that counties with GIS have more substantial recovery projects. Something like two week turnaround vs. four months. We should attempt to document this from both ends of the spectrum.

Study Johnson County regarding use of HAZUS.

Talk to Dennis Harper in Jon's office about the State's process as it is affected by GIS. Jon to set this up.

Analysis should address response and recovery (where the big benefits will be found), and also preparedness (when data is easily available).

This event FEMA wanted parcel data up front, which was the first time Jon has seen them ask for this.

Reference the summer's flood and tornado events by a single FEMA disaster number, which will include Parkersburg tornado as an overall severe weather event.

Dave Croll from Johnson City and his efforts combining modeling and LiDAR data to forecast flood heights on buildings.

Flood inundation tool run by DNR and used by Jon's office.

Pictometry imagery purchased by the State for use by all resulted in labor savings of not having to contract county by county, presumably reduced bulk rates vs. $15K per county. We'll need to do a base case of what actually happened as well as an optimized scenario.

Jon to provide contacts at Corps of Engineers.

Jon has a good log of time he spent trying to broker deals for data. This was unreal, having to deal with city councils who did not want to share data.

We want to show the benefits of IGI during events such as the flood.

They are going through the after action process currently and there has been lots of response.

Concept of using data to preposition things, like sandbags. This goes beyond sandbags, consider pumps and National Guard resources.

Savings from use by Jon's office of ArcGIS server.

Use by local agencies of LiDAR, obliques, other imagery.

Jon to provide list of benefits and any metrics he is able to assemble. Jon also to provide contacts and introductions in some cases.

Joyce Flinn, Iowa Homeland Security, Response Division   1/30/09
515-323-4313 joyce.flinn@iowa.gov

She points out that Iowa Homeland Security would typically do mapping themselves since many counties in Iowa don't have GIS capability. However, the recovery/mitigation efforts such as buyouts would look at county level inundation maps. County maps would also be used for analysis after the fact of whether flood walls were constructed properly.

She suggested additional contacts: Dennis Harper (515) 979-1832. He manages field efforts for public infrastructure. John Wageman, State Hazard Mitigation Officer (515) 251-3676.

Karen D. Smith., Flood Management Program, Water Resources Section   6/5/09
Iowa Department of Natural Resources
(515) 281-4310 karen.smith@dnr.iowa.gov

Followup on comments from Chris Ensminger, "Flood plain guys use LiDAR routinely to make determinations. For example, you can't site feedlots in the flood plain. Use of LiDAR could provide $50K savings to landowners vs. having a survey."

Karen sees 60-70 landowners a year needing survey type information. Multiply that by four regions and make a conservative estimate of 200 landowners/year. Easy stretches of survey would cost at least $1500. Use of LiDAR rather than requiring surveys would save landowners $300,000/year just in the area of flood plain permitting.

Use of LiDAR also saves time for Karen and other staff at the rate of 2 hours/permitting effort = 400 hours/year staff time saved. There is a lot of phone calling and paper work associated with having a survey done.

LiDAR is providing them with better data, resulting in more avoidance of damages from flood events, but this is difficult to estimate. They did not have LiDAR data available in areas of concern for the 2008 flood.

Kathryne Clark, Iowa DNR GIS Analyst   11/10/2008
(515)281-4583 Kathryne.Clark@dnr.iowa.gov

Tornados: Got ftp site up for Emergency Management, to transfer data from counties to state emergency management. This site ended up being used more broadly than was originally designed.

Major state projects: 1) run flood inundation models provided by ESRI for communities along Iowa and Cedar River corridors and for Des Moines. She created 4 or 5 studies. 5 hours/person X 3 staff = 15 hours. Results sent to Jon Paoli for his use. 2) maps showing location of environmental facilities that DNR regulates threatened by flood waters. This also was sent to Jon for internal use. Manufacturing and storage sites for six communities. Eddyville and some small

communities in South Central Iowa. 2 hours X 4 staff = 8 hours; 3) georeferencing flood plain map boundaries. Ask Chris Ensminger about level of effort for this.

Activities after the flood: 1) worked with underground storage tank staff, 1 hour; 2) created maps showing location of farmsteads impacted, using satellite imagery. From Waterloo south. Pete Colash or Jon Paoli would know this level of effort. Pete created layer to ID flooded areas; 3) location of confinements (pigs) near Oakville that were regulated by DNR = 2 hours

Time with EPA. Methodology for working with their contractors and for work with National Guard. EPA Ops Chief Jim Davis in KC. Colin Willits, contractor out of KC. Leon with National Guard.

__Mike Raes, State Mitigation Planner, Iowa Homeland Security__   *__6/2/09__*
__Mike.raes@iowa.gov__   *__(515) 725-3215__*

Mike has been trying to develop a record of loss avoidance for their 2010 mitigation plan and is very interested in our financial analysis, would like to see the report when it is complete.

He recommends that we use a Level 2 or 3 HAZUS run to estimate potential county-wide damage. Show large and medium-size county runs, nothing as large as Polk County.   We discussed the work Shane Hubbard has been doing with HAZUS and the fact that he has certainly done Level 2 runs for Johnson County, incorporating localized GIS data. A Level 3 run would incorporate actual refined data from businesses. I will check with Shane to see what he has available.

We discussed using the 2007 Mitigation Plan to show Johnson County's risk level relative to the entire state. This could then be used with the HAZUS output to show 20 year risk for the entire state.

We only have 25 years of good recorded flood history. Any data at all only goes back to post-WW II era. Thus, any stats relative to flood are somewhat unreliable

Dennis Harper came up with the loss estimation approach for the 2004 report. It was not changed for the 2007 report, which may explain notes in that report regarding the data not having changed since 2003.

I reported back on the availability of HAZUS output from Shane for 2008 runs of 100 year and 500 year flood for Johnson County. Shane also indicated that FEMA has contracted for statewide HAZUS runs for 100 and 500 year floods and that this may be available in draft form, but doubtful. Shane to provide data from his runs early next week.

Mike will be at a FEMA office this afternoon and he believes that he can get buildings at risk values for 500 year run statewide.

We discussed best way to approach weather risk and Mike said that he likes the Oregon State flood frequency analysis methodology. However, we are uncertain if data for Iowa is readily available. I commented that it would be beyond the scope of this project for me to attempt these runs, although we would certainly use the results if they were available.

<u>**Educational organizations**</u>

Ann Rosenthal, University of Iowa Facilities   *3/12/09*
(319) 335-5823 ann-rosenthal@uion.edu

They did get the steam tunnels back in service by heating season. However, they lost the power plant during the flood and had to set up temporary boilers to feed the stream tunnels.

If tunnels had not been available by heating season, 12 buildings would have needed alternate heat source. In order to occupy the building would have needed to set up a skid load boiler. This would definitely have been done for the library at a cost of $500K. Probably would have been done for the Union, again for $500K. Possibly would have been done for 5 other classroom buildings, in the range of $150K-$250K each.

Chet Wieland, University of Iowa Facilities (referred by Kirk Banks) 3/12/09
(319) 384-0996

They met with the Corps every morning to get release rates from the reservoir. Shive Hattery ran model for them daily. Contact is Phil Larson (310) 354-3040.

Having a building damaged results in significant loss due to operations not being possible in that building. In many cases they had to rent space. They got three buildings back online quickly, accounting for half of their classroom space. Also got the Mayflower Residence Hall, housing 1100 students, back and running. Also consider utilities that had to be protected – transformers, storm sewers, pipe.

Used modeling output to determine how high to build sandbags. University land undulated so some sandbag walls built to 4 foot, others to 6 foot.

Contact Wendy in Facilities (319) 335-1246 regarding potential damage to buildings and buildings saved.

