Best Practices in Using Technology for Public Information

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NAPSG Foundation

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Having situational awareness in the EOC....
...means nothing without situational awareness in the living room.
Why Use Maps?

- Easy to understand*
- Up to date
- Spatially explicit information

1. Type address here (or use location)
2. Find out what to do here
Example: Live Wildfire App

http://youtu.be/uSTGUYNY8_s?hd=1
Example: Live Wildfire Map

Usage details for the period:
September 29, 2019 - October 29, 2019

Item Views this Period: 3,818,225
Avg Item Views Per Day: 127,274.17

Usage Time Series

- Getty Fire
- Tick & Kincade Fires
- SaddleRidge Fire
Today’s Objectives

Everyone should leave this workshop with:

An understanding of common challenges associated with NOT using maps for public information sharing.

A checklist of best practices for public information maps.
  - Technical
  - Operational

A draft worksheet for maintaining and sharing public information maps as part of a geospatial game plan.
Agenda

• Common Challenges
• Case Studies
  • City of Boulder
  • Mariposa County
  • State of Oregon
• Best Practices
  • Technical
  • Operational
• Hands-On – Create A Game Plan
• Using the USDA Media Tool
• Amplify Your Message
Exercise: Be The Public

Access this public information map: [https://arcg.is/1TvWye](https://arcg.is/1TvWye)

1. Type in this address on the right: **900 Grape Ave., Boulder, CO**
2. Do you need to evacuate right now?
3. Where is your nearest open shelter?
4. Are there any road closures to be aware of?

Scan the QR with your camera
Common Challenges
Don’t want these posts to be about your agency?
Common Challenges when NOT using maps

1. Information that is not spatially explicit
2. Information that is difficult to update after it is shared
3. Information that has little or no situational awareness value
4. The media will make their own
...little or no situational awareness value

- Long lists of road names or evacuation zone boundaries
- Very difficult to interpret and make decisions from
- Problem for both internal and external situational awareness
- Often creates cross-jurisdictional issues (e.g., the public may not know which County website they should visit)

*Examples shown in the following slides are not meant to be critical of agency or personnel*
....not spatially explicit

• Creating evacuation zones using street names that don’t create an area

• Colloquial names cannot be “Googled” and can mean different locations depending on audience

*Examples shown in the following slides are not meant to be critical of agency or personnel*
…difficult to update once shared

• Once you share a screenshot or static list of placenames, it cannot be unshared

• Tweets and Facebook posts often get reshared hours or even days later!

*Examples shown in the following slides are not meant to be critical of agency or personnel*
...the media will make their own

- In the absence of agency provided information, the media (news and social media) will make their own maps

- Media maps may be:
  - Inaccurate
  - Not up to date
  -Disconnected from operational tempo

*They may also do a very good job but would always work better in partnership with the agency having jurisdiction.*
Case Study: City and County of Boulder
## City and County of Boulder

### Incident: 2013 Floods

<table>
<thead>
<tr>
<th>What Went Well?</th>
<th>Not So Well?</th>
<th>Improvements Made to Public Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posted a public information map that showed road closures</td>
<td>City servers could not handle the load during the first operation period, had to switch to county servers and add resources</td>
<td>Moving everything to ArcGIS Online to improve scalability</td>
</tr>
<tr>
<td>Good connection with the Type 1 IMT GISS</td>
<td></td>
<td>Creating an evacuation specific application</td>
</tr>
<tr>
<td>EOC was staffed with highly trained GIS professionals</td>
<td></td>
<td>Created internal mapping applications using WebApp builder to help ESFs (connected to Public Info Map)</td>
</tr>
</tbody>
</table>
Improvements Made

2013 FLOOD MAPS

Detailed maps of the September 2013 flooding and associated impacts to people, private property and public infrastructure in the City of Boulder.

This mapping is not used for regulatory purposes and does not change the FEMA floodplains. This information was captured to document the event and provide insight into areas requiring future analysis and mitigation.

