Capturing Field Data: Esri's suite of mobile field data applications

Joseph Kerski, PhD

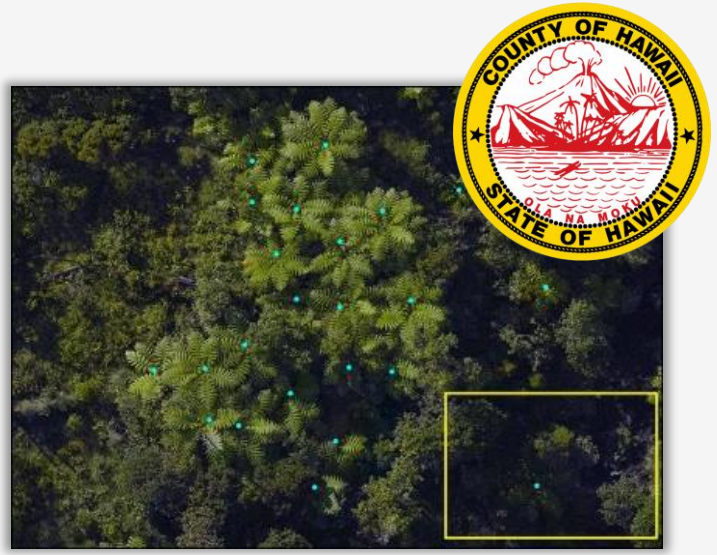
Brian Baldwin

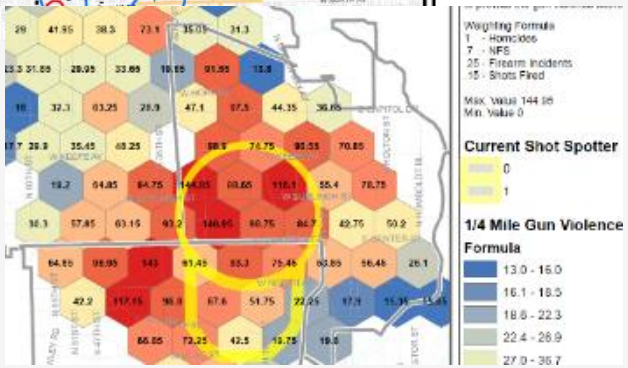
On your cell phone, please visit the app store and download:

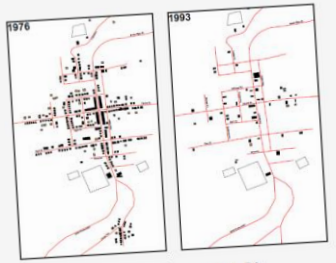
ArcGIS Field Maps

ArcGIS QuickCapture

City of Milwaukee







GENESEO
THE STATE UNIVERSITY OF NEW YORK

ROCHESTER INSTITUTE OF TECHNOLOGY
R·I·T
1829

UWM

Peace Corps

Salem
STATE | UNIVERSITY

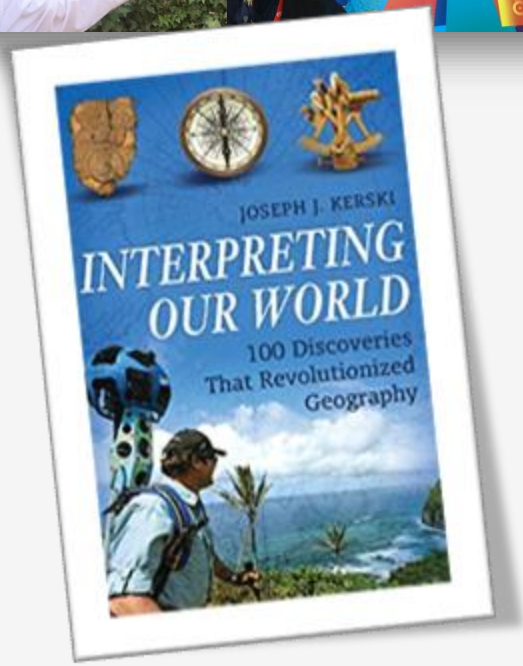
Federal Agencies

Private Industry

University

Graduate School

Nonprofit



Esri's Education Program

Enabling, Encouraging, and Equipping

… future decision makers to think spatially and critically, solve problems, and use geotechnologies effectively to build a resilient world and become the change agents of tomorrow.

- **7,000+ universities globally**
- **Free licenses for all K-12 (Esri Schools)**
- **Education, research, and operations**

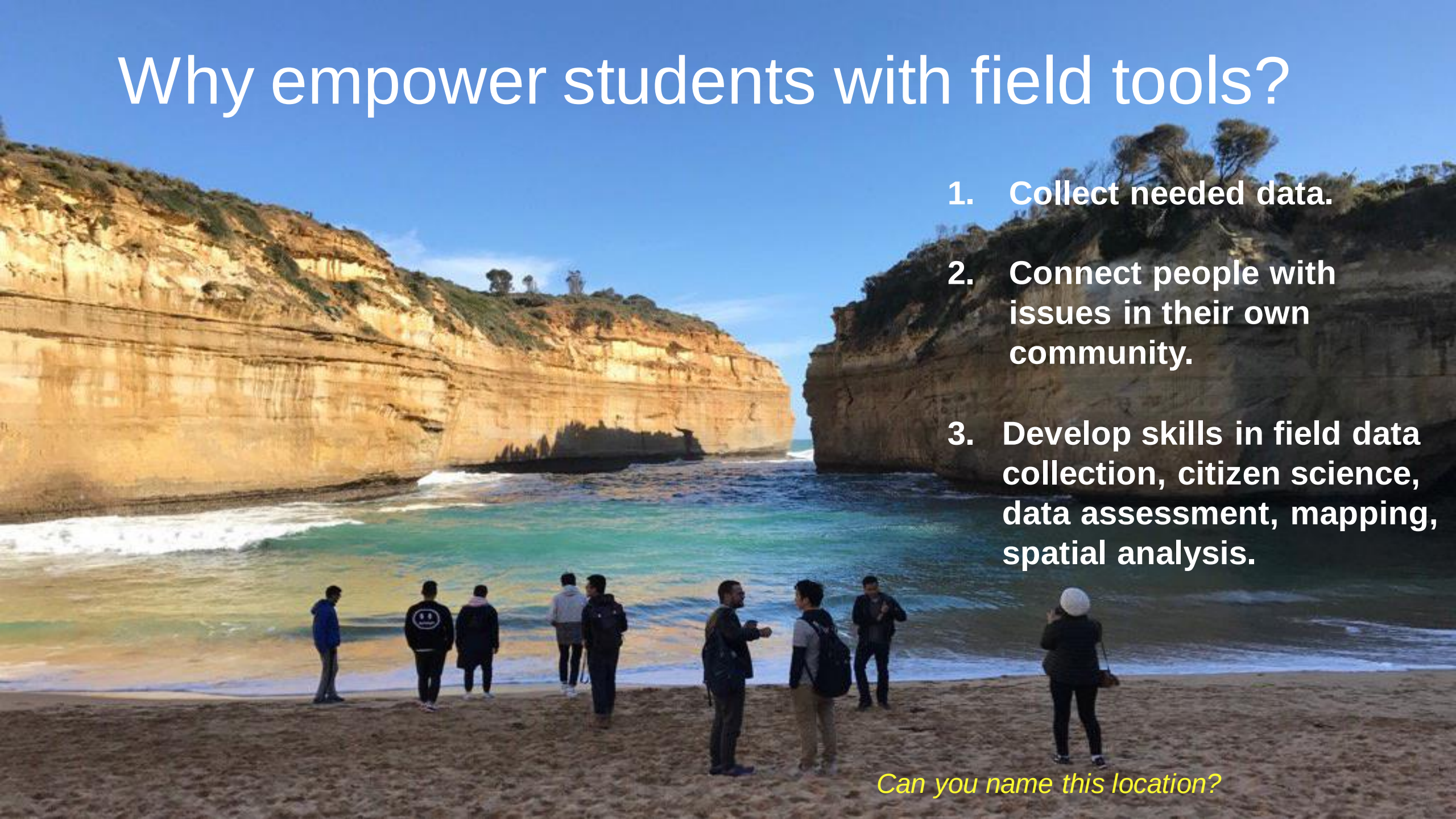
‘Field Operations’ - Goals for this Session

- Understand the capabilities of the 3 main Esri mobile field data collection tools.
- Be able to determine which tool is best to meet specific instructional and research goals.
- Gain confidence using these tools in the ……. **field!**

Outline

- Introductions
- Why field data and collection?
- Esri's apps
- Field Trip!
- Discussion
- Resources / Wrap-up

Why empower students with field tools?

