Situation Manual
Rising Waters

Exercise Only

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Conducted at the 2017 National Geospatial Preparedness Summit

Contents

1 Introduction

This National Geospatial Preparedness Summit (NGPS) preparedness exercise is a hybrid discussion-based and functional exercise designed to advance skills of GIS staff and use of location-enabled decision support capabilities by decision makers and operators – to promote shared understanding and enhanced operational coordination. Key elements of that coordination involve data, analytics, products, and technology requirements, all of which support decision making.

This scenario-driven exercise is structured to explore key questions outlined below. Associated objectives are described in the following subsections.

- What pre-incident and incident level geospatial capability, products, information, and analysis are needed to support effective operational decision making throughout the disaster life-cycle?

- What are the essential features and functionality of effective decision support capabilities that aid operational coordination, planning, and situational assessment?

1.1 Employing Geospatial Capabilities

What pre-incident and incident level geospatial capability, products, information, and analysis are needed to support effective operational decision making throughout the disaster life-cycle?

- Confirm or identify triggers indicating **what** geospatial capabilities are needed to support disaster operations for this short-notice, slow-moving incident.

   - How does incident scope, scale, and complexity of multi-jurisdictional responses shape requirements for unified GIS/Geospatial support?

   - Are there unique triggers for single-jurisdiction versus complex multi-jurisdictional and/or cross-discipline responses?

- Validate and identify **when and what** geospatial and associated analytical products are needed to prepare, initiate, and tailor disaster operations for this incident.

   - Which products/analysis could be directly accessible and consumable by operators or decision-makers with little or no GIS/geospatial analyst interaction?

   - Which products/analysis require mutual interpretation/clarification with GIS/geospatial analysts?

- Validate or identify common operational **information and geospatial product/analysis requirements** specific to the short-notice, slow-moving scenario provided.

- Validate or identify additional key **operational workflows** needed to support timely and effective decision making.

1.2 Geospatial Preparedness

What essential features and functionality of effective decision support capabilities aid operational coordination, planning, and situational assessment?

- Validate **common operational coordination decision points** and information required to support decision making.

- Identify the **essential features and functionality** of decision support capabilities.

- Identify **enhancements for location-enabled decision making capabilities** that could be provided by GIS staff.

- Identify **potential shortfalls** in how location-enabled decision support products or tools are provided and used for emergency or disaster operations.

- Validate **workflows** and information management requirements between decision makers/operators and GIS support.

This Situation Manual provides objectives and desired outcomes, a detailed scenario, and proposed facilitator questions for discussions during the exercise.

2 Exercise Goals

Advance the skills of GIS staff and use of location-enabled decision support capabilities by decision makers and operators – in an effort to promote shared understanding and enhanced operational coordination.

2.1 National Organizations and Agencies

- Verify common information requirements needed for effective decision making in a flood event across levels of government.

- Validated or Identify data requirements needed to fulfill common information requirements in a flood event across levels of government.

- Verify or Identify common features and capabilities of location-enabled decision support capabilities needed to drive action and support decision making in a flood event.

- Validate or identify emerging smart practices regarding common operational coordination decision points, information requirements, and GIS capabilities that should be incorporated into national guidelines, standards, tools, and templates.

2.2 Local, State, Territorial, and Tribal Agencies

- Validate and strengthen understanding of operational decision points, information requirements, and GIS capabilities required to support decision making in a flood event.

- GIS staff have a better understanding of how to develop and deliver the right information products to decision makers at the right time to inform operational coordination in a flood event.

- Operators and decision makers have a better understanding of GIS staff capabilities, products, and analysis that support decision making in a flood event.

- Bridge terminology or communication gaps between decision makers, operators, and GIS staff to better anticipate and fulfill information requirements.

3 Exercise Format

Discussion-based and functional exercise activities provide a forum to achieve exercise objectives. This exercise will begin with a brief tabletop exercise to promote mutual understanding across and between operators and GIS practitioners. Functional exercise play provides a hands-on opportunity for operators/decision makers and GIS practitioners to apply skills and knowledge needed to employ GIS capabilities in a simulated response to a major flood event.

