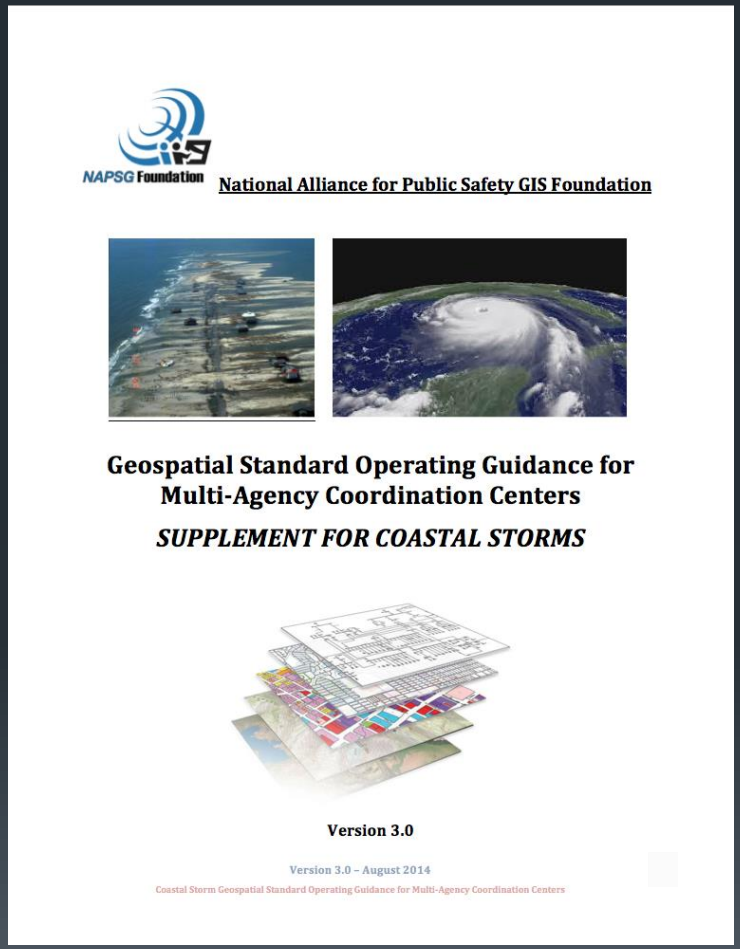
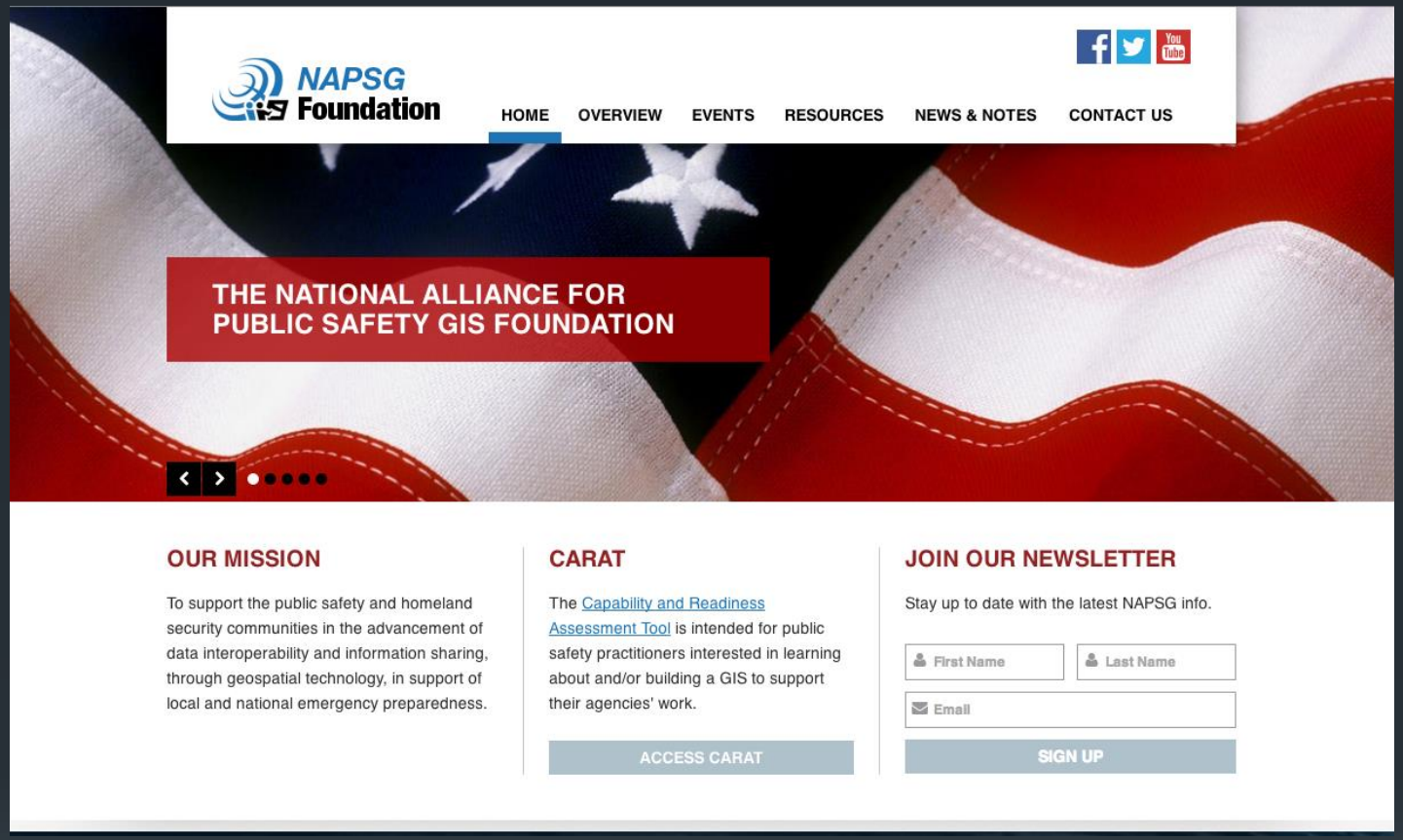
Coastal Storm Standard Operating Guideline

Presented by Bruce Oswald, PMP, NAPSG Project Manager & Author

August 26, 2014

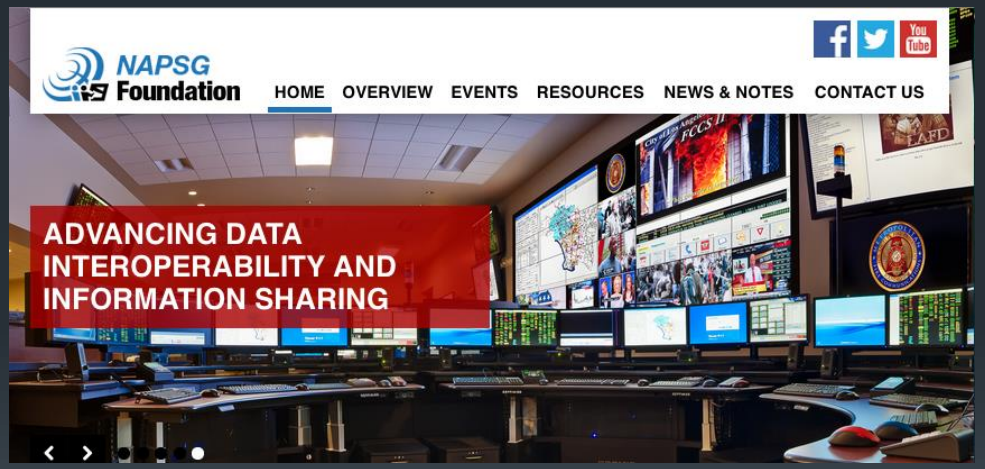




National Alliance for Public Safety GIS Foundation (NAPSG)

NAPSG Offerings

- Capability and Readiness Assessment Tool
- Virtual Training
- Regional Public Safety GIS Workshops
- On-line videos
- DHS GeoCONOPS
- SOG's
  - Standard (MACC)
  - Coastal Oil Spills
  - Wild Fires