All Mapping Data is Draft and Subject to Review.
Case Study: Mariposa County, CA
Mariposa County, CA

- Town of Mariposa, gateway to Yosemite National Park
- Population ~20,000 people
- Visitors > 1 Million people
- Hazards
  - Wildfire
  - Flood
  - Traffic
## Incident: 2017 Detwiler Fire

<table>
<thead>
<tr>
<th>What Went Well?</th>
<th>Not So Well?</th>
<th>Improvements Made to Public Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIS Staff supported the EOC (1)</td>
<td>There was not enough GIS Staff.</td>
<td>None (yet)</td>
</tr>
<tr>
<td></td>
<td>There was a huge disconnect between evacuation notice creation by sheriffs and the GIS Team in the planning section.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Public Information Map made available.</td>
<td></td>
</tr>
</tbody>
</table>
Mariposa County Sheriff's Office

Monday October 7th, 2019 :: 05:52 p.m. PDT

Briceburg Fire Mandatory Evacuations

A Mandatory Evacuation Order has been issued for the following areas: Both sides of Highway 140 from the Octagon to Colorado Rd. This includes the Bug Hostel area and all of Buffalo Gulch Road.

A Red Cross Evacuation Center has been established at the New Life Christian Church located at 5089 Cole Rd.

Instructions:

Address/Location
Mariposa County Sheriff's Office
5089 Old Hwy N
Mariposa, CA 95338

Text-a-Tip - Text TIP MARIPOSASO followed by your message, to 888777
Submit an anonymous web tip

Alert Details
Severity:
Severe - Significant threat to life or property

Urgency:
Expected - Responsive action SHOULD be taken soon (within next hour)

Certainty:
Observed - Determined to have occurred or to be ongoing

Category:

### Mariposa County, CA

**Incident: 2018 Ferguson Fire**

<table>
<thead>
<tr>
<th>What Went Well?</th>
<th>Not So Well?</th>
<th>Improvements Made to Public Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>More GIS Staff supported the EOC (2).</td>
<td>GIS Staff are still mapping evacuation notices from Nixle alerts.</td>
<td>Formation of a GIS Working Group across local counties, tribal, and federal agencies.</td>
</tr>
<tr>
<td>Live Public Information Map released!</td>
<td>FEMA National Shelter System not accurate.</td>
<td>Refinements to symbology and process of public information map.</td>
</tr>
<tr>
<td></td>
<td>Not clear how to map road closures.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Created public information map “on the fly”.</td>
<td></td>
</tr>
</tbody>
</table>
Mariposa County, CA

Incident: 2019 Briceburg Fire

<table>
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<th>What Went Well?</th>
<th>Not So Well?</th>
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</thead>
<tbody>
<tr>
<td>Public Information Map shared via Nixle Alerts.</td>
<td>*Bug with Collector on Android / W10 We still need a game plan for sharing data across agency maps, editing road closures, and shelter status.</td>
<td>Map was shared by our PIO and on social media for the first time. Public Information Map was ready to go (and is now) prior to the incident!</td>
</tr>
<tr>
<td>Sheriff's started evacuation planning from a map using Collector for ArcGIS.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff used internal layer to understand number of homes, VRBO, and sensitive needs population in zones.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mariposa County, CA

https://www.arcgis.com/apps/webappviewer/index.html?id=9cdac8da837f4ef3b9abd8d0a67ec7d4
Case Study: Oregon State
## Incident: 2017 Solar Eclipse

<table>
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<tr>
<th>What Went Well?</th>
<th>Not So Well?</th>
<th>Improvements Made to Public Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input from local/tribal/state community</td>
<td>Not everyone participated</td>
<td>Repeatable process for gathering data</td>
</tr>
<tr>
<td>COTS technology utilized</td>
<td>Lack of sharing from some jurisdictions</td>
<td>Connection with news media</td>
</tr>
<tr>
<td>Repeatable process</td>
<td></td>
<td>Creation of data sharing agreements</td>
</tr>
<tr>
<td>News media utilization</td>
<td></td>
<td>Drove creation of statewide fire evacuation layer</td>
</tr>
<tr>
<td>Cross pollination with OpsCenter system (like WebEOC)</td>
<td></td>
<td>Data views for the general public</td>
</tr>
</tbody>
</table>
State of Oregon – What Went Well?