3.1 Breakout Groups

NGPS participants will be grouped into four (4) facilitated breakout groups. Each group will consist of approximately 40-50 participants and reflect blended and balanced participation by decision makers, operators, and GIS staff. Participants will be preassigned and directed to their assigned groups.

3.2 Scenario

All breakout groups will use a single scenario and receive injects at the same time. The exercise scenario focuses on the potential for a complex incident effecting a broad regional area resulting in an incident of national significance.

3.3 Simulation

Each breakout group represents a different agency/jurisdictional perspective effected by the scenario. The Facilitator/Controller should guide players into exercise play based on the agency/jurisdiction they are simulating.

3.4 Facilitators/Controllers

NAPSG Foundation Facilitator/Controllers will be assigned to each breakout group. Facilitators/Controllers will possess a combination of operational experience and technical knowledge.

3.5 Technical Support

Each breakout group will be assigned 1-2 NAPSG Foundation Technical Support experts. They will be available to provide technical assistance to GIS staff during conduct to support developing and producing decision support products.

3.6 Technical Preparation

All NGPS participants will be set-up in applicable technology platforms, including the NAPSG Center (NAPSG's instance of ArcGIS Online), prior to the day of the exercise. NAPSG Foundation will use its existing process to pre-establish user accounts and provide them to participants.

3.7 Observation and Evaluation

This exercise is a four-hour facilitated exercise with hot wash. Facilitator questions and injects allow participants to discuss roles, responsibilities, and key decision point, while developing and applying location-enabled decision support capabilities. Discussions are structured around identified core capabilities, critical coordination points, requirements, and potential challenges or shortfalls. Each breakout group will have individuals assigned as exercise evaluators/observers.

4 Participants

Exercise participants include public safety decision makers, operators, and GIS staff from local, state, and federal agencies nationwide.

4.1 Scope and Assumptions

Exercises play a vital role in geospatial preparedness by enabling emergency management practitioners, geospatial technologists, and other partners to build, sustain, and validate capabilities as well as identify potential capability shortfalls and areas for improvement. A well-designed exercise provides a low-risk environment to share understanding of roles, requirements, challenges, and critical coordination points that foster collaborative problem solving and communication across organizations.

Facilitators and coaches ensure participants have an opportunity to contribute. While questions may be directed to specific players at times, all participants are encouraged to share their perspectives. It may be necessary to move discussions forward or move to other questions to maximize opportunity for a diverse set of participants to engage in the exercise. Time constraints and flow of discussion may not allow all proposed questions to be addressed.

Participants should consider the following exercise ground rules to ensure exercise objectives are met in a reasonable amount of time and that the exercise runs smoothly:

Keep exercise objectives in-mind throughout the exercise.

Participate openly, and focus discussions on appropriate topics related to exercise objectives. Asking questions; sharing thoughts; and offering forward-looking, problem-solving suggestions are strongly encouraged, as these will enhance everyone's exercise experience.

Focus your comments and consider time constraints.

In any exercise, assumptions may be necessary to complete discussions in the time allotted. During this exercise, the following assumptions apply:

- The scenario and likely effects to the communities and surrounding area(s) are plausible, and events occur as they are presented.

- There is no hidden agenda or trick questions.

- Players receive information at the same time.

4.2 Observations and Evaluation

Exercise observation and evaluation strategies for this facilitated discussion are consistent with Homeland Security Exercise and Evaluation Program (HSEEP) Guidance and appropriate for use with exercises intended to provide learning opportunities rather than test individuals or plans.

Employing Geospatial Capabilities:

1) Were triggers indicating what geospatial capabilities are needed to support disaster operations for this incident validated or identified?
   a) If yes, what triggers were validated?
   b) What new triggers, if any, were identified?
   c) If no, why not?
2) Given the scenario, simulated jurisdictions, and available GIS capabilities, what support, analysis or products did operators indicate they would use or request?
   a) D- 24
   b) D+ 0
   c) D+ 24
   d) And beyond (predictive situational awareness)
3) What information did participants indicate needing to know prior to making or fulfilling a request?