Contact Ann Rosenthal in Facilities (319) 335-5823 regarding cost to provide supplemental utilities if steam tunnels were not available (cost of backup heating).

Dave McClain, University of Iowa Water Plant   ***3/25/09***
(319) 335-5990 office; (319) 631-2331 cell

Two scenarios for losing the water plant: 1) intake structure taken out; 2) flooding from tunnels, connections were plugged but there was a breech.

Sandbag operations only affected scenario #1 so we'll only look at it. Work around would be a portable trailer. They did something like this in 1993. This year they had DOT pump mounted on a trailer available. They needed to be sure they could stay online due to hospital demand for water plus their cross-ties with city water services. To use the backup would have cost: fuel to the pump and effort to resurrect intake structure plus effect of river raw water on pumps.

Dave to get back to me with cost estimates.

3/27/09

Dave kicked cost estimates around with staff and concluded that they really do not know what costs would have been. They also sandbagged in 1993, thus protecting the water plant, and have never had to deploy a backup due to the intake structure being taken out.

Dave notes that elevation mapping with a surveyor on the ground taking elevation shots is what's most helpful in the type of flood they encountered. Building a sandbag wall correctly is key and is much more apt to be successful if you know the goal when beginning to build. Result is a better structure.

John DeGroote, Geoinformatics Training Research Educations and Extension Center (GeoTREE), University of Northern Iowa   10/22/08 319-273-3877   john.degroote@uni.edu

Tornado response

They were asked to make maps of Parkersburg damage for the University Business School's Institute for Decision Making. Three or four people went to the site with GPS, cameras, video equipment. The idea was to map the entire path of the tornado but it was 40 miles long, too long to do it all.

They got oblique photos from Iowa Homeland Security. This imagery was not consistent but it did have some GPS points attached which they imported to GIS as reference points. They used NAPE photos in conjunction with the obliques. Students digitized damaged buildings, 800 structures, and ranked damage on the Fugita scale. They digitized areas of forest damage and created polygons of debris fields.

This information was put on a web site http://geotree2.geog.uni.edu/Tornado/ using Arc server. Hyperlink capability was provided for photos and videos. They used the web site to share data with Butler and Black Hawk Counties and Iowa Homeland Security.

They attempted an estimation of structural damage. They've had no contact with FEMA regarding this assessment damage as the two organizations don't really have a means for contacting each other or sharing information. John Paoli know about the damage assessment but possibly this knowledge did not go beyond him.

What would they do different next time? If a standard area photo at good resolution was available, that would be much easier to digitize. Does Iowa Civil Air Patrol have a protocol for its flights? Paoli thought they did not. John would be very interested to know if anyone has mapped the full tornado path.

UNI is trying to get more involved in GIS for emergency response and to get Federal funding to establish a disaster response center. I should speak with John's bosses, Dr. Ramanathan Sugumaran (sugu@uni.edu), head of GeoTREE, and Dr. Patrick Pease (patrick.pease@uni.edu), head of the Geography Department.

Deliverables: Time spent field data collection and digitizing. Contact information for Institute for Decision Making.

Flood response

Paoli provided them with oblique imagery acquired by Air Patrol upon his request. This imagery was almost impossible to georeference. It did have GPS coordinates but was difficult to reconstruct.

They only planned to do Black Hawk County. However, they asked Aerial Services about imagery that had been collected. Aerial Services agreed to share Cedar Falls/Waterloo imagery for research purposes only.

A student digitized 80% of flooding in Black Hawk County. They made a statistical comparison with FEMA 100 and 500 year flood plain boundaries. They estimated the number of buildings flooded using Black Hawk County parcel base. There was some uncertainty in matching buildings to parcels.

They used HAZUS for scenarios, also using Digital Elevation Models. Had HAZUS predict where a 100 year flood would be and estimate damage. Then they compared the actual damage to HAZUS predictions. John is hoping to publish an article on these comparisons.

They had difficulty getting HAZUS to work correctly. John believes you really need a hydrology engineering background to make HAZUS work. The product is not well documented. Working with it is well beyond the reach of the average county or state employee. He recommends we speak with Shane Hubbard at University of Iowa about these issues as he seems to know the most about HAZUS and his former center in Indiana does HAZUS modeling for various counties and states.

Their data was presented recently at East Iowa GIS Day, which had 150 people in attendance. They haven't shared it with anyone else. They can't share the imagery from Aerial Services or any products derived from it. Time has passed

so people aren't so worried and demanding of data. However, John believes that it would be good to have their flood analysis as input to new FEMA DFIRM boundaries.

John will provide a time estimate for the digitization work but the HAZUS effort falls more under the area of general research and would not be appropriate to count.

John wonders if FEMA or some other agency will map this flood.

Lessons learned: They should have been quicker to act in partnering with agencies. With hindsight he can see great benefits to improved communication and data sharing protocols.

Deliverables: Time spent digitizing. Salary and overhead info. Set up appointments with John's bosses at appropriate time.   Followup with Paoli regarding FEMA use of GeoTREE work. John may want to get to know his State Floodplain Manager.

Kirk Banks, Space Information Manager, Planning, Design & Construction
University of Iowa   ***10/28/08***
 319-335-5502 [***kirk-banks@uiowa.edu***](mailto:kirk-banks@uiowa.edu)

There is a GIS/GPS staff member who works for Kirk.

Long before the flood, they were given forecasts of 100-year flood event and had a mitigation plan in place. This modeling was similar to 1993 flood event. Everything was supposed to work. However, as this year's flood started, they began getting higher flow rates from the Corps. Using GPS, their crew started taking location reads, including elevation, along sandbag areas. The campus crew was easier to control and had additional help from private firms.

Soon the flow rates were beyond anything that had been planned for. They went out with GPS crew to get elevations for buildings at risk and projected high levels. How many floors up did things need to be moved? This was calculated based on ground level elevations. Everything happened very quickly. They were trying to pull 500-year flood plan together in 1 ½ days. Setting 0 point to gauge risk to the rest of a building. Outlier buildings were evaluated next.

This was a unique flood in coming upstream from the Iowa River, being pushed up Clear Creek. There was a foot or two plus/minus error. The administration needed to decide whether to evacuate. Where to evacuate? How many floors up to move? GIS/GPS provided benchmarks regarding risk to buildings, which allowed decision makers to prioritize.

What would they have done without quick reads? 1) used private firms or 2) used old manual methods of pulling information. Using GIS/GPS data: 1) saved things as needed by moving them to higher ground 2) left areas alone as needed. Kept response from going overboard.   Provided good solid information. Modeling was correct.

At the end of the week, they got the worst flow rate. They went out and physically marked buildings with spray paint for worst case scenario. Kirk remembers case of spraying two feet above the threshold of a building and peoples' eyes got huge. He did this for ¾ mile along the main boulevard on the east and west side of campus. The goal was to mark needed sandbag height.

Once in place, sandbag crew could have continuous survey information and relate it back into the GIS system. Downloaded from field units into AutoCAD. Converted into spreadsheets for 25 buildings at risk. Analysis to make next mitigation process better when flooding happens the next time. Worked with Johnson County and other groups.

Dyke held well but steam tunnel system was inundated, backfilled. County flyover done fairly close to high crest point, providing a solid representation of worst case scenario. FEMA Des Moines wanted information and they had it ready to go. Quick turnaround to push information out. Helps with cleanup after the flood. Steam tunnel faults, ventilation openings and the like, were mapped and analyzed. Public radio transmitter station went off the air. Off campus tended to be out of sight, out of mind. Mapping helped with cleanup and insurance claims.

Time savings: They could not have done it the old way. Went from 100 year to 500 year event in one week. They built a dyke based on 100 year predictions. Mapping helped in the decision to abandon that effort. There was nothing available to keep eight to 10 feet of water out. Mapping made for an easier decision to move to the east side of campus to work on dykes there. They were able to save 10 to 13 buildings at risk. Saved a solid seven buildings up against the river.