• The entire community (local/tribal emergency managers, state emergency response partners) provided input on creation of a master eclipse events layer
• Were able to use COTS technology (Esri geoform) to populate a master data layer
• Easy to visualize events using data created from geoform as well as a javascript page showing the table view
• Integrated with public mapping program (Public RAPTOR) for keeping the public informed
• Social media integration – used Virtual Operations Support Team (VOST) to help spread the message
• News media caught on to resources available to public
• Integrated OpsCenter (our WebEOC like product) with GIS to indicate active declarations and EOCs
• Used opportunity provided by eclipse to have a master wildfire evacuation layer and shared to public map
State of Oregon – Not So Well?

- Did not get everyone’s participation
- Some jurisdictions did not share data during the event
Improvements Made

• While the eclipse was a “once in a lifetime event”, did provide a repeatable process for collecting data from partners and helped establish the importance of a wildfire evacuation layer for the state

• Established connection with news media and public information to help spread the word and be the official resource for data – news media is even embedding public RAPTOR on their pages during major events to keep the public informed

• Formalized handshake agreements (now data use agreements with signatures) for consuming and integrating RAPTOR incident data outside the RAPTOR application – GIS server access to data providers and feature service editing capability

• Creation of simpler mapping applications geared towards specific data using storymap/operations dashboard templates (Leadership Briefing product)

• Creation of GIS contacts directory for getting a hold of key players at local/tribal/state/federal level (modeled after NSGIC Emergency Management Contacts Directory)
State of Oregon

2018 Results

- Public Engagement:
  - Become resource for relevant data about wildfire evacuation
  - Take advantage of sharing of services with partners
  - Keep the public informed with accurate and up-to-date information
  - Nearly 500,000 views of Public RAPTOR during fire season
Technical Best Practices

CORE INFORMATION NEEDS FOR THE PUBLIC DURING WILDFIRES

Wildfires increasingly impact populated areas across the West (see InSPIRE for incident details and a quick map of all current incidents). NAPSG Foundation, in conjunction with the East Disaster Response Program, has been supporting public safety agencies with best practices for Public Information Maps. This post is a synopsis provided to help agencies get better prepared before the next disaster strikes. The blog is focused on fire incidents, but the same principals apply to most types of disasters.

Technical Best Practices

1. Simplicity
2. Scalability
3. Security
4. Smartphone
5. Shareable
1. Simplicity

- Evacuation Notices
- Open Shelters
- Road Closures
- *Hazards

Mariposa County GIS Staff during the 2018 Ferguson Fire did a great job of keeping their map as simple and up to date as possible. This provided essential information to the Public in a way that was easy to understand.
1. Simplicity
1. Simplicity

Evacuations – Am I Safe Here?

• Keep it simple!
• Red, Yellow, Green
• Address / Place Searchable
1. Simplicity

Shelters – Where can I go?
• Show open shelters
• Are pets allowed? Livestock?
• Regional vs. Local
• Up to date
1. Simplicity

**National Shelter System**

The Red Cross National Shelter System (NSS) contains information for over 56,000 potential shelter facilities and is used to track and report shelter information during disasters.

*not all shelters participate, potentially moving to a cloud-hosted layer in 2020 but in the meantime be aware of scalability issues

https://gis.fema.gov/arcgis/rest/services/NSS/OpenShelters/MapServer
Road Closures – How Do I Get To Safety?

