

# Implementing Collector for ArcGIS: Lessons Learned



CHESAPEAKE

• ENVIRONMENTAL MANAGEMENT, INC. •

*Applying Practical Science to  
Improve Communities*

Dan Smith, GISP - Frank Bowne

# Chesapeake Environmental Management, Inc.

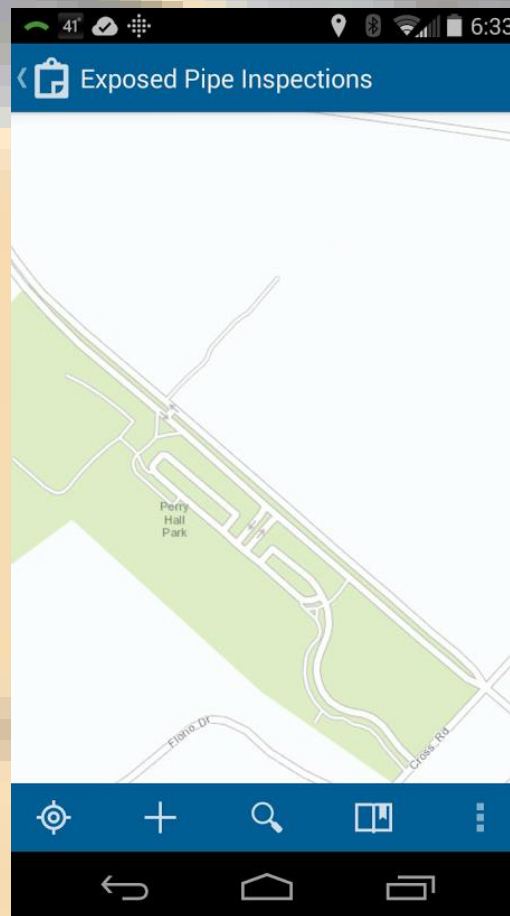
- Founded in 1993
- Headquartered in Harford County, MD (Staff 50+)
- MBE Woman-Owned Small Business
- Maryland Top 100 MBE in 2006, 2008, 2010, 2012 and 2013
- SBA MD Small Business Person of the Year (2014)
  - Stephanie Hau: President and CEO
- MSGIC Corporate Sponsor
- Relevant Technical Services
  - Natural Resource Assessments & Permitting
  - Environmental Site Assessments (ESA)
  - Asset Protection/Stream Stabilization
  - NEPA Documentation/Permitting
  - Information Technologies (GPS/GIS)
  - Engineering and Landscape Architecture

# Overview

- Collector for ArcGIS
  - Free app for iOS and Android
  - Allows clean interface for mobile editing of maps hosted by ArcGIS.com
  - Requires Organizational ArcGIS.com login
- ArcGIS.com
  - “ArcGIS Online is a collaborative, cloud-based platform that allows members of an organization to use, create, and share maps, apps, and data, and access authoritative base maps and ArcGIS apps” – Esri
  - Web mapping platform with a collection of geoprocessing tools and layers that can be used to create and share maps.

# Why use Collector?

- Easy-to-use interface
  - It's on familiar operating systems (iOS and Android), with familiar functionality and interface



Collector for ArcGIS

# Why use Collector?

- Clear layout of attributes with little setup
  - Out-of-the box clean interface with a natural workflow. Touch where you want to create a feature, attribute entry immediately begins.

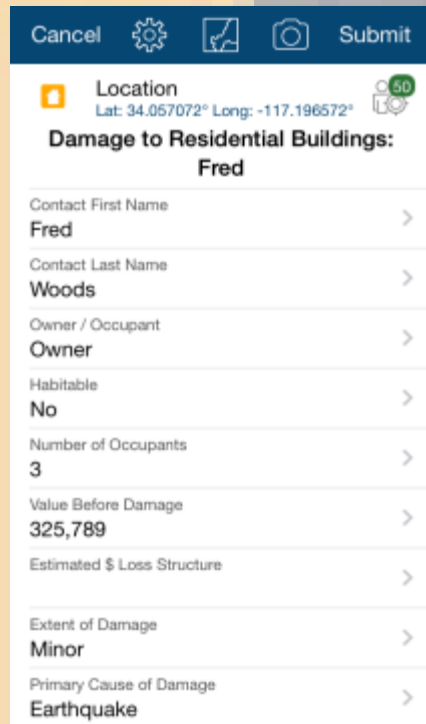
The screenshot displays the Collector mobile application interface. At the top, a status bar shows the time as 6:39 and various system icons. Below this is a dark blue header bar with a checkmark icon on the left and two menu icons (a list and a camera) in the center. The main content area is white and contains several form fields, each with a label and a dropdown menu:

- CORROSION CONDITION:** <No value>
- EXTENT OF THE CORROSION:** <No value>
- CONDITION OF THE COATING:** <No value>
- CONDITION OF THE PIPE:** <No value>
- NOTES OR COMMENTS:** (text input field)
- ATTACHMENTS** (section header)

At the bottom, there is a dark blue footer bar with three icons: a person with a magnifying glass, a paperclip with a plus sign, and a gear. Below the footer bar is a black navigation bar with three white icons: a back arrow, a home house icon, and a recent apps icon.

