

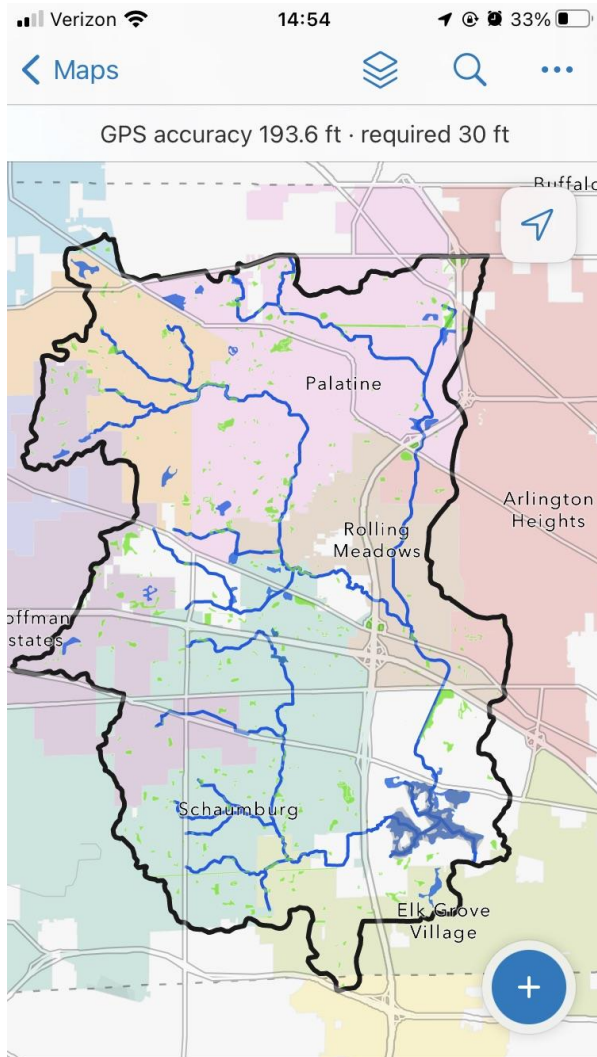
Field Data Collection Tools

ILMA/IL AFS Joint Conference
March 16, 2022

Hey and Associates, Inc.



Agenda



- WHY?
- GIS Data Collection
- Eternal Antenna
- Remote Sensing
- Sonars
- Water Level Loggers
- Sondes
- Drones

Why GIS (and all of these tools) for Data Collection?



Adopt modern workflows

Eliminate or reduce reliance on paper processes.



Boost data accuracy

Obtain accurate, reliable, and accessible data.



Save time and money

Optimize efficiency in field-focused activities.



Gain location perspective

Allocate resources to deliver the maximum impact.



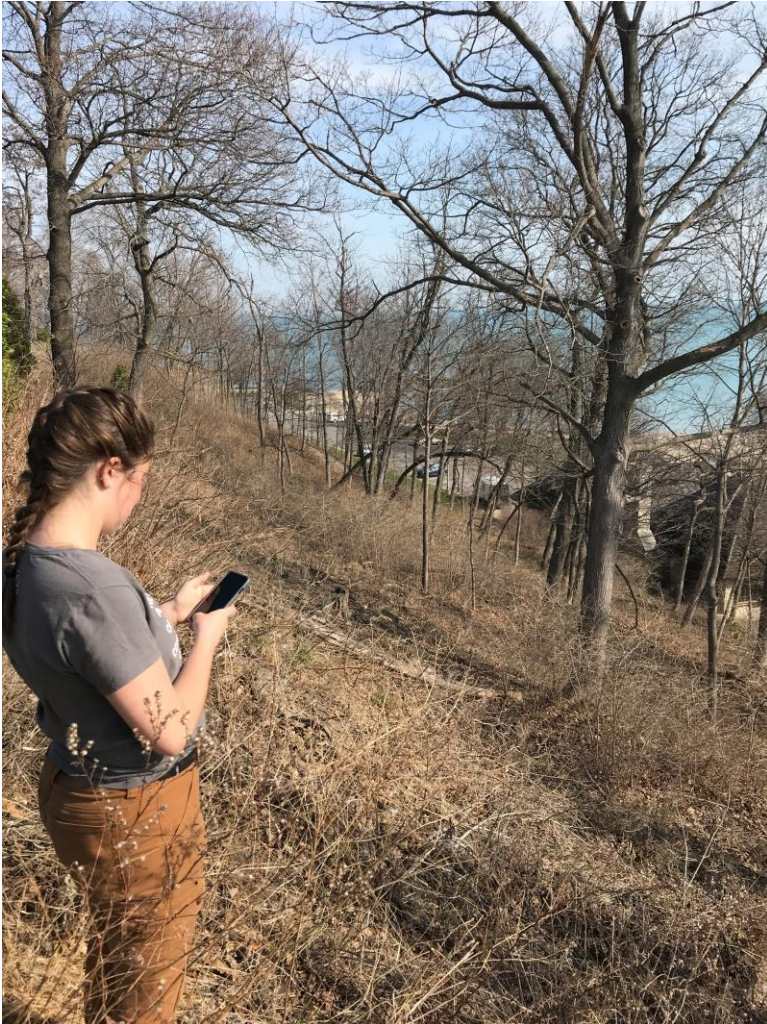
Monitor status in real time

Use visually rich dashboards to inform decisions.

Make better decisions!



GIS Data Collection



- Cloud-based
 - Browser access
 - Application access
- Crowdsourcing spatial information (+ Communication Tool)
- Proprietary software: ESRI annual subscription
- Non-ESRI options (application dependent)
 - Ecobot
 - Uinta
 - Mapit GIS
 - SW Maps
 - Shiny (R)
 - Plotly | Dash (Python)
 - Tableau
 - Power BI
 - Others – growing field

Create a web app

What do you want to do?

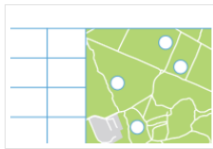
Select a configurable app. ?

Search

Choose an app template to provide a focused map experience for your audience.



3D Viewer



Attachment Viewer



Category Gallery



Chart Viewer



- Use Instant Apps
- Show All
- Collect/Edit Data
- Compare Maps/Layers
- Display a Scene (3D)
- Explore/Summarize Data
- Interpret Imagery
- Make a Gallery
- Provide Local Information
- Route/Get Directions
- Showcase a Map

Create a web app

What do you want to do?

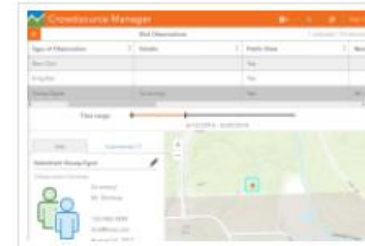
Select a configurable app. ?

Search

Collect new data or edit the location and field values of existing data



Basic Viewer



Crowdsource Manager



Crowdsource Polling



Crowdsource Reporter



GeoForm



Sidebar

- Use Instant Apps
- Show All
- Collect/Edit Data
- Compare Maps/Layers
- Display a Scene (3D)
- Explore/Summarize Data
- Interpret Imagery
- Make a Gallery
- Provide Local Information
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Upper Salt Creek Watershed Based Plan Interactive Web Mapping Application



We, the Upper Salt Creek Planning Team, are collecting data from you, our Planning Committee, to inform the Upper Salt Creek Watershed Based Plan. We thank you for your participation, as this data is crucial to determine where we may need to further investigate current water quality conditions and recommend action. We encourage you to identify areas of concern, in progress projects, or potential project locations as they relate to the Watershed Based Plan through this interface, as they will be included in the final document, and in turn may support eligibility for grant opportunities. If we need to follow up with you, we will contact you using the email or phone number collected as part of your submission.

If you would like to submit more than one concern, please close out of the "Thank you for your contribution!" pop-up after you hit "Submit" and fill in the form again.

This application is the interface for data collection. We will stop collecting potential areas of concern on January 31, 2022, but will continue collecting projects in progress for the duration of this planning effort. If you are facing technical difficulties with this application, please contact us at SaltCreekPlan@gmail.com. Contact information and additional resources documenting this planning process are available at UpperSaltCreek.com.

1. Enter Information

Name (required)

Organization (required)

Select...

Please use the drop down menu to select your organizational affiliation.

Organization

If you selected "Other" above, please type your organizational affiliation.

Email

Please type your email address if we need to contact you regarding your submission.

Phone

Please type your phone number if we need to contact you regarding your submission.

Submission Type (required)

Select...

Please use the drop down menu to select the description that best fits your submission. For examples of what types of concerns or projects to report, please see the next drop down field.

Concern Type or Issue Project Intends to Address

Select...

Please use the drop down menu to select the description that best fits your submission.

Comments

Please elaborate on the concern or project. What is the problem? What will the project entail? 500 characters remaining

📎 Please attach any pertinent photos, videos, or documents to better show or describe the concern. If your attachment exceeds 10MB, please email saltcreekplan@gmail.com

Select File

Name (required)

Please type your name.

Organization (required)

Select...

Please use the drop down menu to select your organizational affiliation.

Organization

If you selected "Other" above, please type your organizational affiliation.

Email

Please type your email address if we need to contact you regarding your submission.

Phone

Please type your phone number if we need to contact you regarding your submission.

Submission Type (required)

Select...

Please use the drop down menu to select the description that best fits your submission. For examples of what types of concerns or projects to report, please see the next drop down field.

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📎 Please attach any pertinent photos, videos, or documents to better show or describe the concern. If your attachment exceeds 10MB, please email saltcreekplan@gmail.com

Select File

2. Select Location

Specify the location for this entry by clicking/tapping the map or by using one of the following options.