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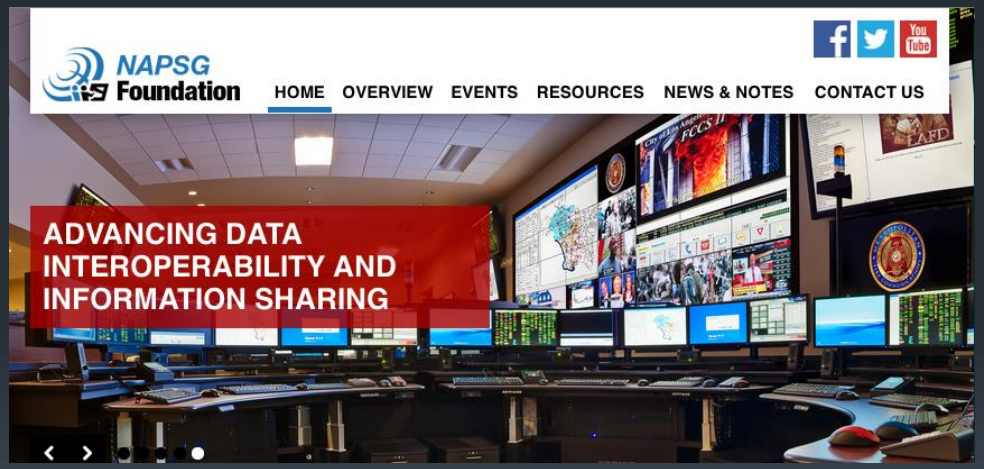

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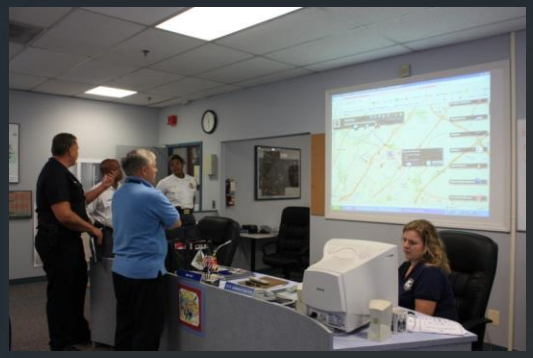
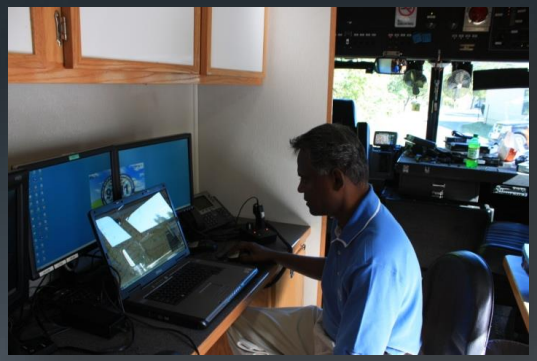
Credits

- Created through the National Alliance for Public Safety GIS Foundation's (NAPSG) partnership with the National States Geographic Information Council (NSGIC) and funded by the DHS Geospatial Management Office
- Developed by a work group from the private sector and from local, state and Federal officials

Why Geospatial Policies in Public Safety?





- Encourage improved communication & collaboration among GIS and emergency response personnel
- Template SOG – tool to help agencies get started in developing their own geospatial policies
- Institutionalize geospatial assets (both equipment & personnel) as mission critical resources in all types & scales of emergencies

Work Group

- Role – Input for ideas, experiences, examples; reviewers provide edits/comments and actively participate in conference calls
- 23 Members
  - Gerard Aiken, Geospatial Coordinator, Response Division, Region 3, Federal Emergency Management Agency (FEMA)
  - David Alexander, Director, DHS Geospatial Management Office
  - Bob Bewley, Chief, Office of Cartographic Data Services, United States Geological Survey (USGS), National Geospatial Program
  - Bill Burgess, Washington Liaison, National States Geographic Information Council
  - Richard Butgereit, Information Management, Florida Division of Emergency Management
  - Brian Crumpler, ISP Coordinator for Northern Virginia, Virginia Information Technologies Agency

Work Group

- Members (Cont.)
  - Bob Davis, Cartographer, USGS, Core Science Systems, National Geospatial Program
  - Tony Foisy, Project Manager, GISP, CSX
  - Heather Gilbert, Project Manager, National Oceanic Atmospheric Administration (NOAA)
  - Sandy Gruber, GIS Coordinator, City of Lincoln City, OR
  - Rezwan Karim, Flood Map Specialist, FEMA
  - Tyler Kleykamp, Chief Data Officer, Office of Policy & Management, State of Connecticut
  - Jim McConnell, Assistant Commissioner for Strategic Data, New York City Office of Emergency Management
  - Mary Meade, GIS Manager, FEMA
  - Chris Meyer, GIS Systems Analyst, City of Virginia Beach, CGIS

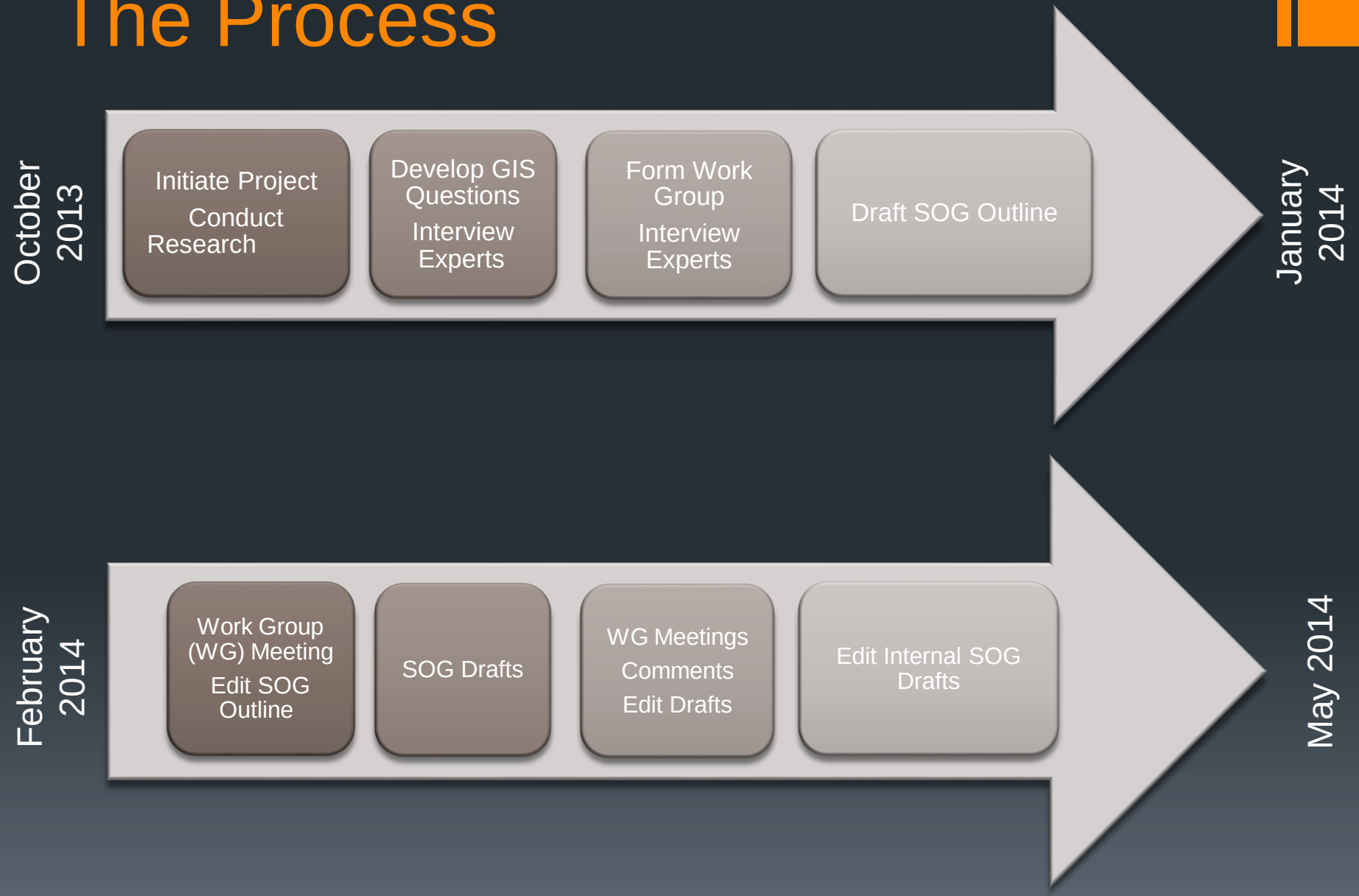
Work Group

- Members (Cont.)
  - James E. Mitchell, PhD, IT GIS Manager, Louisiana Dept. of Transportation & Development
  - Robert Moore, GISP, Catastrophe Risk Analyst II, American Modern Insurance
  - Dale Morris, GISP, Director, Erie Co., NY, Office of Geographic Information Services
  - Peter Noy, CIV, United States Coast Guard
  - Bruce Oswald, Project Manager/Principal Author, NAPSG
  - Chris Rogers, Lieutenant, Kirkland Fire Department, Kirkland, WA
  - Farouk Rohoman, Information Assets & 9-1-1 Data Manager (Acting), IT Solutions, Corporate Services, Niagara Region, Canada
  - Sandi Stroud, NG911 Project Manager, Michael Baker Jr., Inc.

