Using GIS for Flood Impact Assessment and Recovery

OFMA 2024 Spring Workshop

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Presenters

Michael Couch, GISP, CFM

- GIS Principal and Department Manager for Meshek
- GIS/Floodplain Experience– 20 years
- Program Management and Leadership

Jason Kleps, GISP, CFM

- GIS Project Manager for Meshek
- GIS Experience – 14 years
- Survey Management and Programming

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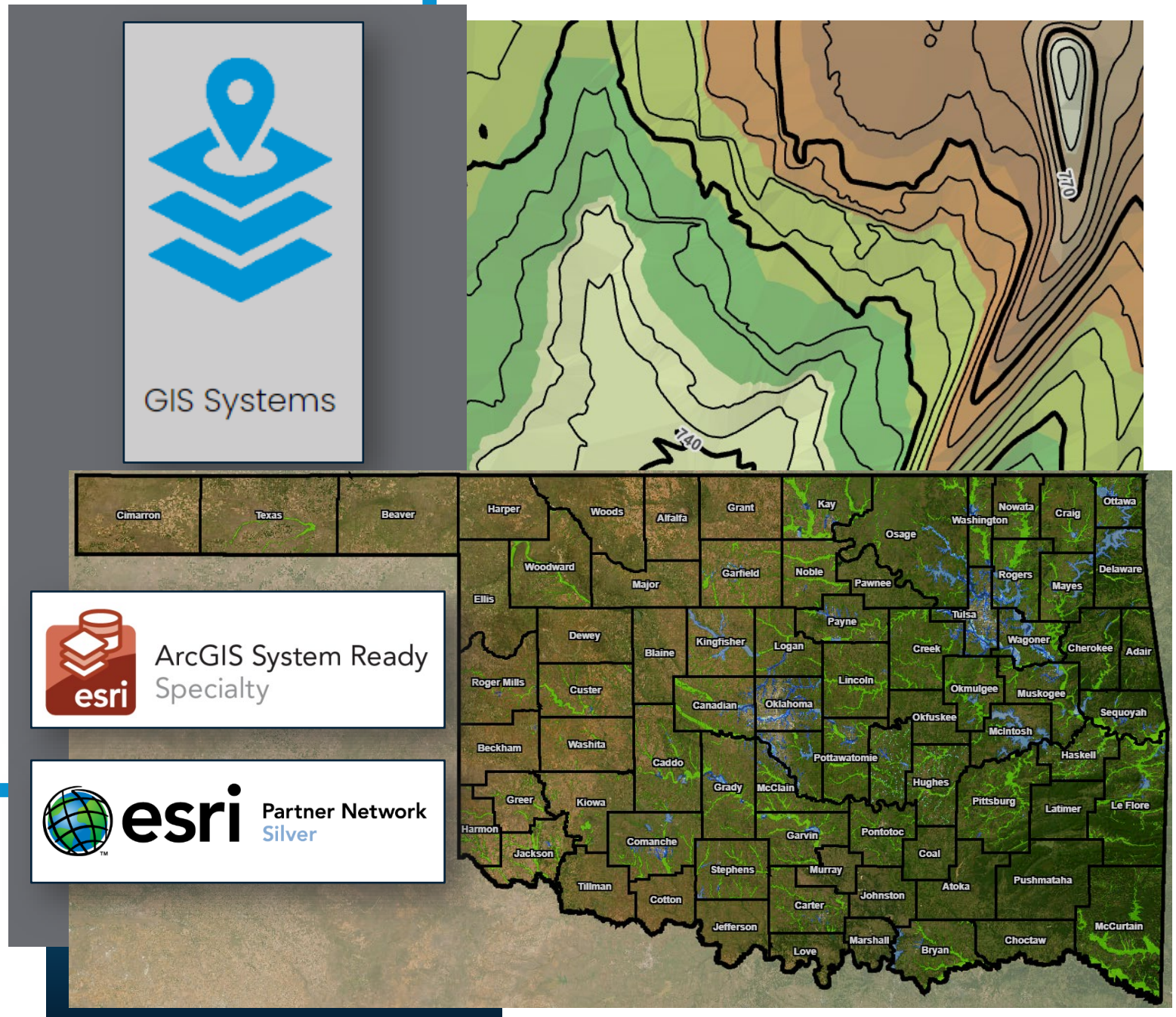

GIS Software

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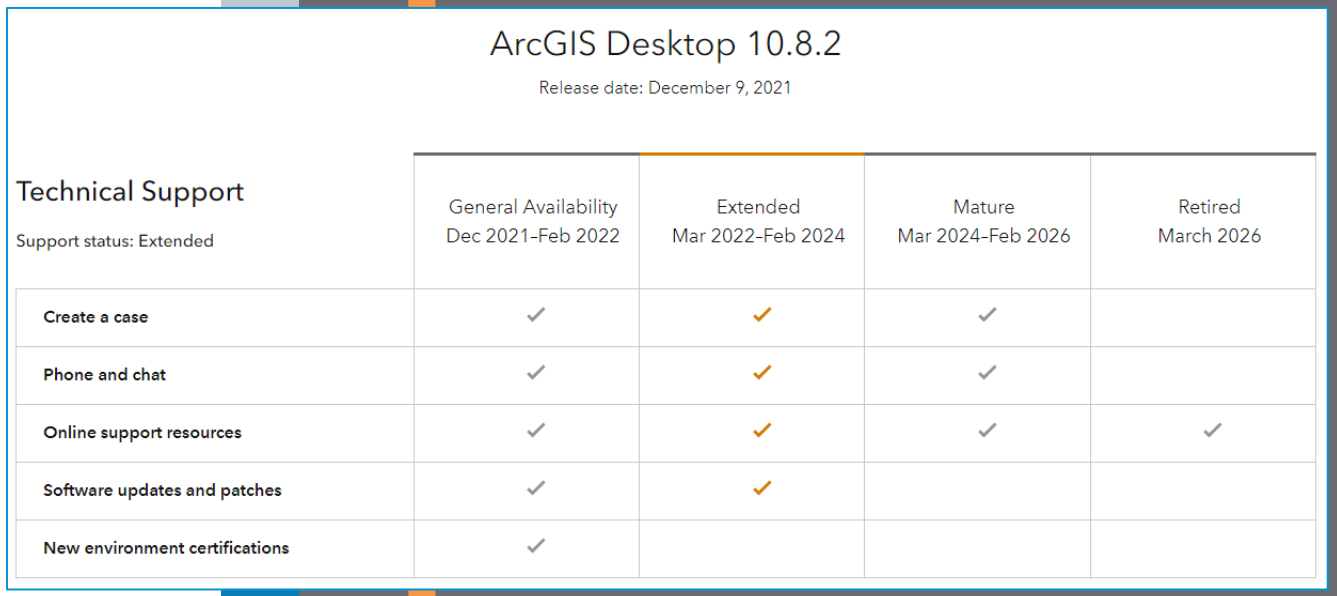
ArcMap Life Cycle Update

Time to move to Pro

- ArcMap (ArcGIS Desktop) final release: 10.8.2 (released 12/9/21)
- Support ends March 2026
- NEW SALES of ArcMap (ArcGIS Desktop and Extensions) will end JULY 1, 2024
- Contact customer rep or OK rep for questions
- ArcMap license has conferred a matching ArcGIS Pro license; will be Pro only for new customers (existing renewals good to 2026 date)



ArcGIS Desktop 10.8.2

Release date: December 9, 2021

Technical Support Support status: Extended	General Availability Dec 2021–Feb 2022	Extended Mar 2022–Feb 2024	Mature Mar 2024–Feb 2026	Retired March 2026
Create a case	✓	✓	✓	
Phone and chat	✓	✓	✓	
Online support resources	✓	✓	✓	✓
Software updates and patches	✓	✓		
New environment certifications	✓			