Search

Find address or place

Latitude: 42.05425, Longitude: -87.76087

Esri Canada, Esri, HERE, Garmin, SafeGraph, Mapbox, OSM, OpenStreetMap contributors, Swatch, and Mapbox

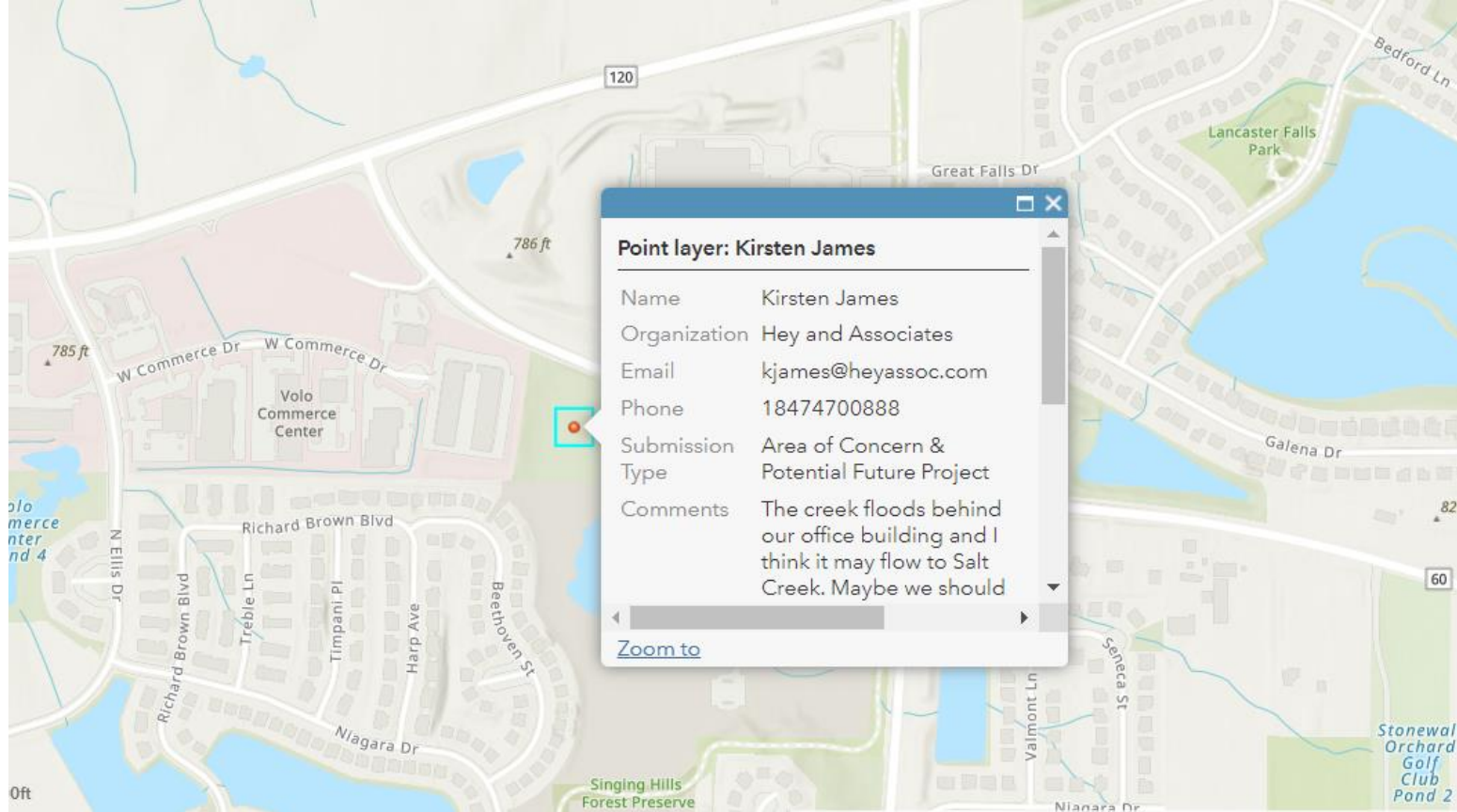
3. Complete Form

Add this information to the map.

Submit

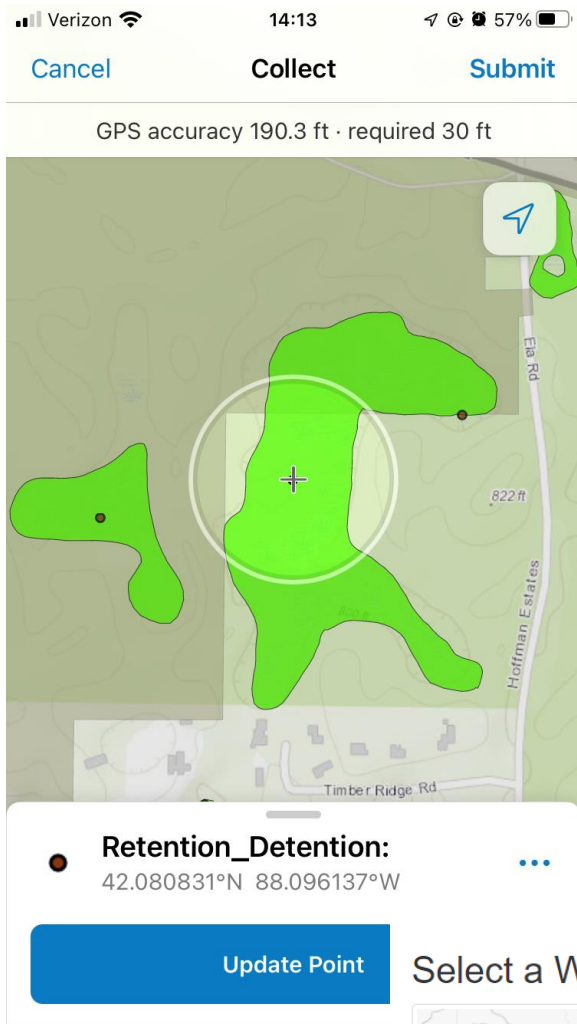
Hey and Associates, Inc.





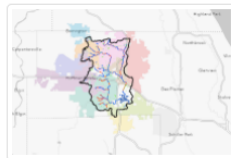
Name	Organization	Email	Phone	Submission Type	Comments	Date	Organization	Concern	Photos and Files
Kirsten James	Hey and Associates	kjames@heyassoc.c	18474700888	Area of Concern & Potential Future Project	The creek floods behind our office building and I think it may flow to Salt Creek. Maybe we should increase detention capacity for this complex.	10/19/2021, 4:02 PM	Hey and Associates, Inc.		(3) Show







- **Load in base data**
 - Base map
 - Non-editable reference layers (polygons)
- **Configure collection interface**
 - Editable collection layers
 - What data will be collected for each feature type?
 - Hide and auto-populate creator, date/time, coordinates, query reference layers
 - Code “domains” (drop-downs)
 - Attachments: photos, documents

Select a Webmap



The selected webmap is [21-0190 DRSCW Web App Map](#). To select a different webmap please click on 'Choose Webmap' button

 Choose Webmap

 Previous

Preview

Next 

Select Editable Layer(s)

This is the layer(s) that the GeoForm will be built from. The layer must be a feature service that is enabled for editing with sharing permissions appropriate for your audience. If all layers are selected, the form will allow a user to choose which form layer to submit to.

Layer

Point layer

← Previous Preview **Next** →

Verizon 14:13 57%

Cancel Collect Submit

Retention_Detention:
42.080831°N 88.096137°W

Take Photo Attach

Latitude

Longitude

County

Municipality

Location Description

Ownership

Basin Type

Select Form Fields

Here you can select which fields will be visible to your GeoForm audience, edit the Labels they will see, and add a short help with data entry.

Order	Enabled	Field	Label
1	<input checked="" type="checkbox"/>	Name	Name
2	<input checked="" type="checkbox"/>	Org	Organization
3	<input checked="" type="checkbox"/>	Organization_1	Organization
4	<input checked="" type="checkbox"/>	Email	Email
5	<input checked="" type="checkbox"/>	Phone	Phone
6	<input checked="" type="checkbox"/>	Category	Submission Type
7	<input checked="" type="checkbox"/>	ConcernType	Concern Type or Issue Project Intends to Add
8	<input checked="" type="checkbox"/>	Comments	Comments
9	<input checked="" type="checkbox"/>	DT	Date

- Load in base data
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List of Values (Domain)

The Conservation Foundation
Geosyntec
Hey and Associates
Metropolitan Water Reclamation District of Greater Chicago
Chicago Metropolitan Agency for Planning
Forest Preserves of Cook County
Village of Arlington Heights
Village of Barrington

Two screenshots of a mobile application interface. The left screenshot shows a 'Collect' screen with a 'Filter' search bar and a list of values including 'No Value', 'Turf Grass', 'Native Plants', 'Invasive Plants', 'Rip Rap', and 'Seawall'. The right screenshot shows the same 'Collect' screen with a 'Filter' search bar and a list of values including 'No Value', 'Wet Bottom', 'Dry Bottom - Turf', 'Dry Bottom - Naturalized', 'Wet bottom with an extended dry area', 'Constructed wetland', and 'Volunteer Wetland'.