Project Goals

- Develop a SOG for coastal storms with a focus on State and local needs
- Provide guidance for GIS professionals w/o backgrounds in coastal storms so they can quickly become productive
- Help emergency managers understand how GIS can be effectively utilized
- Determine key emergency management protocols and GIS components needed
- Insure consistency with the DHS GeoCONOPS & the NAPSG SOG
- Publish on NAPSG website for ease of dissemination

The Process

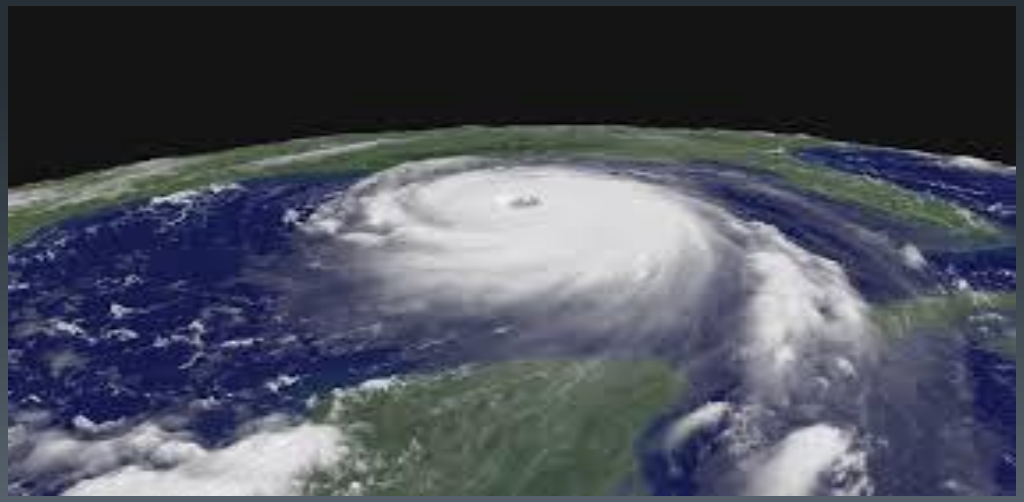

October 2013
Initiate Project
Conduct Research
Develop GIS Questions
Interview Experts
Form Work Group
Interview Experts
Draft SOG Outline
January 2014
February 2014
Work Group (WG) Meeting
Edit SOG Outline
SOG Drafts
WG Meetings
Comments
Edit Drafts
Edit Internal SOG Drafts
May 2014

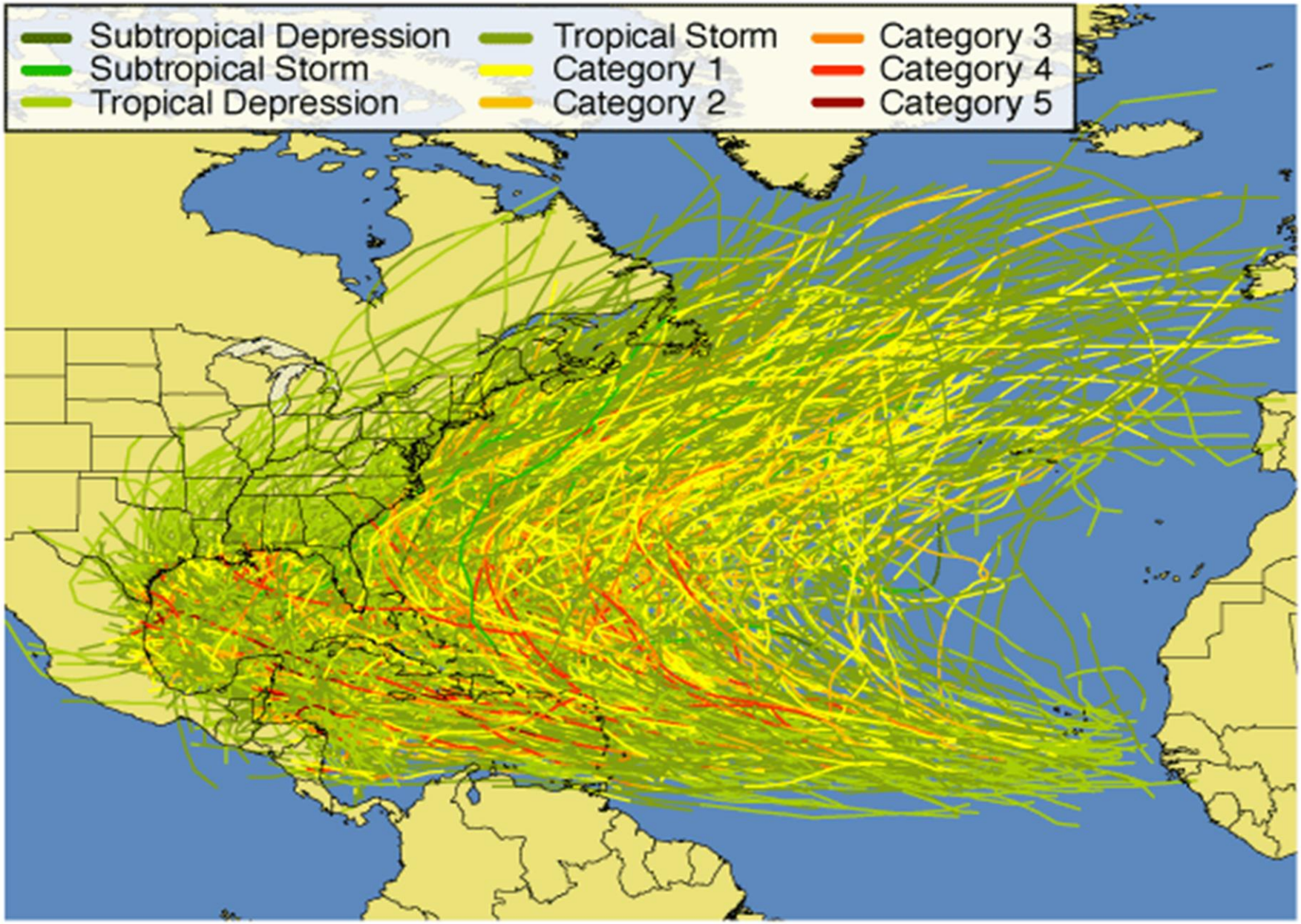
The Process Continued

June 2014

- Final SOG Draft to DHS
- DHS Review of Draft
- Modify Draft
- SOG Posted to NAPSG Website & Webinar Given

August 2014





USGS Depiction of Atlantic Basin Tropical Storms from 1851-2000

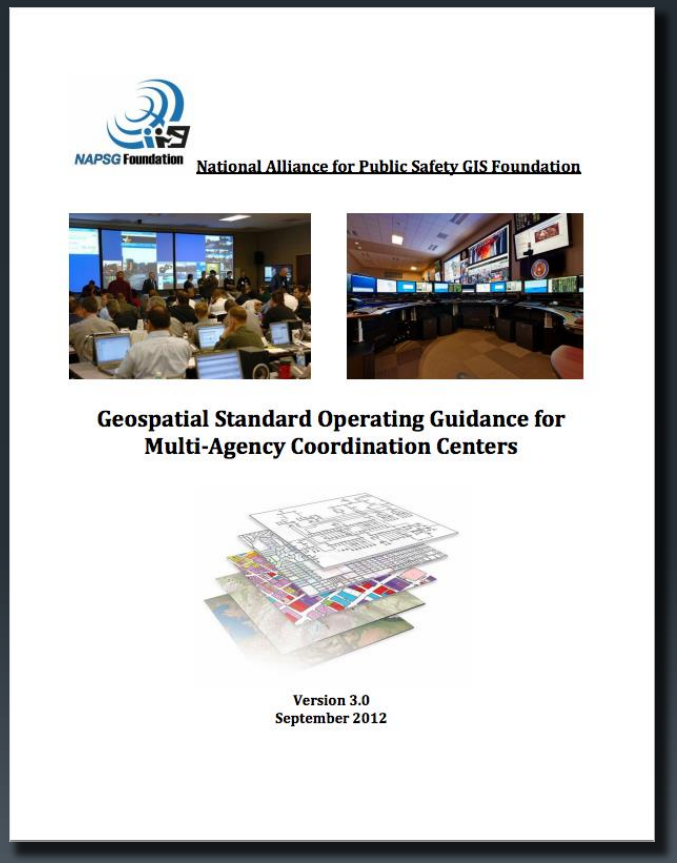
Coastal Storms Are Significant!