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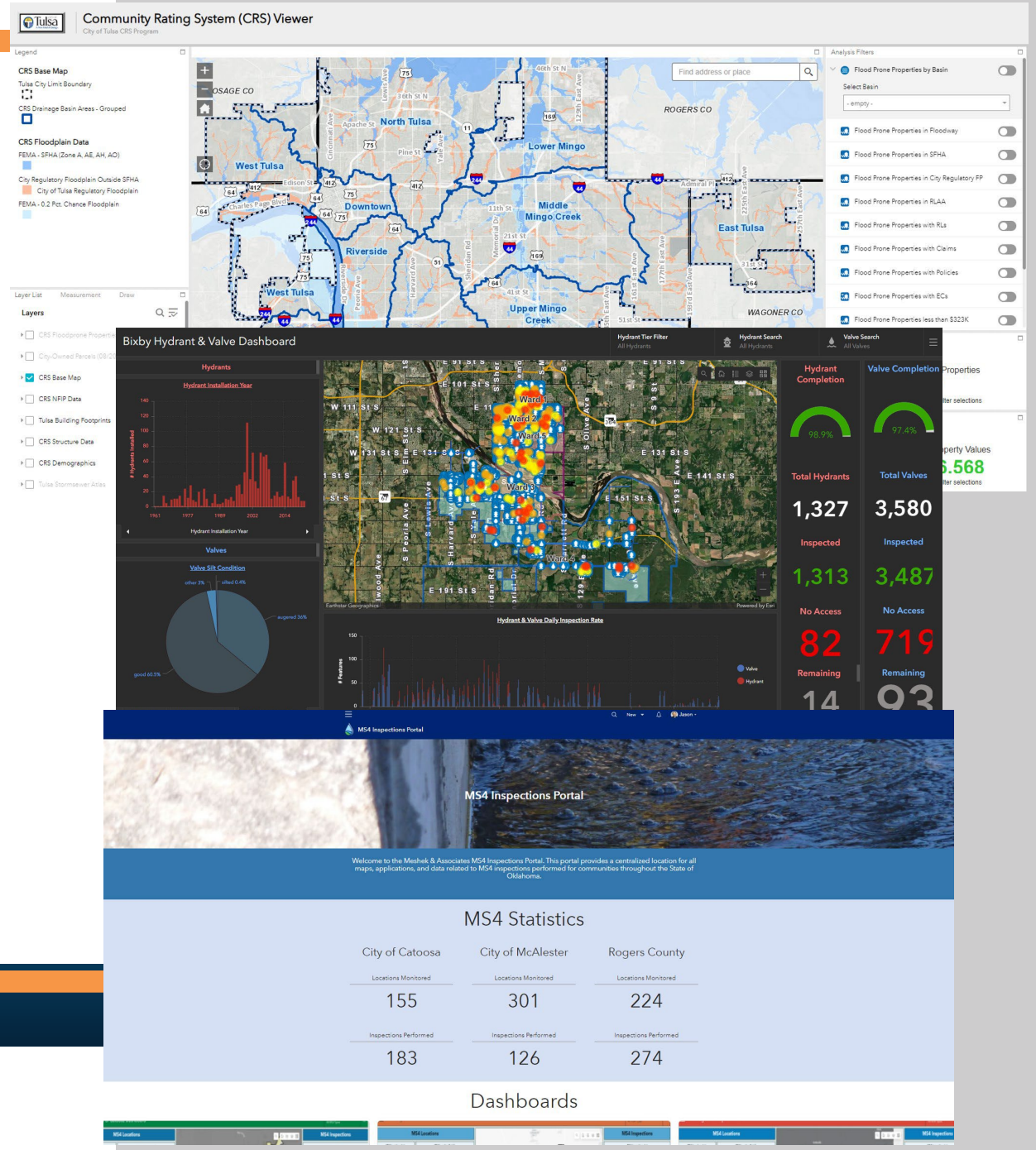
Modern GIS Applications

Different Options for Different Purposes

No longer desktop-executable install only:

- Viewers
- Dashboards
- Hub Sites
- Field Apps
- All fully supporting web and mobile access



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GIS Survey and Field Data Collection

Interacting with and Collecting Data

ArcGIS Field

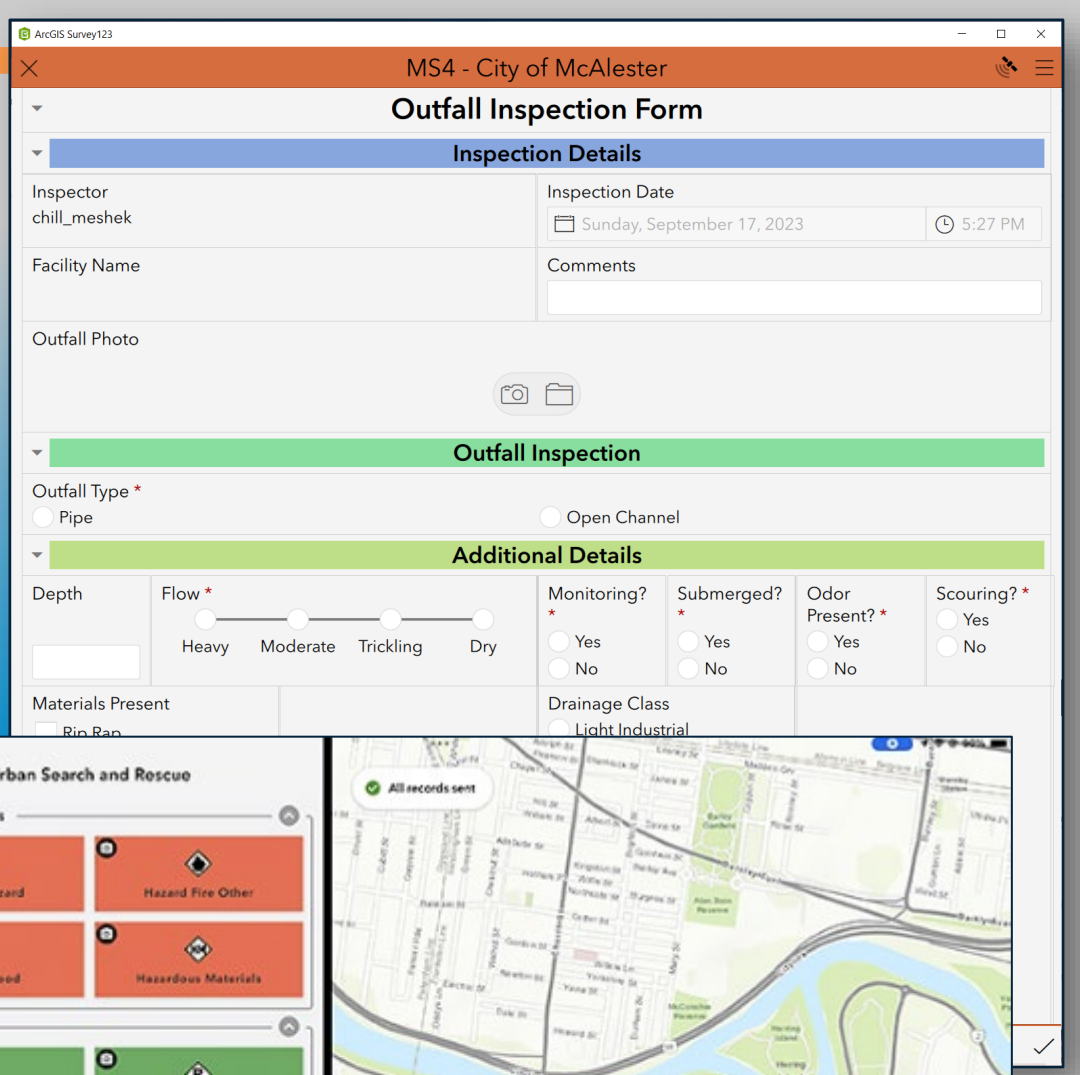
- "Map-centric"
- Collect new data and edit existing data
- Ideal for asset inventory – lots of features
- Access data via mobile device
- Offline editing available

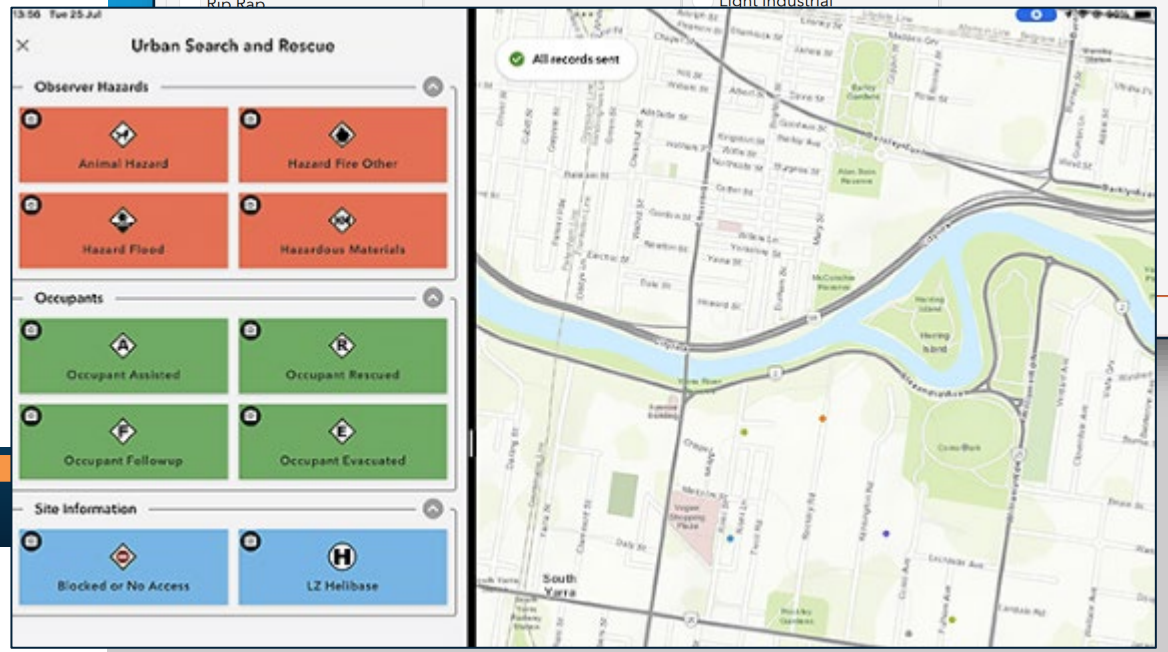
Survey 123

- "Form-centric"
- Build forms specific to your data collection needs
- Ideal for replacing paper-based forms
- Access data via mobile device
- Offline editing available

QuickCapture

- Click and go – click for a type, snap a pic, go on to the next





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Training

Take advantage of the training through the Esri Academy – most free or covered by maintenance.

