

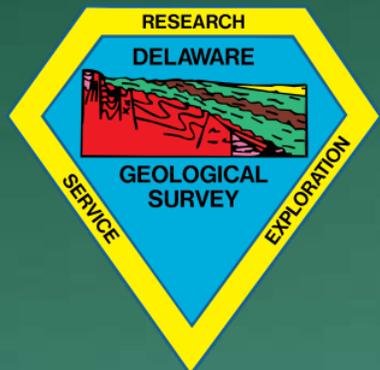
Geologic Field Mapping in Delaware – Paper Maps to ESRI Collector App

Lillian Wang, GISP

GIS Specialist/Cartographer

Delaware Geological Survey

University of Delaware



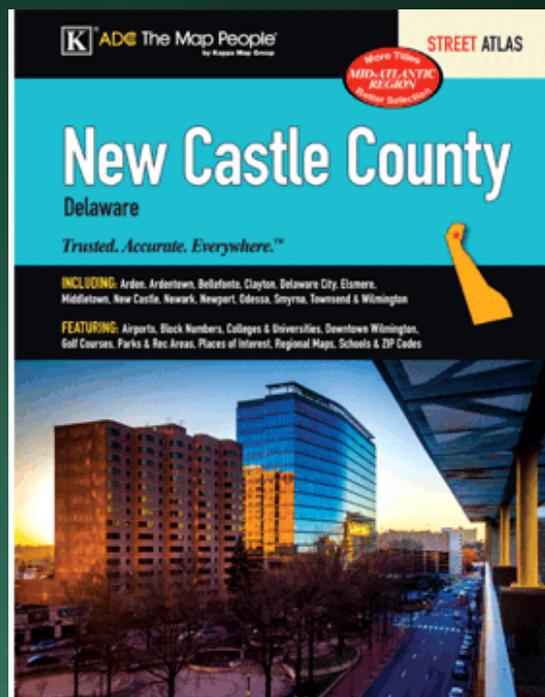
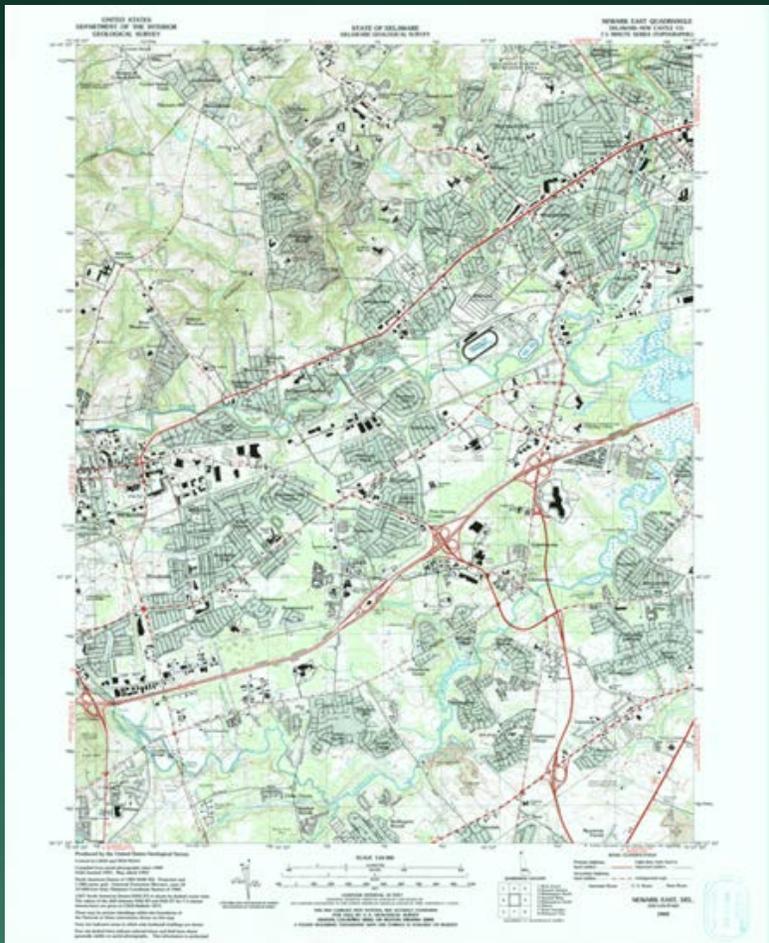


Field work – drilling, hand augering



Field maps – paper (1980s'-2007)