- Show road closures
- Regional
- Updated
Where is Anderson Valley?
1. Simplicity

As your incident grows in complexity, and you need to add more than 3 or 4 layers to map, consider having additional maps.

Story Map Series is shown here for the Decker Fire - [Documentation](napsgfoundation.org).
1. Simplicity
1. Simplicity

As your incident grows in complexity, and you need to add more than 3 or 4 layers to map, consider having additional maps.

Web AppBuilder share widget can be used to customize the visibility of layers and map extent - [Documentation](#)
Labels for evacuation areas can be incredibly helpful for improving map usability.
2. Scalability

- Do not host data on internal servers!

- ArcGIS Online Cloud Hosted layers are scalable and you do not pay per view.

Best Practices for High Demand/Viral Apps

Sharing and Collaboration
September 13, 2018
Kelly Gerrow-Wilcox

updated from an article published March 2017

News Flash! ArcGIS Online users make great Apps that are used to inform and engage the public about important and interesting geospatial topics. Apps hosted on ArcGIS Online are easily shareable and can receive hundreds of thousands of views in a short amount of time. ArcGIS Online scales to meet the demand of your application, making it easy to create and share applications that may receive a high demand of requests (1000s of request per second) from your users.

Consider a natural disaster, where apps are created to inform the public of evacuation zones and shelters. These apps may receive hundreds of thousands of views in a matter of days, receiving a high amount of web traffic. In order to ensure that these apps are performing at their best under high demand, consider these best practices for layer management, so ArcGIS Online can handle the rest.
2. Scalability

Usage details for the period:
October 21, 2019 - October 28, 2019

Item Views this Period: 2,491,420
Avg Item Views Per Day: 355,917.14

Usage Time Series

Item Views:
- 10/20: 234,654
- 10/21: 249,200
- 10/22: 234,654
- 10/23: 235,654
- 10/24: 649,200
- 10/25: 593,652
- 10/26: 525,962
- 10/27: 492,616
2. Scalability

Hosted Feature Layers and Views

3. Security

• Do not provide public access to editable feature layers in your public web maps and apps.
3. Security

Hosted Feature Layer Views
- Internal Editing
- Public Viewing of LIVE Data

Blog: Getting Started with Hosted Feature Layer Views
3. Security

Internal Editing Feature Layers

Operations Response Solution

Live & Filtered Public Feature Layer Views

Public Information Map Solution
+70% of public are reading the news on their mobile devices!

Your maps need to work on mobile in order to be effective.
5. Shareable

• Share them via alert messages
• Embed in emergency management websites
• Share via Social Media
• Use at Public Meetings
• Double check all the layers, web maps, and apps are shared publicly!
Use Living Atlas subscriber content in public maps and apps

The Living Atlas of the World is a collection of authoritative maps, data, imagery, tools, apps authored and published by Esri and partners. It also includes contributions from ArcGIS users worldwide. It is a curated subset of ArcGIS Online items Esri, and the Arc community.

Types of Living Atlas content

Much of the content found in the Living Atlas is available publicly, with no restrictions content is not publicly available by default, and falls into two categories:

Subscriber content is the collection of layers published by Esri that requires an organizational subscription account to access. These are layers such as Landsat 8 ima NAIP imagery, landscape analysis layers, and historical maps. Subscriber content is provided as part of your organizational subscription and does not consume any credits.

External URLS to subscriber content:

LA City Fire Department embeds incident maps right into their “NEWS” websites and also links to them in their social media posts.
5. Shareable

“Media Map” Configurable App Template

Works on mobile, even embedded!
5. Shareable

LA City Fire Department also shares their maps with the local news!
2019 Easy Fire: Ventura County had an evacuation map ready before the fire started (for power outages). Tweet within 10 minutes!
5. Shareable

Interactive Map: Kincade Fire evacuation zones, fire perimeter


2019 Kincade Fire
- Transitioned from a power outage map to a fire public information map
- Sonoma County Public Information Map
- More than 8 Million Views
Florida SERT has a “Know Your Zone” website always ready to go, not just when a hurricane is imminent. **Example**
5. Shareable

