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NWS WFO Jackson (MS), San Antonio,
& Cheyenne GIS/IDSS Teams
Blue & Red Ocean Strategy

- Innovate & Pursue New Opportunities Perspective
- Defend Current Position Perspective

Products & Services

Blue Ocean

- New

Red Ocean

- Existing

Blue Ocean

- New

Blue Ocean

- Existing
Red Ocean
Warning & Watch Services
Social Media Channels
NWS Webpages
NWS Routine Text Products
NWP Output

Blue Ocean
IDSS GIS/AGOL Services
River Flooding GIS Output
Post-Wildfire Flash Flood & Debris Flow Vulnerability
Integrated Emergency Management Services
How can the NWS launch into the GIS IDSS blue ocean?
Bridge innovative tools across the **NWS** & **Emergency Manager** span.

Science       Messaging       Response

Connections       Relationships
SAFER GIS DSS Application Suite

Storm-SAFER

Wildfire-SAFER

Tropics-SAFER

Flood-SAFER

Heat-SAFER

Provides NWS & Partners with:
1) When
2) Where
3) How Bad
WY-SAFER Hazard Dashboard

Storm-SAFER

Wildfire-SAFER

Flood-SAFER

WRN-SAFER
Badger Creek Burn Scar

FLASH FLOOD WARNING TILL 3:30 PM

TIMING
Now through this afternoon and evening.

AMOUNTS
3/4 to 1 inch has already fallen with another 1/2 inch possible.

IMPACTS
Areas of localized flooding and debris flows will be possible if not probable across portions of the burn scar in southwestern Albany County.

NATIONAL WEATHER SERVICE
Published on: 07/12/2018 at 1:15PM

THANKS TO:
- Chris for that report!
- Tornado continues to cycle just southwest of Mound, LA. Tornado could develop any moment.
SAFER AGOL Application Architecture

6 Tabs total

Legend: Web Application | Web Map | Supporting File | Web Link

SAFER Web Tabbed Story Map Application – arcg.is/CKOfv

Tab 1 – NOAA/NWS/EWX – SAFER Situational Awareness Overview Dashboard Application

NOAA/NWS/EWX – SAFER Situational Awareness Overview Map

Tab 2 – Radar & River Flood Stage Time Aware Map

Radar_Warnings Web Map

Tab 3 – SAFER – Flood Extents and Hydrographs

EWX Hydrograph .csv file

Tab 4 – MRMS 1-Hour Rainfall Accumulation Estimates

Tab 5 – MRMS 3-Hour Rainfall Accumulation Estimates

Tab 6 – USGS Streamer Application – Web Link

USGS Streamer Link
WY-SAFER Hazard Dashboard: arcg.is/aanH5

Storm-SAFER: arcg.is/0nTaHL

Wildfire-SAFER: arcg.is/1Dj8XC

WRH HRRR & Debris Flow: dev.wrh.noaa.gov/wrh/debrisflow/#

Flood-SAFER: arcg.is/CKOfv (Texas Centric Version)

WRN-SAFER: arcg.is/Xm40r
Another Blue Ocean – River Flooding Extent Maps

U.S. Army Corps of Engineers
Flood Event Simulation Model

Only 3 files needed to operate model

Extents produced in a matter of hours

70-98% accurate compared to ‘accepted’ HEC-RAS AHPS standards
Experimental River Flooding Inundation Maps

Height Above Nearest Drainage (HAND) Method

Derived HUC6 10-meter DEM Raster files across entire US CONUS

Internal & Core Partner planning exercise use*

Create KMZ files for Google Earth

*more testing needed in central & east CONUS
How to build a Flood SAfER ArcGIS Online Web Application

Jared Allen & EWG GIS Team
Senior Forecaster, NOAA/National Weather Service Austin/San Antonio, TX Weather Forecast Office
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Greetings,

Below you’ll find instructions on how to set-up an ArcGIS online webapp application configured similarly to the current operating version of the Flood Situational Awareness for Emergency Response (SAfER) Application hosted by the NOAA/NWS Austin/San Antonio, TX WFO. It can be accessed by clicking here. In addition, a direct link can be accessed by typing the following URL: arcgis.com/apps/local. Below is a picture of the latest version. The latest version online may look slightly different than pictured given periodic revisions.

To sum up the application’s purpose: It is designed as both an internal NWS and external Emergency Manager one-stop shop web application to increase river flooding awareness by providing enhanced decision support services to emergency response for river flooding episodes via NWS products and social media channels.