Would decisions have been reached without GPS? Yes, but the measurements made decisions easier. How high to build regarding topography of the river bank. Ability to explain the situation and get the National Guard involved. Decisions were quicker. Use as a communication tool – helped settle nerves and concentrate effort.

Benefits:
1) Evacuation west side
2) Remediation east side
3) Internal communications
4) Planning for the future – will plan for 500 year floods; information to mitigation consultants; cheaper to develop the next plan; insurers
5) Cleanup
6) Steam lines cleaned up
7) Normal activities back up and running quicker

Just now finishing off repair of east side steam tunnels. **Some buildings did not get cleared out. Damage estimates? Risk management may have a handle on these figures.**

Chris Morrow – flood mitigation consultant, risk management office. Should have worksheets on what was damaged.

O&M Director – Kirk to send email contact info. East/west side response. Could not have done his job without GPS crews.

Alternative of digging through old construction prints would have resulted in poorer decisions, such as how to best move expensive lab equipment.

Their insurers should know what was at risk.

If they couldn't heat campus using steam tunnels, this would affect research activities. They would have to bring in temporary mobile units for one to two months due to slower recovery of steam tunnels.

3/25/09

Majority of flooding to campus came through steam tunnels. Sandbagging kept the flow in the river, resulting in ponding only. Thus sandbagging prevented

structural damage from flow to buildings that flooded. Without sandbagging they would have lost some buildings, up to 13 would have required major rehab.

Water plant did not go down purely from sandbagging effort. What would they have done if it went down? Ask Dave McClain, water plant manager (319) 335-5990. Might also speak with Gary Creed, mechanical distribution manager, focused more on steam tunnels (319) 335-5156. They cut and sealed openings from the water plant to the steam tunnels – just another piece of the flood activity.

There were 9 buildings on the east side of Madison that did not flood. These were at their highest elevations. Sandbagging saved 7 buildings, which got water from steam tunnels only. No university buildings got flow damage. Contrast with Cedar Rapids which has this type of damage.

Values of buildings – building and content value vs. construction replacement value. When they hit 50% of these values, have the option to rebuild and relocate and FEMA supports that. $26M replacement value on insurance for performing arts center vs. over $200M to rebuild in today's construction costs. Risk Management might have a better handle on these issues, which are currently in flux.

Go to Board of Regents website for building replacement values.

Kirk proposes using actual numbers on damage and then estimating how much more damage if water was flowing. Take the number to Chet Wheland for these estimates. Jerri King, Asst. to Assoc. VP (319) 335-1242 deals directly with the Board. Consolidates info for the Board of Regents.

Example of centralized services. Base station maintained in one of their dorms had to be recalibrated due to lost power. New IDOT GPS enhanced system will prevent this outage in the future.

Kirk would attribute all of correct sandbagging efforts to modeling forecasts.

Federal agencies

Becky Griffis, Meteorologist/Forecaster, GIS Focal point, National Weather Service, Omaha *10/23/08*
Rebecca.Griffis@noaa.gov *(402) 359-2394*

There are 38 offices of NWS in the Central Region. They have a centralized mapping project with the goal of getting every office feeding into a common database. Omaha is the pilot office, along with the Central Region Headquarters. Their plan is to have all offices using the common database by February 1, 2009.

They are calling the February rollout Version A. The February 1 goal has to do with being prepared for tornado season. The project has been in the works for three years, but an upgrade to Arc 9.3 caused them to redo their mobile format recently. Their mobile units are GPS receivers connected to laptops. They rate damage on the Fugita scale from 1 to 5. Each GPS point has attributes. In Version B, they'll be able to incorporate photos and have image sharing capabilities.

The director of the entire NWS came from DC to see this project and decided that NWS should deploy it nationwide. They perceive a huge cost benefit to work this way rather than with paper maps.

NWS offices with Iowa counties include Omaha, Sioux Falls, Des Moines, La Crosse and Quad Cities. The Omaha office covers 30 counties in Nebraska and 8 in Iowa.

Tornado response:

Her office covers eight SW Iowa counties, responsible for them whenever there is a warning. NWS staff go to the field and rate tornado damage using GPS receivers connected to an Arc server. They gather data points, put them in a database and map them. The maps are used by quick response teams, counties, insurance agencies, emergency response organizations. They create a KML file and use Google Earth for display. Sometimes they will fly the path of a large tornado, but did not do this in 2008.

They respond to wind events beyond tornados. If there is a big wind event, they will do a damage survey. There was a huge event through Omaha and Council Bluffs where they drew damage polygons that were used heavily by county emergency managers and insurance companies.

Assessing flooding and tornado damage is pretty cut and dried for NWS. One big thing for them is media. To get something published up to the web quickly is key. FEMA wants to know where to send trailers.

NWS services rates tornados, does forecasts for rivers. They talk with the Corps and other water people but NWS is the agency to issue flood statements. They help the Corps determine if rivers need new flood stages.

Flood response:

NWS hopes to get flood mapping, boundary of inundation, going in the future. This is something they really want to accomplish. They would collect the data after floods and keep it archived on their server.

Becky has an interest in us developing financial analysis for costs/benefits of their project for the Central NWS District, which we would then scale to show analysis for Iowa only.

Bob Franke, FEMA Region VII   **2/4/09**
bob.franke@dhs.gov   **(816) 283-7073**

Bob works in flood hazard mapping. He looked at remote sensing data to define the extent of the Iowa flood, using the Google Earth product for example. Also used NGA product.

Questions answered using GIS and imagery:
1) Is it worthwhile to do frequency analysis of gauges?
2) Do we have the needed flood hazard information? He notes that they used recent LiDAR data from the State where it was available.
3) Use in gathering high water marks.

Information went to the joint field office in Des Moines. Disaster reservists there rotate in and out every four to eight weeks so it may be difficult to find someone to speak with. Mary Meade was the lead for the geospatial unit. If there is still a geospatial unit at the joint field office, they probably still have the imagery used last summer. Mary should know who followed her at this office.

Regarding the questions above:

Question 1: Frequency analysis of gauges – was the event large enough to warrant analysis? Imagery helped focus Bob's effort and probably saved him 4 to 8 hours of Internet searching.

Question 2: FEMA mapping program – lots of areas throughout the nation are not receiving updated maps. Many flooded areas in Iowa did not have updated maps, which hinders local officials trying to make decisions about where to rebuild. Many flooded areas in Iowa had never been mapped by FEMA.

For recovery purposes, FEMA produced flood hazard maps for 16 counties. Analysis done was the same as for a FIRM but they can't use disaster funds to create FIRMs. Thus, the maps created have no regulatory standing and are purely advisory at this time. However, the analyses performed will be used at a later time to create FIRMs.

Ten meter DEMs were used in areas where LiDAR was not yet available. Even older analyses used quad sheets. Bob notes that when the map modernization program began in 2004, they were told they would receive funding to map the entire land area for the nation for flood hazard. This program was not adequately funded. In 2004, they had 10 meter DEMs for all of Missouri and Nebraska but not for Iowa and Kansas. An agreement was made with USGS to fund data collection for the remaining areas for Iowa and Kansas.

Newer mapping is done with approximate methods, with no associated field work. The reason for this is that a detailed study costs $8000 to $10000 per map miles versus $100 per map mile for an approximate study. Newer terrain data will be used when it is available.

Question 3: High water marks. Bob used GIS to help decide where to send survey crews to gather marks. Their contractor had crews out in the areas from July 2 to 15. Better decisions were made but probably no analysis time was saved.

Bob Lemon, USGS   ***2/19/09***
(573) 308-3736

Bob called due to Milo's email circulated 2/13/09 recommending I contact Greg Snyder at USGS in Reston. Greg forwarded this query to Bob.