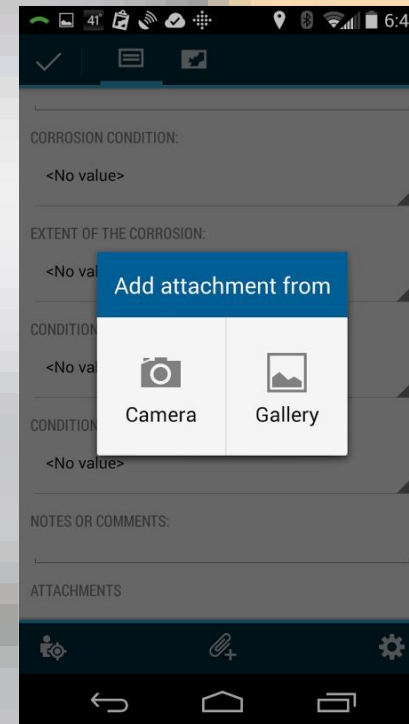
# Why use Collector?

- Easy photo integration
  - Because it's on mobile operating systems that users already know, they will recognize common icons to capture data. Photos are easily integrated into attribute table.



The screenshot shows the iOS version of the Collector for ArcGIS app. At the top, there is a blue header bar with icons for Cancel, settings, a map, a camera, and Submit. Below this, the 'Location' is displayed with coordinates (Lat: 34.057072° Long: -117.196572°) and a green '50' speed indicator. The main title is 'Damage to Residential Buildings: Fred'. Below the title, there are several form fields with right-pointing chevrons: 'Contact First Name' (Fred), 'Contact Last Name' (Woods), 'Owner / Occupant' (Owner), 'Habitable' (No), 'Number of Occupants' (3), 'Value Before Damage' (325,789), 'Estimated \$ Loss Structure', 'Extent of Damage' (Minor), and 'Primary Cause of Damage' (Earthquake).

iOS



The screenshot shows the Android version of the Collector for ArcGIS app. The interface is similar to the iOS version, but with a dark theme. A blue overlay box titled 'Add attachment from' is centered on the screen, showing two options: 'Camera' with a camera icon and 'Gallery' with a gallery icon. The background form fields are partially visible, including 'CORROSION CONDITION:', 'EXTENT OF THE CORROSION:', 'CONDITION', 'NOTES OR COMMENTS:', and 'ATTACHMENTS'.

Android

# Why use Collector?

- Available on many devices
  - iPhone, iPod, iPad, iPad Mini, Android phones and tablets
  - Sometimes the best device for the job is “the one you have with you”



# Can Use External GPS with Collector for ArcGIS

- Trimble Pro XT
- Trimble GeoExplorer 6000 and 7000 series
- SX Blue



(We were unsuccessful with a Trimble GeoExplorer 7000 using Android OS with Bluetooth connection)



# Two ways to use ArcGIS.com:

- Data hosted by Esri
  - Using your organizational login, create data layers or upload shape files to be edited with the app
    - Data is stored on Esri's servers
- Host your own data as map services through ArcGIS.com
  - Create an MXD using ArcGIS for desktop and then publish it to ArcGIS for Server.
  - Create a map service using ArcGIS for Server
  - Add that map service to an ArcGIS.com map under an organizational account that you have access to
  - Edit the data in your map service under the organizational login.

## Using Collector to edit a service:

- Need to have an ArcGIS for Server license
- Create maps using familiar tools in ArcGIS for Desktop
- Data remains “locally” housed on your own servers
- Maintained in an SDE database vs managing shape files
- Might be more difficult to manage, depending on familiarity with databases

# Real world examples:

- NPDES
  - Task in Anne Arundel Co., MD required that we edit existing SWM features as well as have the ability to add new and proposed features
  - Connectivity was not an issue- field crews were able to work online the entire time
  - Users unfamiliar with GIS were able to use the Collector app with minimal training
- HAZMAT site identification
  - Task in Prince Georges Co., MD required ability to identify and mark HAZMAT features near site of proposed water tank
  - Field crews had cellular connectivity, but the connection was very slow. Offline editing was not needed, but this was a case where it almost was.



