

BEST PRACTICES FOR NATURAL HAZARD EVENTS

PRE-EVENT	
Set up map templates before the event	Customize map templates based on event type; make sure proper map notations and data layers are part of the template. Have base maps (templates) with the commonly used layers already created saves time and leaves mainly creating/editing event-specific data.
Organize your data and project files	Create a data and filing structure for the event that is easy to understand and use as different staff members will used for 24/7 shifts.
Distribute necessary information	Distribute necessary information using multiple methods so it is available from multiple sources should some not be available during/after an event. Have maps preprinted and ready in advance.
Assess if you need formal agreements with other entities for GIS assistance	Some entities may require formal agreements for GIS data sharing or support whether it's between states, municipalities, or regional governments, efforts should be made prior to events.
Create a GIS "call list" to staff the event	Whether at the local level or state level GIS call lists are important to be established prior to events and reviewed on quarterly bases or as relevant. If possible coordinate with the State GeoLab in the State EOC or through the CT GIS Listserv.
Have the most current data layers available	In advance of pending storms or season, GIS staff should review their key data layers to determine if any updates may have occurred, especially if using mapservice links. When possible, have metadata easily accessible.
Automate data collection process as much as possible	During non-event times review and assess where processes or steps can be automated; reach out to others in the GIS community for tricks and tips.
Identify residents on well water or other groups with special life-safety needs	This type of analysis should be conducted during non-event times and the resulting data layer be incorporated into map templates. Identify other similar unique situations or concerns that should be addressed prior to events.
Make GIS staff part of the EOC	Reach out to EOC managers, Chief of Police or Fire, social services, etc. and ask to participate in pre-planning activities or exercises. Reach out NOW.
Using National Hurricane Sea, Lake and Overland Surges from Hurricanes (SLOSH) data to	In addition, when possible after a surge event, record and identify inundated areas in order to compare the SLOSH or flood data to actual events.

anticipate flooding scenarios	
Fully-functional GIS network in case of loss of Internet	As the two storm events showed, utility lines and communications lines can seriously effect internet connections and GIS staff needs to anticipate this loss and plan ahead to ensure key data sets are stored locally.

DURING EVENT	
Track and display citizen request calls by category type	If time allows, track downed tree, power lines, traffic light outages, etc.
Provide town maps to utility workers	Basic town maps are highly valuable, especially out of state workers. Add any unique data such as downed trees, power lines, traffic light outages, etc.
Mapping incidents in the field	Explore the use of mobile device applications that record and send X Y coordinates of problems spots back to the EOC/GIS staff. Explore training key field staff.
Create and manage evacuation and sheltering options.	While shelter and evacuation routes may change depending on the type of event, working with emergency management personnel ahead of time and at least identify main routes will save time during an event.
Inter-departmental and inter-agency coordination to prevent map making repetition.	Identify others with your organization that may be making maps for others and develop a coordination process.
Streaming live weather data from Hurrevac and NOAA.	When available, utilize real-time mapservice feeds into your GIS. See below for numerous links.

POST-EVENT	
Help with Damage Assessment Reports and Efforts	Work closely with those conducting damage assessments; try to map these locations and tag the reports to the locations.
Assess for data files and project files	“Clean up” any loose ends in terms of data, maps products produced, and store them for future use.
Conduct follow-up discussion with other emergency response staff	Identify areas of success and areas of improvement for the future.
Develop an internal GIS wish list	Identify data, software, hardware, etc. that would have benefitted your GIS during the event.
Map the “Extent” of the event	If possible try to identify the geographical extent of the natural hazard (e.g. extent of storm surge, flooding, tornado swaths, etc.)

Storm Preparation GIS Resource Links:

State of CT Resources:

UConn Map and Geographic Information Center:

<http://magic.lib.uconn.edu/>

CT ECO Simple Map Viewer (Contains Hurricane Surge Inundation Mapping)

<http://ctecoapp1.uconn.edu/simpleviewer/ezviewer.htm>

ConDOT Interactive Travel information Map:

http://www.dotdata.ct.gov/iti/master_iti.html

CT ECO Map Services:

http://cteco.uconn.edu/map_services.htm

National Map Services:

FEMA Flood Maps:

<https://hazards.fema.gov/femaportal/wps/portal/NFHLWMS>

National Hurricane Center GIS:

<http://www.nhc.noaa.gov/gis/>

Topo Map Server:

http://services.nationalmap.gov/ArcGIS/rest/services/US_Topo/MapServer/

National Hydrography Data Set:

<http://services.nationalmap.gov/ArcGIS/rest/services/nhd/MapServer>

Flooding and Precipitation Forecasts:

http://map.floridadisaster.org/GIS/rest/services/Hazards/Weather_Flooding_Precipitation/MapServer