Southland Civil Defence in NZ
- Map embedded on website 24/7
- Allows for a “Report It” function
- Process in place for editing map behind the scenes

See Example
Some nice examples from Australia!

https://arcg.is/HHG48
Test, Test, Test

• Send to at least 4 people of different backgrounds for feedback.
• Watch them use it, recording timings
• Ask them to answer questions
  • Where is the fire/flood/tornado?
  • Do you know if you need to evacuate based on your location?
  • Where is your nearest shelter?
  • How would you get to the nearest shelter?
Technical Best Practices

1. Simplicity
2. Scalability
3. Security
4. Smartphone
5. Shareable
# Technical staff - Do you have a geospatial game plan?

<table>
<thead>
<tr>
<th>Type Of Info</th>
<th>Link / URL</th>
<th>High Demand Ready?</th>
<th>Easy To Understand?</th>
<th>Training / SOP Ready?</th>
<th>Archived and Ready For Next Incident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evacuation Notices</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Road Status</td>
<td>Link</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Shelters</td>
<td>Link</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Wildfire Perimeter</td>
<td>Link</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
</tr>
</tbody>
</table>
Operational Best Practices

Who does what and when? Geospatial Game Plan
Operational Best Practices

1. Design the Information Product
2. Build A Team
3. Build A Game Plan

*You will need to repeat this process for different hazard types or phases of disaster (e.g. Response vs Recovery).
1. Design the Information Product

• Define your audience
  • Language
  • Demographics
  • Environment
  • Connectivity

• Identify the real-world problem
  • Providing accurate and up to date fire-related information to the public.

• Envision your solution
  • A one-stop shop map that answers key questions related to fire incidents.
1. Design the Information Product

Audience

- Language
- Demographics
- Environment
1. Design the Information Product

Real-World Problem – Satisfy Core Information Needs for the Public

• Am I Safe Here?
• Where Can I Go?
• How Do I Get There?
2. Build A Team

Who needs to be a part of your public information map workflow?

• GIS Specialist
  • Are they on-call staff?
  • 24/7 coverage during disasters vs train a watch officer
  • Interagency cadre?

• Public Information Officer

• Liaisons:
  • Evacuation Notices: Incident Management Team GIS, Law Enforcement
  • Shelters: Mass Care, Red Cross
  • Road Closures: Law Enforcement, Public Works, Department of Transportation
3. Build A Game Plan

- Who does what, when?
- Approval Process?
- Executive Oversight?
Hands-on Session

Public Information Geospatial Game Plan
Operations Response

• **Audience:** Emergency Management Planning and Operations Staff, County Sheriff

• **Problem:** Your County Emergency Management Agency is planning a training exercise and wants to make use of “Web GIS.” Typically, they have you print out a new wall map each operational period and the status of facilities (e.g. shelters) are maintained in spreadsheets.

This time they want to coordinate planning and operations across multiple locations, with everyone having the most up to date information on a live map. For example, they want to be able update the status of evacuation zones and shelters without requiring GIS expertise.

• **Solution:** Operations Response App
Public Information

- **Audience**: The Public

- **Problem**: The Public needs situational awareness as much as emergency managers and first responders. They want answers to questions like:
  - Do I need to evacuate?
  - Where can I go for more information or protection?
  - How do I get there / are there any road closures?