Frank Bowne, GIS Developer

# Prep Data

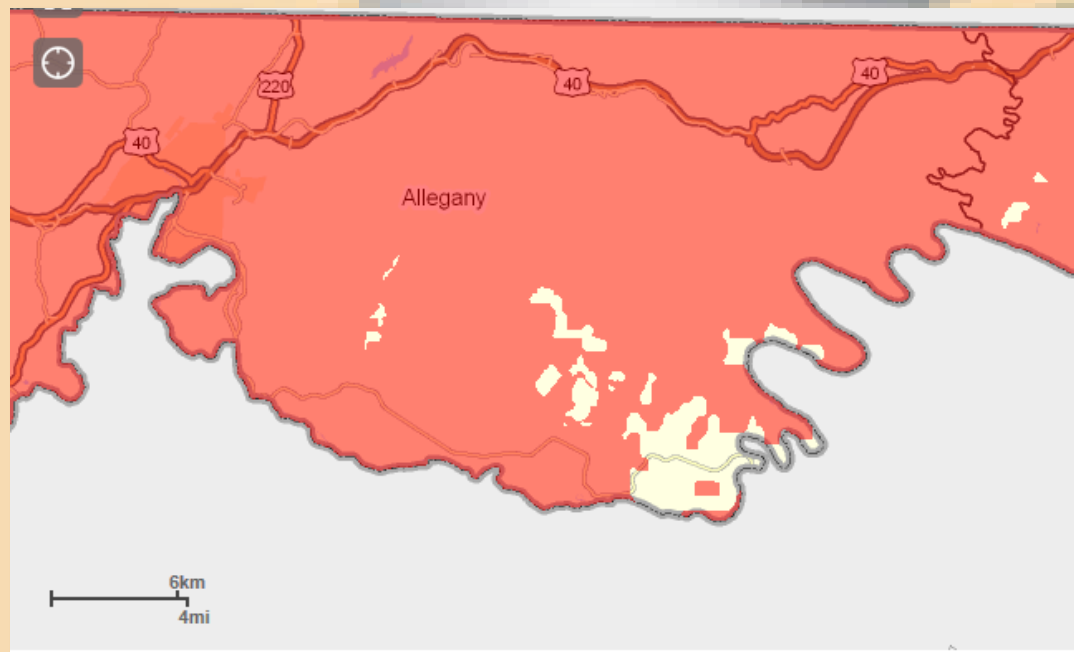
- Data prep is the most important and time consuming part of Collector for ArcGIS
- Because the whole point of Collector is collecting and editing, the data must be an editable ArcGIS Map Service with **Feature Access Capability** often referred to as a Feature Layer or Feature Service
- If all of your data is view-only, you don't need Collector. *ArcGIS Online* for iOS or Android is sufficient