Geospatial Preparedness Evaluation and Observation Criteria:

1) Did GIS practitioners produce an enhanced and predictive consequence assessment that effectively supported operator decision making? (i.e., Did the products inform and change or affirm decisions using sound location-enabled analysis?)
2) Did GIS practitioners successfully incorporate operator-driven critical information points that successfully aided in operational decision making?
   a) If yes, what critical information points were incorporated and why did they prove effective?
   b) If no, why not? What challenges were experienced?
3) Did GIS practitioners successfully incorporate USNG to identify areas of interest, describe areas of responsibility, and communicate consequences to increase accuracy or confirm planning assumptions to support each discipline? (e.g., rather than communicate projected consequences by entire county, city – were GIS practitioners able to use USNG to "zero" in on affected areas?)
   a) If no, why not? What challenges did they experience?

4.3 Core Capabilities

The National Preparedness Goal, released in September 2011 and revised in 2015, defines what it means for the whole community to be prepared for all types of disasters and emergencies. It

also identified five mission areas encompassing 32 "core capabilities," or the distinct critical elements needed to achieve the National Preparedness Goal of a secure and resilient Nation.

Three core capabilities will be explored during this exercise: Operational Coordination, Planning, and Situational Assessment. Definitions for these core capabilities are as follows:

| Core Capability	Description	
Operational Coordination	***Establish a unified and coordinated operational structure*** and process that appropriately integrates all critical stakeholders and supports all disaster operations.	
	Response	**Recovery**
	• Mobilize all critical resources and establish command, control, and coordination structures within the affected community and other coordinating bodies in surrounding communities and across the Nation and maintain as needed throughout the duration of an incident • Enhance and maintain command, control, and coordination structures, consistent with the National Incident Management System (NIMS), to meet basic human needs, stabilize the incident, and transition to recovery	• Establish tiered, integrated leadership, and inclusive coordinating organizations that operate with a unity of effort and are supported by sufficient assessment and analysis to provide defined structure and decision making processes for recovery activities. • Define the path and timeline for recovery leadership to achieve the jurisdiction's objectives that effectively coordinates and uses appropriate local, state, tribal, territorial, insular area, and federal assistance, as well as nongovernmental and private sector resources. This plan is to be implemented with the established timeline.
Planning	***Conduct a systematic planning process*** engaging all installation components and tenant units as well as relevant mission partners as appropriate in developing strategic and operational approaches to meet defined objectives.	
	Response	**Recovery**
	• Develop operational plans that adequately identify critical objectives based on planning requirements, provide a complete and integrated picture of the sequence and scope of the tasks to achieve objectives, and can be implemented within time frames contemplated in the plan using available resources	• Convene the core of an inclusive planning team (identified pre-disaster), which will oversee disaster recovery planning. • Complete an initial recovery plan that provides an overall strategy and timeline, addresses all core capabilities, and integrates socioeconomic, demographic, accessibility, technology, and risk assessment considerations (including projected climate change impacts), which will be implemented in accordance with the timeline contained in the plan
Situational Assessment	***Provide all decision makers and Senior Leaders with decision-relevant information*** regarding the nature and extent of the incident, any cascading effects, and the status of operations.	
	Deliver information sufficient to inform decision making regarding immediate lifesaving and life-sustaining activities and engage governmental, private, and civic sector resources within and outside affected areas to meet basic human needs and stabilize the incident. Deliver enhanced information to reinforce ongoing lifesaving and life-sustaining activities, and engage governmental, private, and civic sector resources within and outside of the affected area to meet basic human needs, stabilize the incident, and support recovery.	

5 Scenario Narrative

5.1 SITUATION

Late June severe flash flooding from a stalled regional storm system flooded Highway 67 with three feet of water southwest of Cleburne, TX. Rural roads saw flooding of one to two feet resulting in several swift water rescues. Collectively, north-central Texas received precipitation amounts 150%-200% above average in the month of June. Early July storms produced several rounds of severe weather with 30+ reports of flash flooding across north-central Texas were reported to the National Weather Service Fort Worth Forecast Office (NWS- Fort Worth).