Many specialty consultants.

State conference workshops (SCAUG, OFMA, OML)

Esri User Conference

User Community / Google

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ArcGIS Solutions for Damage Assessment

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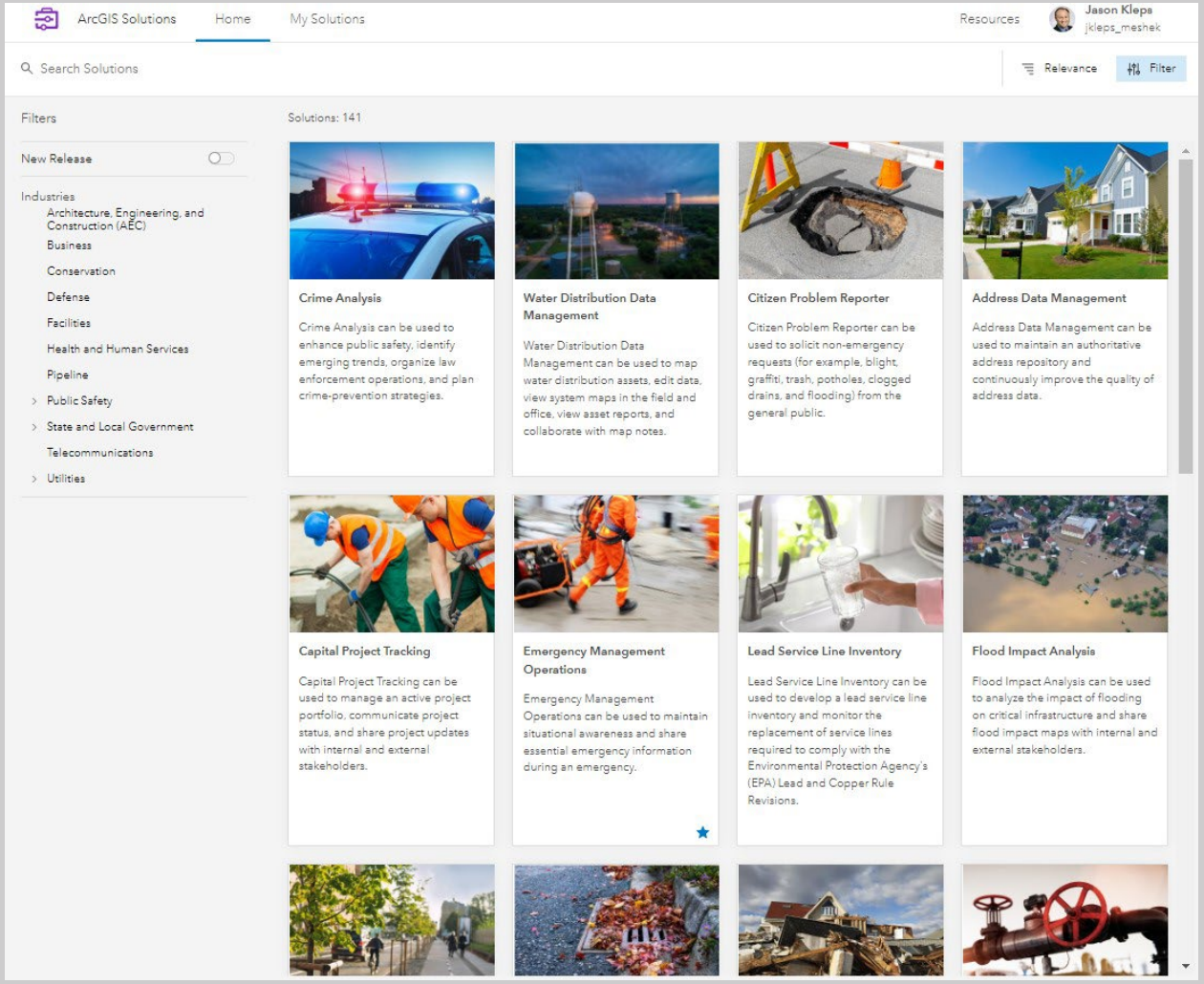
Focused Apps

- ArcGIS Solutions - https://www.arcgis.com/apps/solutions
- Solutions for every need:
  - Damage Assessment
  - Permitting
  - Construction Inspections
  - Flood Impact Assessment
  - And Many More …



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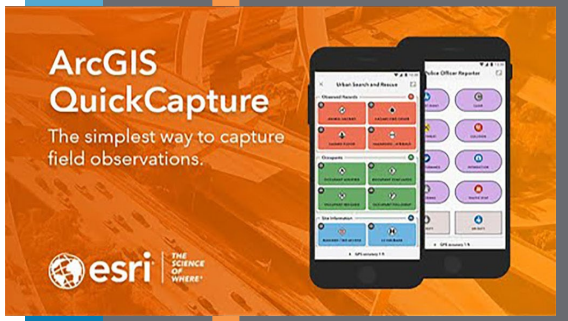
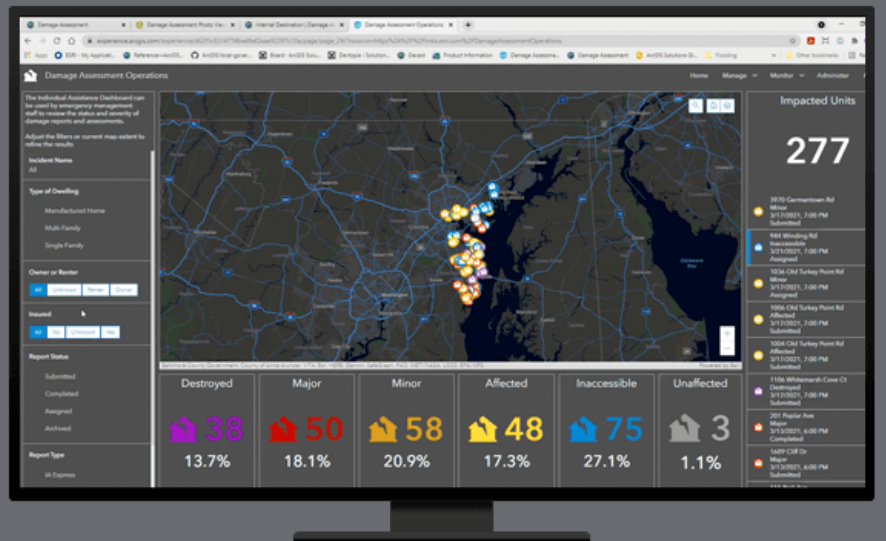
Esri Damage Assessment Solution

Esri Damage Assessment Solution

Damage Assessment Solution

- Solution comes with maps, apps, and layers with FEMA-approved survey templates for conducting Joint Preliminary Damage Assessments (PDA)
- Customizable
- Rapid assessment using Quick Capture
- More detailed follow up surveys using Survey123
- Data collected feeds into layer and into dashboard
- PDF reports can be generated from the data