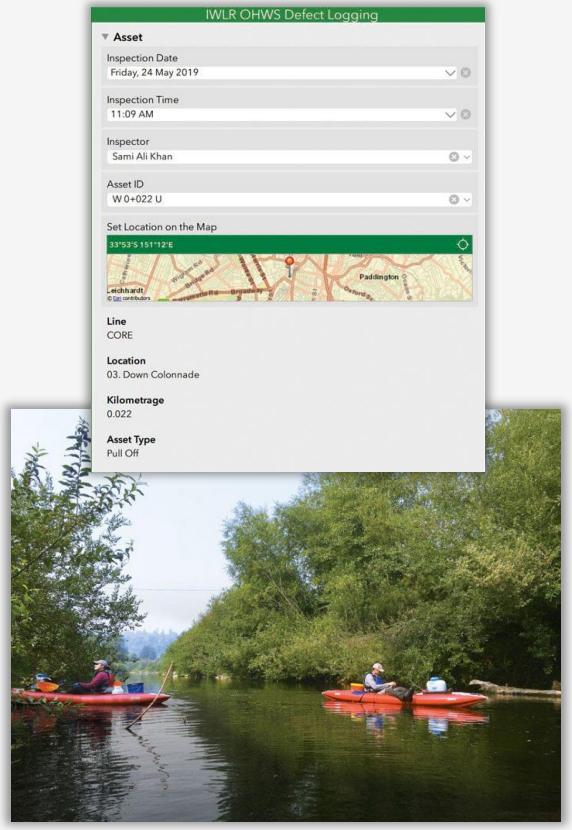


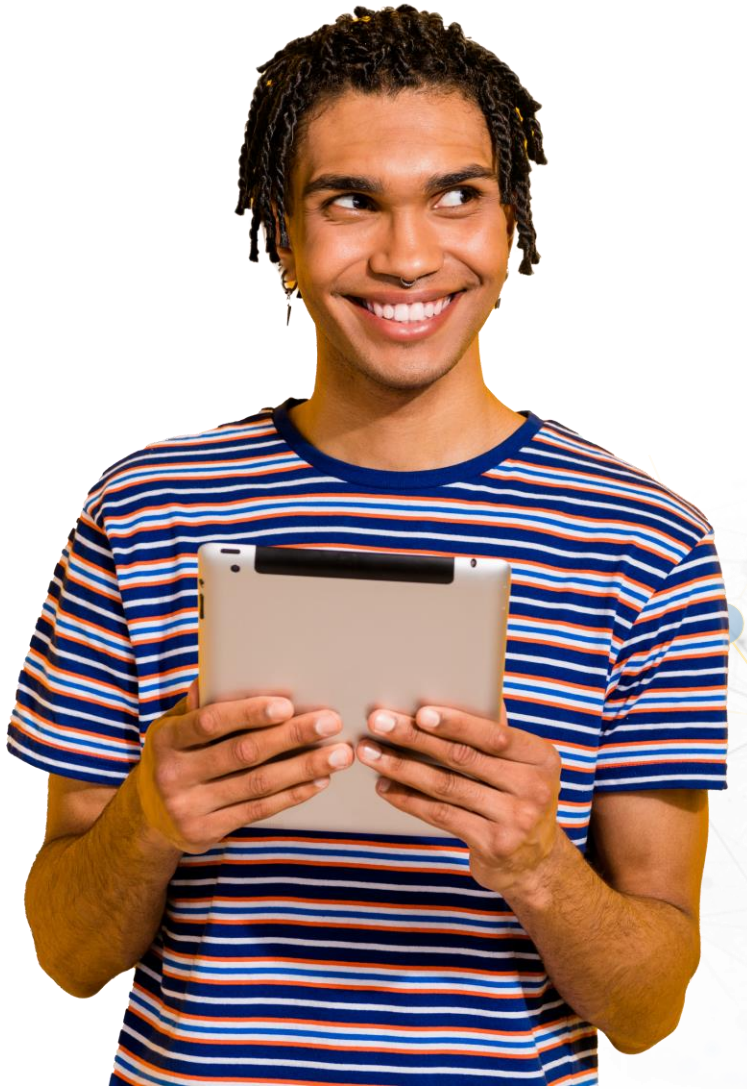
1. **Collect needed data.**
2. **Connect people with issues in their own community.**
3. **Develop skills in field data collection, citizen science, data assessment, mapping, spatial analysis.**

Can you name this location?

‘Field Operations’ in the Classroom?

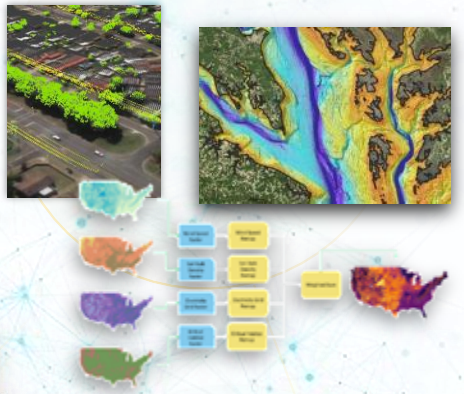
- Making GIS ‘relevant’
- Develop workplace skills
- Own the entire GIS ‘lifecycle’



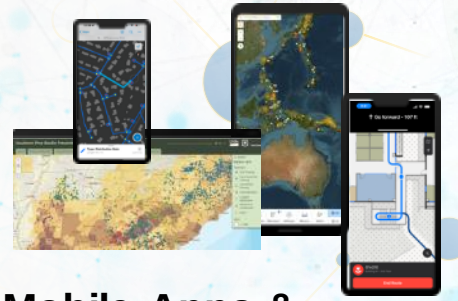


Web-based Mapping & Cartography

Advanced Spatial Analytics & AI



Imagery & Remote Sensing

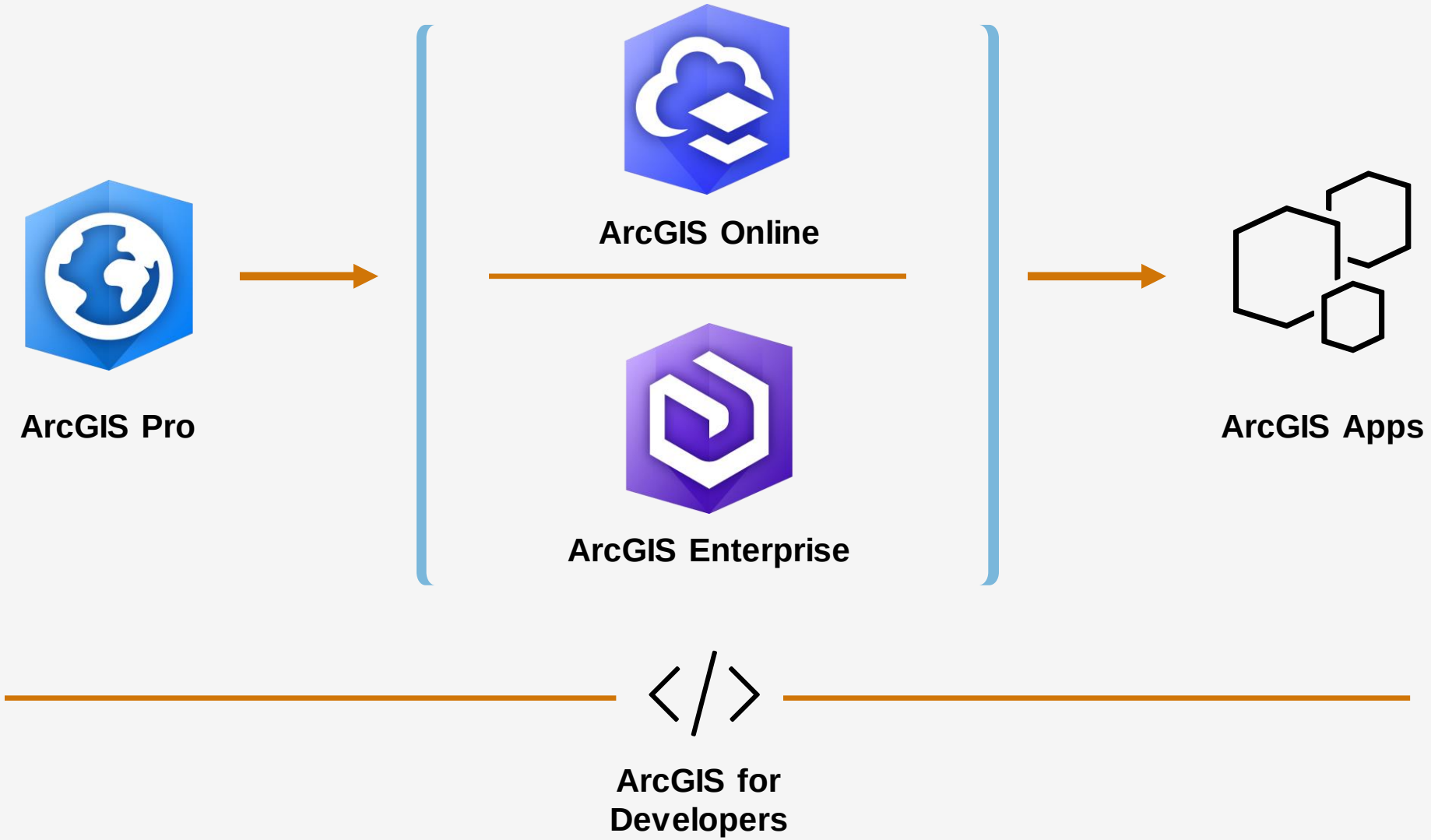


Mobile Apps & Workflows

Sharing & Presenting

ArcGIS is used across multiple disciplines, from Architecture to Zoology

The Web GIS Paradigm



ArcGIS Apps Bring the Power of Location to Everyone

Extending the Reach of GIS

Apps by theme

Office

ArcGIS Earth

Esri CityEngine

Maps for Office

Maps for SharePoint

ArcGIS Insights

Esri Business Analyst

GeoPlanner for ArcGIS

ArcGIS Maps for Adobe Creative Cloud

ArcGIS Dashboards

Field

ArcGIS QuickCapture

Survey123 for ArcGIS

ArcGIS Field Maps

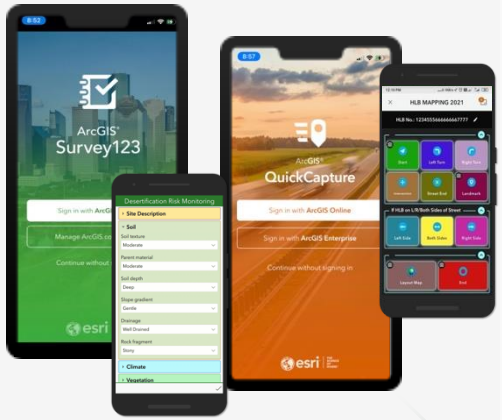
Drone2Map for ArcGIS

How can you map field-gathered data?