# Prep layer for **Offline** (On Device) Use



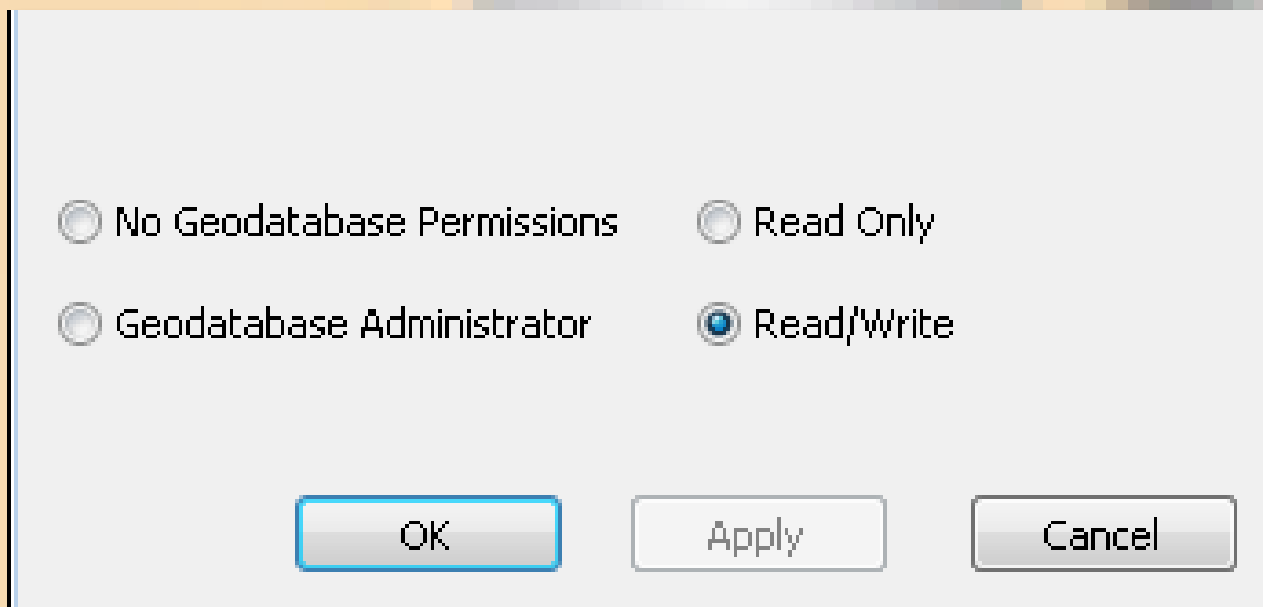
# Coverage

- You will want Offline enabled unless you are positive your broadband provider has 100% coverage in the geographic area you are going to collect in



# SDE data

- The Layer in ArcMap must be Sourced to a SDE data connection/feature class that has read/write privileges using a DB authenticated (not OS) user even if you don't want to edit it in Collector



☐ No Geodatabase Permissions      ☐ Read Only

☐ Geodatabase Administrator      ☒ Read/Write

OK      Apply      Cancel



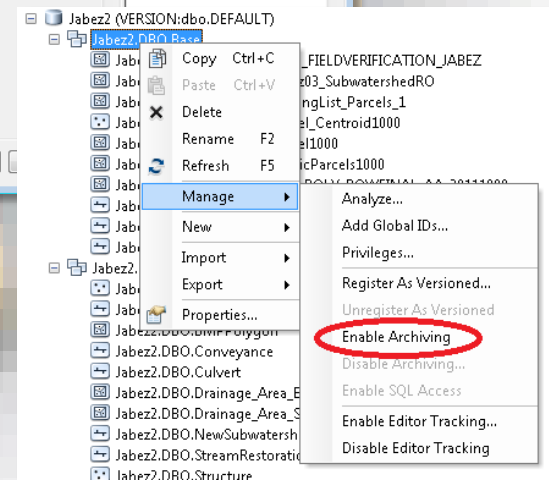
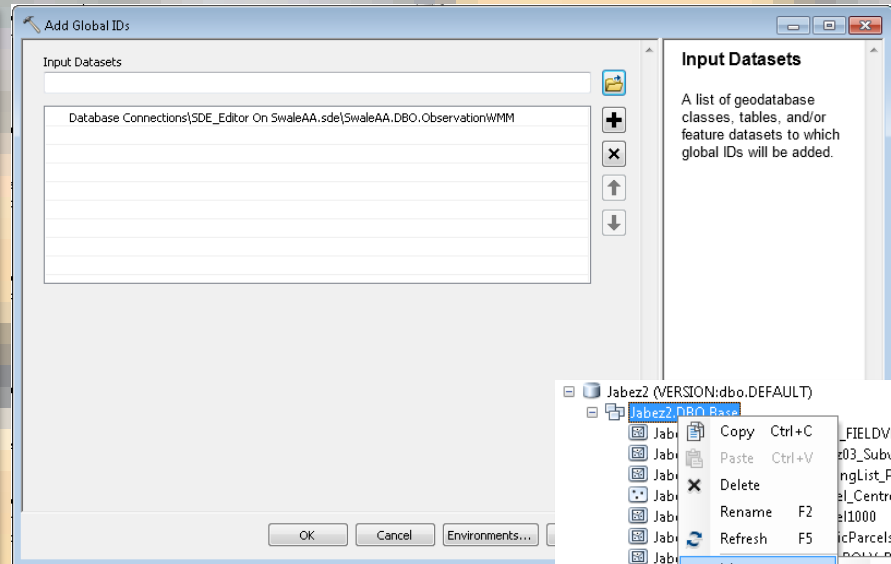
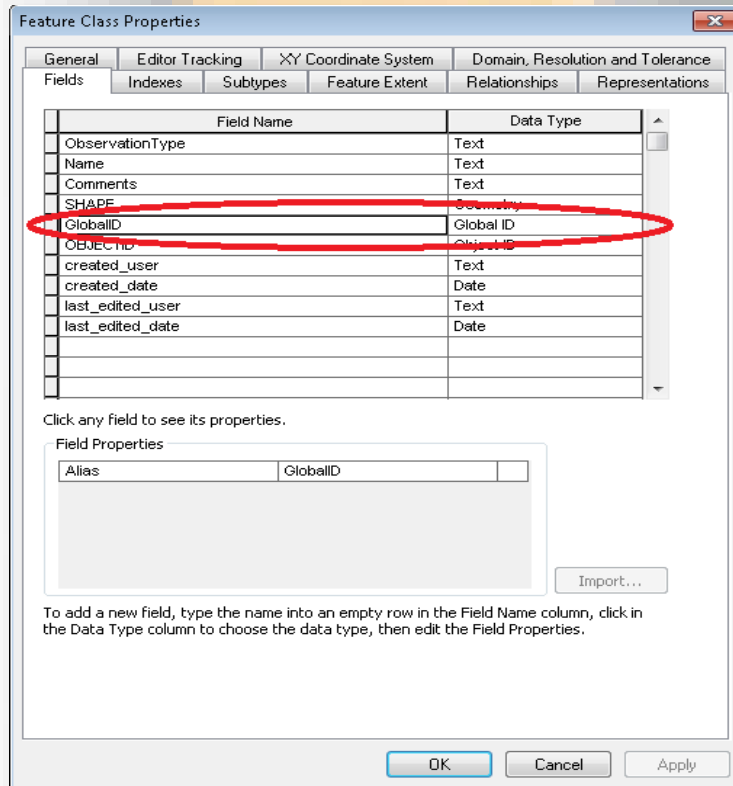
# Web Mercator