- Load in base data
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- Configure collection interface
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 - What data will be collected for each feature type?
 - Hide and auto-populate creator, date/time, coordinates, query reference layers
 - **Code “domains” (drop-downs)**
 - Attachments: photos, documents

Verizon 14:13 57%

Cancel Collect Submit

Retention_Detention:
42.080831°N 88.096137°W

Take Photo Attach

Latitude

Longitude

County

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Location Description

Ownership

Basin Type >

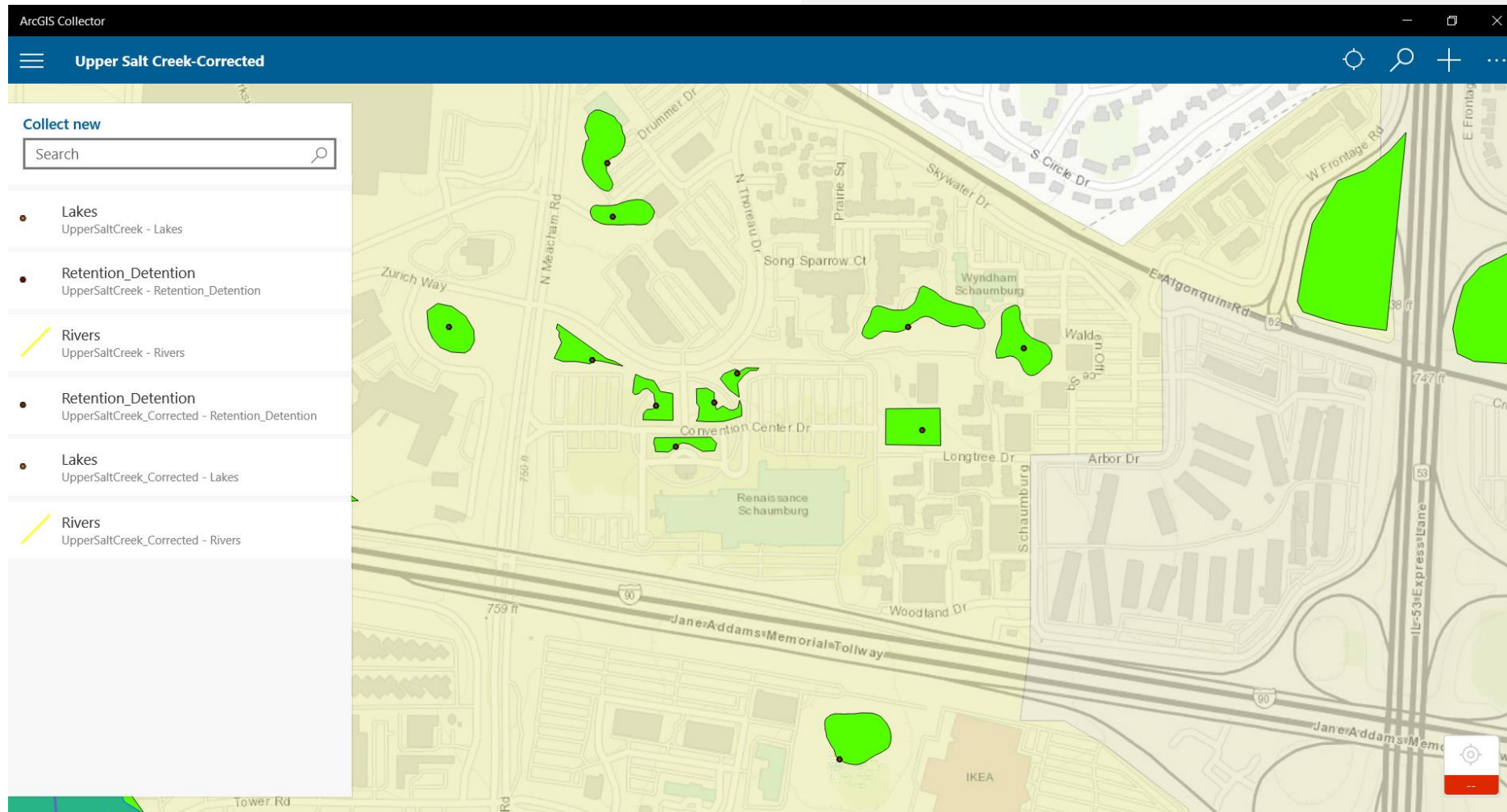
- Load in base data
 - Non-editable reference layers (polygons)
- Configure collection interface
 - Editable collection layers
 - What data will be collected for each feature type?
 - Hide and auto-populate creator, date/time, coordinates, query reference layers
 - Code “domains” (drop-downs)
 - **Attachments: photos, documents**

Nuts & Bolts: GIS Data Collection



- Read Default Location Services to acquire and record spatial location (20-30')
- Points: unique locations, generate nodes on a line or polygon
- GPS averaging for increased accuracy
- Live updates
- Download for offline use
- Permissions

Detention Basin, Inventory & Assessment



Stream/River Inventory & Assessment

ArcGIS Collector

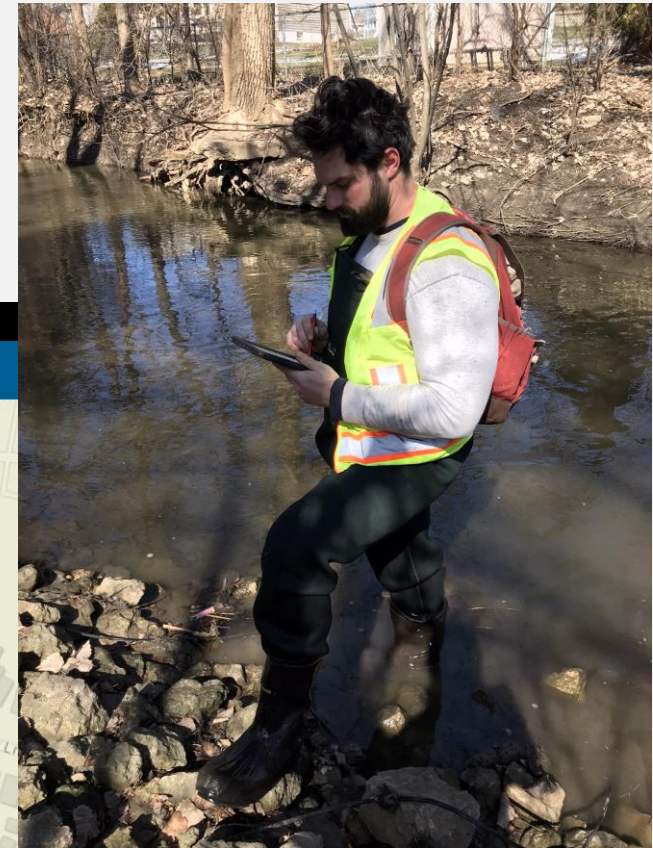
Upper Salt Creek-Corrected

← 3 features ×

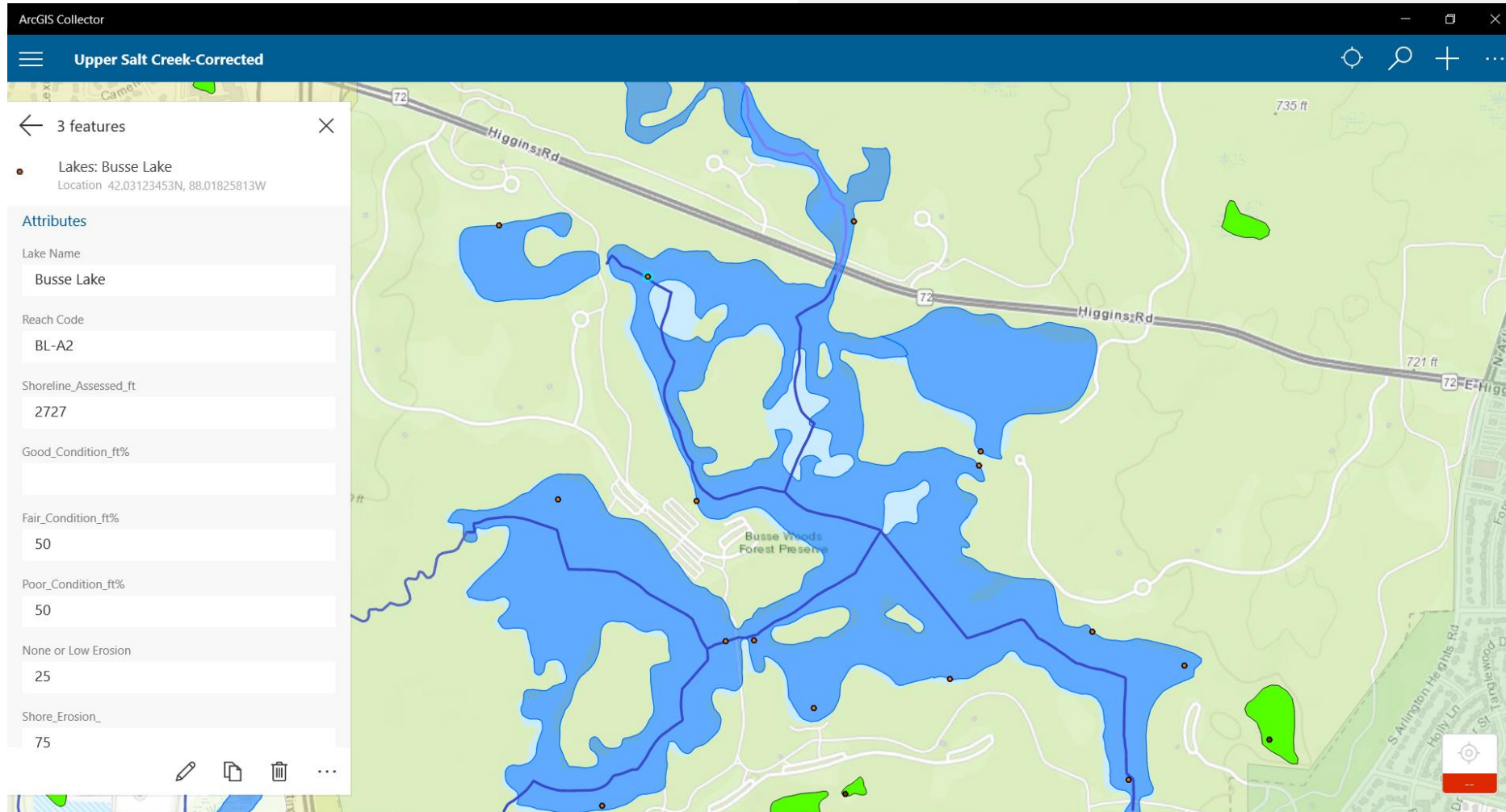
Rivers: Arlington Heights Branch
Length: 2166.36 ft

High_Channelization_ftprct	
Riparian_Condition_Good	
Riparian_Condition_Fair_ftprct	50
Riparian_Condition_Poor_ftprct	50
None_Low-Erosion_ftprct	
Moderate_Erosion_ftprct	100
High_Erosion_ftprct	
None_Low_BedErosion_ftprct	100

Map labels: S Falcon Ct, Kingfisher Ln, Mallard Ct, Bobolink Ln, Owl Dr, Thrush Ln, North Saik Park, Pheasant Dr, Hawk Ln, Swallow Ln, Meadow Dr, Thrush Ln, 720 ft, Martin Ln, Town Ln.