Bob is in charge of International Charter flights. During the Iowa flood event there were daily conference calls with Brenda Jones at the Eros Data Center regarding making data available. All data for Iowa was funneled through Jon Paoli. If not Paoli, who??? Jon was Bob's contact for everything in Iowa.

FEMA contracted with USGS for flights. This data was made available to Jon and then dispersed throughout the state. Jon was State Project Manager for International Charter program. Eagle imagery went through Jon. FEMA and NGA imagery went through Jon.

David Eash   Hydrologist   U.S. Geological Survey   2/17/09
319-358-3615   daeash@usgs.gov

Email from Eash preceding phone conversation:

As I mentioned Friday, we can not estimate the likelihood of flooding over the next 20 years. You mentioned looking at flooding over the past 20 years and using that data to estimate flooding for the next 20 years. As you probably know, the last 20 years have been a relatively wet period for much of the State and there has been considerable flooding. We have no idea if the past 20 years may represent the next 20 years.

You mentioned the 1-percent (100-year) and 0.2-percent (500-year) chance floods as flood probabilities to target for the estimate of the likelihood of flooding. As I mentioned, our gauging station network does not represent a uniform coverage of the State and we do not necessarily have a gage in every county - so estimating the likelihood of flooding in every Iowa county for the next 20 years from our gauging station network will not work exactly.

One approach I thought of, is that we could go through the peak-flow record for every continuous gauge, and even every crest-stage gage, and determine from currently available flood-frequency estimates, the number of floods, if any, at each gage that were less than a 1- or 0.2-percent chance flood (greater than a 100- or 500-year flood). Compiling this information would require a bit of work as this information is not readily available. The peak-flow file for each gage would need to be retrieved, the annual maximum peaks would then need to be ranked, and then the largest peaks would need to be compared to flood-frequency estimates to determine if any of the peaks were less than the 1- or 0.2-percent chance floods.

I am copying our GIS experts in the office (I am not one of them) to let them know about this request from the Geospatial Information & Technology Association and the Iowa Geographic Information Council (hope I said that correctly), in case they may also be able to help provide some information.

I am really swamped with work right now, if the above analysis sounds like something you would be interested in, I will inform my supervisor of this request and we will see what we can do to help meet your request for this information by the end of March (if that was the date you mentioned).

Phone conversation:

David speaks further regarding his email suggestion. They have 150 continuous records gauges and 90 crest stage gauges in place in Iowa this year. One thought would be to screen down to one gauge per county and compute the frequency of floods from peak flow in each file. However, there would be problems with this approach as it would not include counties affected by rainfall in an adjacent county. Thus, this approach would likely result in underestimating.

David also suggest use of flood profile reports. The Corps does high water mark profiling.

Another approach would be to check with the State regarding tracking of disaster declarations by county or with FEMA regarding tracking of damage. Both of these agencies tend to lump disasters together rather than tracking flood events separately. Disaster declaration numbers are for two to four week period with all disasters lumped together.

David pulled up one of his reports online and found data citations from 2005 for Bonnie Shepard at FEMA regarding disaster claims and Dennis Harper at Iowa Homeland Security.

David notes that we would likely introduce some bias into reporting by using past 20 years for forecasting as past 20 years was unusually wet in Iowa. It would be preferable to look at 40 years of data or more.

We agree that the approach suggested in his email is too complicated for this project and would not be likely to give good results. Better to go to Iowa Homeland Security or FEMA for records discussed above.

Jeff Zogg and Jeff Johnson, Davenport NWS   **1/21/2009**
515-270-4501   **Jeff.Zogg@noaa.gov**

Note that Marion Baker, with email bouncing from NWS, is now with the Corps (816) 386-3222 marian.e.baker@usace.army.mil and may be useful from that perspective.

Jeff Johnson regarding Becky Griffis project – he sees this is a project more to get NWS Central Region on the same playing field. It would be good to contact Jim Keeney at NWS Central office in KC to discuss (816) 268-3141.

Storm surveys has historically been done manually. They are trying to move forward with technology.

Parkersburg tornado: the damage survey used GIS. They used Google Earth to identify location of spotters during the warning phase. It is now possible to view warnings graphically. If you look at the radar page, you'll see a grid box which is the extent of the warning area. Communities make siren decisions using this as do Code Red and private sector services. Emergency managers are increasingly using graphic projects.

Regional headquarters know the most about NWS agency process changes.

Prototypes for using Google Earth such as overlay spotter reports, satellite imagery. KLM files used internally, layering tornado watches and spotter reports. Also used for winter storms.

Floods: Jeff was working in the Davenport office during the 2008 flood. He used overlays in Google to show the impact of a broken levee. This was also done in the Des Moines office.

Potential benefits for flood inundation mapping. NWS conducted a national service assessment after the floods. Recurring theme was a desire for inundation mapping. NWS did some projects in Indiana with inundation mapping. The Iowa project with Cappuccio currently has a funding roadblock. The service assessment team is still working. He refers me to Noreen Schwein (816) 268-3147 for an update on the assessment.

NWS is sometimes a consumer of geospatial data but mostly a supplier. Their users are county planning and county emergency response. County emergency management coordinators are NWS main conduit to county agencies.

Storm-based warnings as a method for graphic presentation. Benefits include reduction of the area of false alarm. Grid box is appended to the bottom of the warning. Storm-based warnings project using Google started October 2007. This has also been done on flash flood warnings. Some growing pains, especially with county sirens. Benefit primarily is to the citizen.

Jerry A. Skalak, U. S. Army Corps of Engineer -Rock Island District   2/3/09
Clock Tower Building, P.O. Box 2004 Rock Island, IL 61204-2004
jerry.a.skalak@usace.army.mil Office: 309-794-5605 Cell: 309-912-5153

Included on the call were additional Corps staff representing some component of GIS or imagery efforts: Chad (?), Scott Cool, John Barantz, and Chuck Gertes.

Jerry notes potential for issues with double counting given overlapping efforts with FEMA. Also the Corps boundaries are watershed-based rather than geopolitical and it could be challenging to separate out Iowa from a watershed.

Their office does supporting projects using both in-house and contracted work.

Notes duplication of efforts regarding imagery collection. Corps is tasked with capturing images of the flood at its crest. However USGS and FEMA often appeared to be doing the same.

Jerry offers to provide a list of GIS products developed by their office specific to flood response and recovery. Discussion of the potential for hundreds of iterations of a product as updates were made of levee breaches. It would be complicated to lists the costs and benefits of each iteration, so one possibility would be to create one estimate that includes all relevant iterations. Jerry notes that they have some idea of what was spent on product generation with locally-hired labor.

There is a FEMA joint field office in Des Moines. It has GIS support capabilities. FEMA shares some of this space with the Corps. Jerry will provide contact information for Melissa Smoot, who knows about FEMA products and resources. One interesting project out of FEMA response efforts showed potential costs for damages from pipelines exposed from erosion due to the flood event. Melissa should know about this.

Jerry will also corral a product list with his thinking about costs. Check back with him if nothing arrives after 10 days.

Mary Meade, FEMA   GIU Lead   ***2/11/09***
 502-209-2492 - in JFO 850-890-6511 - external to the JFO Cell 850.890.6511
mary.meade@dhs.gov

Mary was primarily involved in response and recovery in Iowa.

The ESF14 Long Term Recovery Unit did much of the work in Iowa, rebuilding and relocating communities. Dealt with all stakeholders – state and federal entities as well as residents. For example, a farming community in the southern part of the state was completely wiped out. The GIS unit worked as part of a group regarding decisions such as whether to restore levees. Many of these were big picture, big dollar decisions, many of which probably still haven't been made. CDBG grants, FDA funds for business rebuilding.