- USGS topographic maps
- ADC map books
- Aerial photography



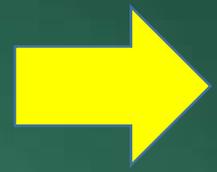
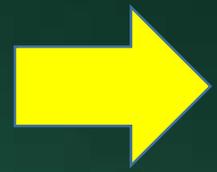
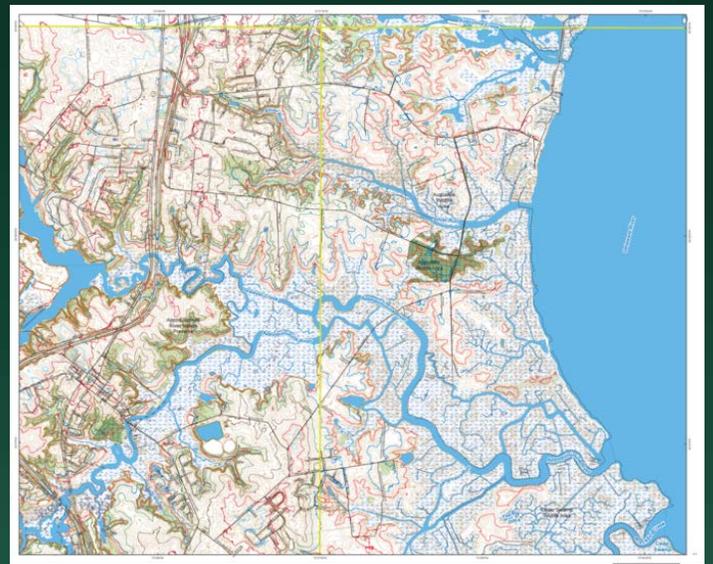
Field maps – paper (2008-2015)