Lakes Inventory & Assessment



Property Management (Dayton Bluffs)

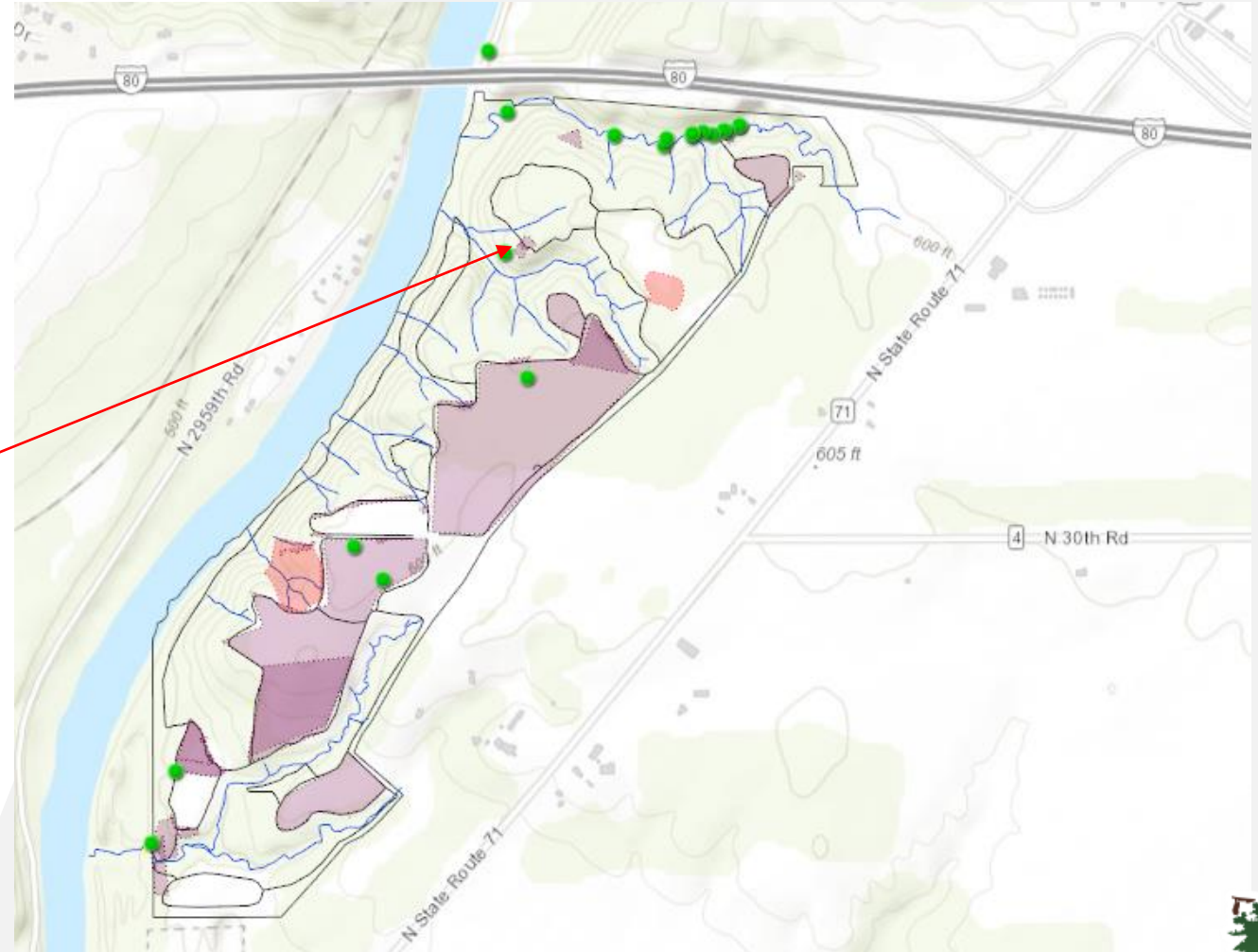
(1 of 5) ▶ □ ×

Noteworthy Areas: Sam

Surveyor	Sam
Site	Dayton Bluffs Preserve
Observation	Additional Canopy Thinning Required
Priority	High
Notes	Area cleared on 3-13-21 work day ~20 trees

Edited by [s_Kilgore](#) on 3/13/21 at 9:15 AM

[Zoom to](#) [Edit](#) [Get Directions](#)



Drain Tile Investigation

DrainTiles - Tile-ID-Pnt

- Tile Alignment
- Tile End
- ★ Tile Failure
- Tile ID
- Tile Junction
- ✕ Tile Transition
- ▲ Tile Outfall
- Tile Riser
- Tile Structure
- ★ Tile Assumed
- ? Other