USGS Real-time Incidents:

http://rmgsc.cr.usgs.gov/ArcGIS/rest/services/nhss_haz/MapServer

HDDS Imagery:

<http://hdds.usgs.gov/ArcGIS/rest/services>

NWS Watches & Warnings

<http://gis.srh.noaa.gov/ArcGIS/rest/services/watchWarn/MapServer>

Tropical Weather

http://map.floridadisaster.org/GIS/rest/services/Hazards/Tropical_Weather/MapServer

Atlantic Storm Viewer

<http://gis.srh.noaa.gov/ArcGIS/rest/services/AtStormViewer/MapServer>

AHPS Gauges

[http://gis.srh.noaa.gov/ArcGIS/rest/services/AHPS_Gauges/MapServer"](http://gis.srh.noaa.gov/ArcGIS/rest/services/AHPS_Gauges/MapServer)

The following information is from the *Draft Geospatial Emergency Response Procedures*, prepared by Federal Emergency Management Geospatial Working Group – New England (March 20, 2012)

Chapter 3. Data management and documentation

Data availability, sharing and licensing

A list of authoritative data sets for homeland security and emergency response can be found in the DHS Geospatial Concept of Operations (GeoCONOPS) document located on the EPA site. The NRCS is also the authoritative data source for soils data.

HSIP Gold contains over 400 geospatial datasets including domestic infrastructure and base map features which have been assembled from Federal agencies and commercial sources for homeland security/defense and emergency management. It can be requested from the National Geospatial-Intelligence Agency (NGA) via the Web-based request mechanism found on the Homeland Infrastructure Foundation-Level Data (HIFLD) Working Group website (<https://www.hifldwg.org>). HSIP Gold can only be disseminated to those HSIP Gold requestors who are validated by NGA as federal government members (or their supporting contractors and consultants) who intend to use the data to support the Homeland Security/Homeland Defense (HLS/HD) mission areas. HSIP Gold may be requested by States only for Presidentially Declared Major Disasters.

HSIP Freedom is available to all Federal, State and local responders. HSIP Freedom is a subset of HSIP Gold free of licensed data. It is on the Geospatial Community of Interest on the Homeland Security Information Network (HSIN). Access to this site can be requested by contacting the 24/7 HSIN Helpdesk at 1-866-430-0162 or HSIN.Helpdesk@dhs.gov.

File naming

Files created and shared require an intuitive filename, including the date and geographic area at the end of the filename. The date format to use is YYYYMMDD. Some examples:
 Grant_sites_1715-VT_20080204.kmz, RI_DistributionPoint_20100206.dbf,
 Red_Cross_shelters_NE_20090707.dbf

File directory structure(s)

The file director is organized functionally but with the ability to search for metadata geographically.

Disaster related data

Category	Response	Recovery	All
Critical facilities			Hospitals Nursing homes Emergency Services (fire and police) School Daycare Places of worship Prison or jail Nuclear power plant Power and water systems Pipelines

			Grocery and lumber stores Aerial imagery
Transportation			Roads Railroads Airports
Base data			Water features Municipal, state and other boundaries Parcel data
Emergency operations	Emergency operations centers Staging areas		
Event specific data	Shelters Points of distribution Resource tracking Power status Federal teams and resources US National Grid (with various granularity) Aerial dispersion models	Preliminary Damage Assessments	Damages Real-time bridge/road damage Environmental database (Environmental First Search) Underground storage tanks, hazmat spills and sources
Search and Rescue	Search & Rescue Grids (USNG or other) Grid Status (Cleared/Searched, etc.) Structural Collapse Perimeter Major hazards Damaged Infrastructure Bases of Operations Forward bases of Operations Construction and welding resources (cranes, lumber, gases) Structural Assessments (e.g. ATC-20) Location/availability of Air Assets Locations of possible Landing Zones (LZs)		

Field data collection standards

Metadata standards

Metadata will be created for all new or event-specific created and shared with the group using ESRI's metadata tool (details in *Appendix 4 - Metadata Tools & Standards*).

At minimum, metadata will include the following elements:

- Abstract
- Title
- Originator
- Publication Date
- Process Description
- Geographic Coordinate System Name
- Horizontal Datum Name
- Security Classification
- Time Period (Currentness, Date and time)

Chapter 4. Map symbology

Many agencies have internal map symbology standards, which they will continue to use during an event. Agencies are encouraged to share their symbology with each other on the FTP site and also on the EPA Working Group Site

(http://oaspub.epa.gov/portal/page/portal/ESConnector/CNTR_ESC/ESCHOME/MYWORKBENCH?escSelectedProjectId=28670). Agencies will be reminded at the annual review in January to update their symbology if needed.