6 selected methods:

1. Create a map tour story map with geotagged photos.
2. Add a set of geotagged photos as "photos with locations" to ArcGIS Online.
3. Conduct field work with GPS receivers, Pasco or other probes, or other devices > create a file with locations > Add to ArcGIS Pro or ArcGIS Online.
4. Create a table with locations and attributes > output to CSV > Add to ArcGIS Online.
5. Use other field apps: eBird, Globe Observer, Mapillary, iNaturalist, fitness apps, or other apps. Export to CSV or other format > Add to ArcGIS Online.
6. Use ArcGIS Survey123, ArcGIS Field Maps, or ArcGIS QuickCapture to collect data that is mappable.

Field Operations & Data Collection



Survey123

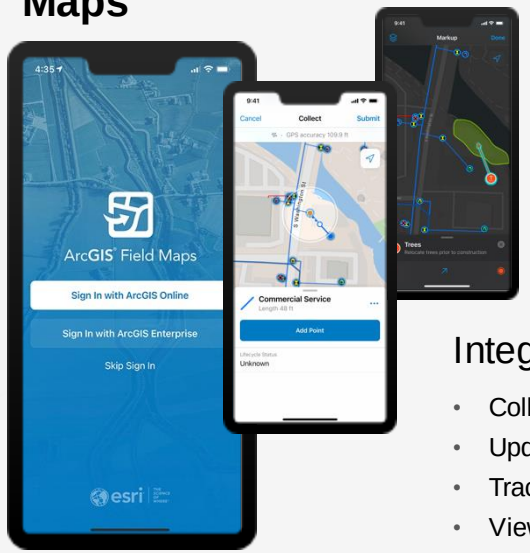
Form-Centric Collection

QuickCapture

Fast Observation Collection

Dashboard

ArcGIS Field Maps



Comprehensive Field App

Integrates

- Collecting
- Updating
- Tracking
- Viewing
- Markup

Comparing the 3 ArcGIS Field Data Collection Apps

ArcGIS Survey123

- Fill out a form
- Example:
  Interviews

ArcGIS Field Maps

- Place info on a map
  OR update existing
  info
- Example:
  Map your school

ArcGIS QuickCapture

- Press a single button
- Example:
  Trash locations

Each of the 3 apps do the following:

1. Capture location
2. Create points, lines and polygons
3. Have ability to add photographs.
4. Work online or offline.

Therefore…

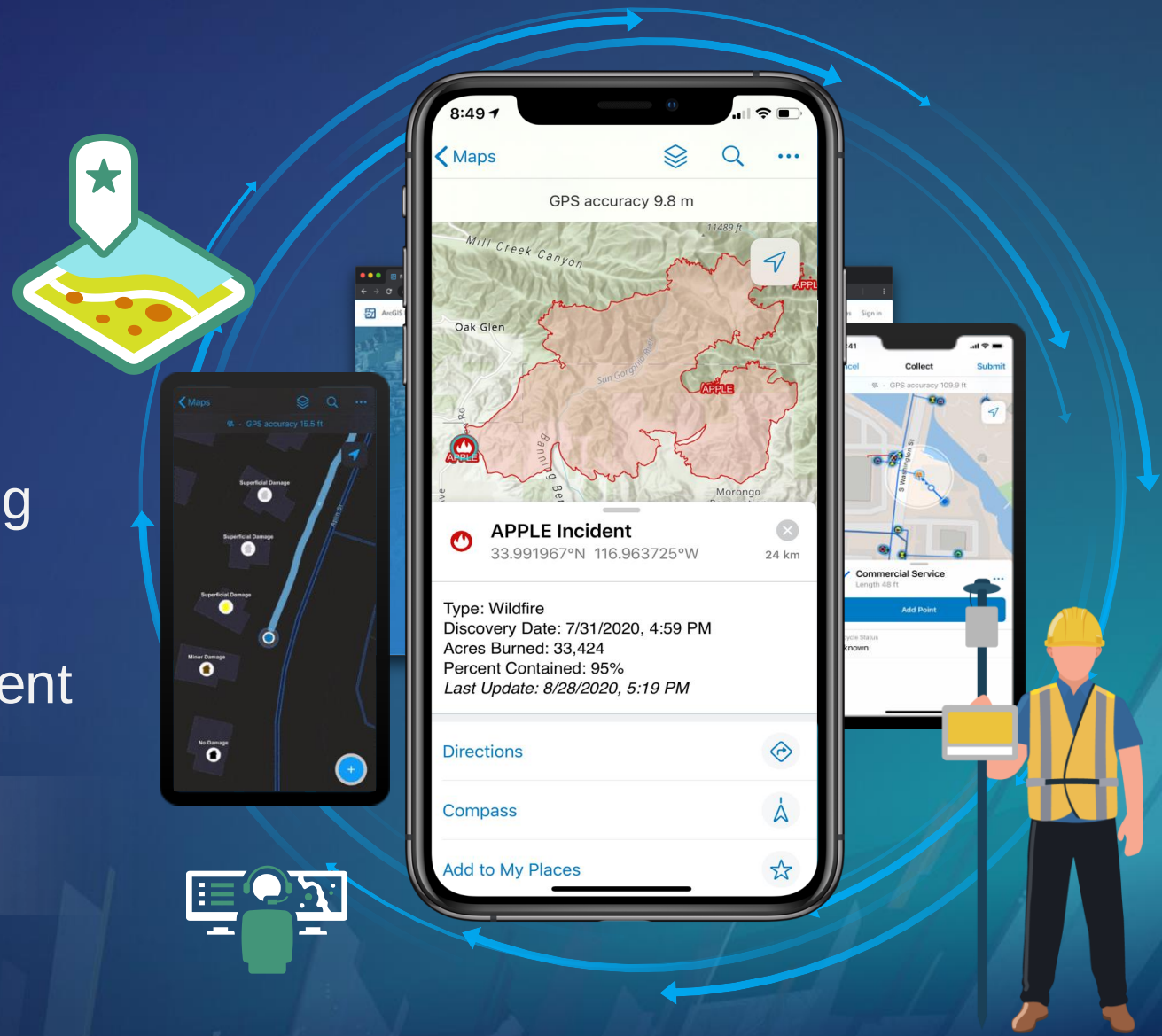
Focus on app that best meets your need for field data and your instructional goals.

If it serves your purpose, it is the best app.

ArcGIS Field Maps

All in one map-centric mobile experience

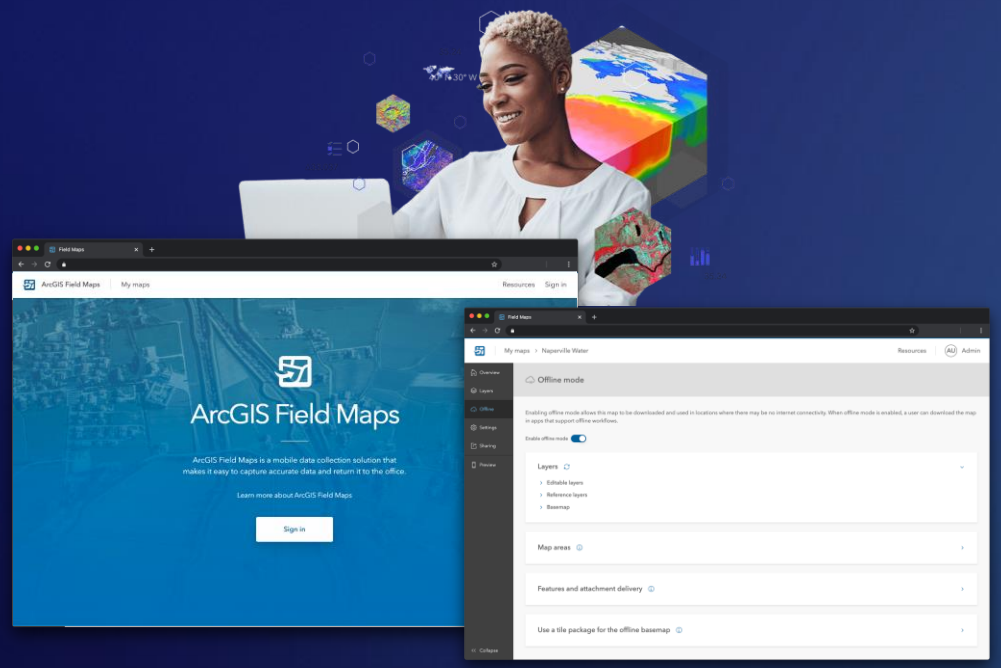
- Mobile map viewing
- Streamlined data collection & editing
- Relevant location focused content
- Connected and Offline