DrainTiles - Trench-Pnt

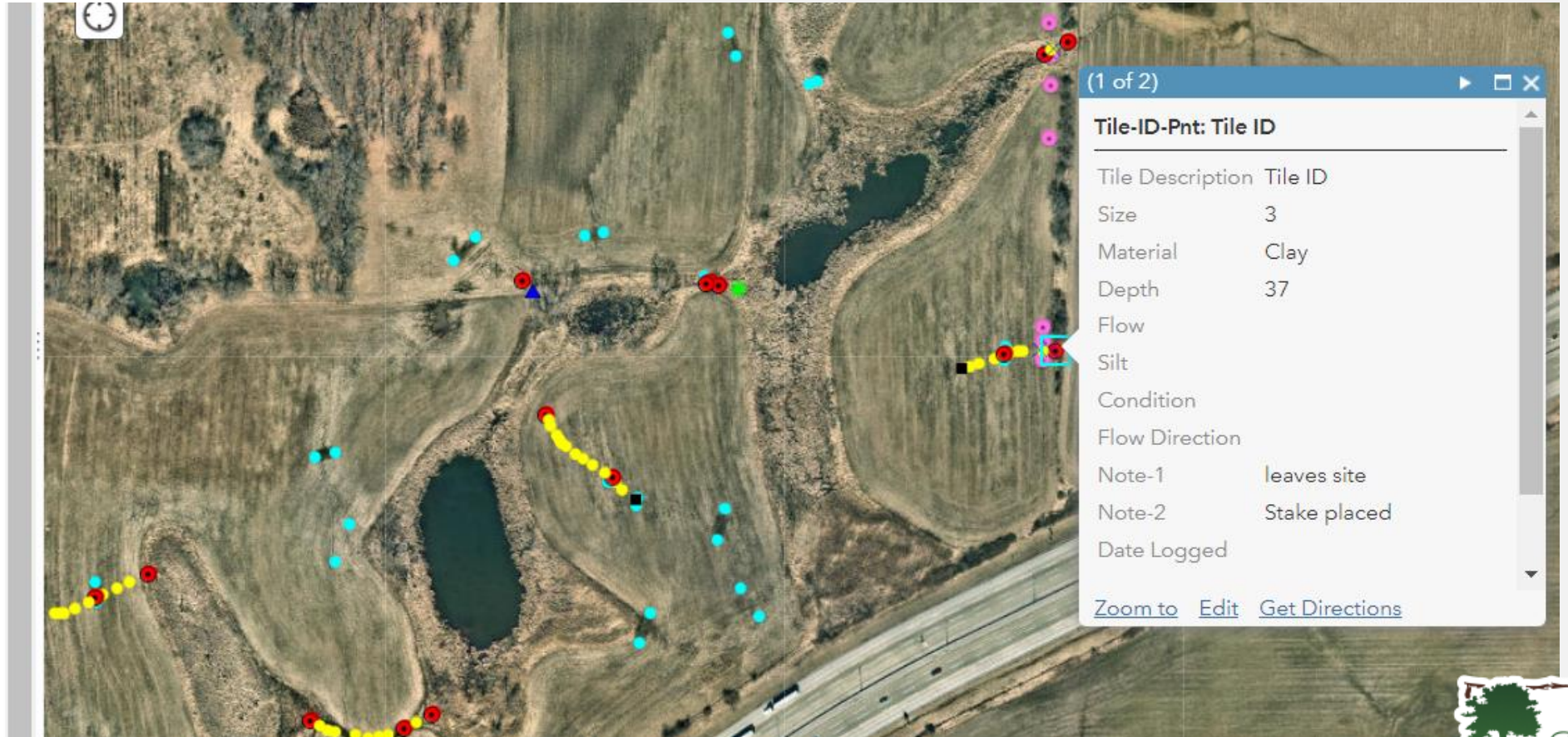
DrainTiles - Survey-Pnt



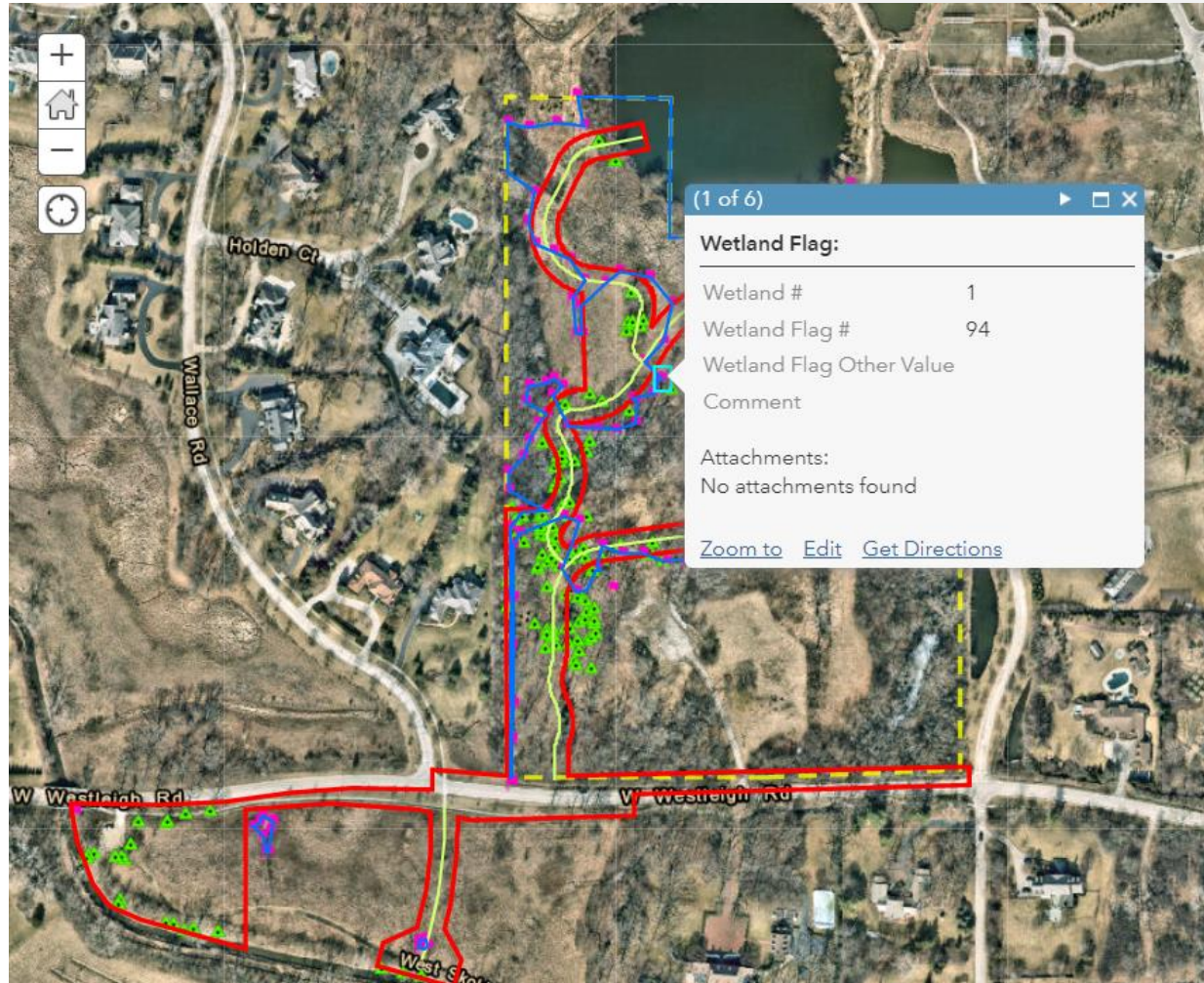
DrainTiles - Utilities



DrainTiles - Other



Wetland Delineation



Tree Inventory

Home ▾ General Tree Survey [✎](#) Open in new Map Viewer New Ma

[Details](#) [Add ▾](#) [Edit](#) [Basemap](#) [Analysis](#)

[Save ▾](#) [Share](#) [Print ▾](#) [Directions](#) [Measure](#) [Bookmarks](#)

[About](#) [Content](#) [Legend](#)

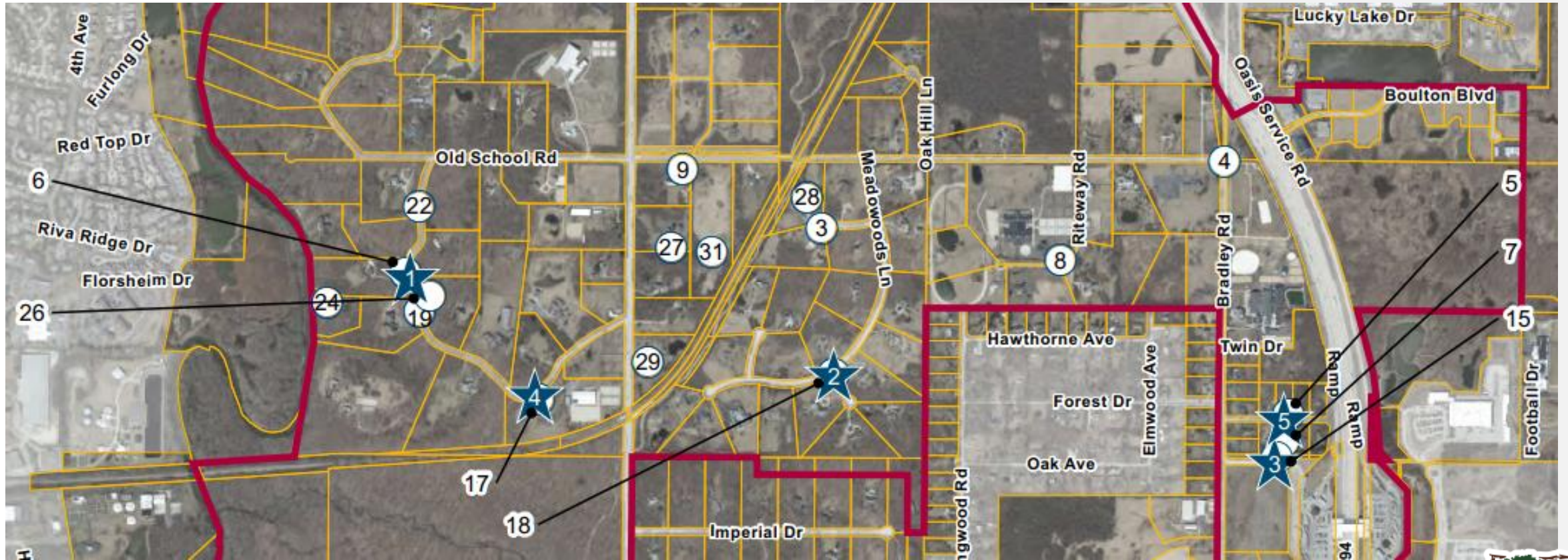
Contents

- 20-0170 PrjBnd
- GeneralTreeSurvey
- Tree is 100% Dead
- Tree is Dying
- Tree is Living
- Tree has been Removed
- World Transportation
- Imagery with Labels

TAG	A...	SPECIES	COMMON_NAM	SUBDIVISIO	CONDITION	DBH	DATE_	NOTES
1,600		Acer rubrum	Red Maple	Ellis Dr. and Commerce Dr	Living	3	8/22/2016, 7:00 PM	Few dead twigs, sun scold half diameter base of trunk
1,601		Acer x freemanii	Freeman Maple	Ellis Dr. and Commerce Dr	Living	6	8/22/2016, 7:00 PM	
1,603		Acer x freemanii	Freeman Maple	Ellis Dr. and Commerce Dr	Living	7	8/22/2016, 7:00 PM	
1,606		Acer x freemanii	Freeman Maple	Ellis Dr. and Commerce Dr	Living	3	8/22/2016, 7:00 PM	Several dying branches, consider rehab
1,607		Acer x freemanii	Freeman Maple	Ellis Dr. and Commerce Dr	Living	3	8/22/2016, 7:00 PM	Several dead branches and leader, consider rehab