- Over half of the Nation's economic productivity is located within coastal zones
- Much of the densely populated Atlantic and Gulf Coast coastlines lie less than 10 feet above mean sea level
- A storm surge of 23 ft. has the ability to inundate 67% of interstates, 57% of arterials, almost half of rail miles, 29 airports, and virtually all ports in the Gulf Coast area (CCSP SAP 4-7)

Agenda

- What is an SOG?
- Who are the audiences?
- Key points for Coastal Storms
  - How can GIS assist emergency managers?
  - What do GIS professionals need to know about emergency management?
  - Keys to the successful use of GIS that Emergency Managers and GIS Professionals should know
- What else is in the SOG?
- How can I get the SOG?

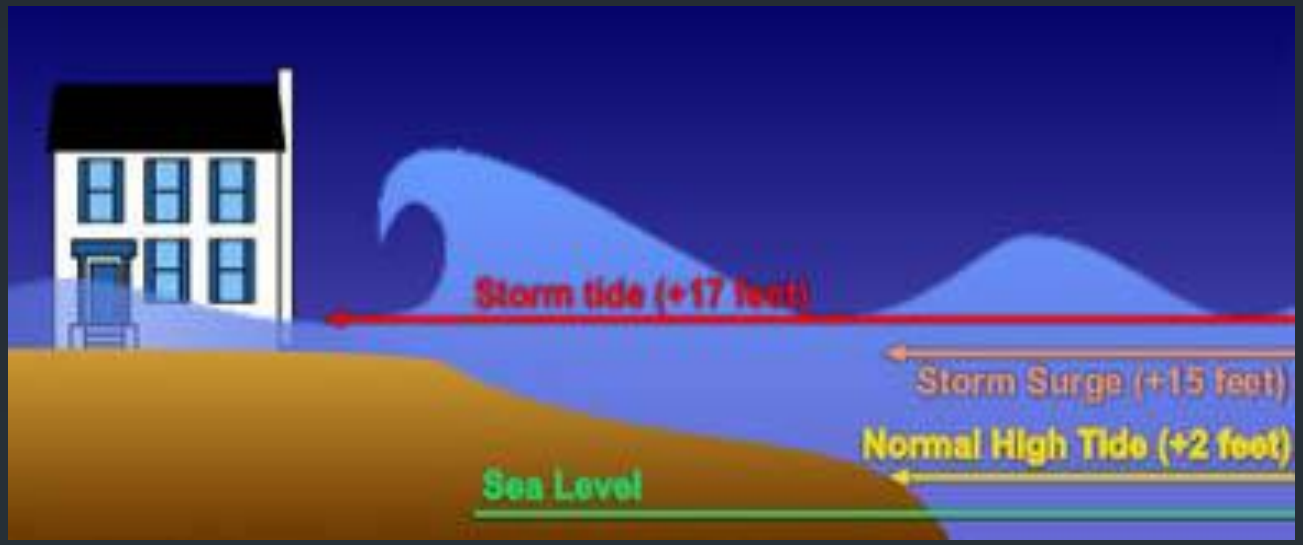
What is an Standard Operating Guidance Document (SOG)?



- Set of guidelines to coordinate geospatial response efforts
- Template, provides you with ideas
- Modify to meet your needs
- Modeled after the general NAPSG SOG
- Coordinated with the DHS Geospatial Concept of Operations (GeoCONOPS)

Who Is the Intended Audience?

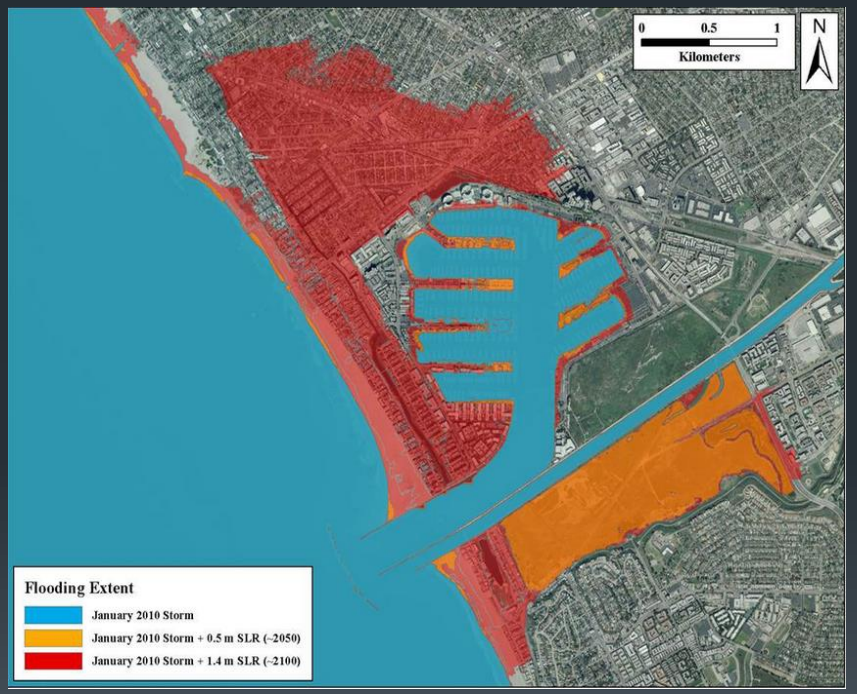
- Emergency Managers
  - What can they get from GIS? (What's in it for them?)
- GIS Professionals (first timers – veterans)
  - What do they need to know about emergency management?
  - What do they need to do to insure that GIS is successful?



What's in the SOG For Emergency Managers and First Responders?