Post disaster imagery was the most critical data because it shows the potential for where water will go. For example, the southern farming community could have drained more quickly if the levee was blown on the other side of the town.

Other issues include RCRA and Toxic Release Inventory data sets. Analysis from these used to influence future building. Imagery showing the extent of the flooding was used as an overlay.

Twelve teams from ESF14 went to communities for long term recovery work. Within the JFO long term recovery activities there would be connections to many agencies plus the state EMA.

James Lee Witt was the FEMA director 10 to 15 years ago. His company by the same name was pulled in for response and had offices in Urbandale which are likely to still be there.

Mitigation: Noel Thatcher at JFO will know who is still there. GIS activities are winding down. Talk to Melissa Smoot.   Also talk to ESF14 lead at JFO.

Public assistance for infrastructure (for example in Cedar Rapids and Cedar Falls) Talk to PA lead or better, deputy PA at JFO.

Debris collection didn't involve imagery in Iowa although imagery was used for this in Mississippi.

Mary has quantified public assistance savings from GIS. Interactive maps for public assistance were created to show facilities with requests in for repairs. It was taking ½ to

one hour to find points using the FEMA Map Center. Solution was to publish the maps to Arc Reader for more rapid triage. Result was being able to go to a point in 3 minutes vs. 30 minutes. Multiply that by 10,000 project worksheets to get man hours saved. Remaining question from Mary's analysis is appropriate hourly rate, with per diem included. She is guessing at $50/hr average. Verify with PA chief.

Mary wrote up this type of cost savings in a couple of paragraphs into a best practice document. It was also written up as a tutorial for Public Assistance. She will send me a copy and I will provide additional info back for her, such as verification of hourly rates.

There was a big issue of no digital flood maps for 80% of Iowa. They spent $50K to have the Corps georeference scanned tiffs of flood maps. Discovered that insurance companies have flood maps for the entire nation digitized but it would be very costly to purchase them through insurance companies.

Used maps for estimates of savings for elevated and relocated homes. Rules kick in at greater than 40% damage. This feeds into success stories for the next event, savings to taxpayers. Helps mitigation to see clusters for focusing mitigation funds. Do we need to redo flood maps, reinforce levees? How to protect property from being flooded again?

Mary notes that funding centralized GIS services for Iowa might come from DHS dollars for agricultural security.

There was a Corps flyover that never got processed as this would cost several $100K and no one could figure out how to use the data. It was difficult to get justification to spend the dollars for processing. The area covered was in the SE corner of the state. NGA asked Mary for ideas on how this imagery could be used for emergency response. One suggestion was for looking at crop yields before and after the flood.

Mary notes that Missouri chose not to have GIS in its JFO for the same flood event. Would be useful to study the differences in analysis capability if information available.

Noreen Schwein, NWS Region VII Central Office   **1/21/09**
(816) 268-3147

The team is to present info on service assessment Feb. 10. Report to be finalized after that. I can call her back after Feb. 10 to see what happened but she does not expect a lot of GIS detail will be included.

She refers me to Wendy Pearson at Region VII NWS (816) 268-3122 for more information about inundation mapping. Or Chris Lander, at Region VII who has more technical expertise with inundation mapping. Wendy is involved in

societal response and in response with existing products vs. inundation maps for the June 2008 flood.

Paul Rooney (Referred to us by Milo)   2/10/09
FEMA - Risk Analysis Division Department of Homeland Security
paul.rooney@dhs.gov Office 617-832-4719 Mobile 617-312-5976

Recommends we look for the Planning Section Chief in Iowa JFO, who would be in charge of managing data.
Also Mitigation Section and Bob Franke at Region VII
Response Recovery Permanent Staff in Region VII
Public Assistance or Individual Assistance sent out field staff, either from JFO or Region VII
Jon Perry, is national FEMA staff who coordinates remote sensing and is interested in cost justification (202) 646-2817.
Also Phil Enriques, Branch Chief for Geospatial Ops Group

Rick Burgess, FEMA Region IV, HAZUS Education and Outreach 1/21/09
Atlanta ofc 770-220-5575   Rick.Burgess@dhs.gov

He wants to communicate to private sector planners regarding risk. Use HAZUS to improve scores on community rating system for flood insurance. Region IV, VI and VIII are very active with HAZUS.

Florida – essential facilities were rebuilt as a result of HAZUS runs. Long term costs vs. costs of moving elsewhere for rebuild. Lee County looking at property damage estimates led them to grant funding. They would have received no public assistance using the previous software.

Regarding need to know Iowa benefits, use open records from the state. Ask the state rather than FEMA, which has privacy issues. He is unclear whether we are looking for individual or public assistance metrics. In the range of Preparedness, Mitigation, Response/Recovery he thinks we are looking at Mitigation category.

Rick wants me to be trained in HAZUS. He suggests I join a Local Mitigation Strategy Committee convened by a local government. They would approve me for field delivery in a joint field office of a course in HAZUS. Also presented at the National Hurricane Conference upcoming in Austin or the National Floodplain Manager Association conference. Kevin Mickey is the premier

HAZUS instructor. I could also join HAZUS User Group in my region or another.

County level benefits: rebuilding publicly owned structures (finance) and individual properties (county development/planners). Accounting glues these groups together. HAZUS breaks down financial exposure at the Census block level. Updating (replacing) data makes block estimates more accurate. Just keeping analysis at the block level would be fine for analysis, the numbers are good.

Only three regions out of 11 use HAZUS much—IV (Atlanta), VIII (Denver) and VI (California). $20M invested in HAZUS without a huge number of users.

***Russell Colon, FEMA Public Assistance Coordinator   3/2/09
Urbandale JFO, Building G   (540) 270-1047***

I was referred to him by Dennis Harper of Iowa Homeland Security. Russell has developed and used risk maps related to rural water and electric coops based on the 2008 Iowa flood. Russell points out that Andy Mitzel of the Corps did the science for this application.

They have used this modeling to locate areas of erosion down cutting over gas mains in Texas. For Iowa, have mapped 40% of the state's rural water distribution system and used it to locate potential problems such as exposed water mains. There are 16,000 points in the Iowa database. Goal of the tool is to help utilities find problems by highlighting vulnerabilities in the distribution system. This analysis can be used for planning redundancy. On the power side, it can be used to find exposed conductors.

Cedar Falls Utilities will be the first Iowa site to have analysis for water, power, gas and communications. The tool found a vulnerable 36" water main, which would impact eight rural counties plus the City of Des Moines. For Southern Iowa Rural Utilities, tool found $1M of work needed when utility had estimated it at $100K.   They have 40,000 miles of pipe and obviously can't walk all of it. The tool saves time and provides a different perspective in looking at utility assets. This work is eligible for Federal funding under Presidential directive to protect critical infrastructure. Regarding flood damage, utilities have until April 15 deadline to provide list of damages.

Russell also has an idea for first responders to tap in to weather signal boxes on traffic signal boxes to get data downloads via twisted pair.

Contacts using the tool:

Rathburn Rural Water 6800 miles pipe   Rod Glosser, Chief Financial Officer (641) 647-2416

Page One Regional Water District (Southwest Regional Water) (800) 579-8068 Kevin Gowing

Sharaton Valley Electric Coop Vicki Daley (641) 932-7126

Central Iowa Water Mike Wilding (641) 792-7011

S. Iowa Rural Water Dan McIntosh (641) 782-5744

Contact for GIS in JFO is Derrick Duncan from Penn State (412) 651-5509

For individual assistance field contact, speak with James Yost?

Have Jim Giglierano make a request from the state to FEMA Public Information Officer Russ Edmonson (540) 597-4635.

4/15/09

Everybody got extensions on their April 15 deadline for damage assessments. Thus they seem more relaxed about time.