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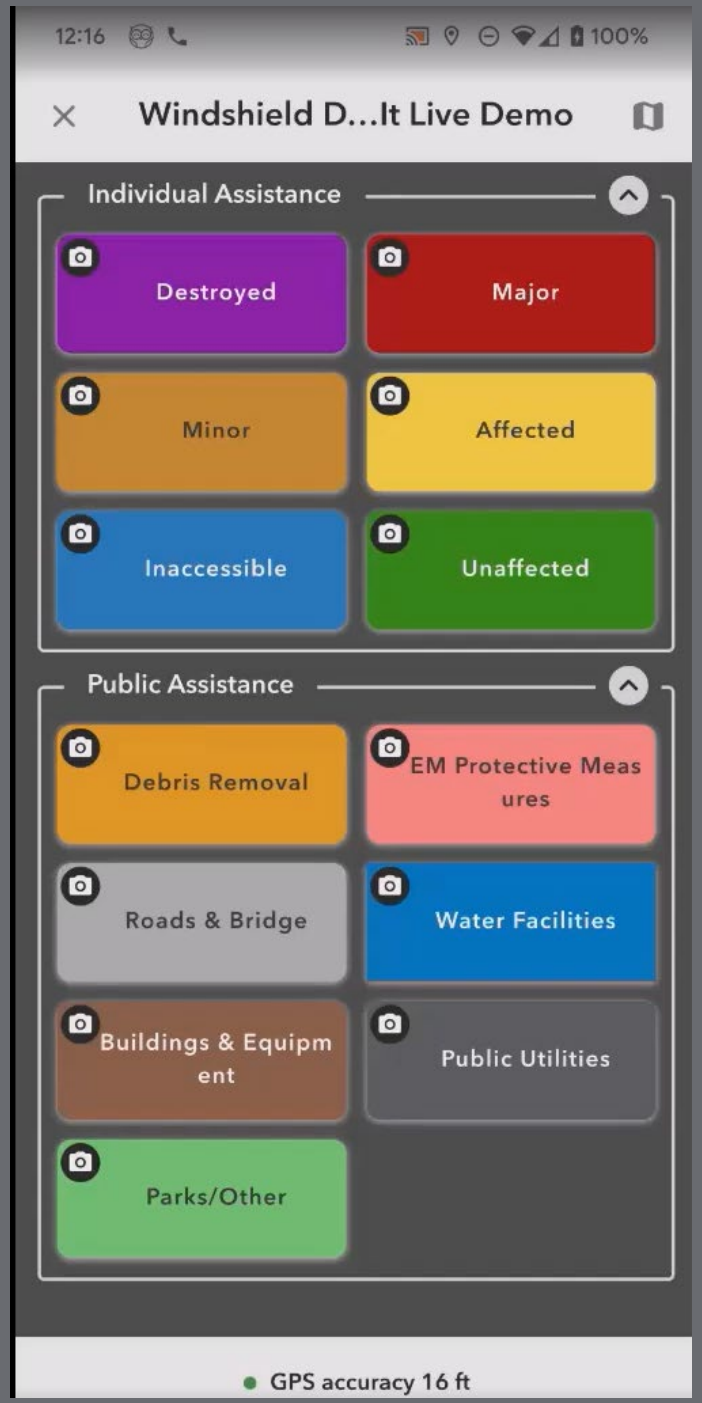
Damage Assessment Solution

Quick Capture

- For rapid assessments in the days after a disaster
- Just set up the categories you want to collect – these become brightly colored buttons
- Create points with a click
- Can also add photos



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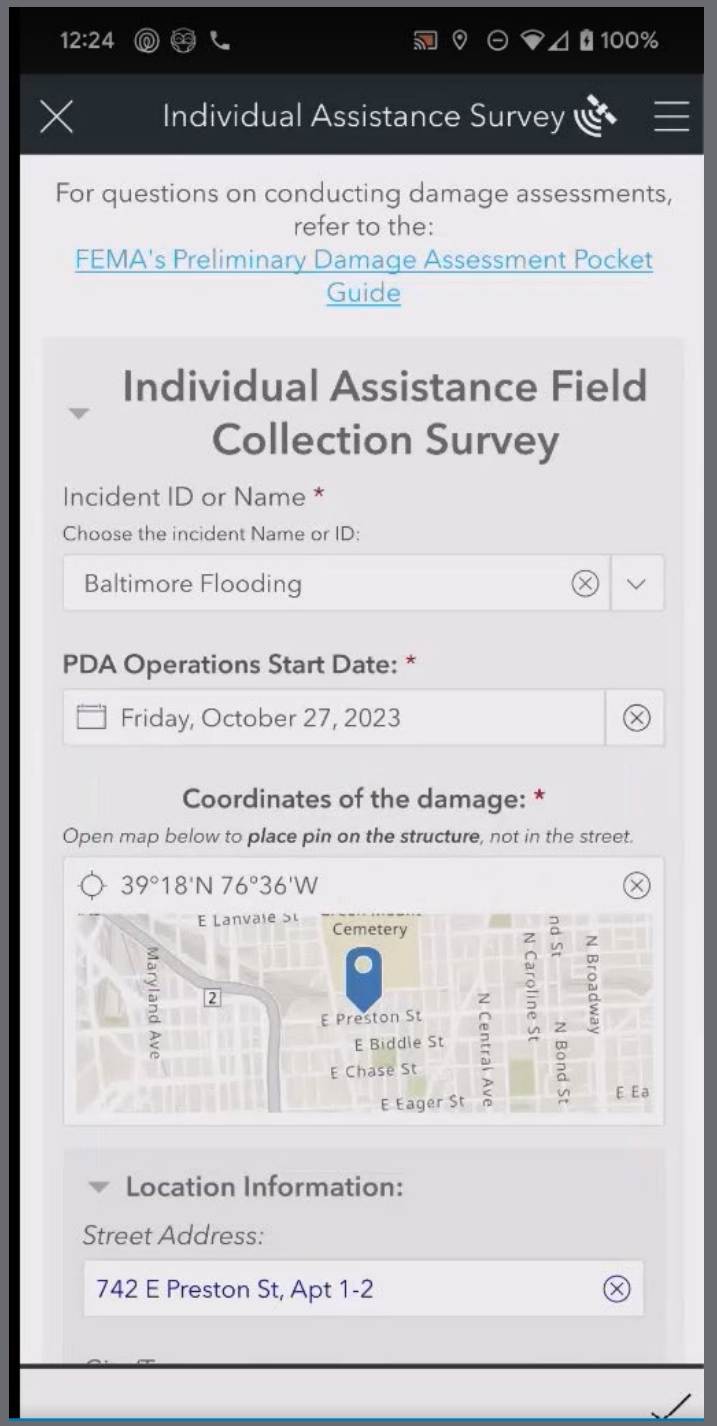
Damage Assessment Solution

Survey123

- For more detailed surveys in the days/weeks after a disaster
- “Form”-centric (but also includes a map)
- Intelligent forms
  - conditional drop-downs
  - auto-calculation of fields
- Can also add photos