- **Solution**: Public Information Web Mapping Application
Technical Game Plan

Hosted Feature Layer Views
• Internal Editing
• Public Viewing of LIVE Data

Blog: Getting Started with Hosted Feature Layer Views
Technical Game Plan

Internal Editing Feature Layers

Live & Filtered Public Feature Layer Views
Demo: Operations Response and Public Information Map

https://arcg.is/1TvWye
## Public Information Map Game Plan

<table>
<thead>
<tr>
<th>Lifeline</th>
<th>Core Info Need</th>
<th>Public</th>
<th>First Responders</th>
<th>Emergency Managers</th>
<th>Operational Game Plan</th>
<th>Technical Game Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evacuation Status</td>
<td>Am I safe here?</td>
<td>What areas do we need to evacuate? How many buildings / people in each area?</td>
<td>What areas have already been evacuated?</td>
<td>County Sheriffs designate initial evacuation zones based on communication with Fire and observations in the field. Emergency Managers use that information to plan for shelter and vulnerable population need (which is automatically calculated from areas).</td>
<td>The Master Feature Layer can be edited from web apps or Collector for ArcGIS (offline). The Hosted Feature Layer View is embedded in the Public Information Map.</td>
<td></td>
</tr>
<tr>
<td>Shelter Status</td>
<td>Where can I go to be safe?</td>
<td>Where do I take / direct evacuees?</td>
<td>Where are the evacuees? Do we have enough room?</td>
<td>Mass Care Lead and Red Cross will update the status of shelters.</td>
<td>The Master Feature Layer can be edited from web apps or Collector for ArcGIS (offline). The Hosted Feature Layer View, filtered for status = open, is embedded in the Public Information Map.</td>
<td></td>
</tr>
<tr>
<td>Road Status</td>
<td>How can I get there?</td>
<td>How do I get to those in need?</td>
<td>What is the status of transportation?</td>
<td>Public Works Lead will update the status of roads verbally over the radio. The GIS Specialist will update the layer.</td>
<td>The Master Feature Layer can be edited from web apps or Collector for ArcGIS (offline). The Hosted Feature Layer View is embedded in the Public Information Map.</td>
<td></td>
</tr>
</tbody>
</table>
# Operational Game Plan

<table>
<thead>
<tr>
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<th>Core Information Need</th>
<th>Public</th>
<th>First Responders</th>
<th>Emergency Managers</th>
<th>Operational Game Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evacuation Status</strong></td>
<td>Am I safe here?</td>
<td>What areas need to be evacuated?</td>
<td>What areas have been evacuated? Where do people need assistance?</td>
<td>Sherriff’s Office hand-draws evacuation zones and GIS Specialist updates the layer using pre-designated zones. Alerts are shared via WEA and social media with link to Public Information Map.</td>
<td></td>
</tr>
<tr>
<td><strong>Shelter Status</strong></td>
<td>Where can I go to be safe?</td>
<td>Where do I take evacuees?</td>
<td>Where are the evacuees? What are their needs?</td>
<td>Mass Care lead changes the status of shelters and edits attribute information (e.g., number of people, capacity, etc.) as needed.</td>
<td></td>
</tr>
<tr>
<td><strong>Road Status</strong></td>
<td>How can I get there?</td>
<td>How do I get to those in need?</td>
<td>What is the status of transportation systems?</td>
<td>Public Works provides internal feed of road status, GIS Specialist updates the layer.</td>
<td></td>
</tr>
</tbody>
</table>
Exercise: Geospatial Game Plan

• Fill out your worksheet the best you can.
• If you don’t have a clear answer for any one of these boxes, you have some homework to do!
• For Discussion: What boxes are missing from your worksheet?
Case Study: USDA Media Tool
I Have A Game Plan – Now What?

Amplify Your Message!
Use Social Media Tools

- Twitter
- Facebook
- Instagram
Use Alerting Systems

- Embed links to the live map in alerts.

[Open live map](https://arcg.is/mSKK8)
Partner with Volunteer Social Media Experts

https://cedrdigitalcorps.org/

https://www.nvoad.org/
Public Information Maps

- Always present
- Always ready
- Always appreciated
Coming Soon!

https://techinnovation-napsg.hub.arcgis.com/
Thank You!

Paul Doherty, NAPSG Foundation
Email: pdoherty@publicsafetygis.org

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