Wapelo had a 15% hit rate on use of the erosion tool for potential damages – that is, 15% of crossings identified by the model had actual damage.

$150K work added this week to Southern Iowa, all attributable to the model.

Rathburn is now going back out and looking for damage, given changes made to the model. They didn't realize loss of cover would make them eligible to relocate pipe. They have one project worth $200K to $300K.

Sheraton Valley found exposed power lines in five areas. Alternate contact is John Miles, General Manager, cell phone (641) 455-8130.

Des Moines Water Works found a 30" case iron main with 50 foot of river bank exposure. Worse yet, it was pointing directly to the Dico superfund site. If the pipe had broken, it would have cut off water to over 400,000 people. Breakage would likely have spread tricholoroethane contamination from the site. Discover this potential was a very wild moment. It took less than $300K to fix the pipe. Russell considers it a 20% probability that the pipe would have broken over the next 5 years and a conservative estimate of remediation cost would be $50M. Also the existing flood control berm would have been eroded.

Russell counted approximately 23 project attributable to modeling, but this is underestimated because as a result of these discoveries, utilities are now looking more seriously for damage.   For example, Central Iowa will leave $1M on the table if they don't go looking for damage. The model says 2400 out of 12,000 crossings should be looked at.

Best overall estimate for projects would be the model adding $5M out of $30M current total.

6/25/09

I called with query about how many utilities could potentially use the erosion modeling tool. Water utilities are: Zenia, Des Moines Water Works, Polashek, Wapelo, Central Iowa, Rathburn, Page One and Southern Iowa Rural Water. There is also Sharaton Rural Electric.

They have completed writing grants now.

Wapelo identified $700K work of washout damage, as contrasted to the $69K annual budget. S. Iowa has 145 projects totaling $2.4M Des Moines identified a potential 30 inch main break that could have affected water to 400,000 people in 8 to 9 counties. Polashek has 10 small projects, each under $60,900.

Uses of the erosion tool for planning: can be used to identify places at risk and to rank projects regarding application for Federal grants. Could be used for risk planning, identifying areas where installations need to be strengthened. State 404 Block Grants are competitive process. A utility could apply for mitigation measures to prevent future damage.

Sue Evers, FEMA Region VII HAZUS Point of Contact   1/30/09
816-283-7005   Sue.evers@dhs.gov

Sue refers me to http://www.usehazus.com/docs/hugss_12_region_vii.pdf for a success story about Shane Hubbard making HAZUS runs for Johnson County during the flood.

She will look for FEMA people for me to contact regarding benefits to FEMA from Iowa counties providing GIS analysis. She recommends Warren Welch from FEMA Region VII. She thinks that Mary Meade, recommended by Jon Paoli, is a Disaster Assistance contractor to FEMA.
Linda Siebert of Saline County, KS made HAZUS runs similar to those done by Shane Hubbard.
She recommends Jim Wakeman, State Hazard Mitigation Officer at Iowa Emergency Management, or Susan Dickson, Long Term Recovery Coordinator.

Upcoming events in our area: Ks. Dam Safety Conference in Lawrence, Feb. 9 – 11, at Holidome and Town Hall Meeting on KC Metro Earthquake Risk in Platt County, MO on Feb. 19.

Toby Rice   FEMA Community Relations Manager, Johnson County 2/20/09
703-346-2454   Toby.Rice@dhs.gov

Toby was in charge of a team of eight people conducting door to door outreach. HAZUS output helped them prioritize their efforts. They meet with community leaders and do door to door effort. Toby believes that he might be the only field person seeking the level of detail provided by HAZUS. Ordinarily, they do not take a technical approach.

Helping prioritize activities: they went immediately to places with flood damage. Output was accurate. They knew if properties were commercial, residential, agricultural. Without the output, low tech way would be to have the county emergency manager highlight areas of damage. This way, their first wave was to go to homes known to be damaged.

HAZUS was very appropriate to this type of flood.

Toby says that having this data may not save time for his team? But they do reach the people affected sooner and the data increases the team's confidence.

More details on what they do: there is a 50 day window to apply after a Presidential Declaration. The real benefit to applying sooner is in ramping up the customer benefits via the Disaster Recovery Center. Possibly this results in a higher percentage of people applying. Toby's staff is able to catch false steps sooner. Community Relations is not in the field for the long term – they are on a very urgent mission.

2/23/09

Recap of Friday's conversation. Toby is a disaster assistance employee. He was a manager in Johnson County for two months. Their mission is to reach out to individuals (homeowners and businesses) with eligible damage. They want to make sure these people can access all parts of the Federal program. They will talk to HR at major employers, churches, whatever it takes.

HAZUS is very effective in forecasting and pinpointing citizens with damage. However, Johnson County making this use of it is not SOP nationwide at this time.

Toby's team was there for 1 – 2 weeks before flooded homes were accessible. This was an unusual situation as a group had been deployed earlier for tornado response and thus was already geared up. HAZUS output was available not long after the water peaked.

Without HAZUS output, they would have gone to the county emergency manager and had him show areas affected with a highlighter. Having the HAZUS output helped them provide better customer service. Community Relations goal is to get people registered for disaster assistance funds. More time means more follow-up.

How would they get names, addresses and phone numbers without the HAZUS output? Typically, 10% to 50% of affected citizens report initial damages regarding a declaration of disaster. Preliminary damage assessment would result in some of this data. They would sit down with the fire chief for highlighting of affected areas. For Johnson County, at two months out they had 1600 registrations. The emergency manager guessed 3000 buildings were

damaged. HAZUS predicted 1500 buildings damaged, which appears to be more accurate and to show that they got very high registration for Johnson County.

600 FEMA staff did Community Relations work for the Iowa flood. There were also staff doing Hazard Mitigation and upper management in this group were using maps. FEMA External Affairs might also be helpful. What we are looking for is Disaster Assistance employees.

Toby estimates that use of HAZUS doubled their efficiency in finding damaged property. **Saved 8 person team X 6 days X 12 hours = 576 hours.**

They would not know the number of affected households to expect without HAZUS, which gave them a metric to aim for. They targeted HAZUS areas for footwork.

FEMA departments with boots on the ground: 1) preliminary damage assessment; 2) Community Relations; 3) Public assistance

Also look at SBA loans for rebuilding businesses, individuals and households, other needs assistance.

Utilities

Dan McIntosh   Southern Iowa Rural Water   3/6/09
(641) 782-5744

Using output from Russell Colon to spot every low point in their pipe system. Without this tool they would have to drive down the road to look at the entire run of pipe. The tool provides them with a starting point and saves time in field examination.   Also gives them something for checks and balance.

They have 3000 miles of pipe. Seeing all of this is difficult and means they would need to drive slower without guidance from the output. They would still need to drive the entire 3000 miles because the land in S. Iowa is rough and there is lots of water. Three to four creeks run through every mile of their pipe.

Their procedure is to check pipe while reading meters. They have hired one person just to check their bigger and more critical lines. Dan will check with this fellow when he is in on Monday or Tuesday to see how much time the tool is saving him. Dan to get back to me with time saving estimate.

John Miles, General Manager, Chariton Valley Electric Coop   4/23/09
Brian Stilley, Operations Manager
(641) 932-7126   bstilley@cvrec.com

Working with the erosion tool has helped them in the general areas of safety and reliability.   They found eight visible washouts based on modeling results and others may be found using locates. Having the modeling output reduced their field effort as they could look at the map and see where to investigate further.

Risk reduction to animals: two washouts were near cattle crossing. Potential for damage varies considerably by protection device, weather, soil conditions.

Potential for damage to cable reduce and faults easier to locate over as much as a three mile stretch. Estimate time to locate a fault reduced from 8 – 10 hours to 3 hours using the tool. 12 fault locates X 6 hours saved/fault X $250/hour for 4 linemen and 2 trucks = $18000 saved in time to locate faults.