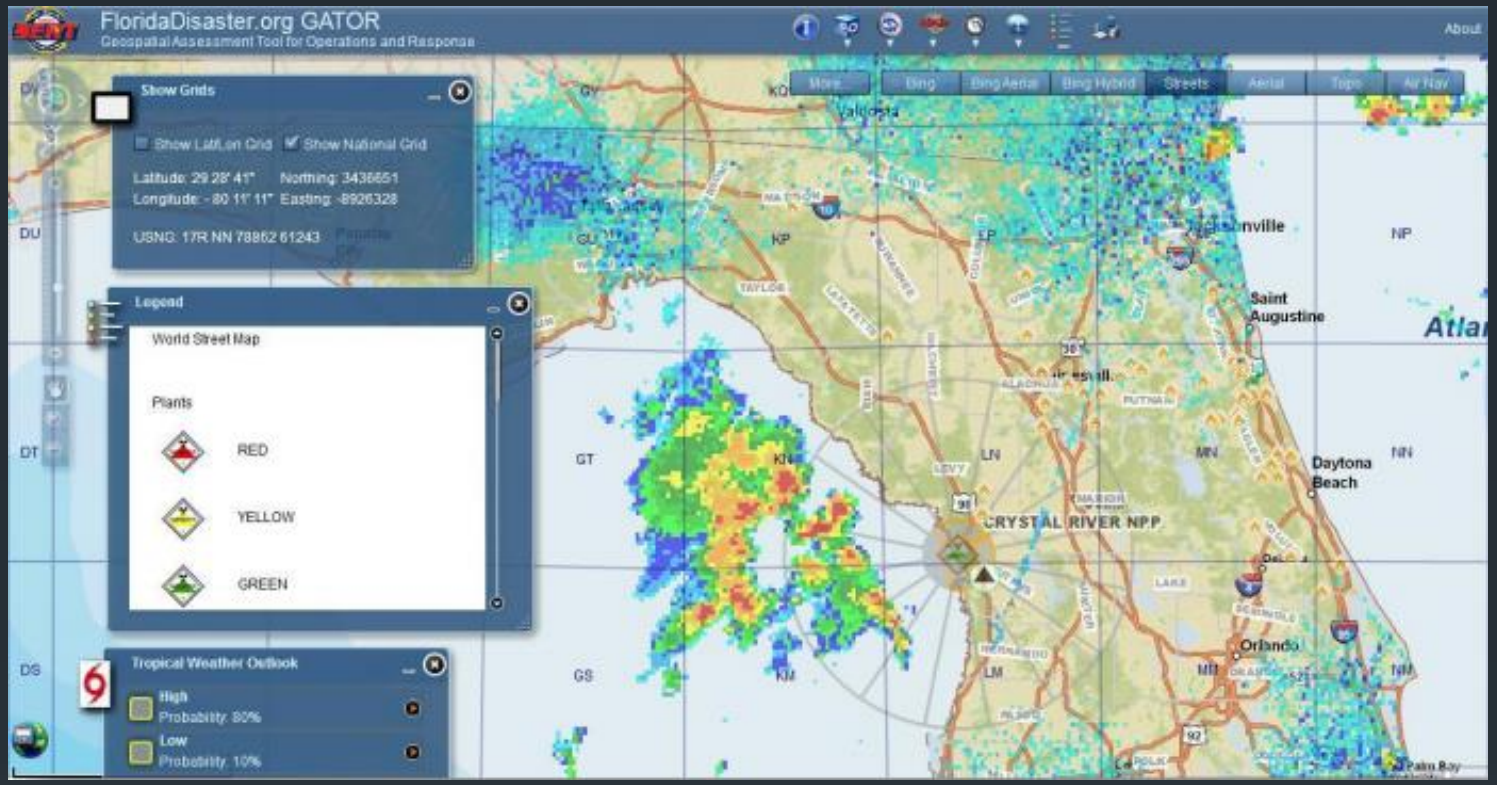
How Can GIS Assist Emergency Managers and First Responders?

- What is GIS?
- What kinds of questions can GIS answer?
- What are the resources needed?
- NAPSG Quick Guide
- FEMA Emergency Management Institute



Keys to the Successful Use of GIS that Emergency Managers Should Know

- Have a GIS team & have them trained in ICS
- Meet with your GIS team prior to the coastal storm season
  - Explain the issues that you encounter in a coastal storm
  - Learn how GIS can meet your needs
  - Relay your timing needs
  - Integrate the use of GIS into your workflow
  - Integrate the use of GIS into drills/scenarios



What's in the SOG for GIS Professionals?

What Do GIS Professionals Need to Know About Emergency Management?

- Emergency Management Systems (NIMS, ICS, GeoCONOPS)
- Emergency Operations Center
- Additional Resources
  - State GIS Coordinator
  - Emergency Management Assistance Compact
  - International Charter
- Emergency Management Terms

Keys to the Successful Use of GIS That GIS Professionals Should Know

- Sell GIS! (establish credibility & deliver!)
- Meet with the appropriate emergency managers
  - Learn their needs
  - Determine what problems need to be solved
  - Suggest & reach agreement on GIS products & timing to assist in resolving those problems
  - Determine what data is required
- Create basemaps, templates, & std. forms where possible
- Standardize GIS products where possible
- Establish a schedule for delivery

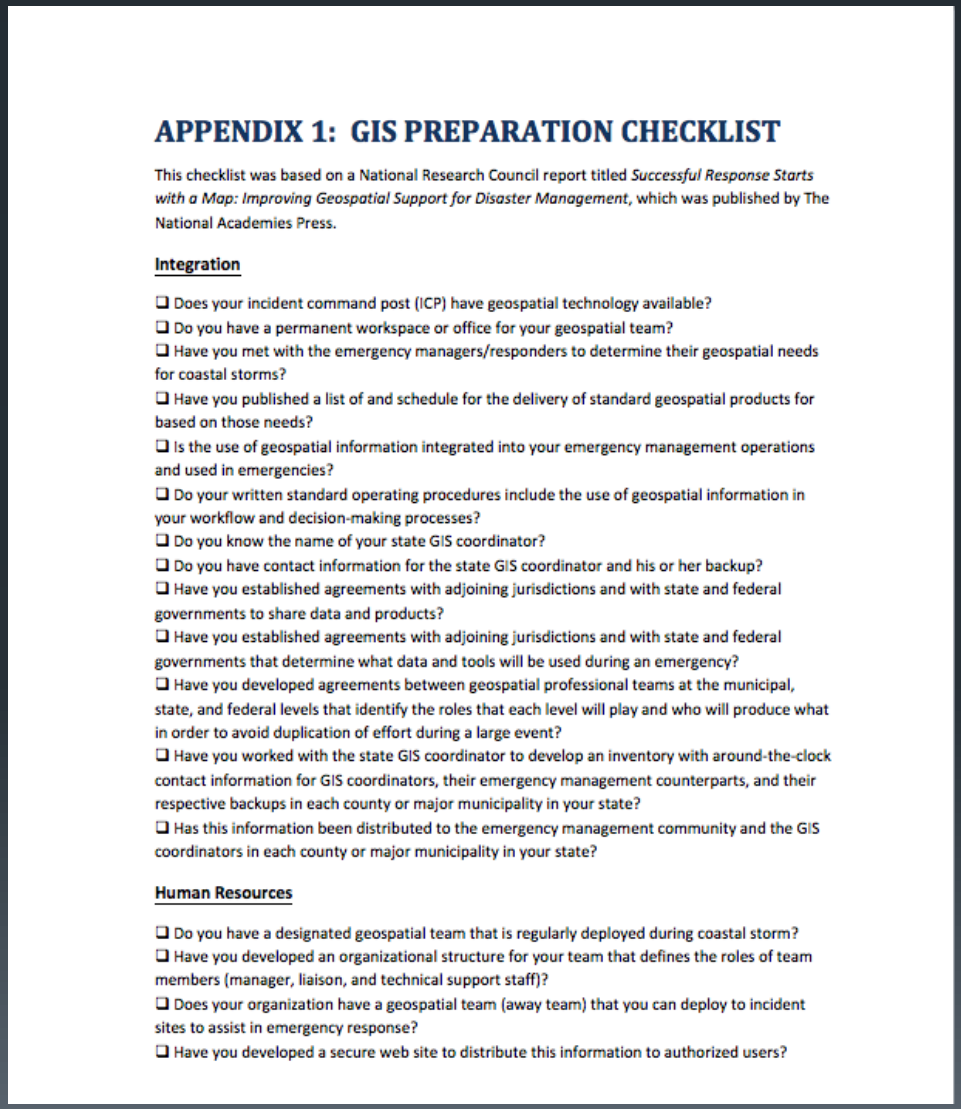
Keys to the Successful Use of GIS That GIS Professionals Should Know

- Work with the emergency managers to integrate these products w/briefings & workflow
  - Test products/delivery cycle during scenario exercises
  - Modify as required

- Establish a system for tracking/reporting progress of standardized and ad hoc products
- Save/archive products as PDF's w/date & time

What Else is in the SOG?

Preparation Checklist



APPENDIX 1: GIS PREPARATION CHECKLIST

This checklist was based on a National Research Council report titled *Successful Response Starts with a Map: Improving Geospatial Support for Disaster Management*, which was published by The National Academies Press.