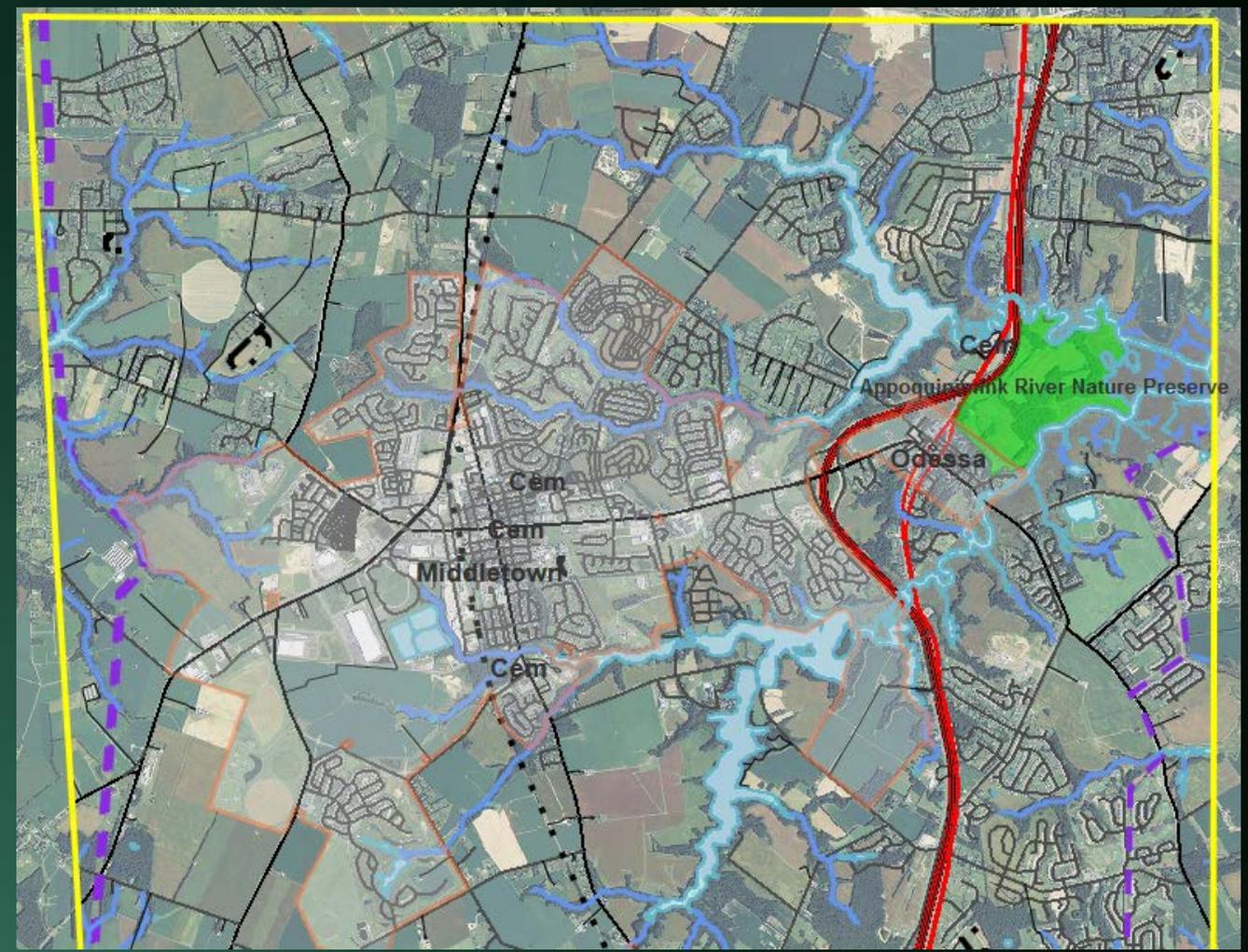


Field maps – mobile

Paper copies

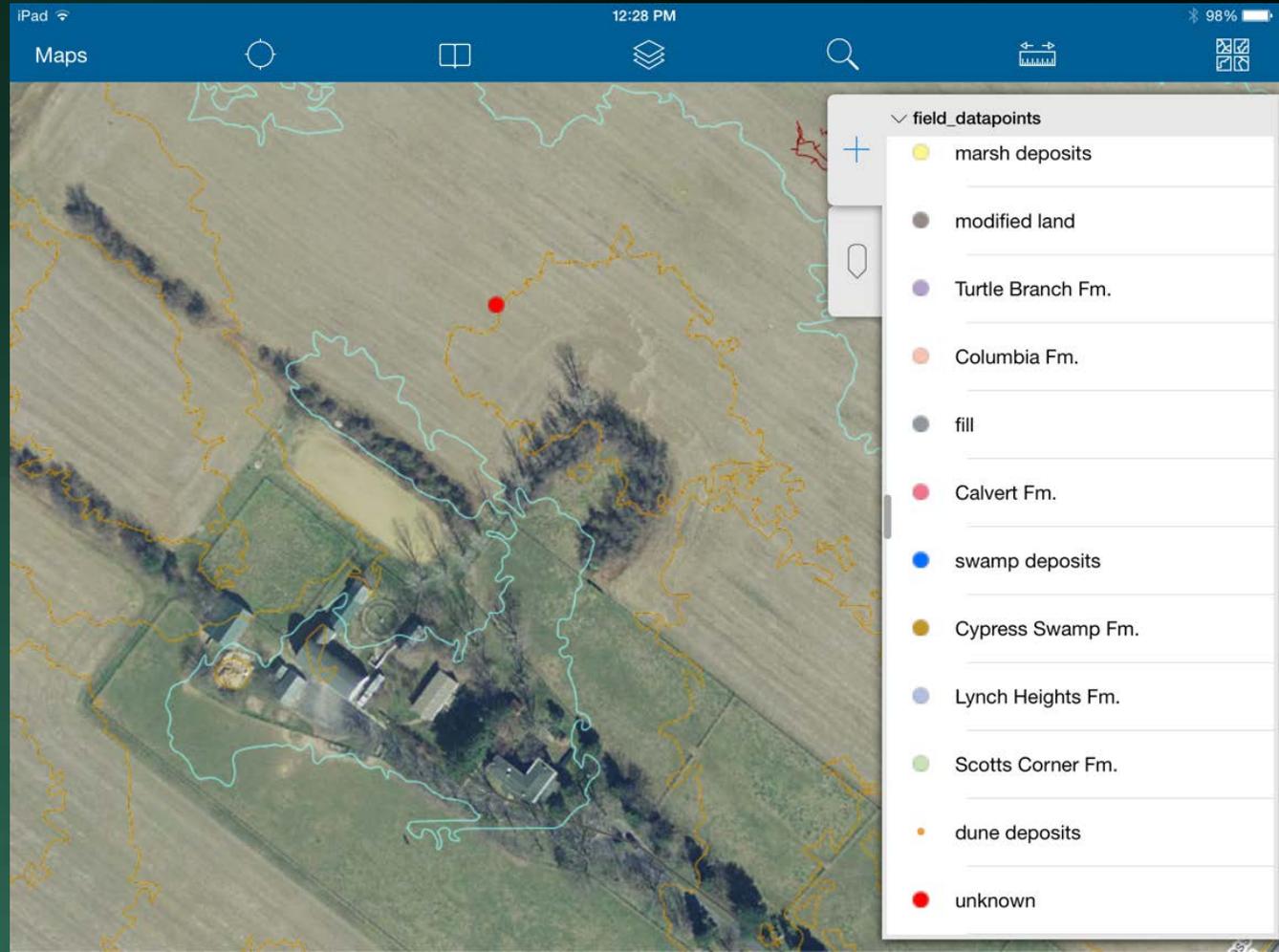


Mobile device



ESRI Collector App

- Collect and update GIS data in the field using a tablet or smartphone
- Attach photos to features
- Data and photos are stored in the cloud
- User can collect data offline



ESRI Collector App – Create Maps

- Prepare data in ArcGIS for Desktop (ArcCatalog/ArcMap)

SAGELK_datapoints - ArcMap

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:71,641 Snapping

Georeferencing

Table Of Contents

Layers

- fieldwork_sagelk
 - <all other values> surf_unit
 - Qcl
 - Qlh
 - Kml
 - Ktht
 - Tvt
 - Qm
 - Qsw
 - U