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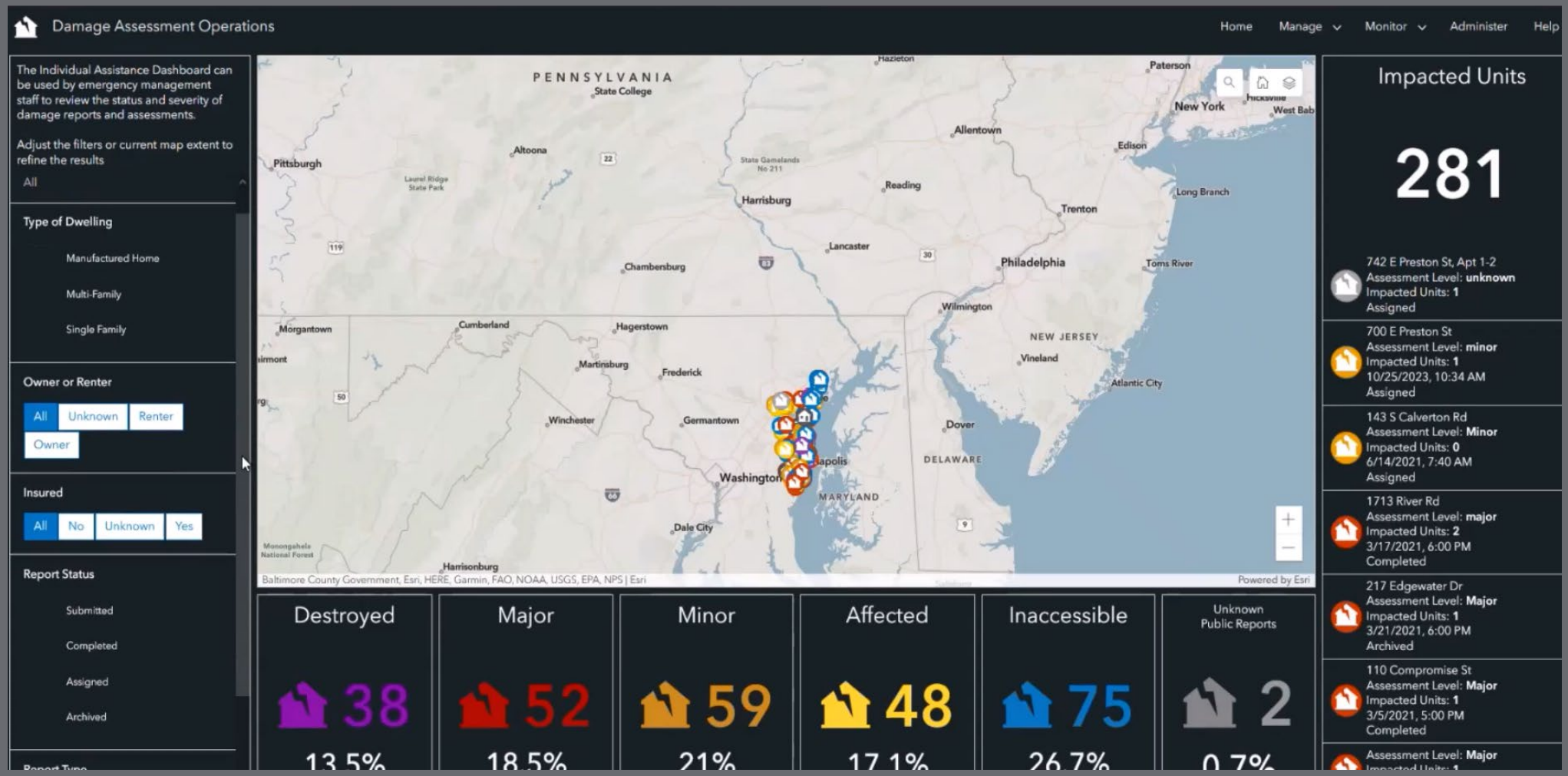
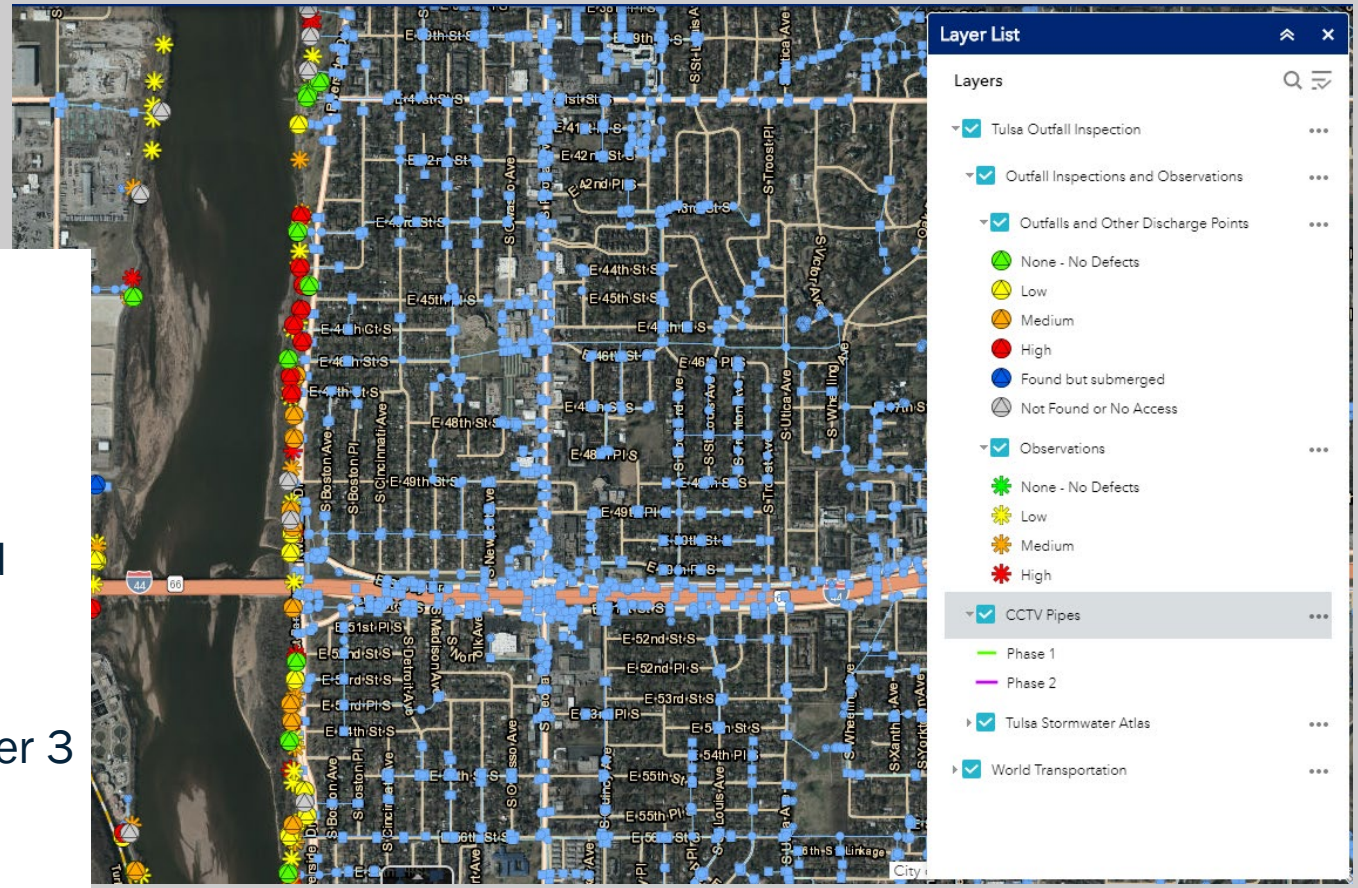
Esri Damage Assessment Solution



Case Study
Tulsa – 2019 Floods

- Damages to the storm sewer system, outfalls, and levees assessed using field apps
- “Eyes-on” inspections completed in under 3 days, results available near-live
- CCTV inspections and repair estimates followed
- Data was used to submit for reimbursement from FEMA



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Esri Emergency Debris Management Solution

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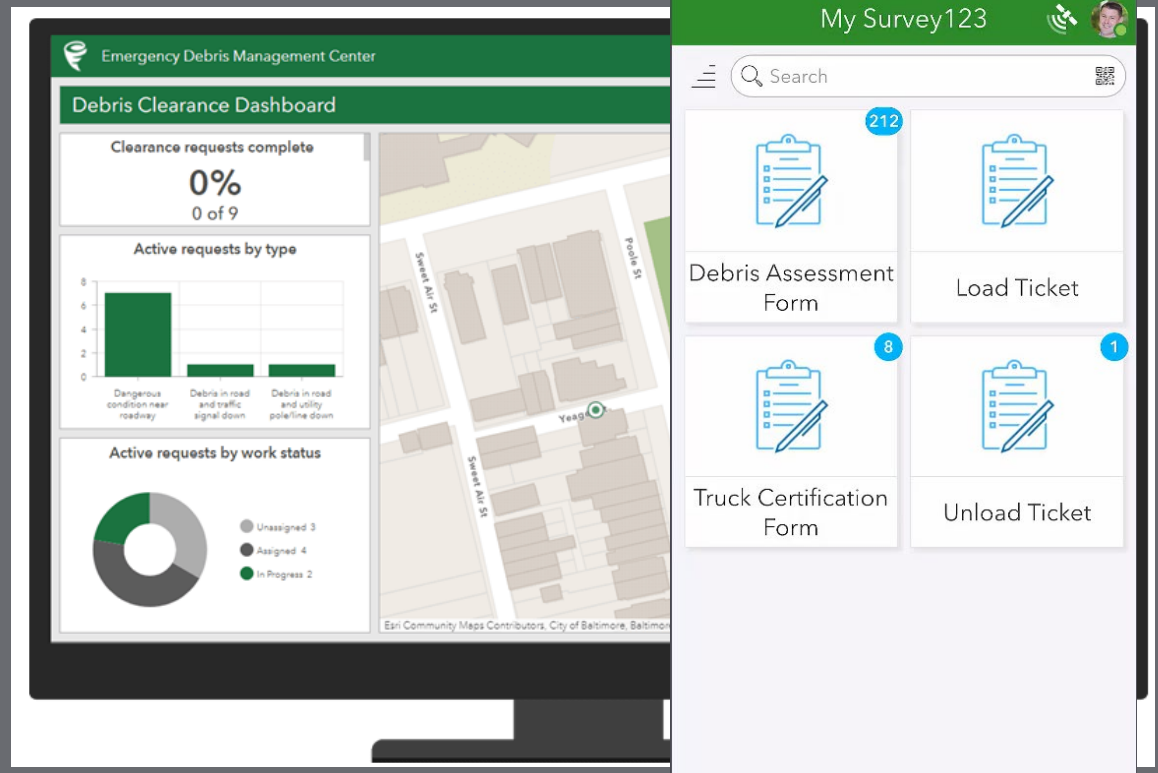
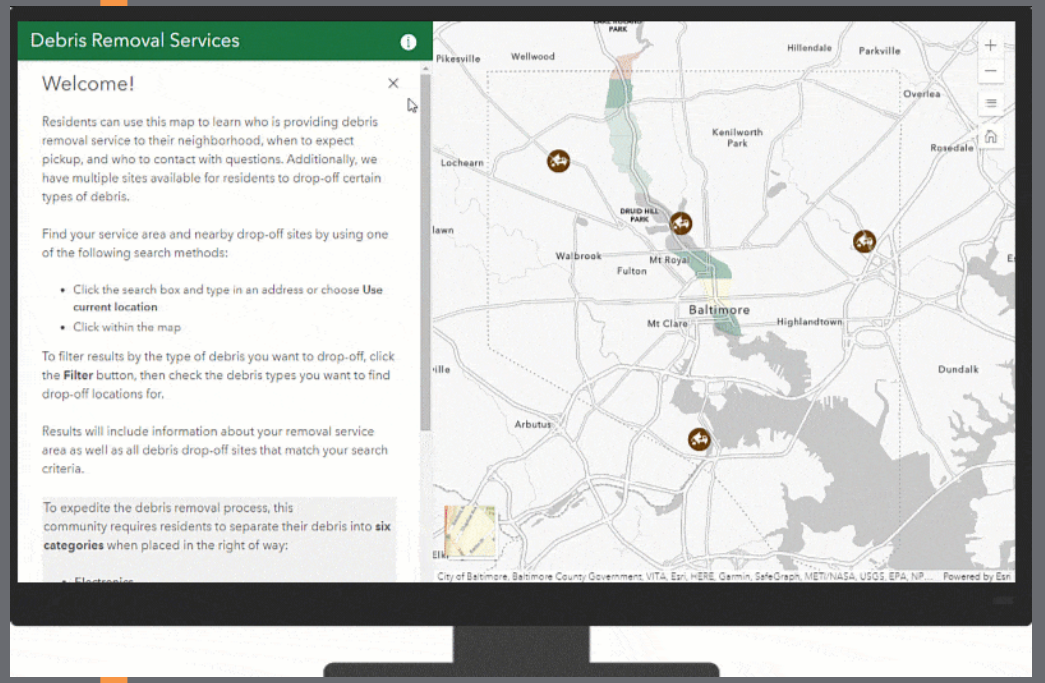