July Rainfall Totals
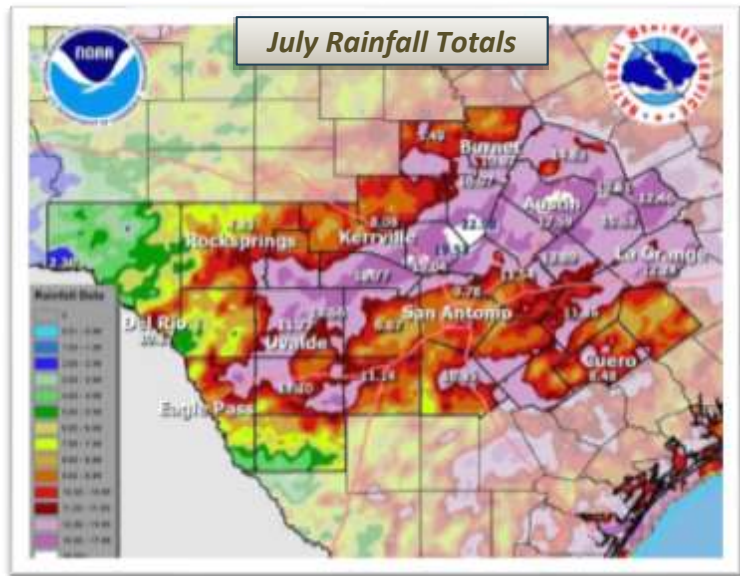
Most locations across south-central TX have received well-above normal rainfall, saturating soils. July has been the wettest month in Texas history. This weather pattern sets the stage for more concentrated and consequential flash flooding events. Current conditions will result in any new rainfall, especially heavy rain, becoming run-off directly into rivers, streams, and flash-flood prone areas.
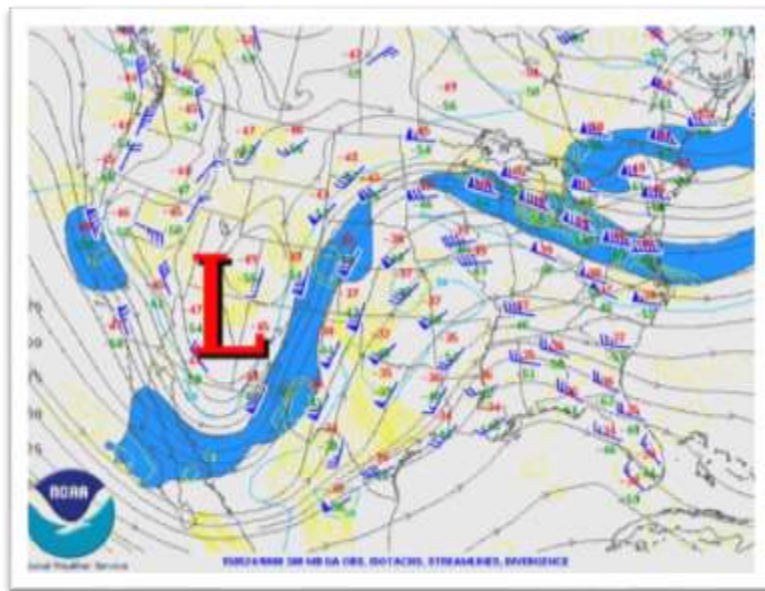
A persistent area of low pressure is expected over the western U.S. that is likely to bring multiple rain events over through