Table

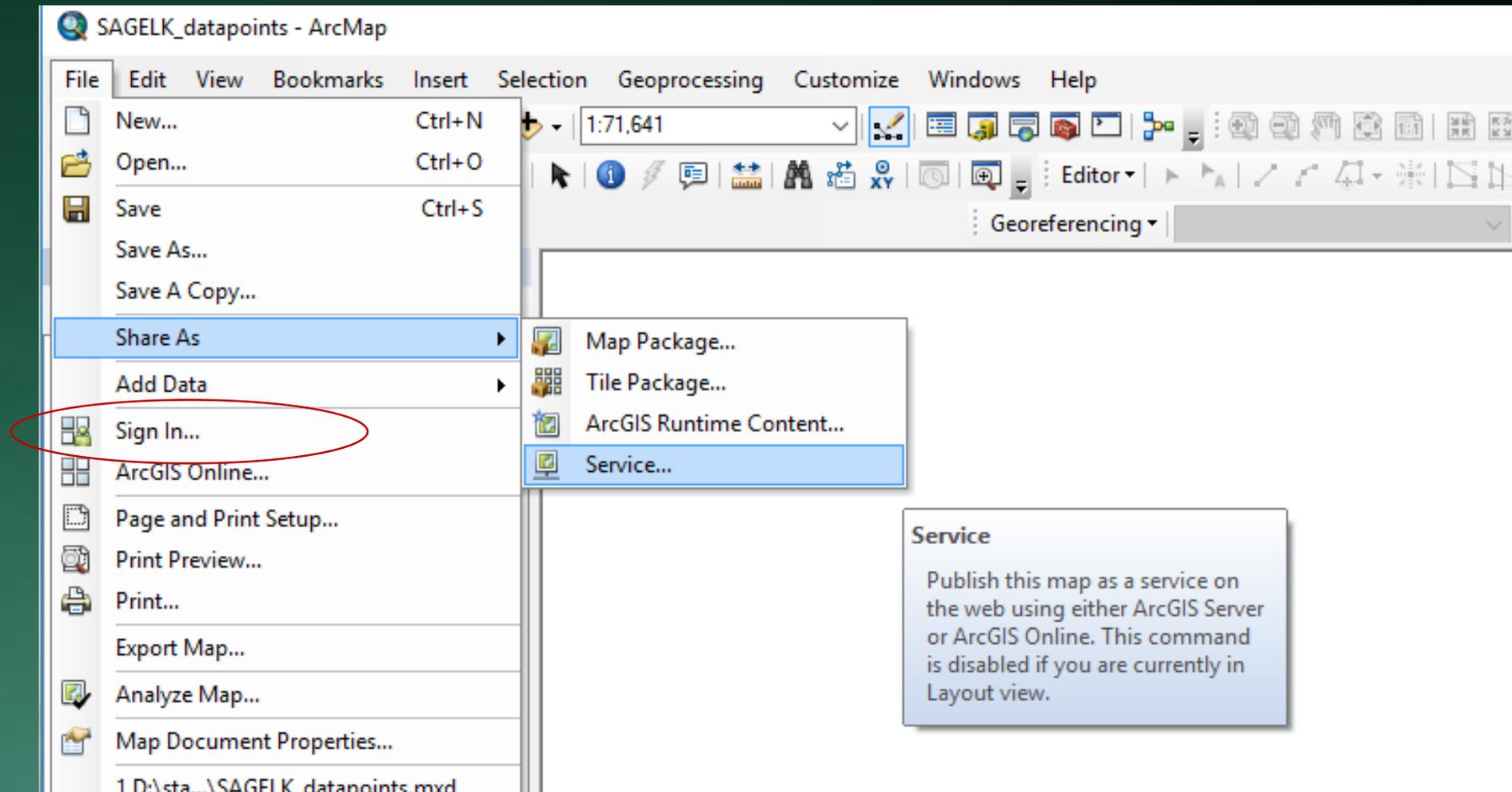
fieldwork_sagelk

| OBJECTID* | SHAPE* | DGSID | LOCALID | PROJECT | surf_unit | ALTITUDE | DEPTH | Quad | comment | Data_Type |
|-----------|--------|-------|---------|---------|-----------|----------|-------|------|---------|-----------|
|-----------|--------|-------|---------|---------|-----------|----------|-------|------|---------|-----------|



ESRI Collector App – Create Maps

- Publish data from desktop to ArcGIS Online



All Maps

Search maps

All On Device

10 maps



MIDCEC field map (online)

3/31/15 | Lillian Wang



tmck practice map feb2016

11/29/16 | Lillian Wang



SMYBBH field map (online)

6/1/16 | Lillian Wang



SMYBBH field map (offline)

Downloaded 9/3/15



Functional Classification of Delaware Roads

4/2/15 | Josh Thomas



MIDCEC field map (offline)

3/25/15 | Lillian Wang



SAGELK field map (offline)

8/29/16 | Lillian Wang



SAGELK field map (online)

8/30/16 | Lillian Wang



SMYBBH field map (offline)

6/1/16 | Lillian Wang



statemap_quads_mappe d

10/26/16 | Lillian Wang



All Maps

All

On Device



MIDCEC field map
(offline)

Synced 5/1/15, 10:44 AM



SAGELK_fieldwork_datapoints Edit

- Overview**
- Data
- Visualization
- Usage
- Settings

Edit Thumbnail

★ Add to Favorites

field maps for STATEMAP project in St Georges-Elkton quadrangles

Edit

by lillian@udel.edu

Last Modified: August 29, 2016

Feature Layer (Hosted)

Description

Edit

Add an in-depth description of the item.

Layers

[fieldwork_sagelk](#)

Open In
Export To
Disable Attachments
Service URL

Access and Use Constraints

Edit

Add any special restrictions, disclaimers, terms and conditions, or limitations on using the item's content.