Field Maps Components

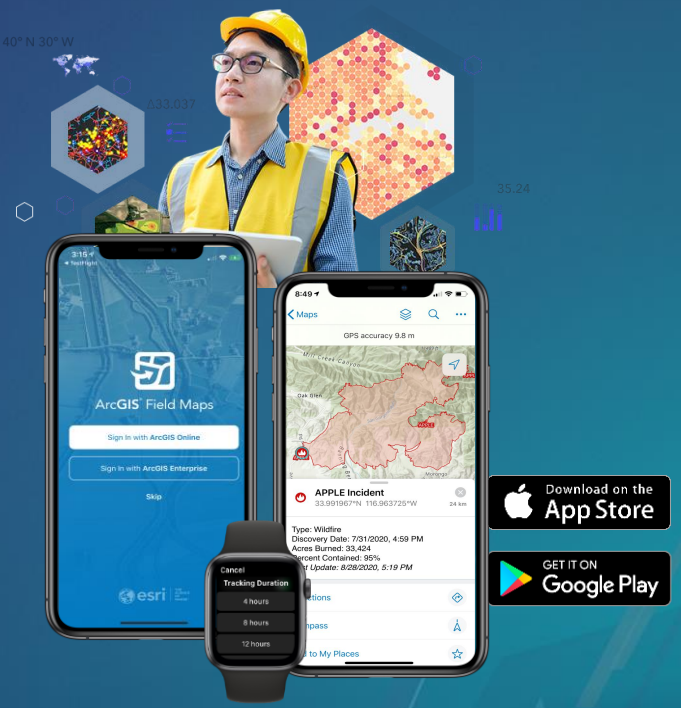
Prepare Maps for the Field

Field Maps Designer



Do Work in the Field

Field Maps mobile app



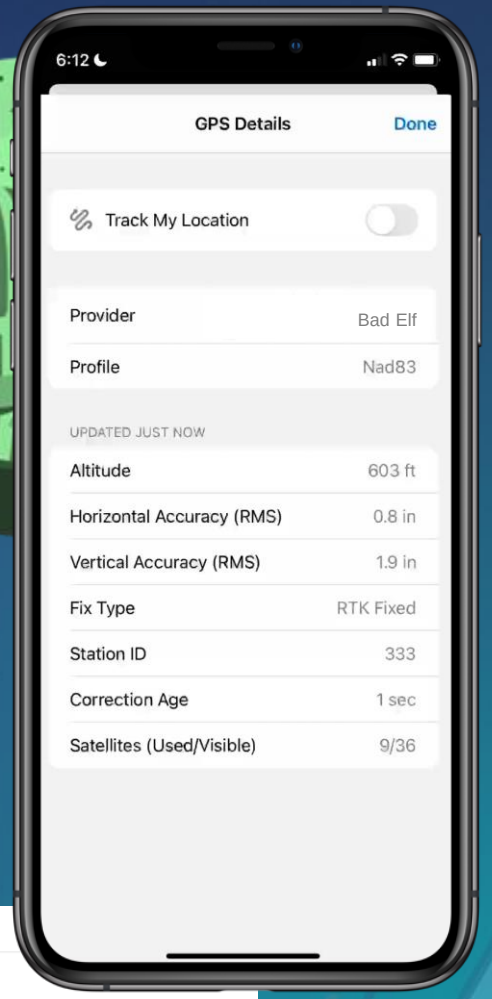
High-Accuracy Data Collection

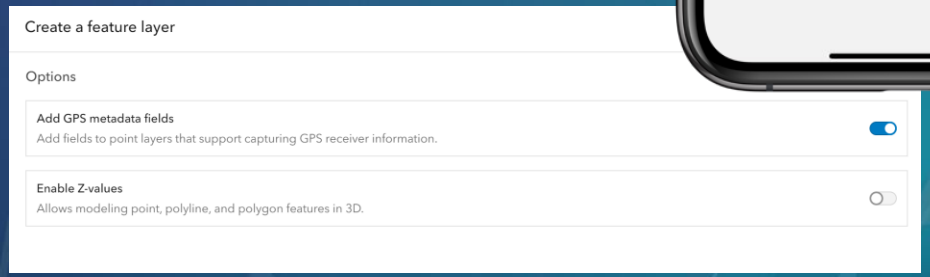
GPS Metadata

- Point, Line, and Polygon support
  - Fields hidden during collection
  - Fields not directly editable in Field Maps
- Summary statistics (Line, Polygon)
  - Average/Worst horizontal and vertical accuracy
  - Worst fixt type
  - Number of manual positions
- Adding GPS metadata fields
  - When creating new layers
  - Exiting layers
    - ArcGIS Pro
    - Python Notebook (https://github.com/Esri/field-maps-scripts/)

Field alias	Field name	Field type	Domain
Position source type	ESRIGNSS_POSITIONSOURCETYPE	Short	ESRI_POSITIONSOURCETYPE_DOMAIN 0–Unknown 1–User defined 2–Integrated (System) Location Provider 3–External GNSS Receiver 4–Network Location Provider
Receiver Name	ESRIGNSS_RECEIVER	String (50)	
Latitude	ESRIGNSS_LATITUDE	Double	
Longitude	ESRIGNSS_LONGITUDE	Double	
Altitude	ESRIGNSS_ALTITUDE	Double	
Horizontal Accuracy (m)	ESRIGNSS_H_RMS	Double	
Vertical Accuracy (m)	ESRIGNSS_V_RMS	Double	
Fix Time	ESRIGNSS_FIXDATETIME	Date	
Fix Type	ESRIGNSS_FIXTYPE	Short	ESRI_FIX_TYPE_DOMAIN 0–Fix not valid 1–GPS 2–Differential GPS 4–RTK Fixed 5–RTK Float
Correction Age	ESRIGNSS_CORRECTIONAGE	Double	
Station ID	ESRIGNSS_STATIONID	Short	

Point layer metadata





Add GPS metadata fields to all layer types

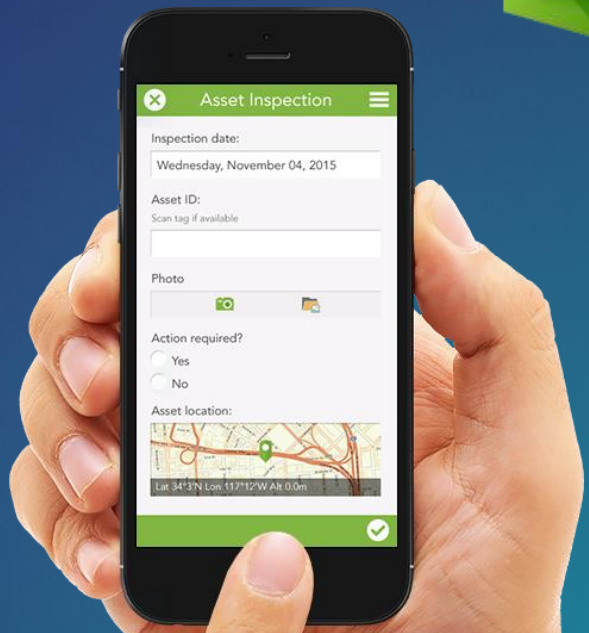
Full list of current GPS values

ArcGIS Survey123

Form-centric field data collection

Leverages Smart forms

Analyze results immediately



Download on the App Store

ANDROID APP ON Google play

Survey123 workflow

1- Ask Questions

(Design & Publish)

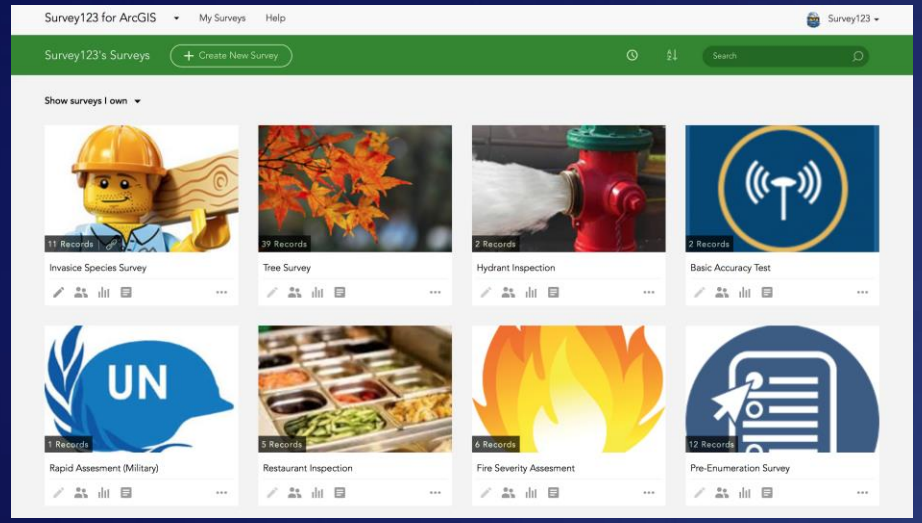
2- Get Answers

(Capture Data)

3- Make Decisions

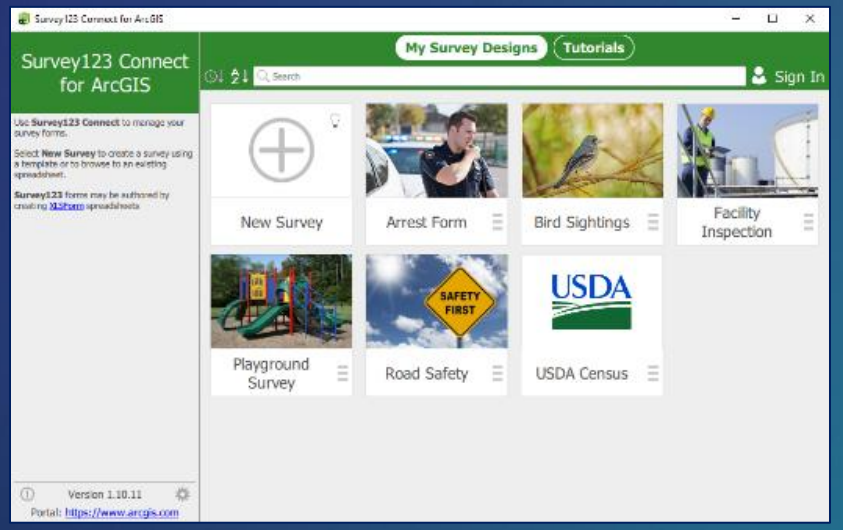
(View & Analyze)

Survey123 Components



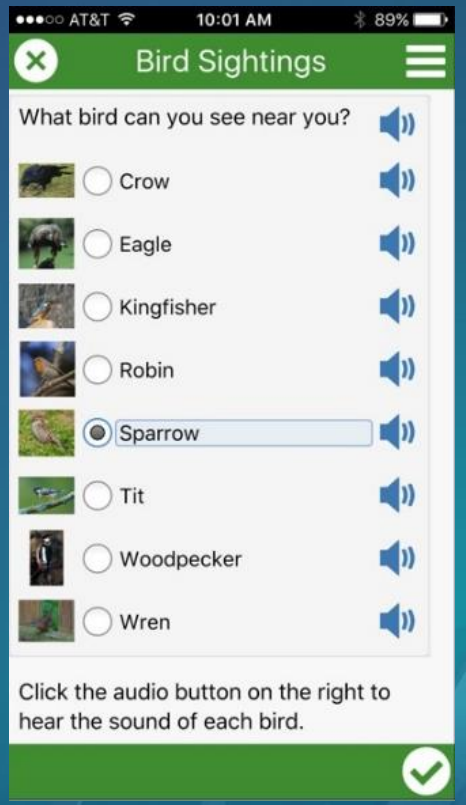
Survey123 website

- Author Simple Surveys
- Complete Simple Surveys
- Manage Access
- Analyze Results