Drainage Concerns

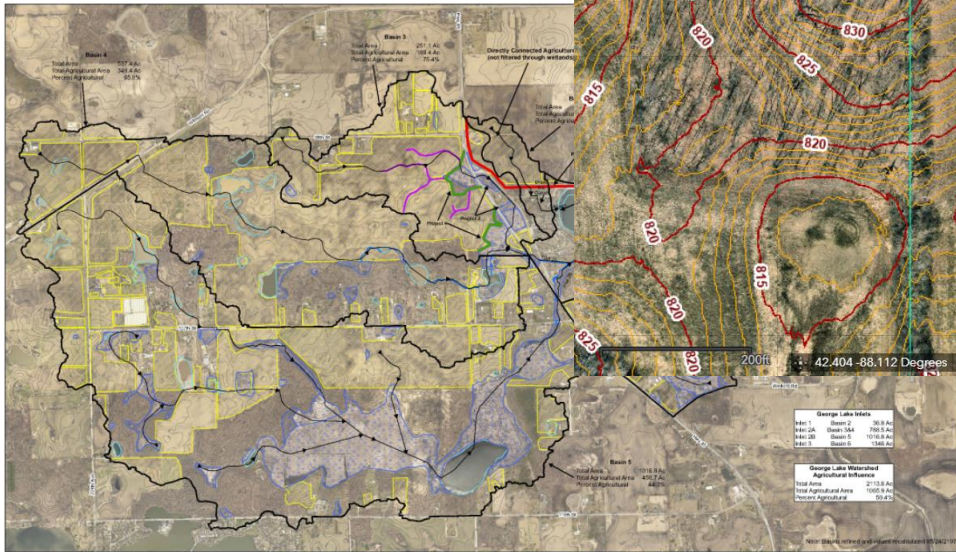
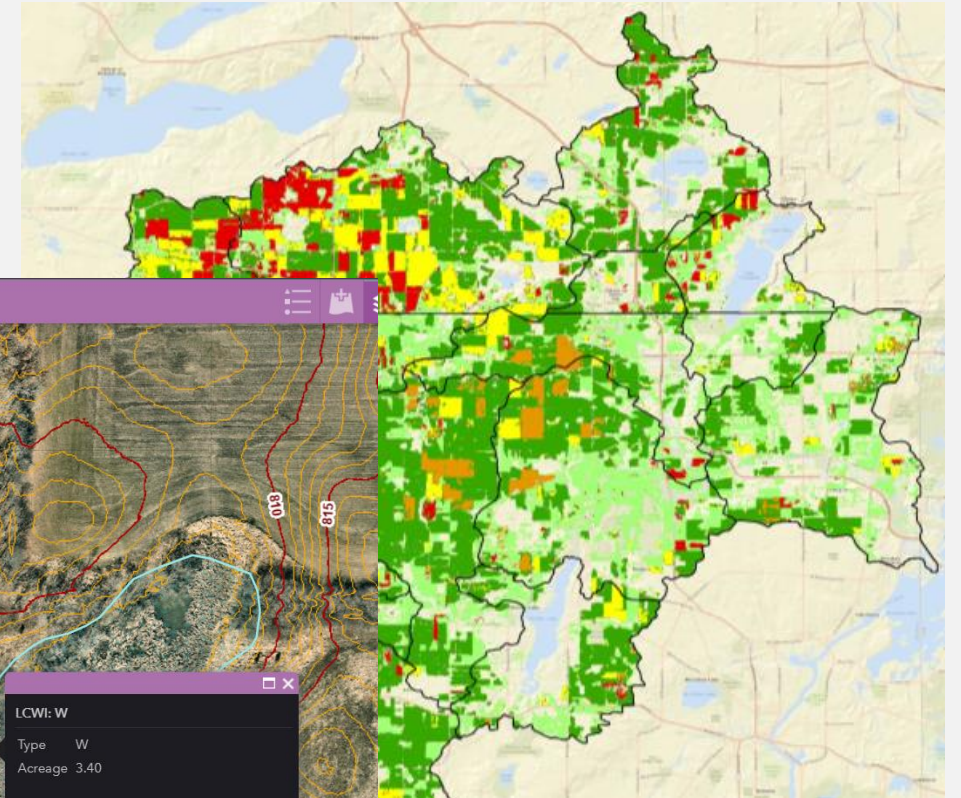


External Antenna



- Bluetooth pairing with supplemental external antenna
- Replaces Default Location Services to improve accuracy (1-2')
- Works with other applications beyond Collector & Field Maps
- Examples
 - Juniper Systems Geode
 - Trimble R-1

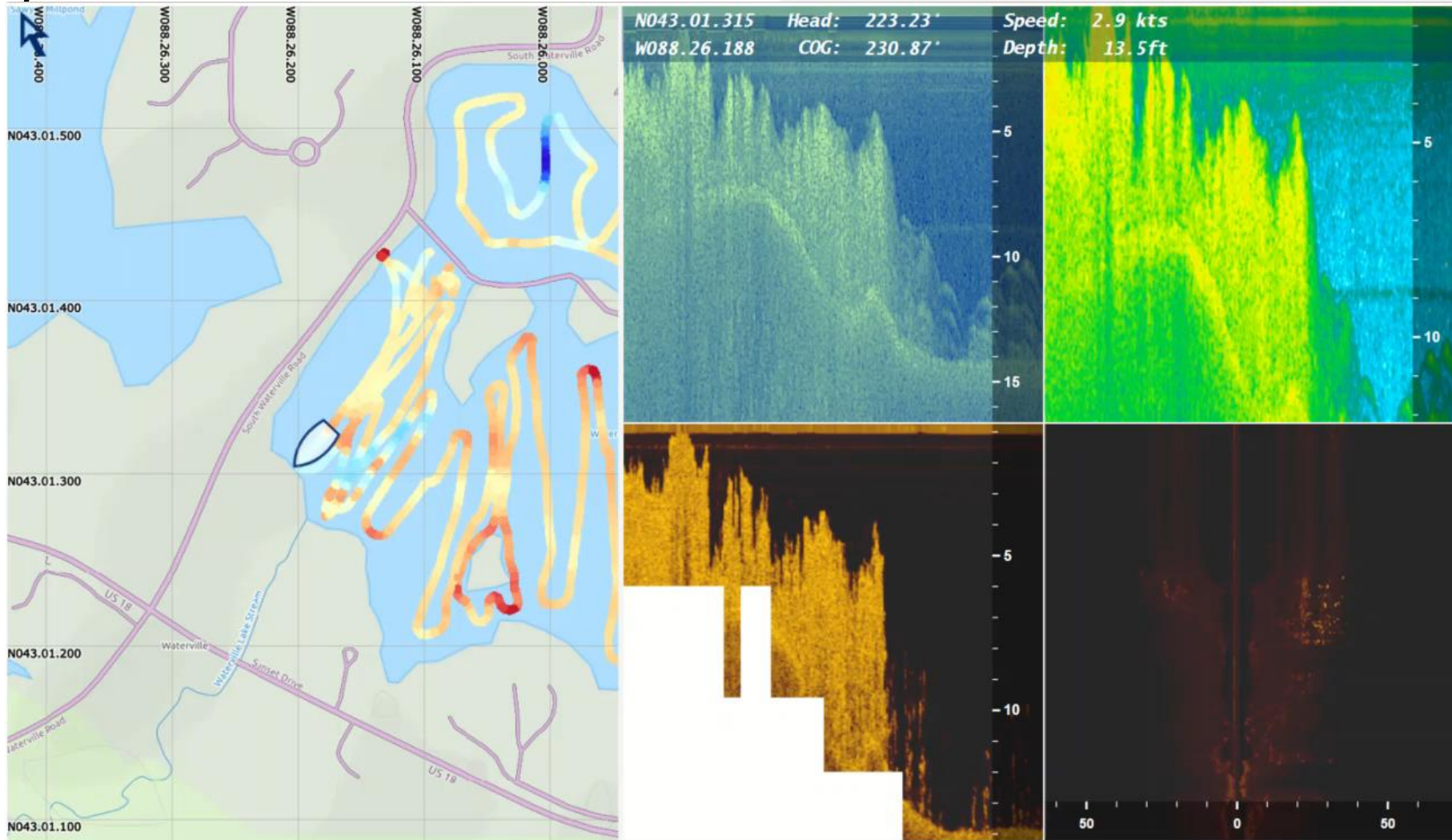
Remote Sensing



Sonar/ReefMaster



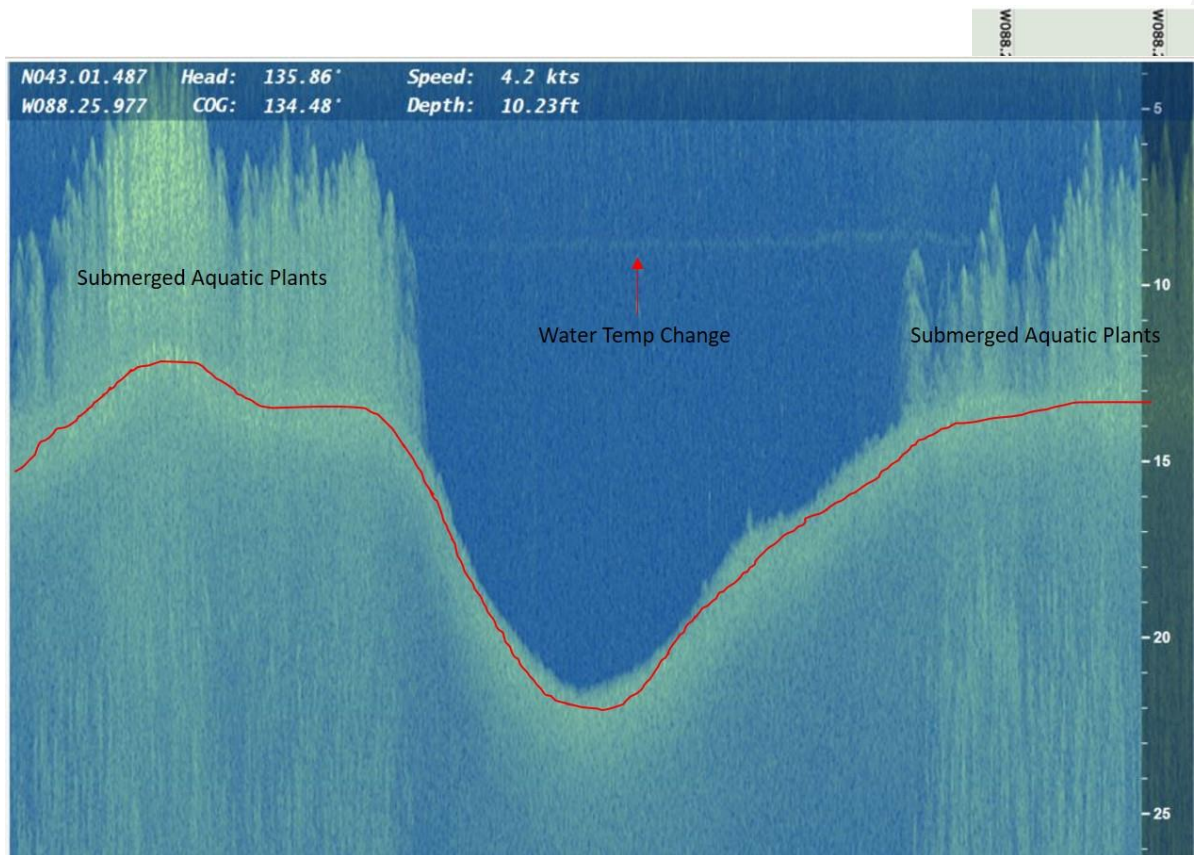
Sonar/ReefMaster



Hey and Associates, Inc.