Open in Map Viewer ▼

Open in Scene Viewer

Open in ArcGIS for Desktop

Publish ▼

Export Data ▼

- Export to Shapefile
- Export to CSV file
- Export to FGDB
- Export to GeoJSON
- Export to Feature Collection

Details

★★★★★ 0 ratings

Source: [Feature Service](#)

Created: August 29, 2016

Size: 240 KB

Shared with: [DGS-STATEMAP](#)



Cancel



Update

- Cancel Done
- surf_unit
- Turtle Branch Fm.
- Columbia Fm.
- fill
- Calvert Fm.
- swamp deposits
- Cypress Swamp Fm.
- Lynch Heights Fm.
- Scotts Corner Fm.
- dune deposits
- unknown ✓
- Vincentown Fm.
- Carolina Bay deposits
- Beaverdam Fm.

Location
 Lat: 39.477861° Long: -75.692014°

Location >

Record_By >

Project >

Northing >

Easting >

Altitude >

Quad >

Depth >

Notes >

Notes2 >

County >

Otcrp_Type >

surf_unit >
unknown

Date >

Cancel



Update

Done

Attachments

Add

- Take Photo or Video
- Choose From Library

Location

39.477861° Long: -75.692014°

unknown

Date

Collector – customizing the map

The screenshot displays the ArcMap software interface. The title bar reads "SAGELK_roads_contours_offlinemap - ArcMap". The menu bar includes File, Edit, View, Bookmarks, Insert, Selection, Geoprocessing, Customize, Windows, and Help. The File menu is open, showing options like New..., Open..., Save, and Share As. The 'Share As' option is selected, and its sub-menu is open, with 'Tile Package...' highlighted. A tooltip for 'Tile Package' is displayed over the map, explaining that it creates a cache of tiles for use as a basemap in ArcGIS Runtime applications. The map itself shows a topographic view with roads, contours, and labels like 'Executive Dr', 'State Hwy 896', and 'Delaware'.

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

New... Ctrl+N
Open... Ctrl+O
Save Ctrl+S
Save As...
Save A Copy...
Share As
Add Data
Sign Out - lillian@udel.edu
ArcGIS Online...
Page and Print Setup...
Print Preview...
Print...
Export Map...
Analyze Map...
Map Document Properties...

1 ...\SAGELK_roads_contours_offl...
2 D:\st...\SAGELK_online_map.mxd
3 D:\sta...\SAGELK_datapoints.mxd
4 D:\Temp\testing.mxd
5 ...\deos_station_de_rec_flood_l...
6 D:\st...\deos_station_de_rec.mxd
7 D:\story_map...\jainur.india.mxd

1:9,028

Georeferencing sagelk12

Map Package...
Tile Package...
ArcGIS Runtime Co...
Service...

Tile Package
Create a tile package from the current map zipped up into one convenient file, and either upload it to ArcGIS Online or save it to disk. A tile package contains a cache of tiles that you can use as a basemap in ArcGIS Runtime applications.

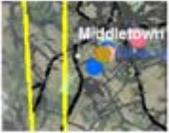
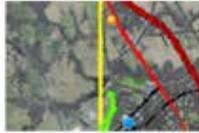
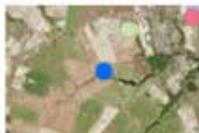