Emergency Debris Management Solution

- Assess debris removal needs
- Monitor debris removal activities
- Collect data on debris amounts
  - Load tickets
  - Unload tickets
- Reporting in dashboards and PDFs
- Let citizens know where debris collection points are located



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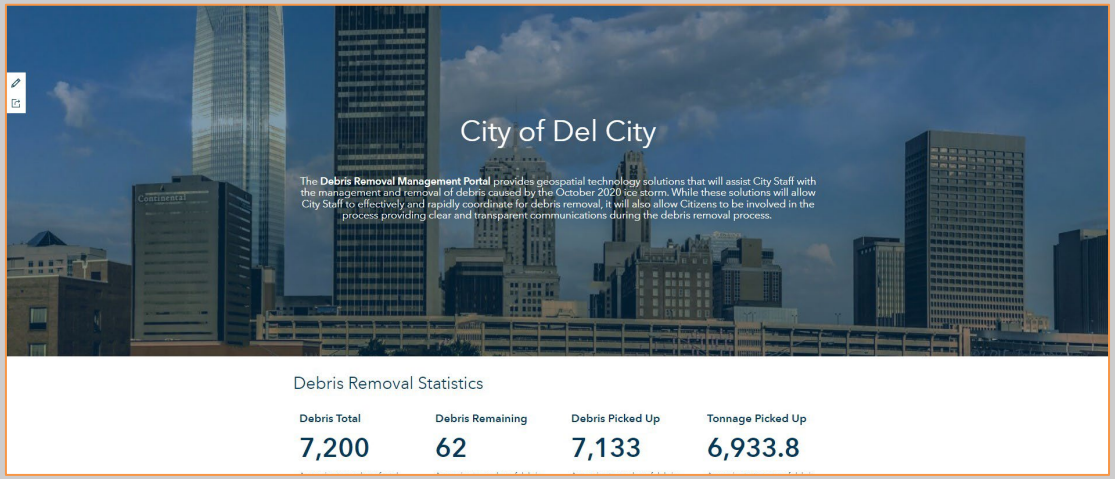
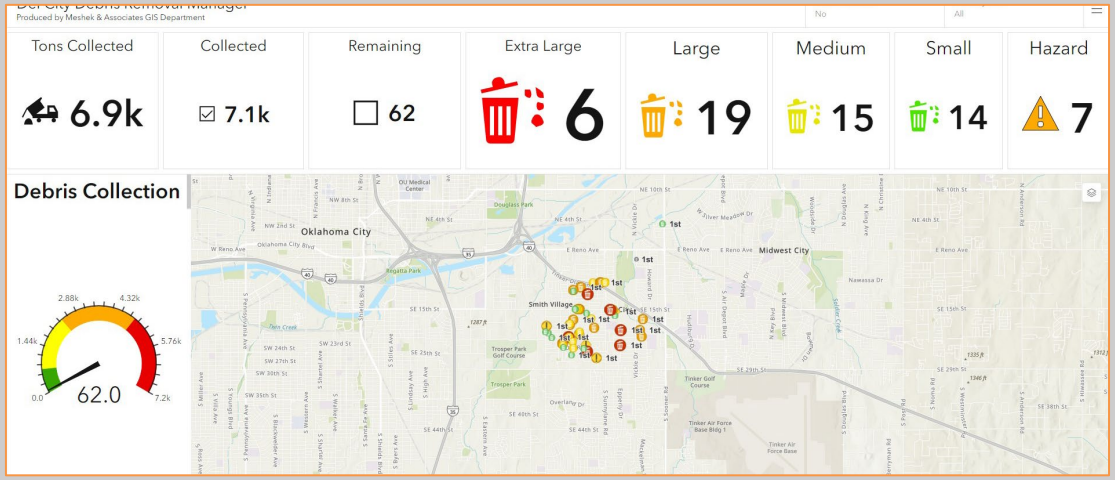
Case Study
Del City - 2020 Ice Storm

- Assess, inventory, and manage the collection of debris from winter storm
- Initial assessment and inventory using mobile GIS apps
- Data viewed and managed in real time using dashboards
- Data was used to submit for reimbursement from FEMA