The application is built around the idea of being an easy-to-use, intuitive, fully interactive, zoomable, engaging application that logically flows from tab to tab to answer essential flood impact questions like:

- What is the flooding situation right now across the region or local area?
- What are the latest radar trends? How much rain has fallen in the last hour? Last 3 hours?
- What specific river, creeks, and streams are being affected? Which small watersheds are being impacted? Where do resources need to be directed to for evacuations or rescues?
- When the river reaches “X” feet, what areas will be impacted? What does the flood extent look like when it reaches major flood stage? Will this road/neighborhood/drainage area be affected?
- Where does the rain need to fall to impact a specific river location?

Section 1: Goals

Goal 1: To efficiently produce accurate flood extents for minor, moderate, and major flood stages at and along gauge sites (for a site specific distance) to aid both internal and external coordination and communication of the NWS with Federal, State, County and City emergency response officials.

Goal 2: Develop an intuitive and powerful interactive webmap and information viewer displaying the flood stages along specific gauge site segments.

Result: SAFER application - arcgis.com/1K69W4m

Section 2: Overview

Below are brief descriptions and overviews of the programs used to create river flood extent areas. A step-by-step tutorial can be found starting in Section 4.

Programs/Applications used in this workflow:
- ArcMap 10.5 or 10.6
- Flood Event Simulation Model (FESM) – US Corps of Engineers Vicksburg, MS
- ILRIS ArcGIS Online Mapping Application – Tabled Story Map
- ArcMap 10.5 - Majority of workflow will involve ArcMap 10.5. Work in this environment will consist of building and editing one point river gauge shapefile, one polyline stream shapefile, and a Polygon shapefile to mask the elevation raster dataset (DEM) to a study area extent. The DEM extent masking will determine how far upstream/downstream the flood extent will be mapped. Workflow will then transfer to the FESM program once the new shapefiles of gauges (points with respective MSL heights of a water surface) and stream segments (Polyline with FromTo Nodes) have been set and saved from ArcMap.

FESM - The required inputs to the model are the one gauge shapefile, one stream polyline shapefile linking the points and a DEM topography raster file. FESM differs from most flood inundation models in that it does not consider other flow or friction, and as a result does not need information about these conditions. Another key difference is that FESM does not directly implement either the Navier Stokes equations, the de Saint...
“...ability for us to be able to do this in-house has led to greater awareness for preplanning, the need for allocation of resources for an upgraded sensor network, and a better understanding of the correlation between gauge height and flood damage.”

- George Streble (Williamson County GIS Manager)
“Bottom-line…these graphics saved lives and allowed for me to compel local authorities for greater aid, resources, and response.”
– Janet Carrigan (Fayette County, TX EM)

Hurricane Harvey Flooding along the Colorado River at La Grange, TX

Shared 3 days prior to Major Crest

Shared 12-hours prior to Major Crest
Critical & Timely When Needed

• Preparation:
  • NWS sharing data before the next flood to GIS & EM partners
  • Develop flood extent libraries of different river levels

• Planning:
  • Key decision timelines
  • Communication of hazards
  • People and resource allocation

• Response & Recovery:
  • EOC awareness and service
Impact Catalog – NWS Evolve Mission

Impacts Catalog Mission and Operational and Functional Requirements

- WFOs (EKA, FFC, LWX, EAX, HGX, ANC, MPC, SLC, APX, DTX, BGM, GRR, MQTT, MKX, LOT, IWX)
- RFCs (Northeast RFC, Alaska-Pacific RFC)
- National Centers (SPC, AWC, NHC, WPC, CPC, NWC)
- All Six Regional Headquarters/ROCs
- Aviation (CWSU Palmdale, Alaska Aviation Weather Unit)
- National Programs (Tropical, Fire Weather, Climate, Hydrology)
Successful management from local NWS WFO level to National NWS Level is critical. Regional Development & Organization Beginning:

- Develop base templates
- NWS WFOs request GIS Mutual-Aid from regional team:
  - Similar to Social Media SAVI & MAS Teams
  - **Severe Hazard/Impacts**
  - **Tropical Hazards/Impacts**
  - **River Flooding Impacts**
  - **Wildfire Impacts**
Thank you!

NOAA VLab Forum

19 April 2019

Questions & Discussion

Email: Jared.Allen@noaa.gov