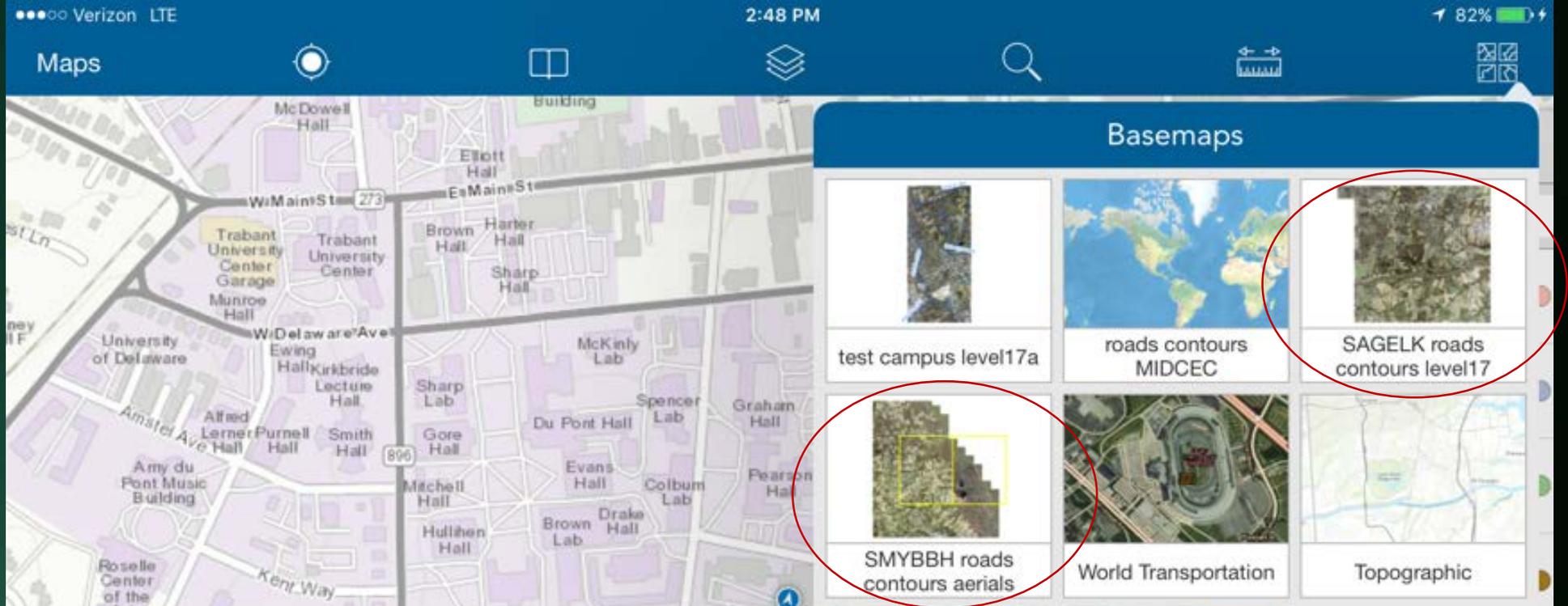
Collector – customizing the map

Verizon LTE 11:21 AM 18%

All Maps  Search maps

All On Device 10 maps

| | | |
|---|--|---|
|  <p>MIDCEC field map (online)</p> <p>3/31/15 Lillian Wang </p> |  <p>tmck practice map feb2016</p> <p>11/29/16 Lillian Wang  </p> |  <p>SMYBBH field map (online)</p> <p>6/1/16 Lillian Wang </p> |
| <p>On Device</p>  <p>SMYBBH field map (offline)</p> <p>Downloaded 9/3/15  </p> |  <p>Mobility Land Access</p> <p>Functional Classification of Delaware Roads</p> <p>4/2/15 Josh Thomas </p> |  <p>MIDCEC field map (offline)</p> <p>3/25/15 Lillian Wang  </p> |
|  <p>SAGELK field map (offline)</p> <p>8/29/16 Lillian Wang  </p> |  <p>SAGELK field map (online)</p> <p>8/30/16 Lillian Wang </p> |  <p>SMYBBH field map (offline)</p> <p>6/1/16 Lillian Wang  </p> |
|  <p>statemap_quads_mappe d</p> <p>10/26/16 Lillian Wang  </p> | | |



File Sharing

The apps listed below can transfer documents between your iPad and this computer.

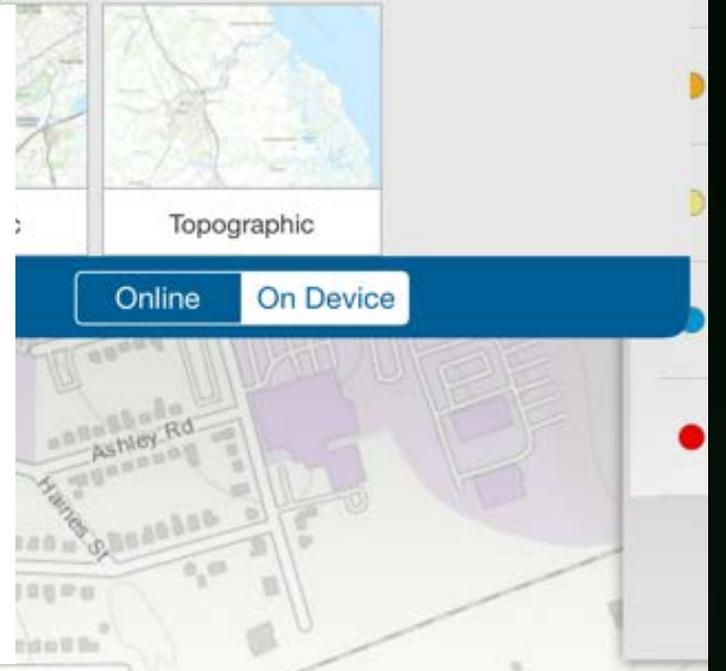
Apps

-  Bad Elf GPS
-  Collector
-  Keynote
-  Pages

Collector Documents

| | | |
|--|-------------------|----------|
|  Basemaps | 3/9/2014 10:26 PM | 463.1 MB |
|  offline_aHR0cDovL3d3dy5hcmNnaXMuY29t | 3/4/2014 12:55 PM | 4 KB |
|  offliner_aHR0cDovL2Fnc3BvcnRhbHNzbC5lL3pL... | 3/8/2014 9:40 PM | 4 KB |
|  offliner_aHR0cDovL3d3dy5hcmNnaXMuY29t | 3/8/2014 10:45 PM | 4 KB |
|  speedy32_aHR0cDovL3d3dy5hcmNnaXMuY29t | 3/10/2014 2:26 PM | 12 KB |
|  user_offline_E4867DBF-9123-448B-B546-585FDE9... | 3/4/2014 12:55 PM | zero KB |
|  user_offliner_09542D37-87F4-4895-93B1-9B3B237... | 3/8/2014 10:44 PM | zero KB |
|  user_offliner_CB85CFEE-3319-4CD2-A3AD-DA649... | 3/7/2014 11:30 AM | zero KB |
|  user_speedy32_634010EA-A099-465A-A92E-8A8E... | 3/9/2014 10:26 PM | 368 KB |

[Add...](#)
[Save to...](#)



Details Add ▾ Edit Basemap Analysis Save ▾ Share Print Directions Measure Bookmarks Find address or place