Integration

❑ Does your incident command post (ICP) have geospatial technology available?
❑ Do you have a permanent workspace or office for your geospatial team?
❑ Have you met with the emergency managers/responders to determine their geospatial needs for coastal storms?
❑ Have you published a list of and schedule for the delivery of standard geospatial products for based on those needs?
❑ Is the use of geospatial information integrated into your emergency management operations and used in emergencies?
❑ Do your written standard operating procedures include the use of geospatial information in your workflow and decision-making processes?
❑ Do you know the name of your state GIS coordinator?
❑ Do you have contact information for the state GIS coordinator and his or her backup?
❑ Have you established agreements with adjoining jurisdictions and with state and federal governments to share data and products?
❑ Have you established agreements with adjoining jurisdictions and with state and federal governments that determine what data and tools will be used during an emergency?
❑ Have you developed agreements between geospatial professional teams at the municipal, state, and federal levels that identify the roles that each level will play and who will produce what in order to avoid duplication of effort during a large event?
❑ Have you worked with the state GIS coordinator to develop an inventory with around-the-clock contact information for GIS coordinators, their emergency management counterparts, and their respective backups in each county or major municipality in your state?
❑ Has this information been distributed to the emergency management community and the GIS coordinators in each county or major municipality in your state?

Human Resources

❑ Do you have a designated geospatial team that is regularly deployed during coastal storm?
❑ Have you developed an organizational structure for your team that defines the roles of team members (manager, liaison, and technical support staff)?
❑ Does your organization have a geospatial team (away team) that you can deploy to incident sites to assist in emergency response?
❑ Have you developed a secure web site to distribute this information to authorized users?

What Else is in the SOG?

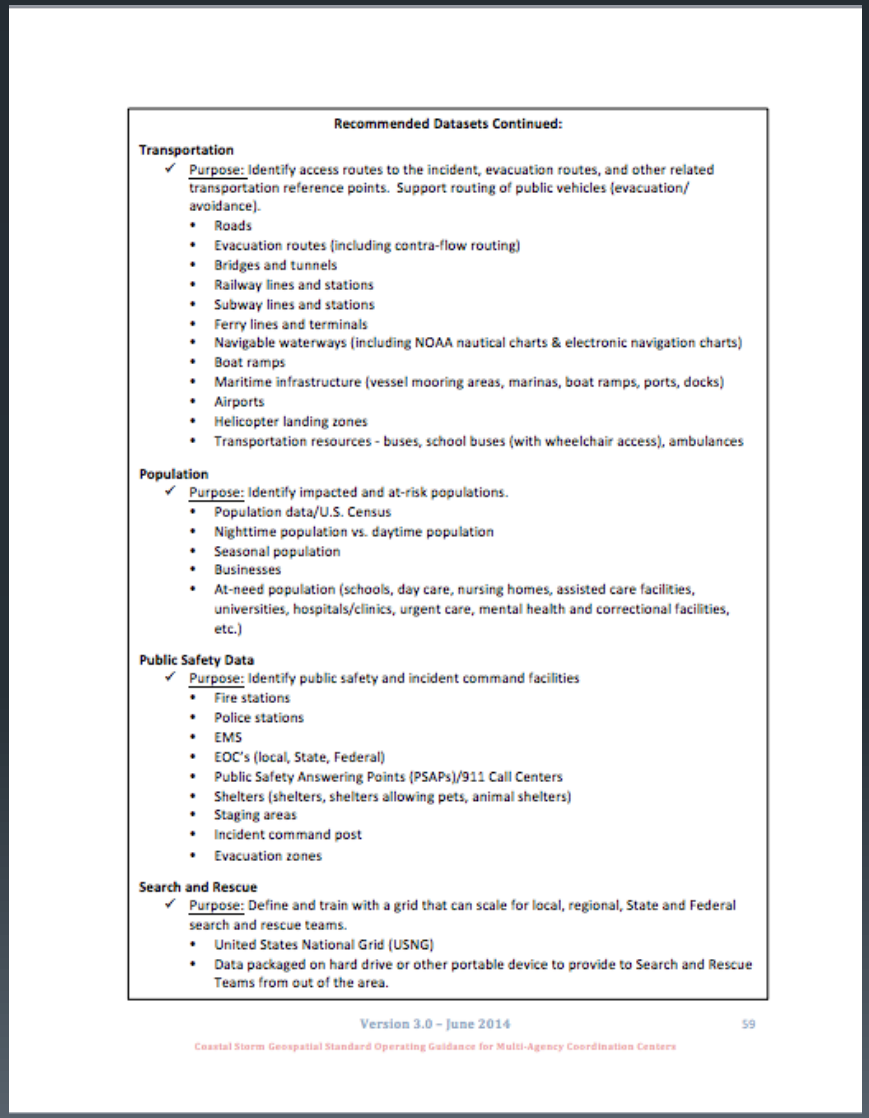
Standing Orders

T-72 hrs. Crosscheck	
Tasks:	*Responsible/Complete*
Website check, how is it holding up under load	GIS Chief
Begin disaster direct feeds/activation template	Webmaster
Current Situation Map for web	GIS Chief
Prepare map for evacuation information	GIS Chief
Begin communications with branch chief for GIS assistance	GIS Chief
Run HAZUS on Statewide Region	GIS
Confer with local NWS office on track, intensity, and timing of storm	GIS
T-48 hrs. Crosscheck	
Tasks:	*Responsible/Complete*
Begin coordination with logistics for Logistics Staging Area/Point of Distribution (LSA/POD) information	GIS Chief
Begin Coordination with ESF4/9 for USAR needs	GIS Chief
Edit the Operational Assets as the area of interest becomes more specific	GIS Analyst
Begin demographics for counties in the area of interest	GIS Analyst
If Recon teams are called in coordinate with team leader for needs	GIS Analyst/ Chief
Confer with local NWS office on track, intensity, and timing of storm	GIS
Map zone(s) to be evacuated by general public within this time period	GIS
Map evacuation routes	GIS
Map hurricane shelters	GIS
T-24 hrs. Crosscheck	
Tasks:	*Responsible/Complete*
Continued coordination with logistics and begin LSA/POD maps	GIS Analyst
Begin creating S&R or reconnaissance requested maps	GIS Analyst
ESF 1 and 3 coordination for transportation constraints	GIS Analyst
Prepare Status Maps	GIS Chief
Run HAZUS on Region	GIS Analyst
Prepare website for accepting field reports	GIS Chief/Programmer
Submit pre-scripted missions for S&R support and Aerial Imagery	GIS Chief
Confer with local NWS office on track, intensity, and timing of storm	GIS
Map any additional zone(s) to be evacuated if forecast worsens	GIS

Figure 8-GIS Team Standing Orders for a Coastal Storm – Pre-Event

What Else is in the SOG?

Data Suggestions



Recommended Datasets Continued:

Transportation

✓ Purpose: Identify access routes to the incident, evacuation routes, and other related transportation reference points. Support routing of public vehicles (evacuation/ avoidance).

- Roads
- Evacuation routes (including contra-flow routing)
- Bridges and tunnels
- Railway lines and stations
- Subway lines and stations
- Ferry lines and terminals
- Navigable waterways (including NOAA nautical charts & electronic navigation charts)
- Boat ramps
- Maritime infrastructure (vessel mooring areas, marinas, boat ramps, ports, docks)
- Airports
- Helicopter landing zones
- Transportation resources - buses, school buses (with wheelchair access), ambulances

Population

✓ Purpose: Identify impacted and at-risk populations.

- Population data/U.S. Census
- Nighttime population vs. daytime population
- Seasonal population
- Businesses
- At-need population (schools, day care, nursing homes, assisted care facilities, universities, hospitals/clinics, urgent care, mental health and correctional facilities, etc.)

Public Safety Data

✓ Purpose: Identify public safety and incident command facilities

- Fire stations
- Police stations
- EMS
- EOC's (local, State, Federal)
- Public Safety Answering Points (PSAPs)/911 Call Centers
- Shelters (shelters, shelters allowing pets, animal shelters)
- Staging areas
- Incident command post
- Evacuation zones

Search and Rescue

✓ Purpose: Define and train with a grid that can scale for local, regional, State and Federal search and rescue teams.

- United States National Grid (USNG)
- Data packaged on hard drive or other portable device to provide to Search and Rescue Teams from out of the area.