- If your layer is going to be a Feature Service **using tiles from a cache** and overlaid in the web Map with the *ArcGIS Online/Bing Maps/Google Maps* Tiling Scheme your layer should be WGS\_1984\_Web\_Mercator\_Auxiliary\_Sphere

# Global ID, Archive Enabled

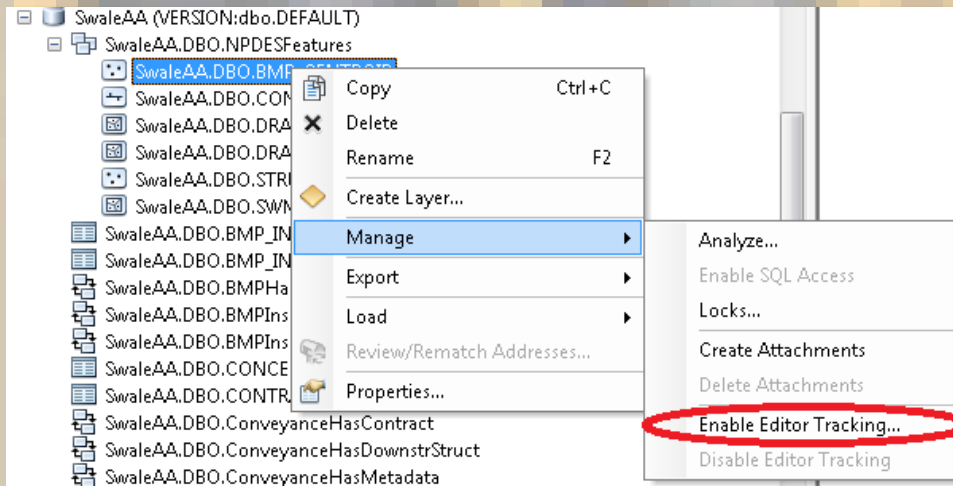
The feature class must:

- Have a globalid column
  - Run GeoProcess Tool: Add Global IDs
- Be Archive Enabled

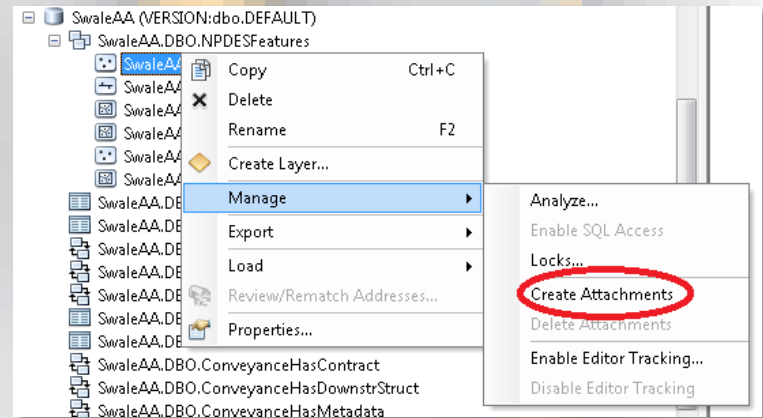


# Optional

- The feature class optionally may have:
- Editor Tracking

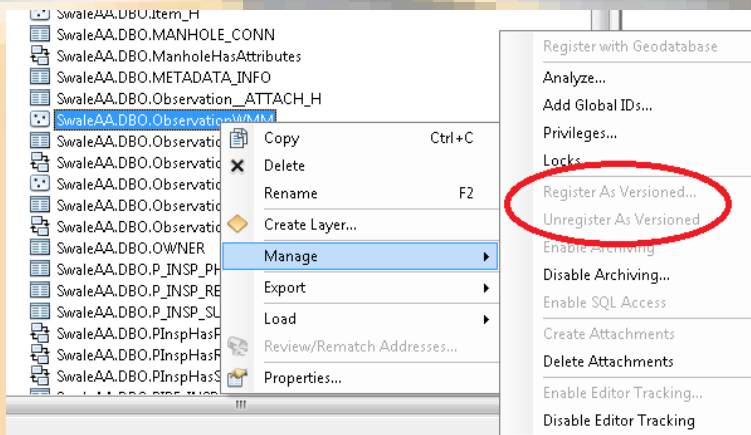


- Attachments Enabled (Do this after Global ID creation and Archive Enabling)