About Content Legend

Contents

datapts dgs

Topographic

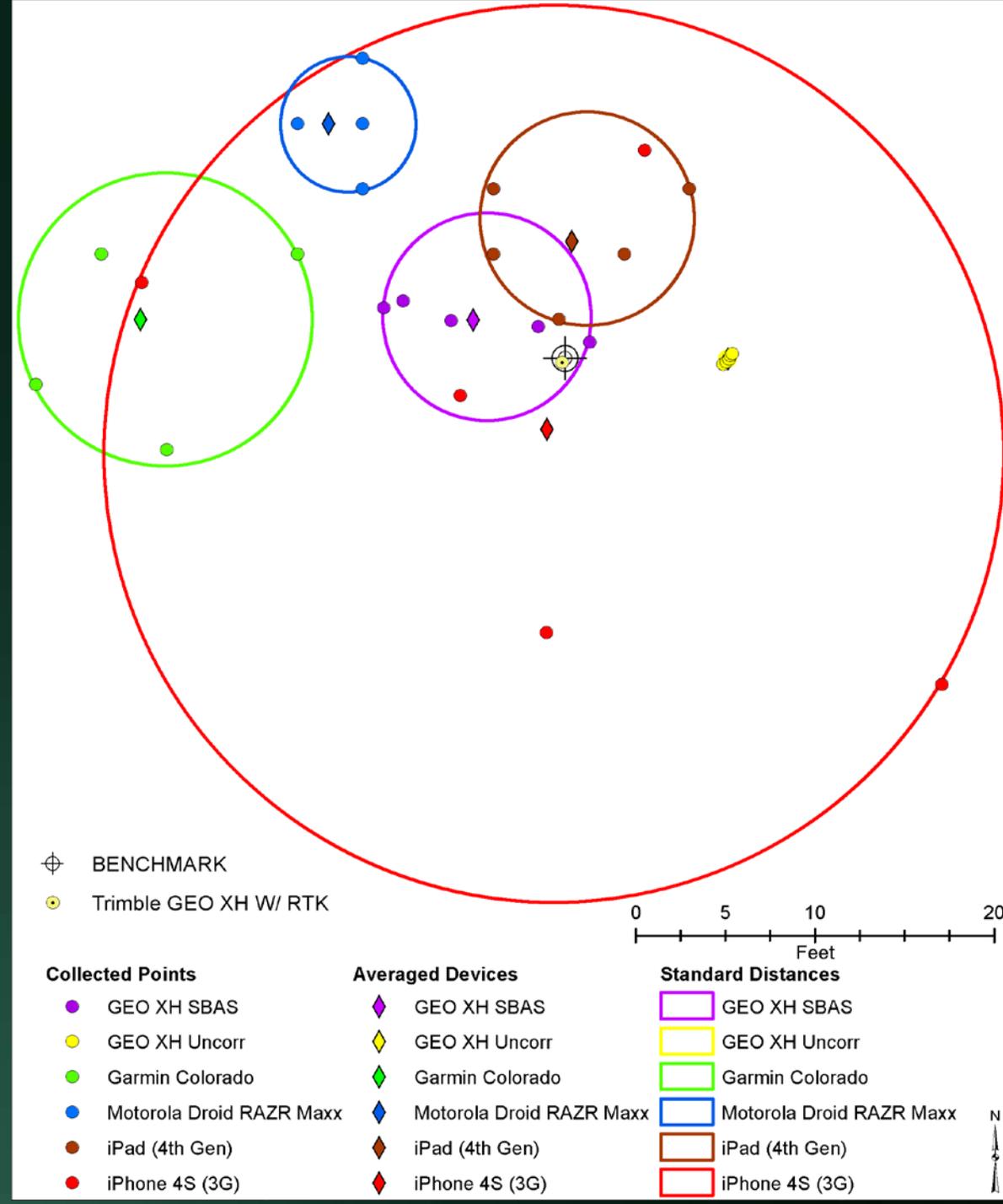


datapts dgs (4 features, 0 selected)

| OBJECTID | DGSID | notes | created_user | created_date | last_edited_user | last_edited_date | CreationDate | Creator | EditDate | Editor |
|----------|-------|--------------------------------|--------------|--------------|------------------|------------------|--------------|------------------|--------------|------------------|
| 1 | Pt1 | DGS garage | | | | | May 17, 2016 | lillian@udel.edu | May 17, 2016 | lillian@udel.edu |
| 2 | Pt2 | DGS annex | | | | | May 17, 2016 | lillian@udel.edu | May 17, 2016 | lillian@udel.edu |
| 3 | Pt3 | Penny Hall | | | | | May 17, 2016 | lillian@udel.edu | May 17, 2016 | lillian@udel.edu |
| 4 | Pt4 | Lane hall, enabled track edits | | | | | May 17, 2016 | lillian@udel.edu | May 17, 2016 | lillian@udel.edu |