Outages would be reduced as a result of finding problems quicker. Some areas don't have backfeed available. Loss of revenue estimated at $5000 - $8000 per incident. ***What is a likely number of incidents? Additional cost of repairs vs. finding and fixing before outage occurred?***

Human life issues. There were kids playing at the crossing where 7000 volts was found exposed.

Mike Wilding, Central Iowa Water   ***3/2/09***
(641) 792-7011

Use of the FEMA erodability tool has opened their eyes to the scope of potential damage, caused them to think about problems they would not have considered. They didn't get maps from Russell until midDecember. By then, snow was on the ground, making pipes difficult to inspect. They've only been able to get out to the field in the past couple of weeks. Just starting to field check the predictions.

Three or four pipes they identified with damage were all identified on FEMA predictions. April 15 deadline for damage estimates is coming up fast. Mike has a request in to Jim Burg of Iowa Emergency Management to extend the deadline by a few months.

They are in 18 counties. The FEMA model identified over 12,000 pipe crossings for them. These are color coded with red showing the greatest potential for damage. They will focus on the red-coded areas. This gives them a tool to know where to start. They have 4500 miles of pipe and 12,000 customers. Without the tool, they would just have their service techs watch for damage.

Southern Iowa is much further along in use of the tool and damage estimation, due to milder winter.

4/14/09

Called him for an update. They have found 12 or so problem areas that were identified by the FEMA tool. However, they have not found a ton of issues with eroded pipes. They did not have as many problems as further south due to differences in terrain. Out of 12,000 crossings, only 1000 or so could be considered large, significant crossings. They have not dedicated staff to inspecting for erosion as SRWA has done and thus have not saved time through using the tool. They do not expect to have significant damage claims filed for pipe erosion.

Nate Pollock, GIS Analyst, Alliant Energy   ***10/24/08***
NatePollock@alliantenergy.com (319) 551-6754

Before the flood, they looked for information regarding risk. Where would a person even go to find this? Floodplain data would have been perfect. There next thought was to use elevation points near the river as they related to the location of substations. This data is some of what was missing before the flood.

After the flood, they got Lynn County floodplain data from the city. Downstream community data was more difficult to locate. They have lots of rural area in their service territory. Getting 100 and 500 year floodplain boundaries to overlay facilities from the city was helpful.

Issue was how to reroute power: 1) for safety and 2) for service restoration.

Later they got data from county FEMA regarding flood extent. They determined what areas could be affected by water. Utility staff could look at maps and determine where to focus their field assessment efforts. They created databases

of safe/unsafe houses, used to identify which customers could safely have power restored.

The city shared information with the utility but it was not a two-way share. City was in the driver's seat regarding communication to the public. There were three major events in 18 months, two ice storms and the flood, all resulting in widespread outages.

Questions for GIS to answer: What circuits are out? How do we restore that? How do we get a sense of our progress? They had systems in place that helped but in the case of the flood, had trouble with the systems themselves. Buildings housing equipment were part of the flood and business processes were interrupted while equipment was relocated.

Alliant has outage management software. Pollock worked in the middle of the flood operations. For the flood, so much power was out over such a wide area that they couldn't rely on the outage management system. A small group managed the restoration.

Cedar Rapids population is approximately 100,000, resulting in a large outage in the city. They made big area maps for use by outage management to give them a sense of what was going on, what was out and what was getting restored. They printed information to give to people in the field. They might have information on laptops but they were still using printed maps. Staff needed to see how lines were connected. They needed a way to draw on paper in the field what work had been done. They did batch updates of this information to the GIS.

What would they have done without GIS? People would have been trying to pull information out of their heads. They needed a diagram all on the same page that everyone could look at for group discussion of problem solving.

How much extra time and money to restore the system without GIS? How much cost for doing the wrong thing in attempt to restore power?

Page One Regional Water, (Southwest Regional Water), Kevin Gowing   3/4/09 (800) 579-8068

Referred by Russell Colon regarding use of erosion potential modeling tool.

Output from the model has provided them with a good guide for field staff to check pipe for damage. It will take them 4-5 more months to assess all the pipe with potential damage. He sees it as a proactive tool that helps them manage this project.

Output from the model is in file format. Using it is like working with a meter read list. Without this file they would have highlighted their list and made guesses without good engineering data. They would have had to go to more locations to assess damage.

They have 900 miles of line with 2.5 crossings/mile = 2500 potential sites. The model output gives 490 potential sites. They assessed problems without model output last July and August and discovered they can check 6 – 8 crossings/hour. The model saved them from checking 1800 crossings / 7 crossings/hour = 257 hours. Staff time at $12/hour + 30% fringe = $4009 staff time saved. Also saved vehicle miles, approximately ¾ of their 900 miles of pipe = 675 miles saved at 58.5 cents/mile = $395 travel saved. Total saved is $4404.

Kevin notes that they core sampled three major sites, hiring and engineering firm to drill down 60 foot to rock. They had a contractor pull new pipe through shale under the river bed so these critical pipes won't ever again have this erosion problem.

Rathburn Rural Water, Rod Glosser, CFO   ***3/2/09***
(641) 647-2416

They didn't originally find a high correlation between modeling output and known damages. They haven't been able to verify predictions yet due to winter weather. They will send construction crews out to check once feasible. Tyler Jacobson handles the tool at their end and has plans to tweak it to make more useable. FEMA had emphasis on size of pipe, which appeared to have skewed the data.

Ruthburn Rural Water, Tyler Jacobson, GIS

Some sites coincided with model predictions but others didn't. His sense is that a lot of potential inputs to the model were not used. The ranges for k factor, c factor, slope coefficient appear to be so wide that these inputs to the formulas were reduced to zero. The result is that the model is only looking at pipe diameter, which is not a modeling effort but a simple GIS query. Pipe diameter

is the only coefficient used, no erodability factor or land cover. Tyler appears to be an experienced modeler.

Consulting and Private Organizations

Curt Manatt, Manatt's Concrete and Asphalt, Johnston   ***1/29/09***
515-278-0247

Manatt's has a concrete batch plant across the street from Dave Croll's office in Johnston. They benefited from Dave's modeling of flood contours as well as Dave's contact with the Corps to predict flood heights.

As a result of the predictions made, they were able to sandbag their property correctly and prevented their office from flooding. Without sandbags, Curt estimates they would have had 3 ½ foot of water in their office, which would have resulted in it having to be gutted and rebuilt. The office sits on lower ground than their shop or concrete plant operations and Curt knows that it flooded in 1993 and had to be gutted. This is their main office and their only office for the Des Moines operation so they were quite focused on saving the building. In addition to well over $100,000 of damage, they would have had the downtime of moving equipment, looking for office space to rent, setting up temporary operations. Curt estimates that a gut and rebuild process would have taken at least two to three months.

Even with sandbagging, their shop got 6 inches of water, as did the concrete plant operations. However, this did not result in significant damage or in loss of sales. Even though they shut down plant operations for a time, they have other plants in the area and were able to shift operations to other locations.

Curt notes that without modeling, they might have given up on sandbagging, as they wouldn't have felt confident in their efforts. This location was one of a few concrete plant locations in the state where it was possible to save something. Others were not so fortunate.

Phil Larson, Shive Hattery, Iowa City   ***3/12/09***
(319) 354-3040

Shive Hattery prepared flood maps for Iowa City in 1995 using HEC RAS. For the 2008 modeling effort, they inserted coffer dam into the 95 data and modeled

its effect on upstream flows. They also went out to the field to correlate field conditions with model output (which turned out to be accurate). There was lots of confusion from their client regarding flow and elevation data. Cost of the modeling and survey work was $46,000.