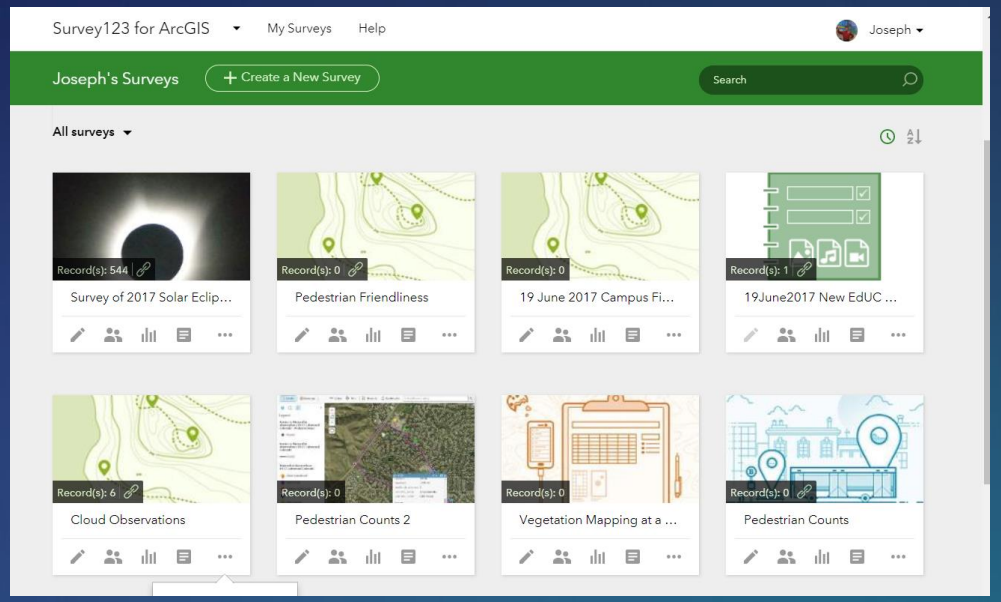
Survey123 Connect – Author Complex Surveys