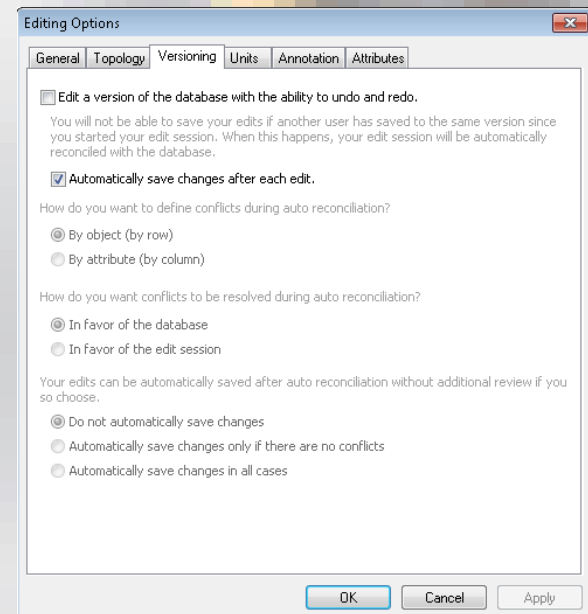


# No Versioning

- The feature class must not be Registered as Versioned

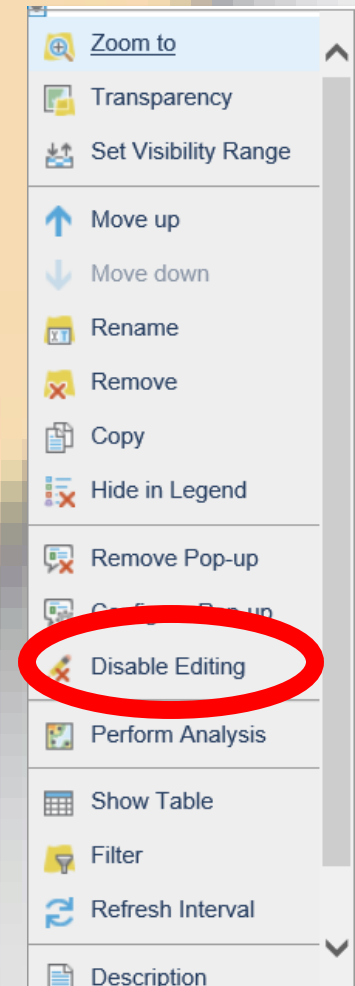


- In ArcMap, untick “Edit a version...”



# Publish Service

- Publish your layer to a Service that has Mapping **and** Feature Access capabilities
- The Feature Access capability **must** have these Operations and Properties allowed even though you don't want to edit the feature class in Collector.
  - Sync
  - Query
  - Create
  - Update
  - Delete
- If you don't want to allow editing attributes, once in the Web Map in ArcGIS OnLine, in the Table Of Contents you can click the down arrow and then *Disable Editing*.



# Service Security

- Using ArcGIS Server Manager:
  - Create Roles

[esri.com](#) | [Resource Center](#) | [Sign Out](#) | [Help](#)

**ArcGIS Server Manager**

Services Site **Security** Logs

Settings Users **Roles**

[Help](#)

Roles in the Identity Store

A role is a set of users related by function, title, or some other attribute. When the built-in store is used to manage roles, click the New Role button to add a role. To locate a specific role, enter the first few letters of the role name in the Find Role field.