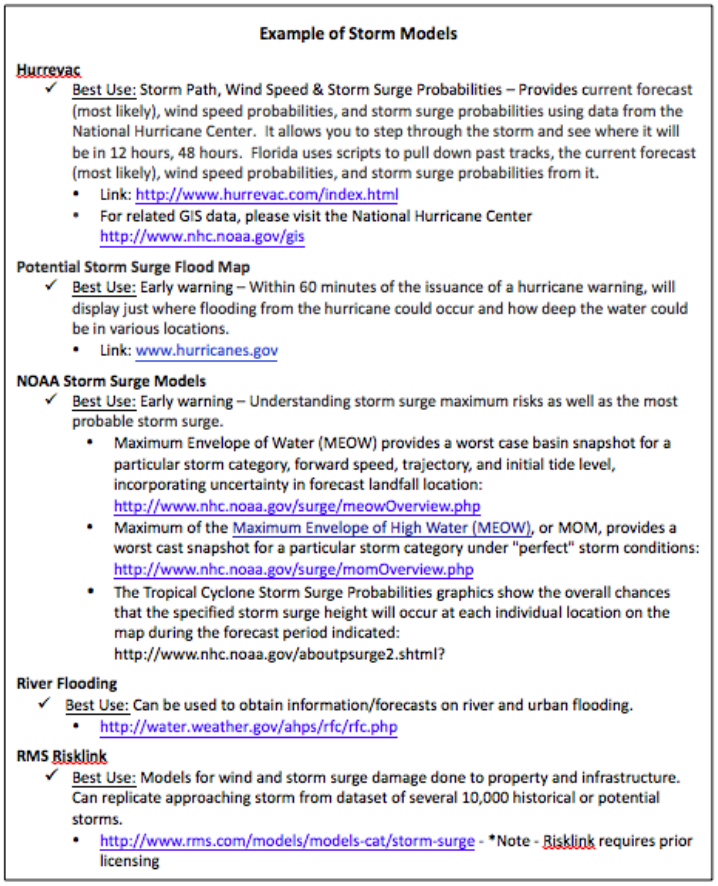
What Else is in the SOG?

Staffing Functions

Position Title	Roles &/or Responsibilities
Team Leader	• Responsible for the coordination of geospatial information system (GIS) production, remote sensing, and geospatial database efforts. • Conducts briefings, attends meetings, and directs overall geospatial support operations. • Interfaces with federal, state, and local authorities establishing Memorandums of Understanding (MOU's), partnerships, and data sharing agreements. • Proactively seeks opportunities to integrate geospatial products into executive decision-making.
Deputy Team Leader	• Reports to the Geospatial Team Leader. • Responsible for maintaining the coordinated efforts of the geospatial team. • During times of absence of the Team Leader, becomes the representative of the Team. (Potentially, the Team Leader on alternate shifts.)
Geospatial Liaison	• Reports to the Team Leader. • Informally, meets with EOC section heads, task forces, etc. Determines latest needs, suggests potential geospatial solutions, determines if standard map products are meeting needs, lets the Geospatial Team know what is happening across EOC and works with them to develop needed and potential geospatial solutions to current and anticipated issues. • Greets customers and assists them in filling out request forms.
Geospatial Production Manager	• Reports to the Team Leader. • Coordinates GIS requirements and supervises assigned Geospatial Analysts. • Prioritizes GIS production and activities. • Defines and insures timely delivery of standard and unique products. • Works with product requesters to properly define requirements and ensures the timely preparation and delivery of recurring and ad hoc GIS products.
Geospatial Analyst	• Reports to the Geospatial Production Manager. • Prepares recurring and ad hoc GIS products. • Compiles various types of geospatial information into map and data products. • Analyzes geospatial data from various sources to answer diverse questions and populate geospatial products.
Geospatial Imagery Manager	• Reports to the Team Leader. • Responsible for the coordination of RS requirements, resources, and requests for the team. • Operates as task originator & collection manager for assets related to the operation. • Works with Geospatial Production Manager to ensure imagery-

What Else is in the SOG?

Storm Models



Example of Storm Models

Hurrevac

- ✓ Best Use: Storm Path, Wind Speed & Storm Surge Probabilities – Provides current forecast (most likely), wind speed probabilities, and storm surge probabilities using data from the National Hurricane Center. It allows you to step through the storm and see where it will be in 12 hours, 48 hours. Florida uses scripts to pull down past tracks, the current forecast (most likely), wind speed probabilities, and storm surge probabilities from it.
  - Link: http://www.hurrevac.com/index.html
  - For related GIS data, please visit the National Hurricane Center http://www.nhc.noaa.gov/gis

Potential Storm Surge Flood Map

- ✓ Best Use: Early warning – Within 60 minutes of the issuance of a hurricane warning, will display just where flooding from the hurricane could occur and how deep the water could be in various locations.
  - Link: www.hurricanes.gov

NOAA Storm Surge Models

- ✓ Best Use: Early warning – Understanding storm surge maximum risks as well as the most probable storm surge.
  - Maximum Envelope of Water (MEOW) provides a worst case basin snapshot for a particular storm category, forward speed, trajectory, and initial tide level, incorporating uncertainty in forecast landfall location: http://www.nhc.noaa.gov/surge/meowOverview.php
  - Maximum of the Maximum Envelope of High Water (MEOW), or MOM, provides a worst cast snapshot for a particular storm category under "perfect" storm conditions: http://www.nhc.noaa.gov/surge/momOverview.php
  - The Tropical Cyclone Storm Surge Probabilities graphics show the overall chances that the specified storm surge height will occur at each individual location on the map during the forecast period indicated: http://www.nhc.noaa.gov/aboutpsurge2.shtml?

River Flooding

- ✓ Best Use: Can be used to obtain information/forecasts on river and urban flooding.
  - http://water.weather.gov/ahps/rfc/rfc.php

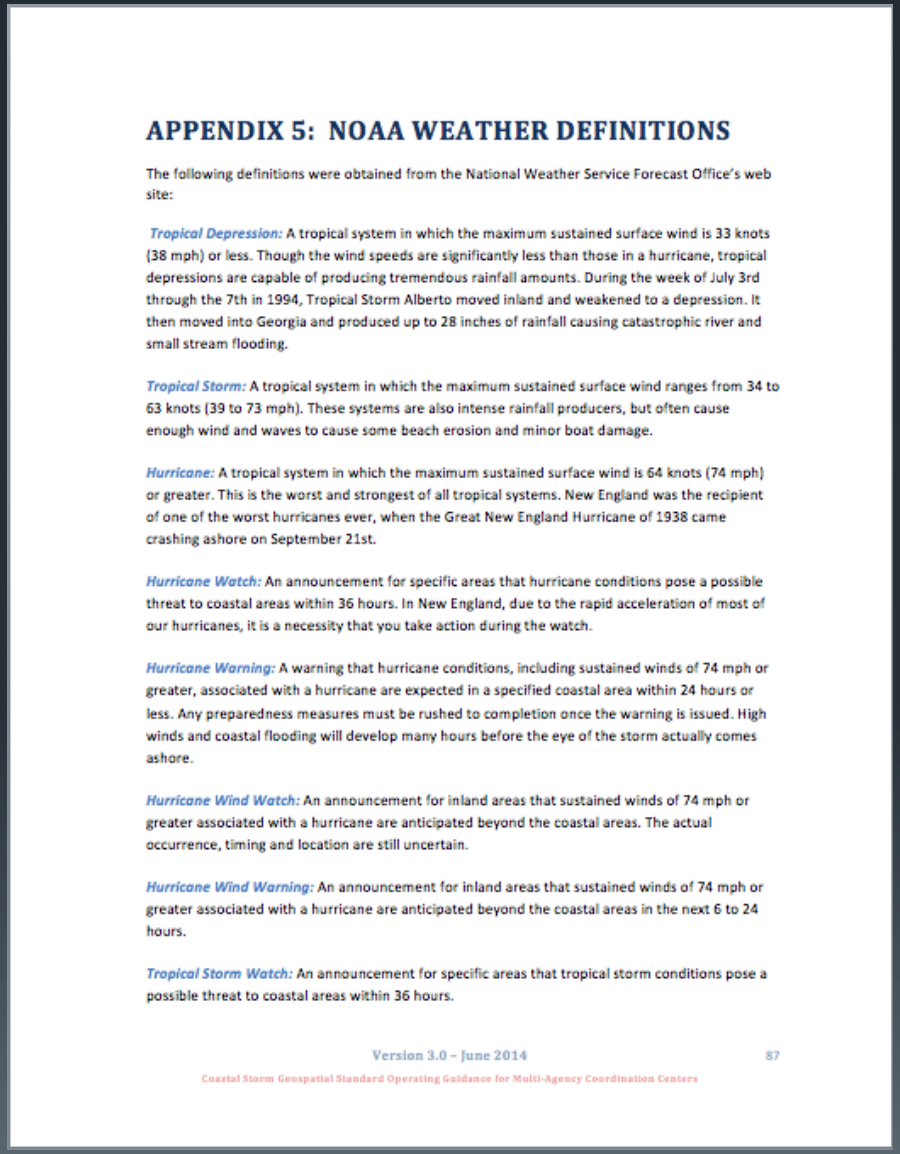
RMS Risklink

- ✓ Best Use: Models for wind and storm surge damage done to property and infrastructure. Can replicate approaching storm from dataset of several 10,000 historical or potential storms.
  - http://www.rms.com/models/models-cat/storm-surge - *Note - Risklink requires prior licensing

Figure 18-Examples of Storm Models

What Else is in the SOG?