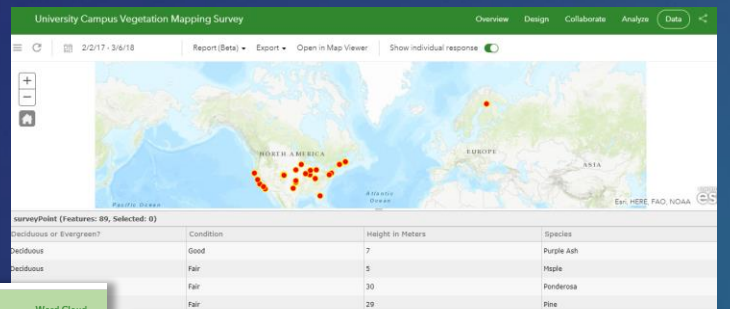
Survey123 for ArcGIS – Complete Surveys

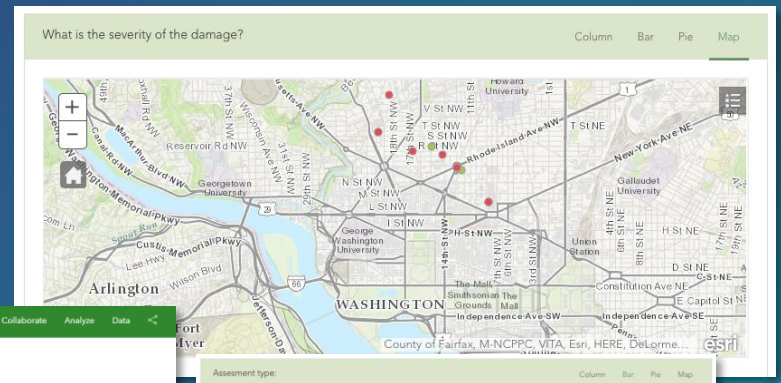


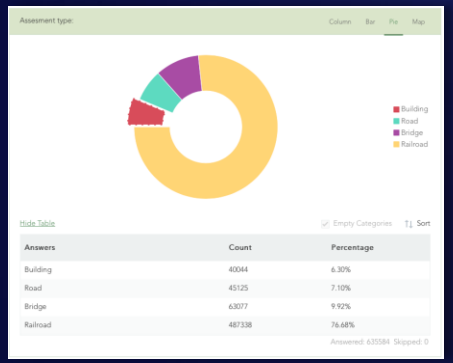
Manage Your Surveys

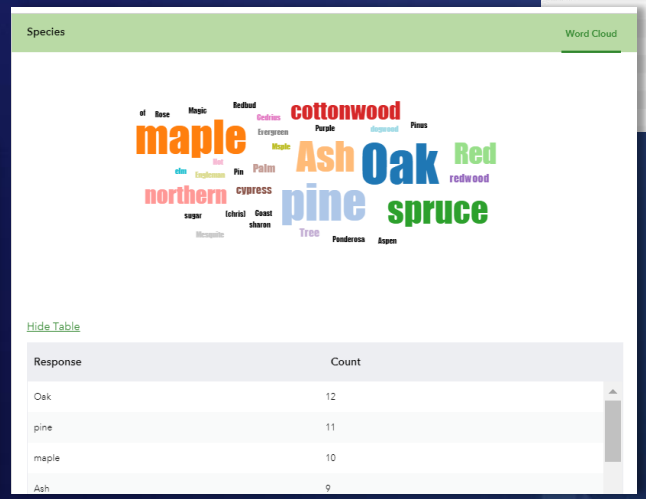
Reporting Tools

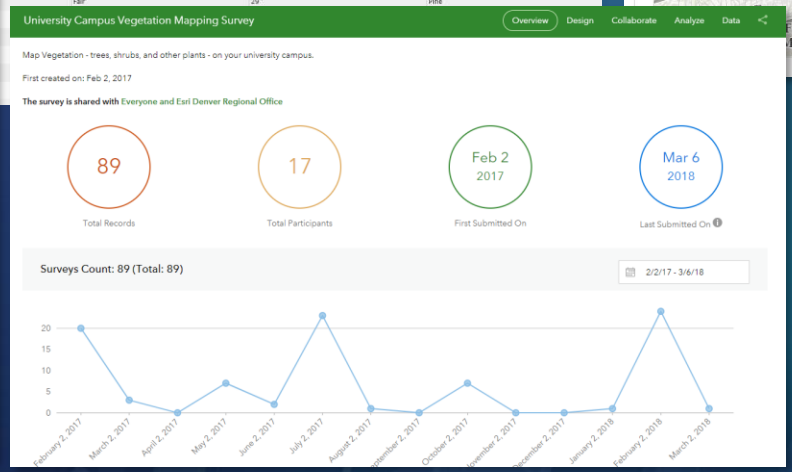


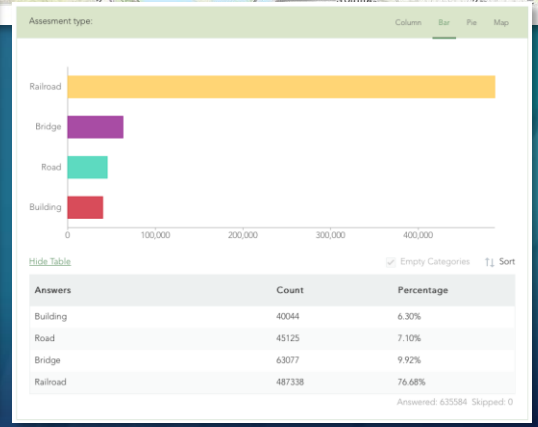












ArcGIS Survey123 Workflow

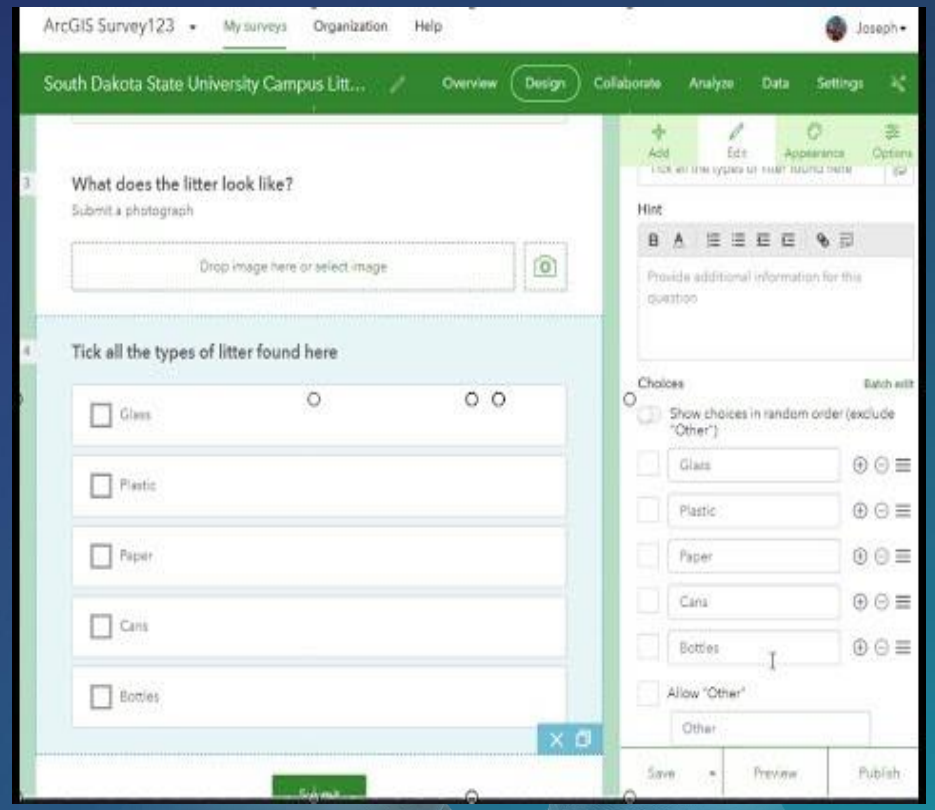
Create survey

Collect data into survey

Create maps and analyze in ArcGIS Online or ArcGIS Pro

Create Dashboards, instant apps, story maps,

and other web mapping apps

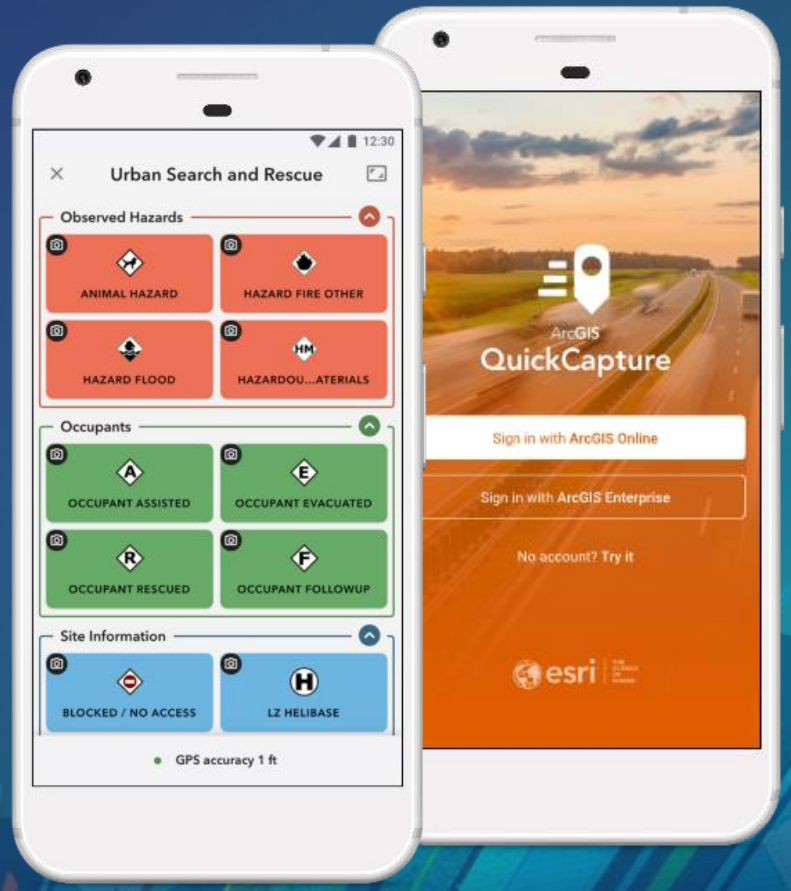


ArcGIS QuickCapture

No training required

Simplest way to capture field observations

At-speed & rapid data collection



Get it from Microsoft

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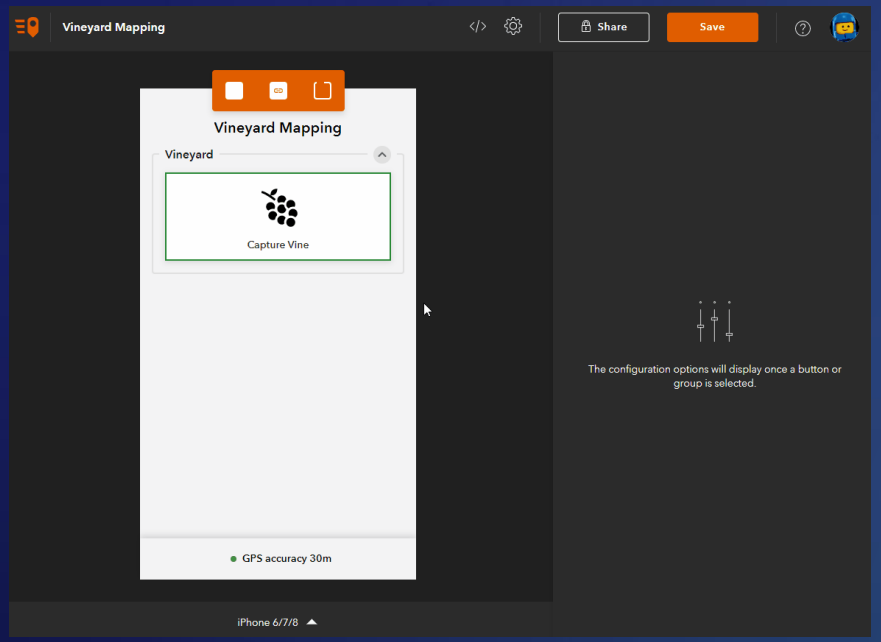
GET IT ON Google Play