Find Role:  [New Role](#)

Role name:	Description	Role type:
ArcUser	ArcUser	User
Edit Swales	Can create, update, delete Swale features	User
EditClinton	Can create, update, delete Clinton Tank hazmat features	User
EditJabez	Can create, update, delete Jabez 3 NPDES features	User

◀ 1 ▶

- And Users and assign them to Roles

[Resource Center](#) | [Sign Out](#) | [Help](#)

**Security** Logs

[Help](#)

manage users, click the New User

[New User](#)

Username	Full name:	Email:
arcuser	ArcGIS User	
Dan	Dan Smith	dsmith@cemsience.com
Frank	Frank Bowne	fbowne@cemsience.com
Hazmat01	Hazmat01	nwalls@cemsience.com
Jess	Jess Petty	jpetty@cemsience.com
Nick	Nick Walls	nwalls@cemsience.com
Stantec	Stantec	ginger.dadds@stantec.com

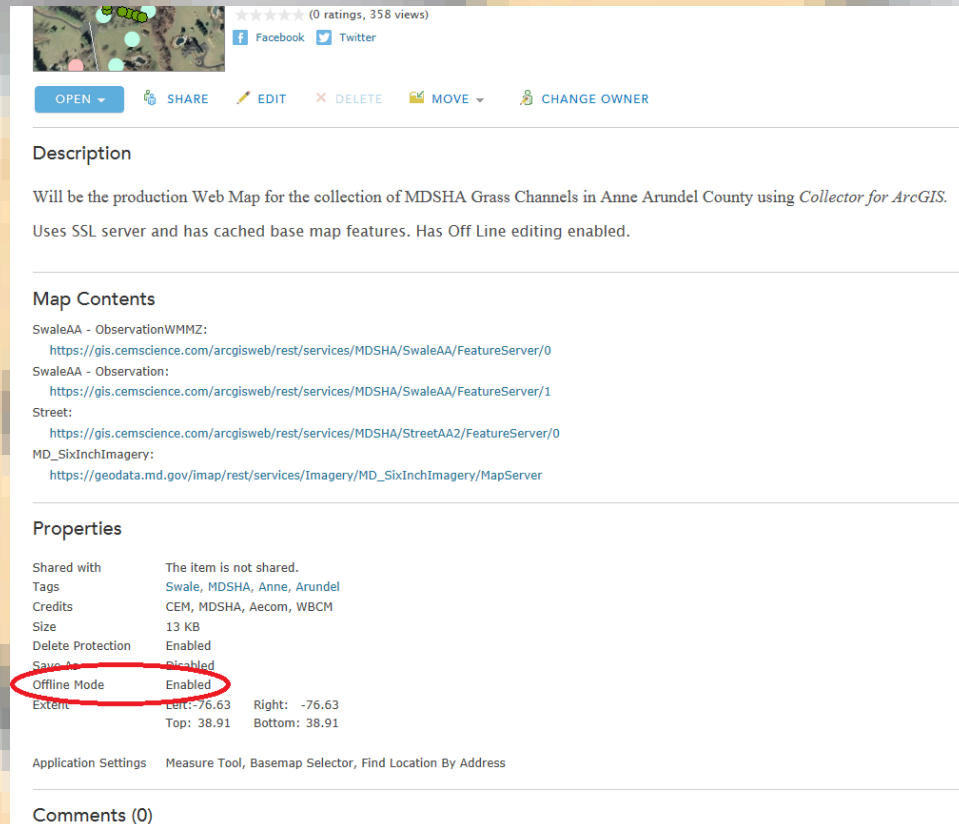
◀ 1 ▶

# Create Web Map

- In ArcGIS Service Manager go into your service and under capabilities click on Feature Access
- Copy the REST URL into paste buffer, e.g., <https://cem-gis-web:6080/arcgis/rest/services/MDSHA/SwaleBaseAA/FeatureServer>
- In your Web Map in ArcGIS OnLine :
  - Add layers
  - Add layer from web
    - URL: paste in the above URL but change the Intranet URL [“https://cem-gis-web:6080/arcgis/rest”](https://cem-gis-web:6080/arcgis/rest) to the Internet URL <https://gis.cemscience.com/arcgisweb/rest>
  - Save
  - Share
    - Don't share with anyone at this stage (tick all boxes off)

# Check Your Web Map is Offline Enabled

- In ArGIS Online;
  - Click *About* and *More Details...*



☆☆☆☆☆ (0 ratings, 358 views)

Facebook Twitter

OPEN SHARE EDIT DELETE MOVE CHANGE OWNER

### Description

Will be the production Web Map for the collection of MDSHA Grass Channels in Anne Arundel County using *Collector for ArcGIS*.  
Uses SSL server and has cached base map features. Has Off Line editing enabled.