Del City Hub Site



Del City Debris Removal Dashboard

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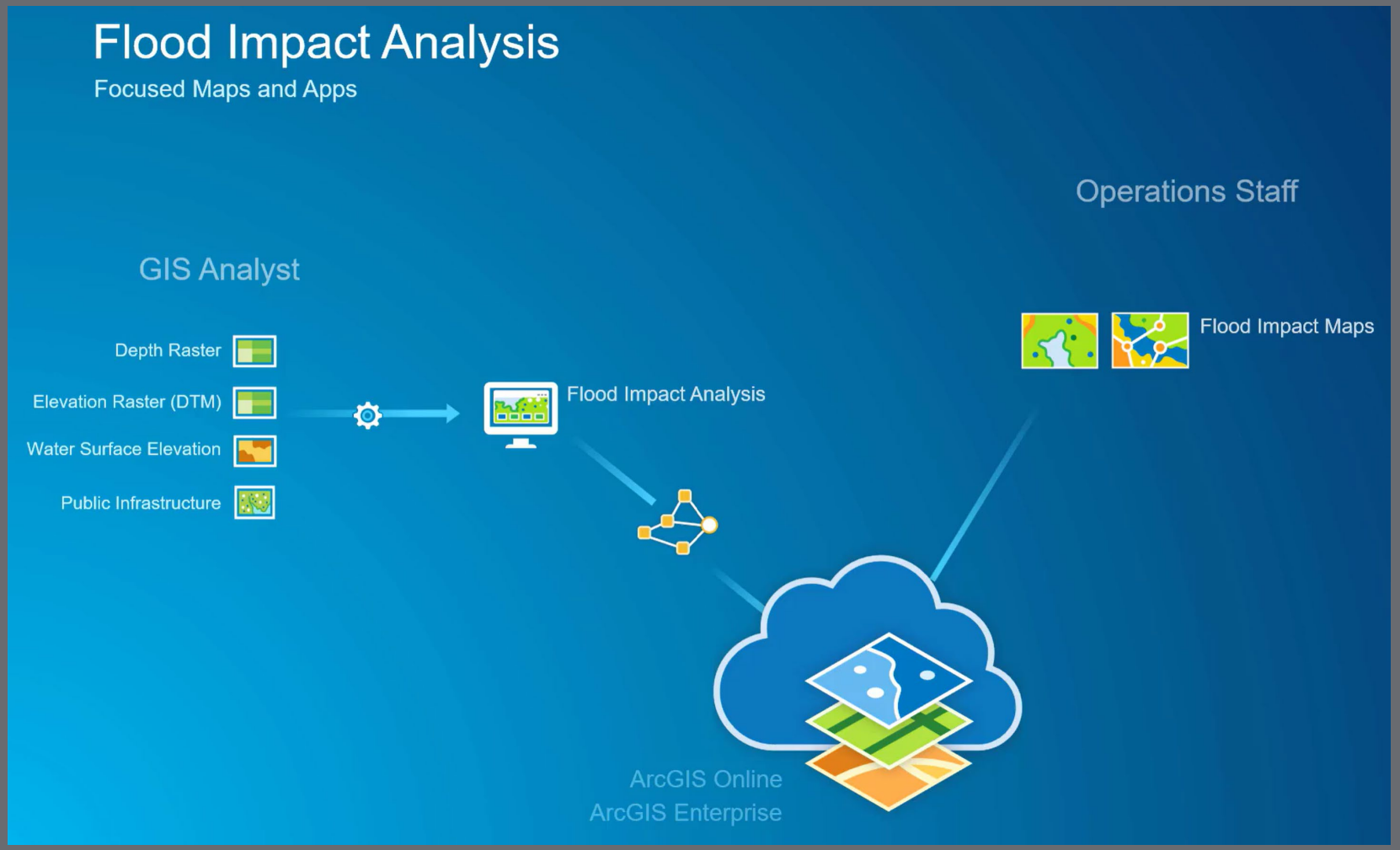
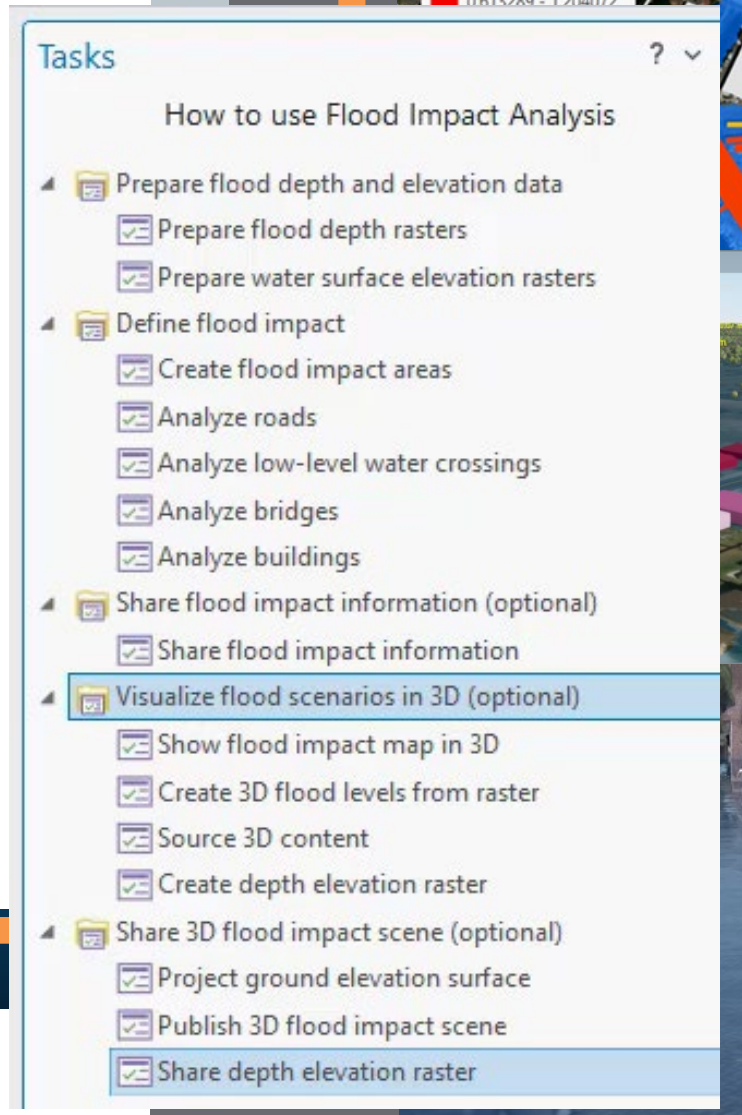
Esri Flood Impact Analysis Solution

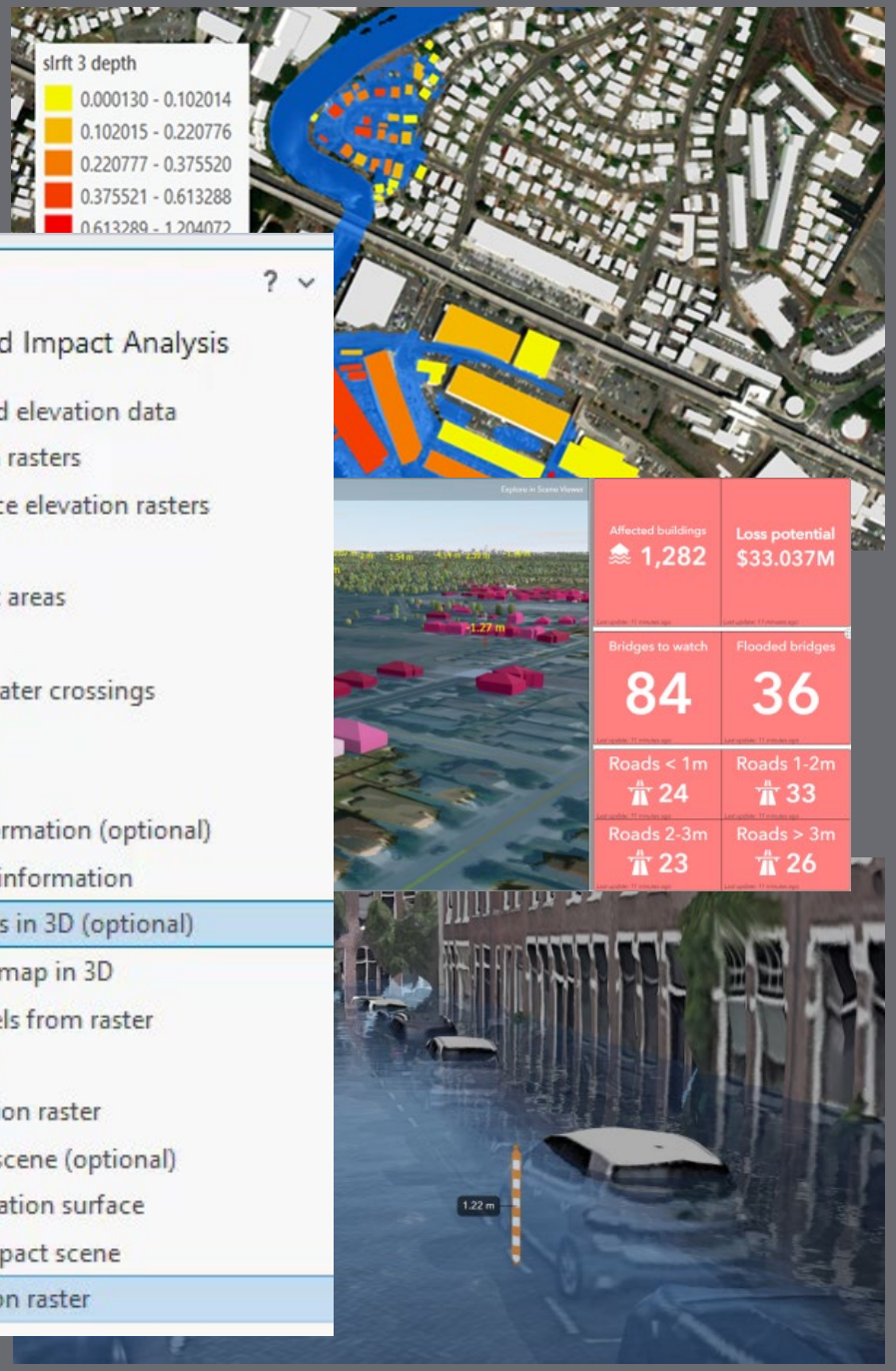
Esri Flood Impact Analysis Solution



Flood Impact Analysis Solution

- Visualize impact of flooding on public infrastructure and critical facilities
- Requires certain data:
  - Flood depth raster
  - Water surface elevation
  - Elevation raster
  - Public infrastructure data
- Guided, task-based workflow
- Share maps internally and with public





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Esri Flood Impact Analysis Solution

Flood Data Resources

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Accessing FEMA Data

FEMA Data Links

FEMA Map Service Center

- https://msc.fema.gov/portal/home

FEMA National Flood Hazard Layer

- https://www.fema.gov/flood-maps/national-flood-hazard-layer

FEMA Mapping REST Services (Direct Data Link)

- https://hazards.fema.gov/gis/nfhl/rest/services/public/NFHL/MapServer

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Publicly Available NFIP Data

https://www.fema.gov/openfema-data-page/fima-nfip-redacted-claims-v2

There is a redacted dataset available in CSV format!