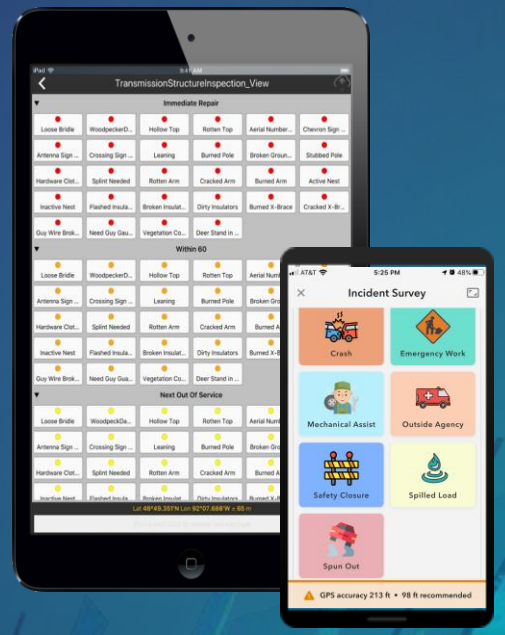
ArcGIS QuickCapture: Components

Design Project for the Field



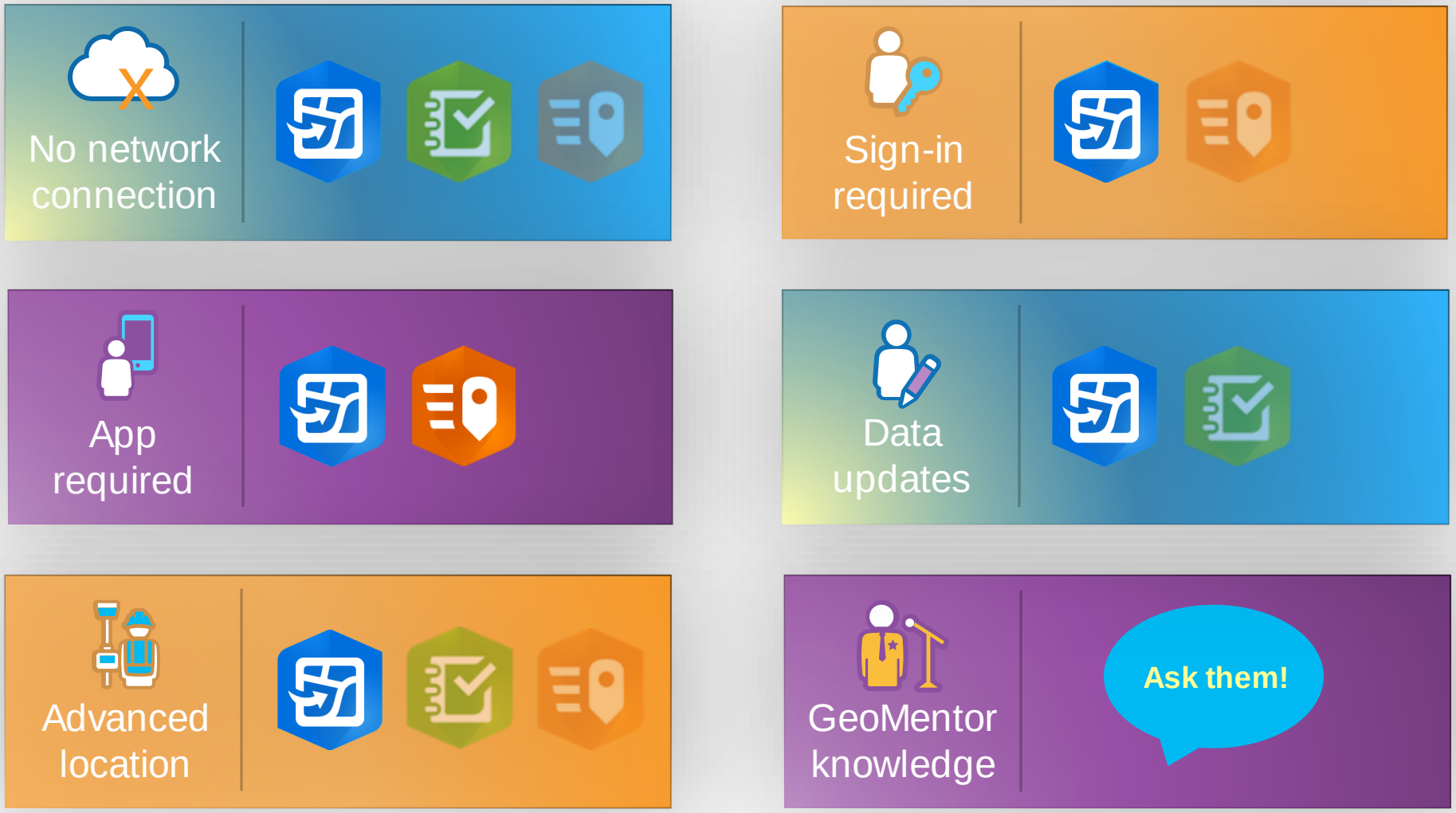
QuickCapture designer web app

Data Collection in the Field



QuickCapture mobile app

Critical Considerations for Choosing an App



Comparison of fundamentals

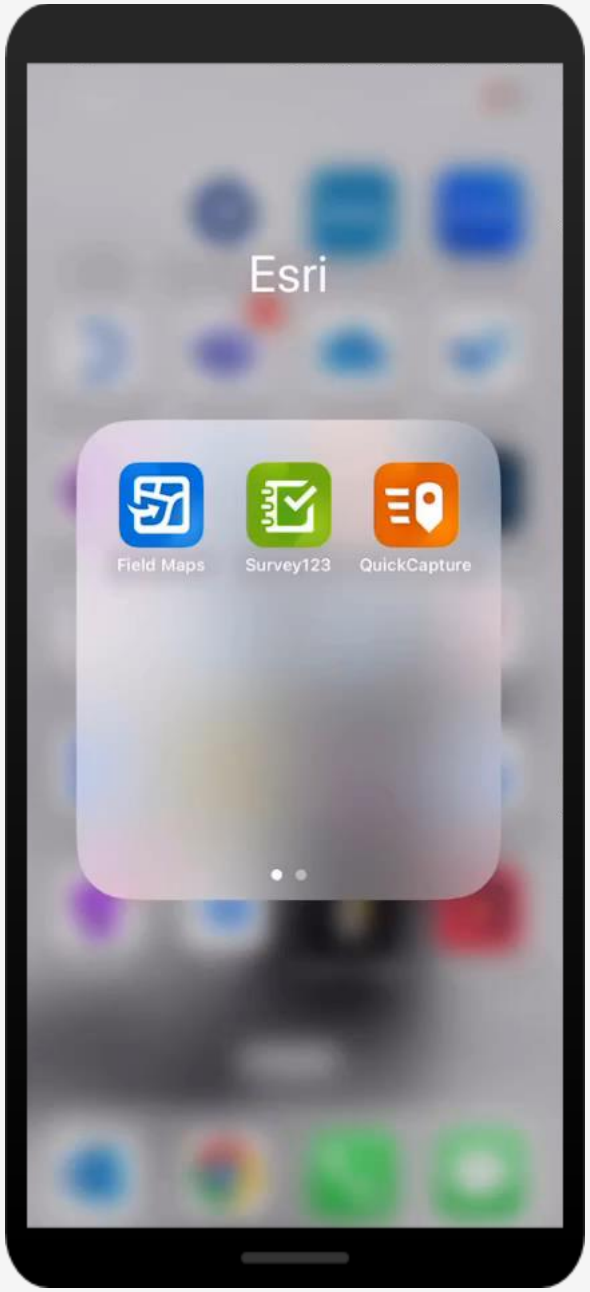
	Survey123	Field Maps	QuickCapture
Intended use	Filling out forms, including ones with complex choices and structures.	Map-focused data collection and updating (editing), including advanced location capturing (such as offsets and snapping).	Rapid, one-button data collection.
Example projects	Interviews (ideally with a question about location). Restaurant inspections and other long, complex forms.	Creating a map of an area, such as a campus or park.	Where trash is found on campus, BioBlitz.
Authoring			
Authoring experience	Simple drag and drop website to create forms or app for more complex authoring.	Create an editable feature layer (templates available), put the layer in a map, and share the map.	Create an editable feature layer (templates available), configure a QuickCapture project, and share the project.
Authoring worklfow	*Example*	*Example*	*Example* | *Example*
Data Collection			
Anonymous data collection?	Yes	No (map shared with specific user)	Limited (supported with ArcGIS Hub Premium, else project must be shared with specific user)
Edit (update) existing data	Yes (if form configured for it)	Yes	No
App required for collection	No	Yes	Yes
Capture user-entered information	Yes	Yes	Limited
Capture multiple features simultaneously	No	No	Yes
Capture a line as you walk or drive along it	No	Yes	Yes
Capture into multiple layers in a single form/map/project	No	Yes	Yes
Offline			
Offline support	Yes	Yes	Yes
Offline basemap	Yes Supported for geographic areas you as the map author define.	Yes Supported for geographic areas defined by the map author or defined in the app by the data collector.	Yes Supported by adding a map package (TPK, VTPK, or MMPK) to your project.
Offline workflow	*Offline workflow*	*Overview video and Implementation Guide*	*Blog on configuring the map*
After collection			
Viewing the data	Has integrated analytics and reports.	Use Map Viewer or other apps.	Use Map Viewer or other apps.

Let's go into the field!

Field Maps

Catch Basin Inspections

- Edit existing features
- Add new features
- Add photos (catch basins)



ArcGIS Survey123

Trees

- Species
- Height
- Health
- Location
- Photo

QuickCapture

Sidewalk Conditions

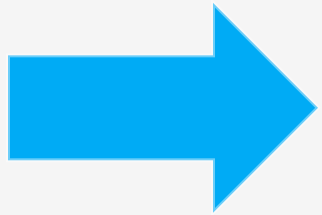
- Inspector (initials)
- Condition (collect photo)
- Comments

App Setup for Each Group

Field Maps: We will update and collect: storm drains!

- Credentials: **student.edsummit# / esri2023ed**
- Web Map**: Catch Basin Inspections**

Survey123: We will collect trees: Type, height, health. On phone, open survey: https://arcg.is/1Cij5i or QR code at right:



QuickCapture: We will collect sidewalk conditions (issues)

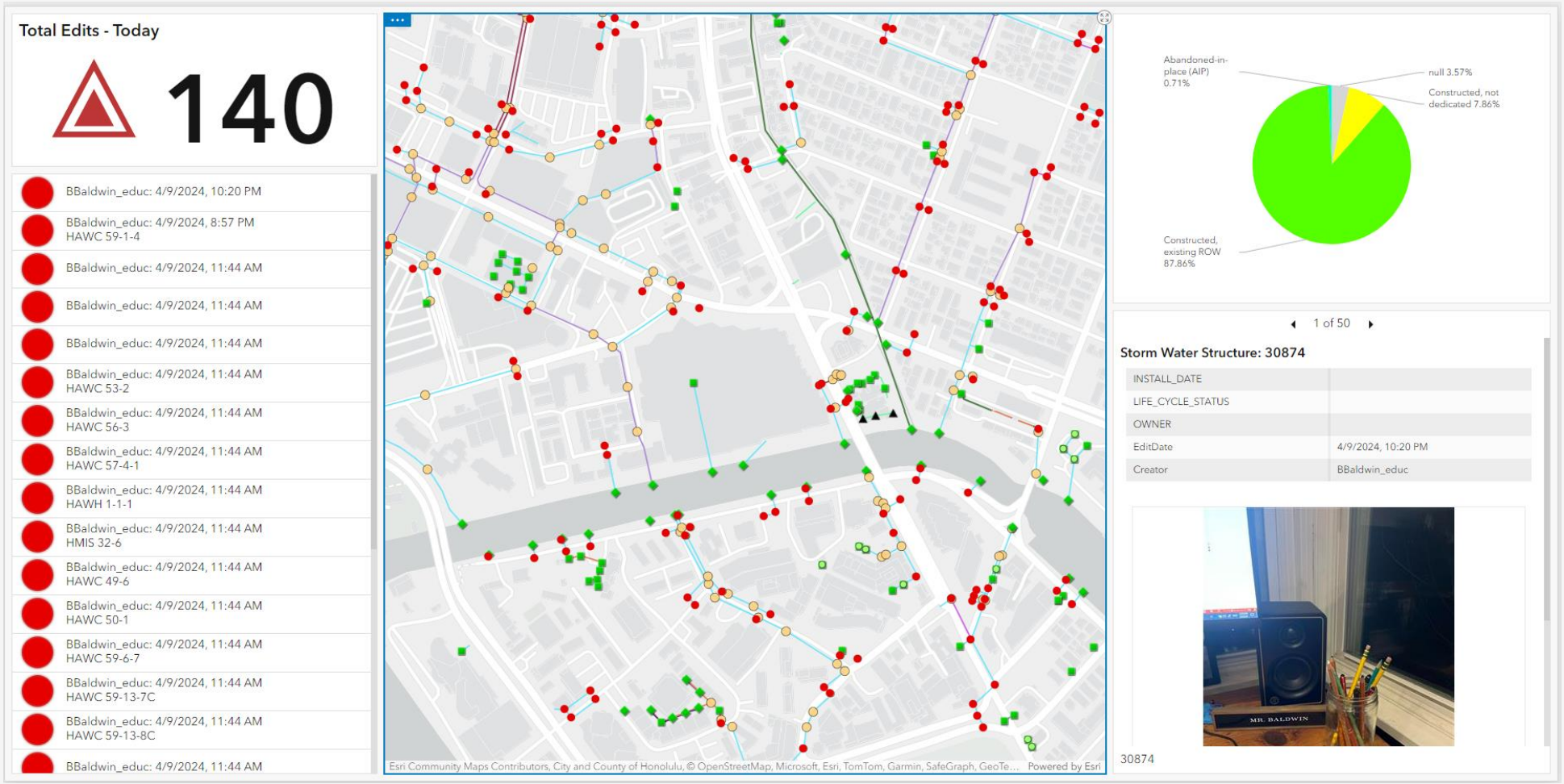
- Credentials: **student. edsummit# / esri2023ed**
- Project**:**
  - **Honolulu Sidewalks**

Let’s go into the field!

Back from the field!