Sonar/ReefMaster



1 Tracks

2 Volumes and Areas

3 Calculate area and volumes Export

Mapped area: 1067511 ft²

Bounding box: 755 x 1755 ft

NW: S033.49.629, E151.19.310

SE: S033.49.918, E151.19.459

4 Depth: Average: 147.5 ft
Min: 127.8 ft Max: 161.2 ft

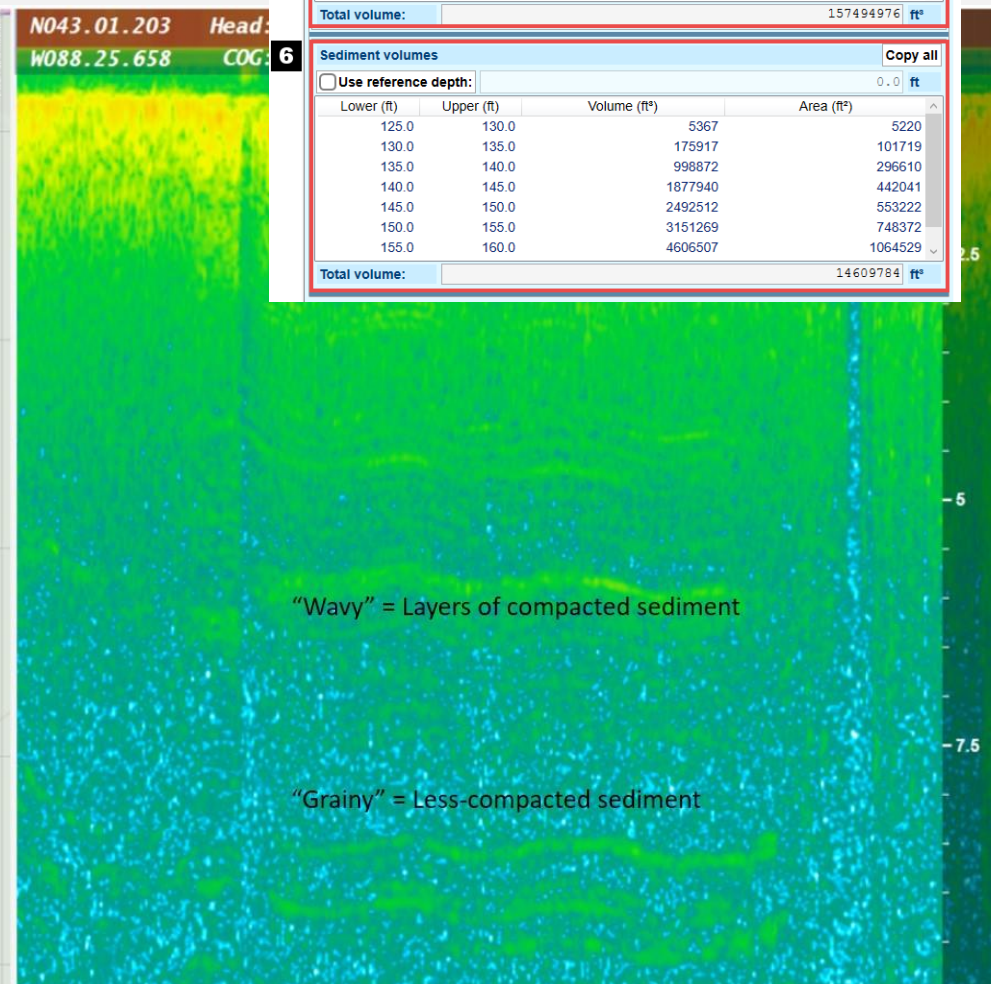
5 Water volumes Copy all

Lower (ft)	Upper (ft)	Volume (ft ³)	Area (ft ²)
125.0	130.0	5332192	1067511
130.0	135.0	5161642	1062290
135.0	140.0	4338687	965792
140.0	145.0	3459619	770900
145.0	150.0	2845047	625469
150.0	155.0	2186291	512803
Total volume:			157494976 ft³

6 Sediment volumes Copy all

Use reference depth: 0.0 ft

Lower (ft)	Upper (ft)	Volume (ft ³)	Area (ft ²)
125.0	130.0	5367	5220
130.0	135.0	175917	101719
135.0	140.0	998872	296610
140.0	145.0	1877940	442041
145.0	150.0	2492512	553222
150.0	155.0	3151269	748372
155.0	160.0	4606507	1064529
Total volume:			14609784 ft³



Sonar/ReefMaster



Water Level Loggers – non-vented



Hey and Associates, Inc.



Water Level Loggers - vented

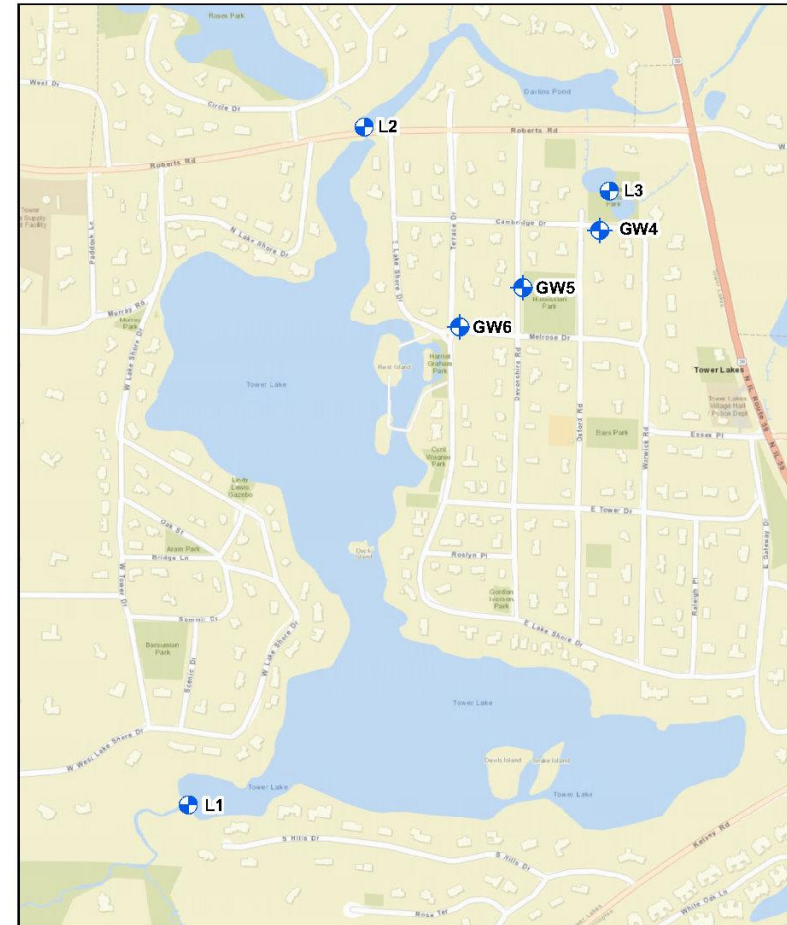


Exhibit Title: **Logger Locations**
Exhibits: **1**
Scale: **1" = 500 Feet**
Orientation:
Project Number: **18-0408**
Date: **11/8/2020**

TIA Tower Lakes Improvement Association
Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture




onset computer corporation

HOBOS Connected

Data Files Cancel

RECENT DATA FILES

SELECT FILE TYPE

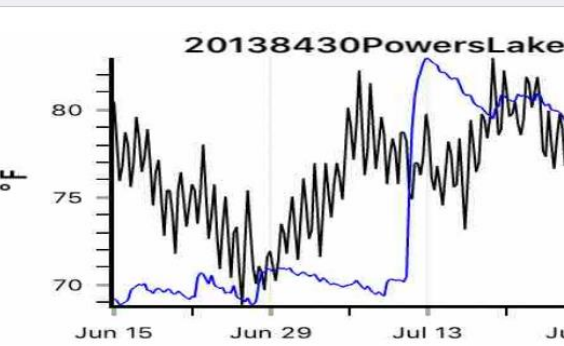






HOBOMobile
Onset Computer Corporation

20138430PowersLakeLL

🔒 📱

Powers
Configured, Logging
74.84°F -2.697ft



-  **XLSX**
Excel file
-  **CSV**
Comma-separated values
-  **TEXT**
Plain Text file
-  **HOBO**
HOBOWare file








Temp only SN 47002614 MX1101
Front Lobby Configured, Logging
71.10°F 48.94%

SN 10597473 SN 10597473 MX1101
Stopped 73.04°F 41.00%

outside SN 47002588 MX1101
Stopped 71.62°F 42.66%

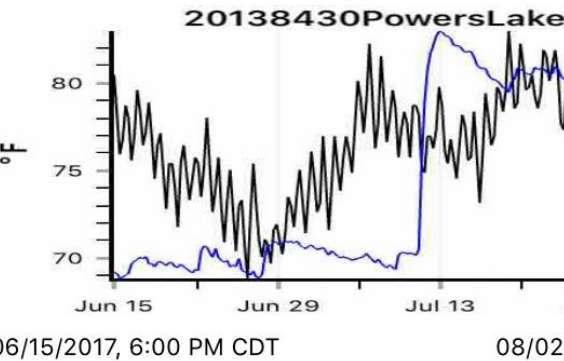
SN 47002592 SN 47002592 MX1101
Configured, Logging
68.44°F 46.50%

HOBOS Data Files Settings About

- ACTIONS
-  **Configure**
Set up and start logging
 -  **Readout**
 -  **Update Reference Water Level**
 -  **Update Water Density** Fresh
 -  **Full Status Details**
 -  **Stop Logging**
 -  **Logger Password**
Not Configured