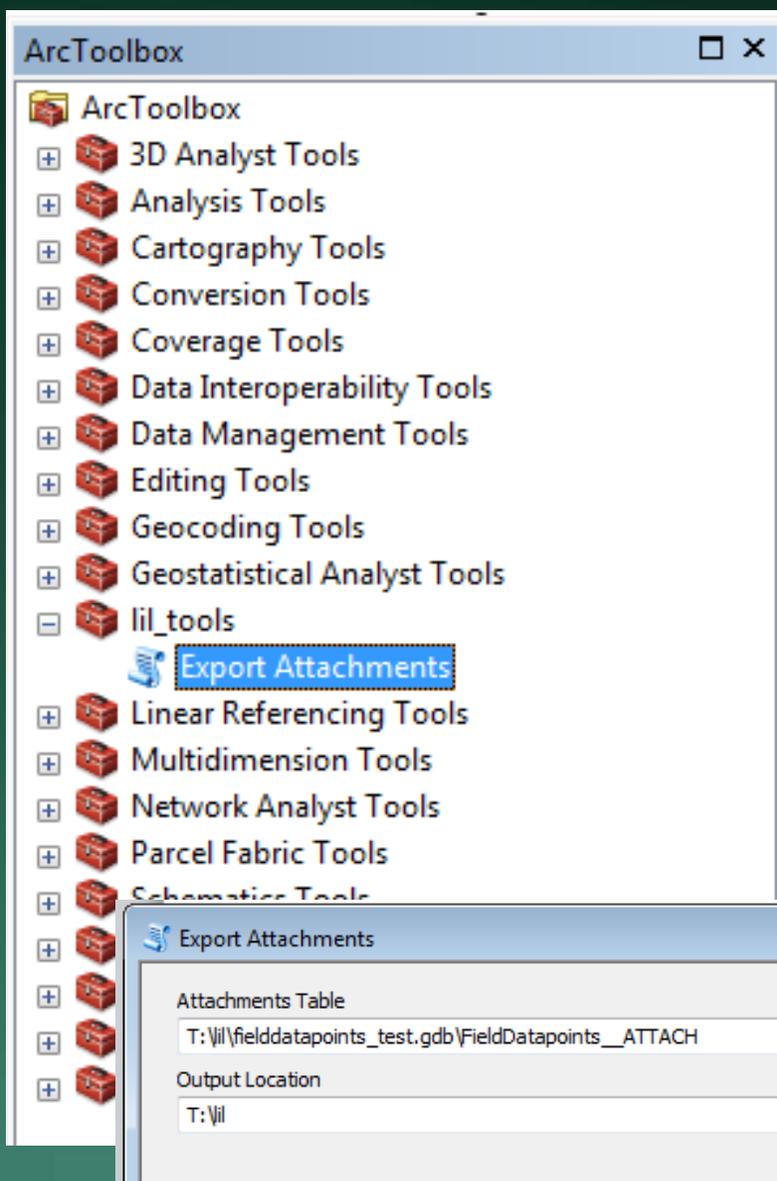
Location Accuracy

- Accuracy will be as good as the device can get
- Informal testing showed iPad (iOS) was most accurate low-grade unit
- Increased accuracy is possible by connecting a GPS to the device (requires special connector)



Batch export attachments from a feature class

<http://support.esri.com/em/knowledgebase/techarticles/detail/41763>

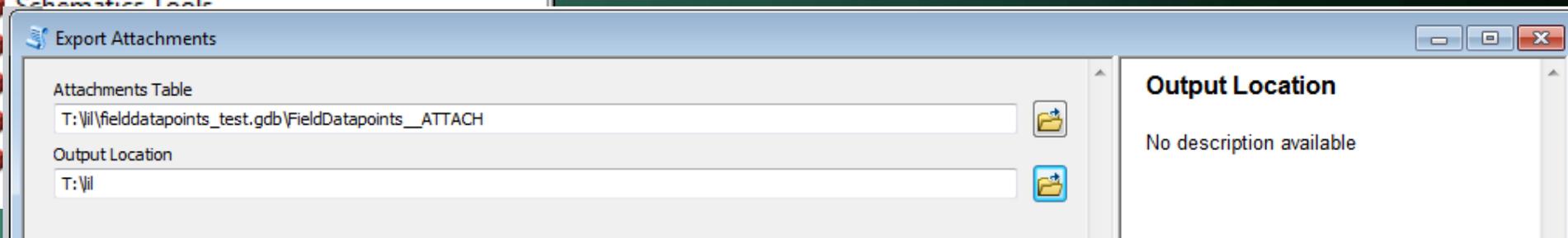


```
import arcpy
from arcpy import da
import os
```

```
inTable = arcpy.GetParameterAsText(0)
fileLocation = arcpy.GetParameterAsText(1)
```

```
with da.SearchCursor(inTable, ['DATA', 'ATT_NAME', 'ATTACHMENTID'])
as cursor:
```

```
    for item in cursor:
        attachment = item[0]
        filename = "ATT" + str(item[2]) + "_"
        filename = filename + str(item[1])
        open(fileLocation + os.sep + filename,
'wb').write(attachment.tobytes())
    del item
    del filename
    del filename
    del attachment
```



Summary (general)

- Create data on desktop
- Publish data from desktop to AGOL and create map
- View map and collect data in Collector App
- Download map to device to collect data offline
- Download feature layer from AGOL back to desktop

Summary (customize maps)

- Create domains to customize pull-down menu
- Tile package file for large datasets
- Side-load tile package files to device (base maps)
- Enable track editing
- Location accuracy (iPad had best accuracy)
- Batch export attachments to desktop with Python script