2002 Tornado Indy: Damage Tracking on the Fly

Dave Mockert and A. Layne Young

Abstract

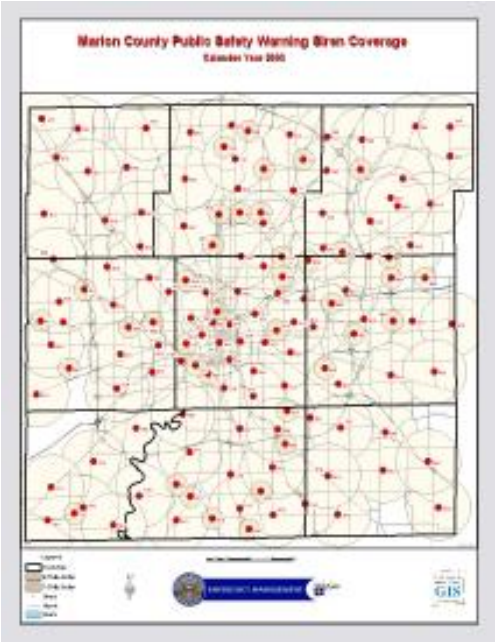
Did you ever wonder who does all the detail work for catastrophic event? On September 20th, 2002, a powerful storm ripped through several counties in Indiana resulting in a FEMA declaration. We took a close look at who does what. Due to our participation in disaster planning we were able to respond to many local, state, and federal (including the public) requests for information--first, because we knew who had the information, and second, because they knew what we could do. Essentially, we used our standard GIS tools to create a very flexible and functional damage tracking system.

Background:

On September 20th, at roughly 1:30 P.M. an F3 tornado ripped through the south and east side of Marion County, causing incredible damage to the Cities of Indianapolis, Beech Grove, and Lawrence. It was a miracle that no one was killed or critically injured. The devastation was immense. Immediately, the Emergency Operations Center (EOC) was activated and resources from Public Safety, Public Works, and building inspectors from the Department Metropolitan Development were called to manage the local response to the tornado. The objectives were to secure the area, provide emergency assistance, begin clean-up activities and get a federal disaster declaration.

Introduction:

What is the role of GIS during a disaster event? Traditionally, public safety and public works folks use GIS services for emergency planning, **prior** to the storm (i.e. coverage of warning sirens, planning evacuation routes, location of vulnerable facilities and etc.) GIS analysis services are used **after** the event to convey the impact of the damaged area. Usually, there are a number of GIS tools available for responding staff to use for making maps during an event. But…you seldom see GIS personnel on call for a local emergency. Could there be a benefit?



GIS Staff Working the September 20 Storm Event

The local emergency management services (EMS) agency declared a state of emergency and activated the EOC. The EMS director has a big task in orchestrating a very complex recovery effort. *(It is because of the September 11 tragedy in New York that GIS has been included in a number of emergency management planning meetings for local, state and federal response prior to this event. GIS got to know about the workflow of first responders and other departments and agencies got to know what GIS was capable of doing.)* The GIS Team and EOC have a comfortable relationship.

However, since GIS never worked an actual disaster there was some confusion about the role. So…we sat with maps in hand and a network full of GIS data at the ready and observed.

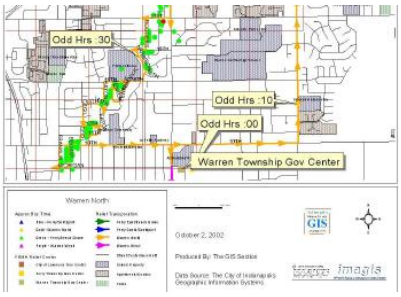
The GIS Team Provides Value

Identifying Unsafe Buildings – Building inspectors combed the ravaged area and assessed each building recording findings on paper, which was entered in an MS Excel spreadsheet, then geocoded and cross-referenced with the property database. Address clean-up was quite a chore because many buildings were destroyed so addresses were approximated.

Getting FEMA Declaration – A documented (loosely) damage estimate is needed in order for the state to request emergency assistance from the federal government. The GIS Team assisted in compiling the data from all the local jurisdictions involved. It was easy to identify the path of the storm and determine the damaged areas potentially missing from the report.