Reading out
25% complete
(tap to cancel)

06/15/2017, 6:00 PM CDT 08/04/2017, 1:44 PM CDT




- GRAPH
-  **Image**
Image of the graph

06/15/2017, 6:00 PM CDT 08/02/2017, 1:04 PM CDT

GROUPS

Favorites 0 Files

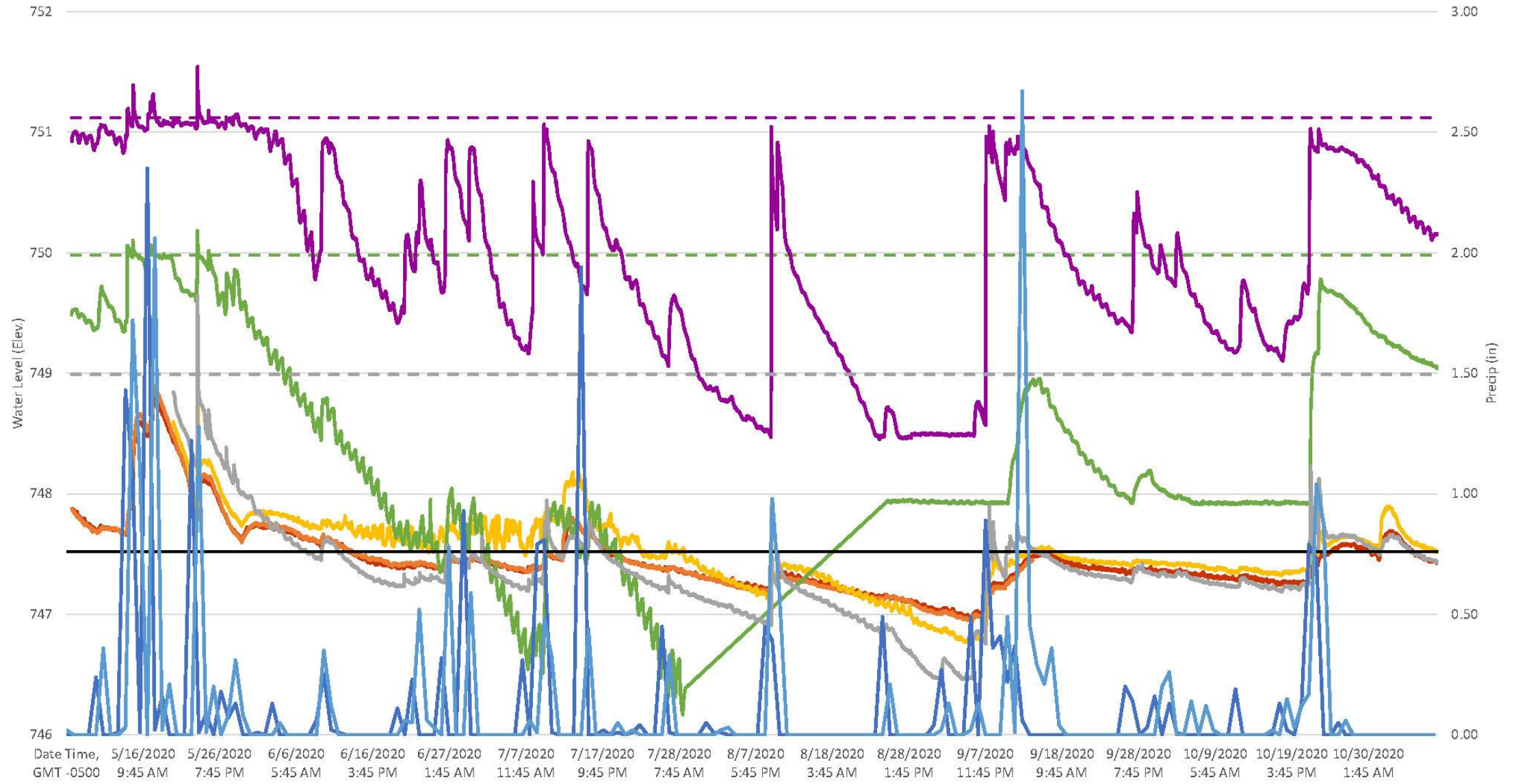
Unassigned 0 Files



InTemp
Onset Computer Corporation

Report - 10877163 - Alarm
Report Created by

Tower Lakes
Groundwater and Surface Water Elevation Loggers
May 6, 2020 - November 8, 2020



- L1: Tower Lake Dam
 - GW4: Ground
 - GW6: Ground
- L2: Davlin's Pond Drain under Roberts Rd
 - GW5: Edge of Soccer Field
 - Tower Lakes Dam Elevation (747.52)
- L3: Cypress Pond in Gordon Lewis Park
 - GW5: Ground
 - Village of Barrington Station
- GW4: Gordon Lewis Park*
Replaced 8/26
 - GW6: Melrose Dr and Lake Shore Dr
 - Lake County SMC Wauconda Station

Water Quality Sondes

Manta 2 Control Software

PC Manta2

Manta2 Logging is OFF

Circulator is OFF

Wipe One Cycle Now

Clear Screen

Capture One Line of Data to PC with Annotation

Capture One Line of Data to PC without Annotation

List Bluetooth Mantas

Restart

DATE	TIME	Temp deg C	pH units	SpCond uS/cm	HDO %Sat	HDO mg/l	pH mV	Int Batt V	Turb NTU	Chl ug/l
03/14/22	13:40:25	15.66	8.60	363.6	100.2	9.76	-106.9	0.45	15.56	0.00
03/14/22	13:40:24	15.66	8.59	363.6	100.0	9.74	-106.7	0.46	13.34	0.00
03/14/22	13:40:23	15.66	8.59	363.6	100.0	9.74	-106.5	0.38	11.55	0.00
03/14/22	13:40:22	15.66	8.59	363.7	100.0	9.74	-106.3	0.43	10.55	0.00
03/14/22	13:40:21	15.66	8.58	363.7	100.0	9.74	-105.9	0.43	9.99	0.00
03/14/22	13:40:20	15.66	8.58	363.7	100.0	9.74	-105.7	0.45	9.92	0.00
03/14/22	13:40:19	15.66	8.57	363.7	100.0	9.74	-105.5	0.45	9.92	0.00
03/14/22	13:40:18	15.66	8.57	363.8	100.0	9.74	-105.2	0.46	11.37	0.00
03/14/22	13:40:17	15.66	8.56	363.9	100.0	9.74	-104.8	0.46	20.58	0.00
03/14/22	13:40:16	15.67	8.55	363.9	100.0	9.74	-104.4	0.46	76.06	0.00
03/14/22	13:40:15	15.67	8.54	363.6	99.9	9.74	-103.9	0.46	419.4	0.00
03/14/22	13:40:14	15.66	8.53	363.2	99.9	9.74	-103.2	0.45	428.1	0.00
03/14/22	13:40:13	15.66	8.52	362.8	99.9	9.74	-102.3	0.45	428.1	0.00
03/14/22	13:40:12	15.66	8.49	247.4	99.9	9.74	-100.9	0.45	367.2	0.00
03/14/22	13:40:11	15.65	8.45	126.6	99.9	9.74	-98.6	0.43	20.73	0.00
03/14/22	13:40:10	15.58	8.60	6.0	99.9	9.76	-106.9	0.45	0.11	0.00
03/14/22	13:40:09	15.47	8.73	0.4	99.9	9.78	-114.5	0.41	0.10	0.00
03/14/22	13:40:08	15.48	8.72	0.4	99.9	9.78	-114.2	0.38	0.11	0.00
03/14/22	13:40:07	15.48	8.72	0.4	99.9	9.78	-113.9	0.45	0.10	0.00
03/14/22	13:40:06	15.47	8.71	0.4	99.9	9.78	-113.5	0.41	0.09	0.00
03/14/22	13:40:05	15.47	8.73	0.4	99.9	9.78	-114.3	0.43	0.09	0.00
03/14/22	13:40:04	15.47	8.73	0.4	99.9	9.78	-114.3	0.46	0.09	0.00
03/14/22	13:40:03	15.47	8.72	0.4	99.9	9.78	-114.1	0.43	0.08	0.00
03/14/22	13:40:02	15.46	8.73	0.5	99.9	9.78	-114.4	0.45	0.05	0.00

Connected on COM3 | Snapshot: C:\Users\ahandeh\Documents\snapshot.csv | Log interval: 15 min | Log File: SCBW-4839-020922



Manta+ : Available with up to 12 sensors

Turbidity

Central Wiper System

Ion Selective Electrodes (ISE):
 Ammonium
 Bromide
 Chloride
 Nitrate
 Calcium
 Sodium

Optical Dissolved Oxygen

Fluorometers:
 •Chlorophylla (blue or red)
 •CDOM/TDOM
 •Blue Green Algae (Fresh/Marine)
 •Tryptophan
 •Crude Oil
 •Refined Oil
 •Rhodamine dye
 •Fluorescein dye/optical brighteners

Also Includes:
 •Temperature
 •Depth
 •pH/ORP
 •Conductivity/Salinity/TDS
 (Sensors not shown)

Hey and Associates, Inc.



Drones/UAVs



Hey and Associates, Inc.

Drones/UAVs



Photo by: Hey and Associates, Inc.
07/11/2021





Photo by: Hey and Associates, Inc.
06/03/2021

Summary

- Cost effective - saving time & money!
- Refurbished
- Grants
- Partners - design, deploy, & manage

Hey and Associates, Inc.



Questions

Kirsten James, PE
Civil Engineer
847-740-0888 ext. 131
847-748-3440
kjames@heyassoc.com

Alex Handel
Environmental Scientist
630-428-4500 ext. 156
ahandel@theconservationfoundation.org

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