The University also hired MMS, a local surveying company, to do survey work related to flood predictions. This firm developed the FERP, Flood Emergency Response Plan, for the University several years back. It was very successful for a 100-year flood but unfortunately, no one planned for a 500-year flood.

There were many logistics issues. Lots of bridges were closed. Crews on each side of the river were isolated from each other. Other crews working include: Coralville City crews, also taking elevations, Dan Holderness (319) 248-1720; Iowa City crews, Ron Knocke.

Shive Hattery collected all the survey data from these four sources by data and time and correlated it. Phil estimates that survey crews from the four entities worked for two weeks straight with over time billing at least $100/hour.

What is needed is in interactive program where anyone can log on to the Internet and input a location and flow and get a result. He notes that lots of people don't know the elevation of their house. Centralizing the live modeling effort would be very useful – sounds like the flood inundation mapping project headed by Cappucchio.

From the position of emergency response, there were lots of bridges closed. Even I80 through the state was closed. Iowa City and Cedar Rapids normally are separated by only 22 miles. Losing a critical bridge made for a 180 mile commute.

How did COG collect road outage data for its Web display? Probably source of info was twice daily phone calls including the sheriff's department and DO staff who were at critical bridges calling in which bridges were flooded.

Try Julie Tallman, City Housing Services, for info on individual assistance funds received. Or Rick Fosse, Public Works Director.

Phil knows from his own experience that Iowa individual assistance funds came really quickly. He had a FEMA check five days after inspection. Some people

got their check in even less time. City cleanup effort also went very well, heroic even. City did a good job of providing sandbags before the flood.

Scott Mattes, Geospatial Group Leader, Howard R. Green Company   10/24/08
smattes@hrgreen.com   515-278-2913

Also participating were Anne Packard and Pete Lovell (who worked with the Cedar Rapids flood effort).

They were asked by the City of Cedar Rapids to go into public buildings impacted by the Cedar Rapids flood and identify potential hazards. They gathered parcel data and LiDAR elevation data to help determine the extent of flooding. What public buildings were impacted? They created mobile GIS forms for staff to take on PDAs for onsite assessments. This was input to the desktop to create quick turnaround reports.

The city requested a shift in focus to analysis of parks. They started out piecemeal on four to six parks. Then they proceeded to the library, police and fire station. They ended up doing assessments of 12 to 14 buildings but only the parks data was brought back to the desktop. They took environmental samples—surface and groundwater contamination, mold, lead-based paint, carbon monoxide measurements , percent oxygen.

Database included building number, street, description of building, power/water off, LEL (lower explosive limit) reads, carbon monoxide, oxygen and hydrogen sulfide levels, plus recorded organic vapor readings from a PID. Also gas samples and pictures of the site. The form was used to record physical observations inside and outside buildings. One record for each observation and one map for each park, linked to the GIS database.

The client for this effort was the city.   The city came to Green on 6/18/2008 for mobilization the next morning. But the contract didn't get signed until 6/20/2008. It would be nice if they'd had this already in place as a contracted solution ready to go. Green was able to do a fast turnaround out of a mobile truck. They idea was to have real-time reports for decision makers. The client decided it didn't need that level of turnaround. They could process data immediately after inspections so decisions could be made about what contractors were needed, what hazards were involved, how to clear a facility and what personal protection equipment was needed. Scott notes this approach was similar to how emergency responders cleared the Pentagon for reoccupancy following 9/11.

Challenges: Big setback because Qwest went down for all of Eastern Iowa. They didn't get online for a number of hours as their internet connection was unavailable. They couldn't transmit data or connect to GIS servers. City servers were down which made data access difficult. If there had been a redundant system hosted at a totally different location than city offices, this would have provided substantial improvement.

Anne: Consider the county data repository hosted in Marshall County. It would probably accept city data as well as county data. This repository provides for multiple security levels including emergency response only. Only seven to nine counties have any information on the site and only one county has public download capability. But the tools for this type of data storage are in place. It was specifically designed for emergency response as it can be difficult for one county to get adjacent county's data.

Scott could run an accounting report to get dollars billed to the GIS effort for flood response. Maybe 120 hours? Lots of front-end hours were invested.

Benefits: Protecting human health, city assets, generating revenue (city revenue from being able to open the softball fields), health of personnel dealing with structures, avoidance of physical hazards like stepping on nails, hazards from rodents, fuel spilled on surface, friable asbestos exposure. There were nasties found in the soil from chemicals in the silt that settled out after flooding. They characterized hot spots on maps and targeted these for removal and cleanup efforts.

More accurate information results in more accurate reports results in more accurate FEMA requests.

Leann Harder in Story County has done a lot of work doing emergency response reporting to FEMA. She knows what FEMA wants to see.

Who benefited from the mapping effort? Users of the softball field and park, people who needed fire and police service, cleanup employees' health was protected, environmental preservation by only throwing away necessary waste. Tax dollars were used wisely through targeting of cleanup efforts.

City having a plan to do work helps to calm the community. This is worth something from a political standpoint. Some reports of scams trying to gouge people as opposed to taking a practical scientific approach. Modeling – where should you locate server resources? Not in a flood area or be prepared to move them.

Anne: That's supposed to be done. Cities and counties have disaster plans.

Rick Havel from Johnson County and Jason Siebrecht from Lynn County made a presentation at E. Iowa conference.

It would be good for me to talk to the city administrator for Cedar Rapids.
Howard R. Green Company recognizes the value of GIS. HRG chose to use GIS to streamline field data collection efforts and to help promote a more professional, timely deliverable.

Howard R. Green had 10 to 15 direct responders doing some analysis and some cleanup. They were mostly engaged in triage of facilities. Later, members of the HRG team provided the City with remediation consultation.

GIS added accuracy and efficiency for:
1) health and safety, especially for cleanup
2) restoration of public services
3) prioritization and time and money

Without GIS, they would have walked in with paper. With GIS, they were able to record instantaneously with aerial photo backdrops providing context. Using paper forms, you'd retype everything. There would be not evaluation or standardization. The process would have taken days rather than minutes. GIS produced improved professionalism and quality. They could have had ranking/triage for buildings looked at. Importance of having facilities ranked before a disaster – Tier 1, Tier 2, etc. They had never done flood recovery of that magnitude before. ***LeAnn Harder might have solid numbers on time savings as she recently migrated from paper to GIS.***

Mobile GIS time savings = two to three days to process without GIS vs. one day with GIS. The larger the project, the greater the efficiency, the bigger the savings. Exponential relationship regarding time saved? They only do the initial setup once.

Anne: City of Iowa City and Coralville and University of Iowa would be good to speak with.

Mattes and Lovell query regarding GITA abstract.

Will Zang, URS—Kansas City (moving to FEMA Region VII shortly)
(913) 344-1066   3/11/09

They created new flood elevations for 100-year flood for 16 counties in Iowa affected by flooding but having old flood maps or no maps. They used available topo data from USGS or new LiDAR (in the case of 3 counties where this was available). Calculated new stream discharges to give new water surface elevations.

This effort was done post-disaster to help with mitigation. BFE was needed for mitigation applications. Work effort was completed in 60 days, with total project length of 4 months. Delivered the maps in October. Who paid for it? National Disaster Declaration opened up funds for hazard mitigation grants. Funded through FEMA, Bob Franke as coordinator. Without maps, for every structure potential buyout would need BFE certified either through contract with Corps or go through FEMA determination process. Ask Bob Franke or State Hazard Mitigation Officer about number of buildings affected.

Counties or State would be preparing applications. Data created was used to flood recovery maps. Cites special project for Mahaska County showing effects of two- to 500-year floods. Note FEMA RISK MAP initiative. Map modernization program expires in 2010. New program addresses how to use updated maps to analyze, mitigate risk? Will more include modeling like HAZUS as well as financial analysis.