the end of the week and into the weekend. As much as 12 inches of rain over a 6-hour period is possible over the upper reaches of the Blanco River watershed. Rainfall may be heavy at times with upwards of 4" per hour as thunderstorms merge/regenerate over southern Blanco and eastern Kendall counties.
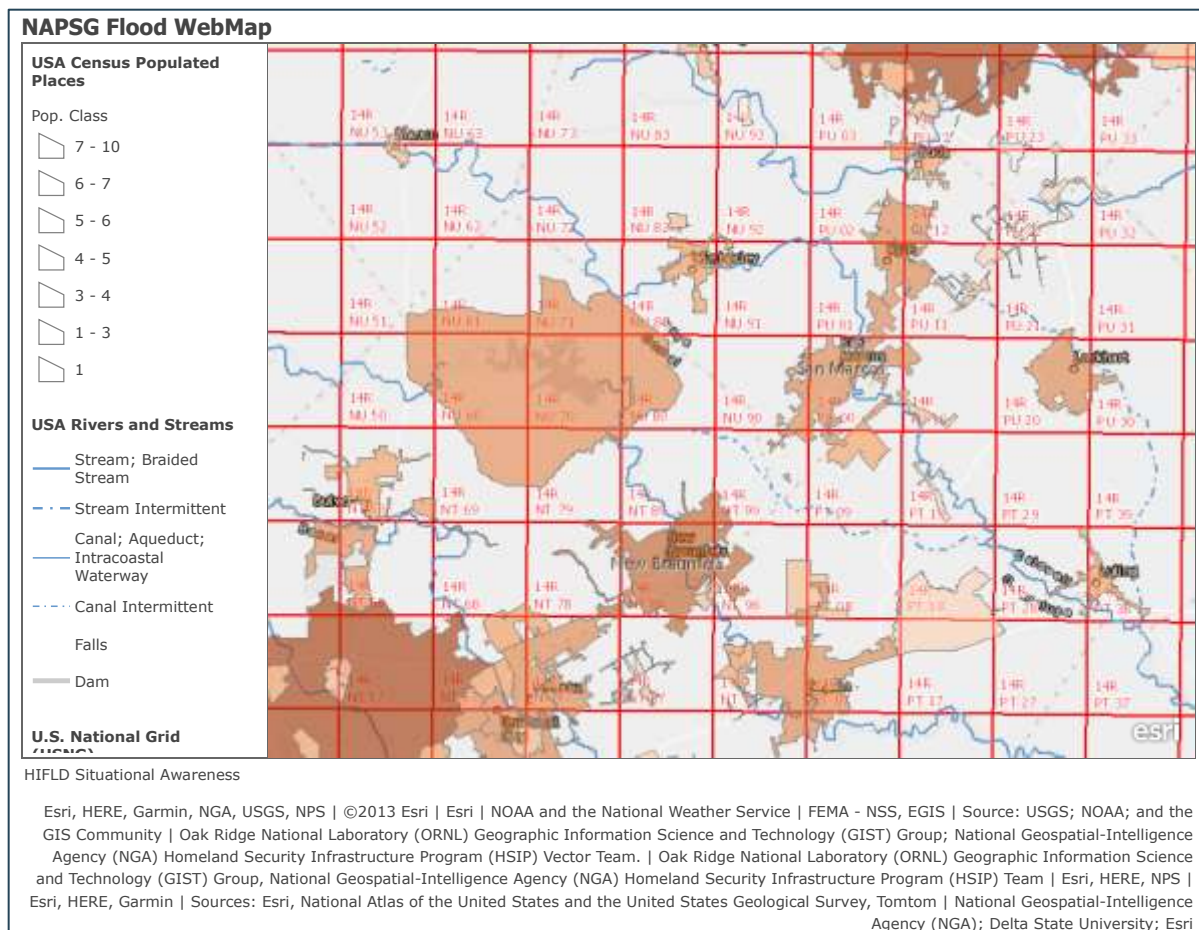
Widespread rainfall of 6-8 inches is possible across Kendall, Blanco, Hays, and portions of Comal. Most rainfall is expected throughout today and into the overnight hours of early Thursday morning, leading to potential rapid rise (2-3ft or more per hour) in Blanco and San Marcos rivers.