Weather Definitions



APPENDIX 5: NOAA WEATHER DEFINITIONS

The following definitions were obtained from the National Weather Service Forecast Office's web site:

Tropical Depression: A tropical system in which the maximum sustained surface wind is 33 knots (38 mph) or less. Though the wind speeds are significantly less than those in a hurricane, tropical depressions are capable of producing tremendous rainfall amounts. During the week of July 3rd through the 7th in 1994, Tropical Storm Alberto moved inland and weakened to a depression. It then moved into Georgia and produced up to 28 inches of rainfall causing catastrophic river and small stream flooding.

Tropical Storm: A tropical system in which the maximum sustained surface wind ranges from 34 to 63 knots (39 to 73 mph). These systems are also intense rainfall producers, but often cause enough wind and waves to cause some beach erosion and minor boat damage.

Hurricane: A tropical system in which the maximum sustained surface wind is 64 knots (74 mph) or greater. This is the worst and strongest of all tropical systems. New England was the recipient of one of the worst hurricanes ever, when the Great New England Hurricane of 1938 came crashing ashore on September 21st.

Hurricane Watch: An announcement for specific areas that hurricane conditions pose a possible threat to coastal areas within 36 hours. In New England, due to the rapid acceleration of most of our hurricanes, it is a necessity that you take action during the watch.

Hurricane Warning: A warning that hurricane conditions, including sustained winds of 74 mph or greater, associated with a hurricane are expected in a specified coastal area within 24 hours or less. Any preparedness measures must be rushed to completion once the warning is issued. High winds and coastal flooding will develop many hours before the eye of the storm actually comes ashore.

Hurricane Wind Watch: An announcement for inland areas that sustained winds of 74 mph or greater associated with a hurricane are anticipated beyond the coastal areas. The actual occurrence, timing and location are still uncertain.

Hurricane Wind Warning: An announcement for inland areas that sustained winds of 74 mph or greater associated with a hurricane are anticipated beyond the coastal areas in the next 6 to 24 hours.

Tropical Storm Watch: An announcement for specific areas that tropical storm conditions pose a possible threat to coastal areas within 36 hours.

What Else is in the SOG?

- Obtaining event data
  - Establish protocols for importing and displaying damage assessment data from mobile devices
  - Establish protocols for collecting data when technology is not available
  - Establish protocols for verifying data (damage assessment, debris, etc.) when possible
  - Engage social media – Twitter, Facebook, etc.

FEMA Damage Classification

Damage Level		Observed Damages
General Damage Classifications		
LD	Limited Damage	Generally superficial damage to solid structures (e.g., loss of tiles or roof shingles); some mobile homes and light structures are damaged or displaced.
MD	Moderate Damage	Solid structures sustain exterior damage (e.g., missing roofs or roof segments); some mobile homes and light structures are destroyed, many are damaged or displaced.
ED	Extensive Damage	Some solid structures are destroyed; most sustain exterior and interior damage (roofs missing, interior walls exposed); most mobile homes and light structures are destroyed.
CD	Catastrophic Damage	Most solid and all light or mobile home structures are destroyed.

NOTE – This Damage Classification is for wind damage. A damage assessment which considers water is: http://www.vaemergency.gov/sites/default/files/IA_Training_Aid_Table_color021507.pdf. It can help to communicate how hard areas are hit without having to physically visit each location. More information on damage assessment is available at: http://www.vaemergency.gov/em-community/recovery/damage-assessment and http://www.vaemergency.gov/sites/default/files/PA_guide_template_color021507.pdf.

What Else is in the SOG?

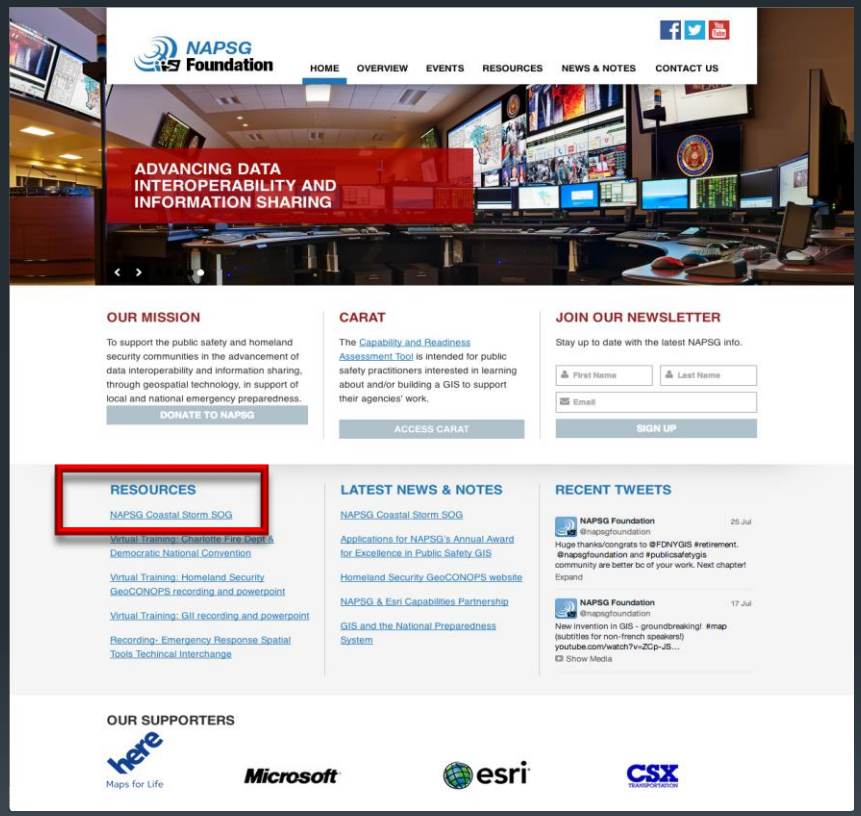
- Communication – emergency mgt. calls, GIS calls
- Shift transition
- State/local/commercial geospatial products and programs
- Glossary of emergency management terms

What Else is in the SOG?

- Training
  - ICS (100, 200, & 700) and FEMA Emergency Management Institute
  - Current software and data/models
- Exercises
  - Engage in exercises within the GIS team
    - Learn roles
    - Insure that they have proper access to relevant data and models
    - Develop speed (“The need for speed!”)
  - Engage in exercises within the entire EOC
    - Feature GIS ingests and the delivery of standardized GIS products and special requests throughout the scenarios.
    - After each training scenario, identify where things went well, where they need improvement, and how those improvements will be achieved!

Where Can I Get the SOG?

- ***NO COST!***
- Available for immediate download at: https://napsgfoundation.org/resources/napsg-coastal-storm-sog/
- As you implement the SOG in your agency, provide NAPSG with feedback so we can improve the it for others



https://napsgfoundation.org

Get Started Creating a Coastal Storm SOG Today!

- Learn what emergency responders need
  - Talk with your multi-agency coordination center
  - Conduct a self assessment with NAPSG's Capabilities & Readiness Assessment Tool: http://carat.napsgfoundation.org/
  - Develop a plan to integrate GIS into the emergency mgt. workflow/SOP
- Familiarize yourself with the Coastal Storm SOG
- Work with GIS and emergency responders to begin creating your own SOG/SOP
- Locate data and models needed
- Create templates, schedule work products and develop reporting mechanisms based on local knowledge, policies, & procedures
- Exercise, educate, & train all emergency mangers & GIS responders on your agency's new SOG/SOP's

Questions?

Also, feel free to follow up with me at:
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