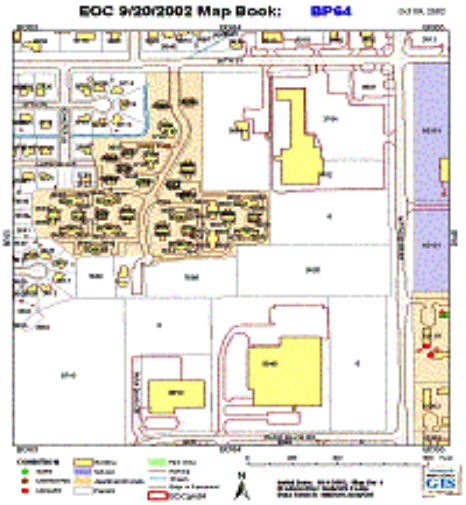
Aerial Photography – Many of the PC's located in the EOC were low-end machines. We were able to assist some of the public safety

command staff in the EOC by providing aerial photography of 'hot spots' from our GIS laptops.



Multi-Agency Support – The GIS Team provided the captured data in a number of formats; as graphics for providing maps to the media and GIS data in various projections for FEMA, the State of Indiana and others.

Custom Mapping – The GIS Team working with IndyGo (public transportation provider) and FEMA produced a series of maps in which a special shuttle bus was routed through the damaged area to provide victims transportation to the FEMA Disaster Relief Centers.



Victim Assistance – The GIS Team was able to produce a number of map books of the area for relief organizations (i.e. FEMA, Red Cross, volunteer groups, neighborhood organizations and others.) This enabled organizers to deploy resources to a specific location without being knowledgeable of Indianapolis.

Grid Map ID: BP64

43	10101 E 38th St	SCHOOL	ROOF/BUSES/CARS	MAJOR	1,000,000	SAFE
49	10003 JOHN MARSHALL DR N	APT-MULTI/SFR	40% DEMOLISHED	MAJOR	$400,000	UNSAFI
50	10017 JOHN MARSHALL DR N	APT-MULTI/SFR	WINDOWS	MINOR	$10,000	SAFE
51	10035 JOHN MARSHALL DR N	APT-MULTI/SFR	20% DEMOLISHED	MINOR	$400,000	SAFE
52	10039 JOHN MARSHALL DR N	APT-MULTI/SFR	75% DEMOLISHED	DESTROY	$900,000	UNSAFI

Public Curiosity – The GIS Team took the data collected and added it to the GIS web site General Data Viewer as a map series so government officials/staff could refer people to that site in lieu of filling map requests.

Post Storm Thoughts:

Post Storm Aerial Photography – It was concluded that a simple flight of the tornado affected area would have been beneficial to many for interpreting the damage, especially for tree cover.The cost of having a company under contract for such a service is minimal compared to the benefit.

Private Data Sets – It would have been nice to have the utility data sets (power, gas, water, sewer, cable, telephone and etc) together in a command center format for managing cleanup efforts.

EMS Authority – Not all of the data was collected in a timely manor.It should be negotiated that emergency data collected should also fall under the control of the EMS commander.

GIS Team preparedness – As a result of this event, the GIS Team has acquired two Dell laptops that contain all of the enterprise GIS data, a CD and DVD writer for providing data to others, an additional bay hard drive with a complete set of data to give another staff member (with a dell laptop), wireless LAN support, complete Arc3x, Arc8x and Arc Pad installations. Staff is now more aware that if an emergency occurs they may be called in to assist. Memorandums of Understanding have been put in place with several GIS firms around the county, so in the event the plotters and network become unavailable; a map office can be quickly configured

at these locations. Agreements are in place with various utility companies that in the event of an emergency, the utility data would be made available for the EOC.

Conclusions:

Many of the functions used to support this storm effort came from good data and ESRI products out of the box. There are a number of good GIS event tracking systems but nothing beats common sense, a good GIS tool and a clear mission. The same strategy can be used for similar events (e.g. natural disaster, bio-terrorism, SWAT event, hazmat incident and etc.)

All GIS agencies and organizations should be 'plugged in' to emergency services plans in their area. These plans often can be located on a local government website. The role an agency plays is dependent on the resources and expertise of the agency providing emergency service coordination. Many organizations do not know the full benefits of GIS in these situations. It is up to us to get more involved. Typically, a document exists that identifies the various emergency support functions (ESF) that constitute a declared emergency. By reading the document you can become aware of the geographic services that are needed and then assist as needed.

Acknowledgements:

Mockert, Dave, 'Homeland Security Preparation Aids Tornado Emergency Response', GeoWorld April 2003

Author Information:

Dave Mockert
GIS Administrator
(317) 327-4663
dmockert@indygov.org

A. Layne Young
Sr. GIS Analyst
(317) 327-7079
lyoung@indygov.org

IndyGIS
200 E Washington St, Suite 2441
Indianapolis, IN 46204

GeoSpatial Information Services

IndyGIS

Indianapolis/Marion County

www.indygov.org/gis