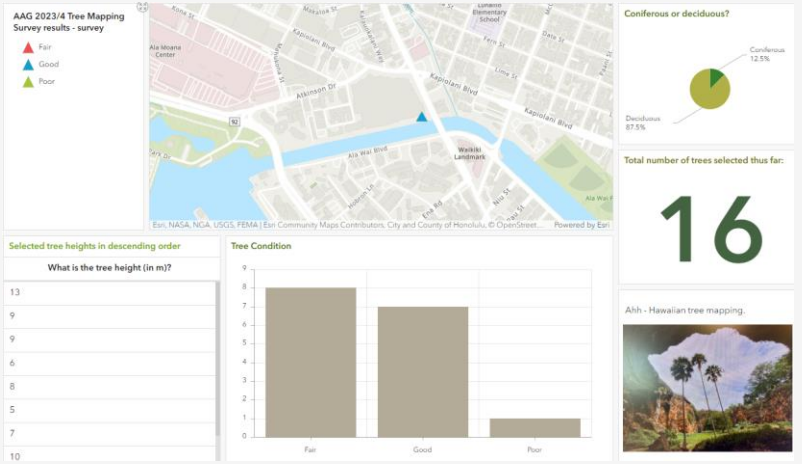
What were your reactions?

Back from the field: Field Maps



https://arcgis.com/apps/dashboards/82455b8704454e0da5d095df6019df88

Back from the field: Survey123

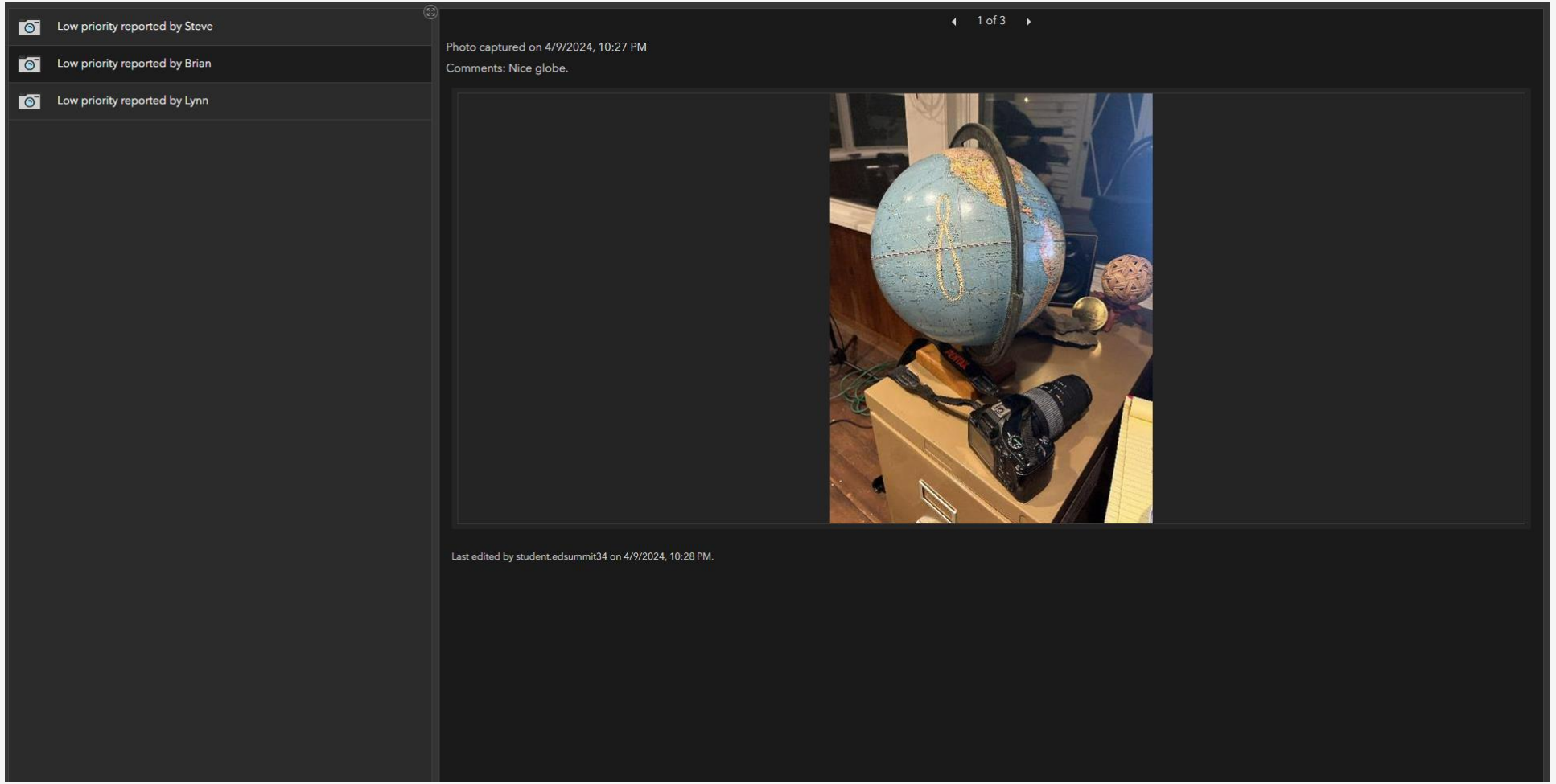


Survey:
https://arcg.is/1Cij5i

Map:
https://www.arcgis.com/apps/mapviewer/index.html?webmap=f98c15be968c45b2b8ed80a1390f09aa

Dashboard:
https://www.arcgis.com/apps/dashboards/ca1f02c193fc4bf59b5ef5a90872cdcd

Back from the field: QuickCapture



Not only is it important to ask questions and find the answers, as a scientist I feel obligated to communicate with the world what we were learning.

- Stephen Hawking

Analyze

Communicate

Analyze

--spatial analysis tools in ArcGIS Online
--spatial analysis tools in ArcGIS Pro

Communicate

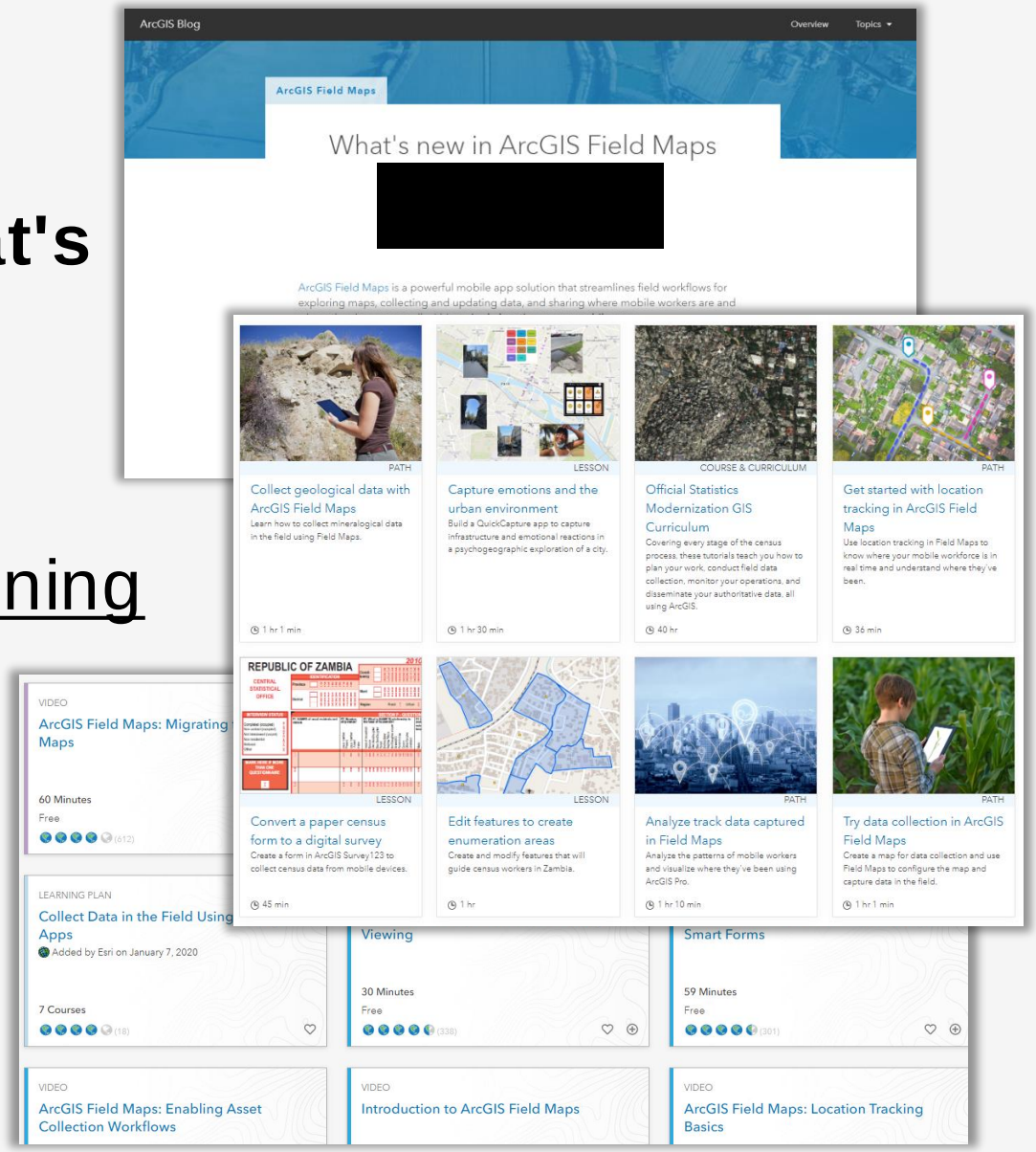
--Instant Apps
--StoryMaps
--Dashboards
--Embed maps in videos
--Articles/chapters/blog essays

Keep learning!

Keep in touch with periodic "What's New" in each of the tools.

Lessons and Tutorials: https://www.esri.com/training

Story Map: https://esriurl.com/appsinschools



Keep learning!

A Higher Ed Chat recording on this topic: https://mediaspace.esri.com/media/t/1_x372uids

Esri Canada's de-mystifying field apps essay: https://resources.esri.ca/getting-technical/demystifying-arcgis-field-data-collection-apps

Joseph Kerski

jkerski@esri.com

Brian Baldwin

bbaldwin@esri.com

baldwinbrian

Mahalo nui loa!

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Any Questions?

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