Data is reported by community, Census block group, Census tract, ZIP, and lat/long (truncated to a single decimal point – a difference of several miles if relying on the coordinates).

As with all data sources, it's critical to keep the methodology, the weaknesses, and the strengths in mind.

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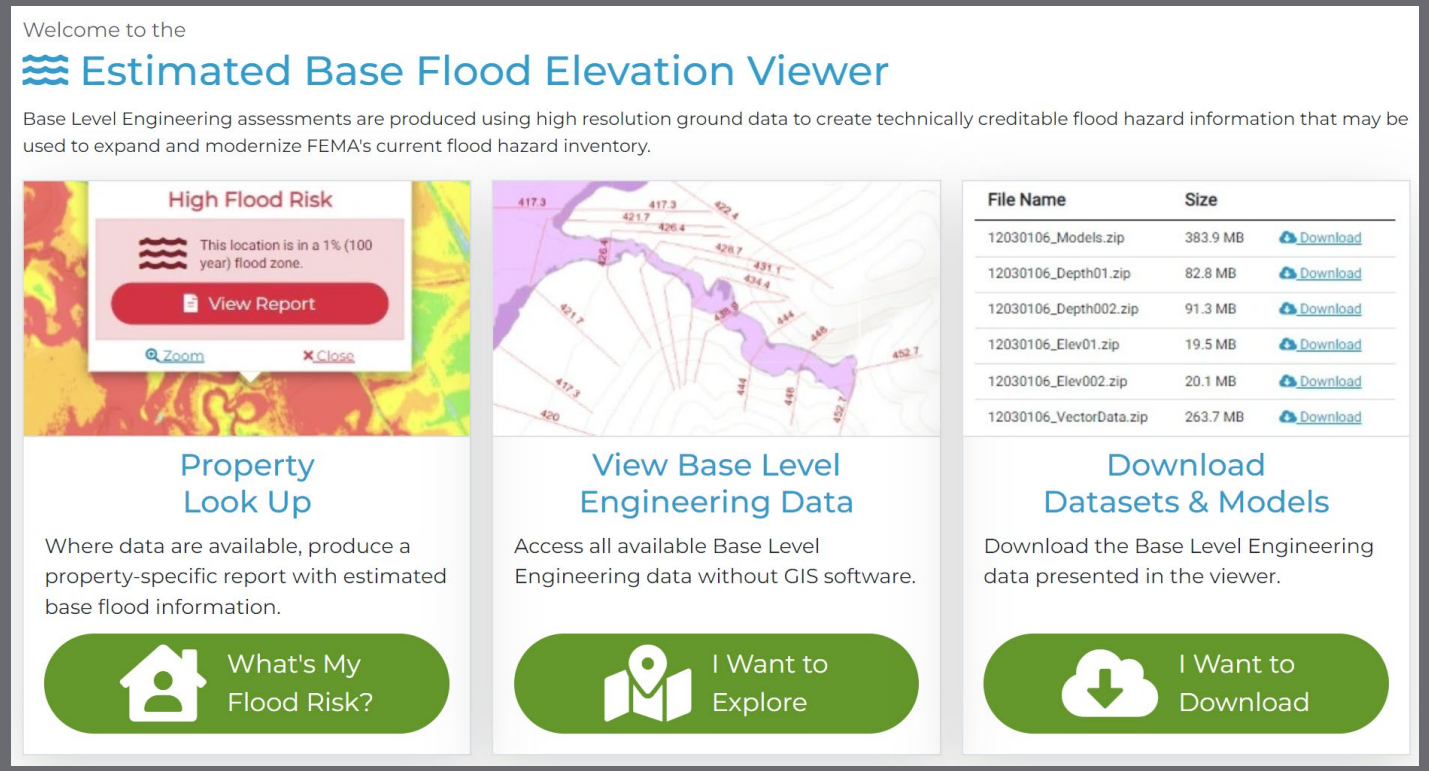
Estimated BFE Viewer

https://webapps.usgs.gov/infrm/estBFE/



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Topography - The National Map Viewer

https://apps.nationalmap.gov/downloader/

The single best place to go for the latest 3DEP LiDAR based topography data is the National Map Viewer Data Downloader.

The NRCS Data Gateway website is still useful for older post-quad data (lower resolution 2m/+ and older than 3DEP; soon all will be replaced by new 3DEP)

All pre-3DEP areas are in the process of re-acquisition, but will not be available soon (est. 2026)

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Thank you!

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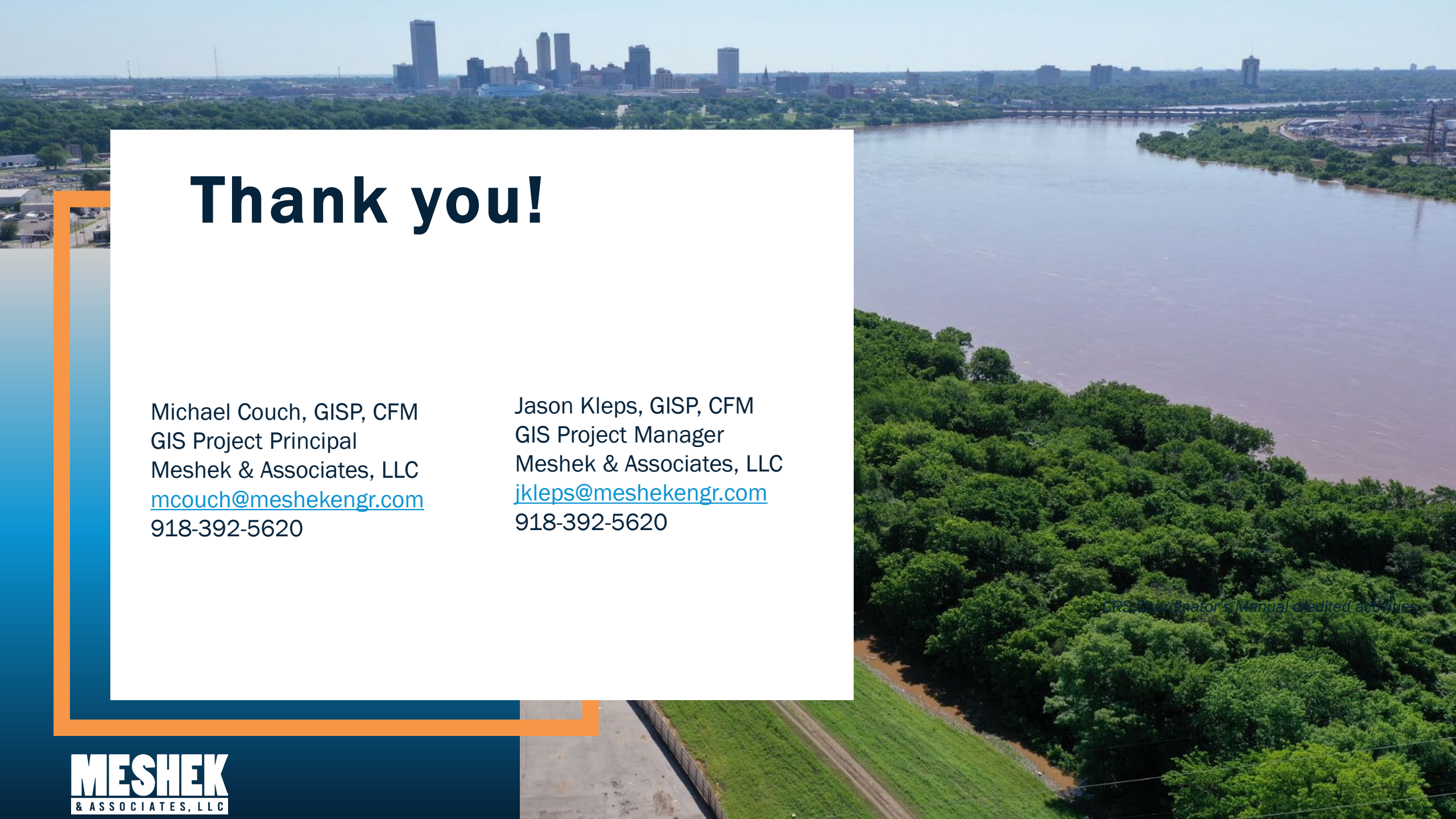

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