Residents, visitors, and businesses along the Blanco and San Marcos rivers or within areas prone to flash-flooding should remain vigilant, alert for public information, and heed public safety warnings as issued by local governments.

Table 1: Demographics

Jurisdiction	Housing Units	Pop (2012)	Under 5	5 to 19 Years of Age	20 to 64 Years of Age	65+ Years of Age
Blanco	1,849	781	UNK	UNK	UNK	UNK
Canyon Lake	11,775	22,496	UNK	UNK	UNK	UNK
Wimberley	1,482	2,760	UNK	UNK	UNK	UNK
San Marcos	18,179	47,433	UNK	UNK	UNK	UNK
Martindale	462	1,145	UNK	UNK	UNK	UNK
Luling	2,115	5,503	UNK	UNK	UNK	UNK

Demographics above include directly and indirectly affected populations. Participants should consider strategies to refine and communicate each affected population group to include cascading effects from damage to or loss of community lifelines such as energy (electric/gas/fuel), communications, water/wastewater, and public health & medical services.

HIFLD Situational Awareness

Esri, HERE, Garmin, NGA, USGS, NPS | ©2013 Esri | Esri | NOAA and the National Weather Service | FEMA - NSS, EGIS | Source: USGS; NOAA; and the GIS Community | Oak Ridge National Laboratory (ORNL) Geographic Information Science and Technology (GIST) Group; National Geospatial-Intelligence Agency (NGA) Homeland Security Infrastructure Program (HSIP) Vector Team. | Oak Ridge National Laboratory (ORNL) Geographic Information Science and Technology (GIST) Group, National Geospatial-Intelligence Agency (NGA) Homeland Security Infrastructure Program (HSIP) Team | Esri, HERE, NPS | Esri, HERE, Garmin | Sources: Esri, National Atlas of the United States and the United States Geological Survey, Tomtom | National Geospatial-Intelligence Agency (NGA); Delta State University; Esri

5.2 Exercise Roles/Responsibilities:

Facilitator/Controller: Facilitates discussions and supporting release of injects, ensuring discussions stay on target to achieve workshop objectives.

Participants/Players: Participate by engaging in collaborative, forward thinking discussions and hands-on solution development – including examining and where possible validating capability and capacity needed to change outcomes, maintain mission assurance, and identify potential challenges or opportunities for improvement.

5.3 Discussion Questions

Exercise participants will engage in discussions, functional exercise play (decision making or GIS activities), and out-brief presentations focused around exercise-specific objectives. Facilitated discussions will be centered on discussions regarding desired outcomes, priorities, courses of action to meet the needs of those affected, resources, and potential challenges with employing geospatial capabilities to support operations.

For Operators Players:
1) **During large-group TTx discussions:** From your operator or decision maker perspective, describe what GIS capabilities and products that GIS practitioners bring to the table.
2) Given the scenario, what geospatial capabilities, analysis, and/or products are needed to support decisions that must be made *now*?
   a) What GIS products/analysis/capabilities do you need to inform decisions and change outcomes for survivors and their communities?
      i) Before the incident? Initially post incident?
3) What GIS products/analysis/capabilities do you need to anticipate needs and requirements?
   a) What decisions need to be made *soon* to develop courses of action to stabilize the incident, including community lifelines, and to:
      i) reduce additional loss of life or injury,
      ii) maintain public health and support medical treatment, and
      iii) minimize damage to property or the environment?
4) Given the Scenario and GIS capabilities, analysis, and products provided, do you have enough resources to promote situational understanding, develop data-driven courses of action, and make informed decisions?
   a) What worked well?
   b) Did you identify smart practices or procedures you may consider integrating into your plans and procedures?

For GIS Staff Players:
1) Can you immediately enhance initial consequence projections and refine operator planning assumptions to support immediate decision making in support of operational coordination?
2) Do your consequence assessments communicate critical information beyond historical documentation of the hazard – tornado track(s) and/or other already known information?
   a) Incorporate these information points/data into your decision support tools:
      i) refined size/scope of directly affected area
         (i.e., not a whole city/town, county, or state)

      ii) potentially affected, critical facilities (schools, fire/ems, law enforcement, hospitals, assisted living facilities), including possible cascading effects

     iii) likely affected community lifelines such as energy (electric/gas), communications, water/wastewater, public health & medical services (dialysis, pharmacies, behavioral health), and transportation

     iv) access and functional needs (mobility, cognitive, autism/downs syndrome), electric dependent

     v) affected populations and demographics for time of incident (day/night)

3) Recommend and communicate recommendations by discipline for priority of effort/focus using the USNG?
   a) Initial debris management (support entry/re-entry)
   b) Search and Rescue
   c) Security/Law Enforcement
   d) Mass Care
   e) Stabilization/Restoration of community lifelines
   f) Patient and human remains collection points

4) Do your decision support tools support shared situational awareness, course of action development, and decision making for D- 24, D+12, D+24, and beyond?
   a) What other information could support decision making and operational coordination? When should they be included (incident timeline) to support which decision cycles?