### Map Contents

SwaleAA - ObservationWMMZ:  
<https://gis.cemscience.com/arcgisweb/rest/services/MDSHA/SwaleAA/FeatureServer/0>  
SwaleAA - Observation:  
<https://gis.cemscience.com/arcgisweb/rest/services/MDSHA/SwaleAA/FeatureServer/1>  
Street:  
<https://gis.cemscience.com/arcgisweb/rest/services/MDSHA/StreetAA2/FeatureServer/0>  
MD\_SixInchImagery:  
[https://geodata.md.gov/imap/rest/services/Imagery/MD\\_SixInchImagery/MapServer](https://geodata.md.gov/imap/rest/services/Imagery/MD_SixInchImagery/MapServer)

### Properties

Shared with	The item is not shared.
Tags	Swale, MDSHA, Anne, Arundel
Credits	CEM, MDSHA, Aecom, WBCM
Size	13 KB
Delete Protection	Enabled
Save As	Disabled
Offline Mode	Enabled
Extent	Left: -76.63 Right: -76.63 Top: 38.91 Bottom: 38.91

Application Settings Measure Tool, Basemap Selector, Find Location By Address

### Comments (0)



# Test

- Start ArcGIS Collector
  - Login to the Web Map's owner account
  - You will see your Web Map
    - If it is offline enabled, you will see a cloud and arrow icon



SwaleAA

10/23/14 | Nick Walls



# Share

- If everything works, go into ArcGIS Online and:
  - Invite members to your Organization
  - Create Groups
  - Invite users to the Group
  - Open the Web Map In Map Viewer and
    - Share with:
      - Everyone
      - Just your organization
      - Members of one or more Groups

Share

Choose who can view this map.

Currently, only you can view your map. Before you can link to it or embed it, you need to allow others to view your map.

☐ Everyone (public)

☐ Chesapeake Environmental Management

☐ Members of these groups:

☐ CEM GIS Users

☐ CEM Hazmat

☐ GPI

☐ Havre De Grace, MD

☐ Stantec

Link to this map

http://bit.ly/1tAehn6

Embed this map

EMBED IN WEBSITE


MAKE A WEB APPLICATION

CLOSE

# If you enabled attachments before enabling Global Ids you will get theses errors in Collector:

- iOS
  - "1 attachment could not be sent" from iOS:
  - SEVERE Aug 21, 2014, 2:52:24 PM Unable to process request. Extension not found Rest
- Android
  - "1 attachment failed to upload" from Android:
  - SEVERE Aug 21, 2014, 2:54:36 PM Unable to process request. Error parsing multi-part request Rest

# Map Download Failed Error

- Got error trying to download to device in Collector for offline use:
- Map Download Failed. Unable to download the map. This map does not support being downloaded to a device. The operation couldn't be completed. (AppFramework error 5.)
- Even though Offline Mode Enabled in Web Map and Cloud icon appears in Collector 
- Cause:
  - Map contained Mdlmap2 Six inch ortho service
  - Using Esri "Imagery With Labels" base map works ok.

# Z Aware Feature Class

- If you untick “Apply Default z values” in service creation, when you go to add a new feature in Collector, you'll get: *“Update Failed. Updates could not be sent. Unable to complete operation, geometry does not have z values or has null values.”*
- If you tick “Apply Default z values” in service creation and make it 0, and you add a new feature in Collector there is no error message. Then look at its Sketch Properties in ArcMap. It didn't collect the z from the gps collection. It is 0. (And no, I wasn't standing at sea level)
- Per Russell Roberts, Product Engineer on the Apps Group at ESRI, Mar 21, 2014: “The Collector app currently does not support m/z values.”

# Sub Meter GPS Data Capture (Android)

- *Trimble GeoExplorer, GeoXT, SX Blue, etc.* GPS receiver - \$3000-\$6000+
- NMEA Output option (GeoExplorer 6000) \$495.00
- Android Tablet \$150.00+
- Mobile Hotspot (MiFi) \$49.99 (with 2 yr. contract)
- *Bluetooth GPS* software for Android \$0
- *Collector For ArcGIS* software \$0
- ArcGIS On Line Subscription (up to 5 users) Included in existing ArcGIS Server 10.2.2 license)

# Sub Meter GPS Data Capture (iOS)

- *Trimble GeoExplorer, GeoXT, SX Blue, etc.* GPS receiver - \$3000-\$6000+
- NMEA Output option \$495.00
- iPad Tablet
  - GPS Cable from Aman Enterprises \$250.00-\$350.00
  - iSxBlue II GNSS – Bluetooth compatible with iOS devices \$3000.00+
- *Collector For ArcGIS* software \$0
- ArcGIS Online Subscription (up to 5 users) Included in existing ArcGIS Server 10.2.2 license)

# Conclusion

- Collector for ArcGIS is a clean, easy to use app without a steep learning curve that is available on many devices.
- Has some limitations- sometimes you will still need a custom ArcGIS 10.x Engine app if you have complex business requirements that Collector cannot handle
- Connecting to external GPS seems to be something that users want to do. It seems like it should be easier. Android requires an additional, non-Esri app to override bluetooth stack.
- Awkwardly named. “Collector for ArcGIS” can be difficult to search on to find answers. “Collector” is too generic.



# Contact



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