Conservation in the Blue River Watershed: Leveraging ArcGIS Online and Microsoft Power BI to create interactive Dashboards and reports.

Caleb Biles | GIS Analyst | The Oka Institute

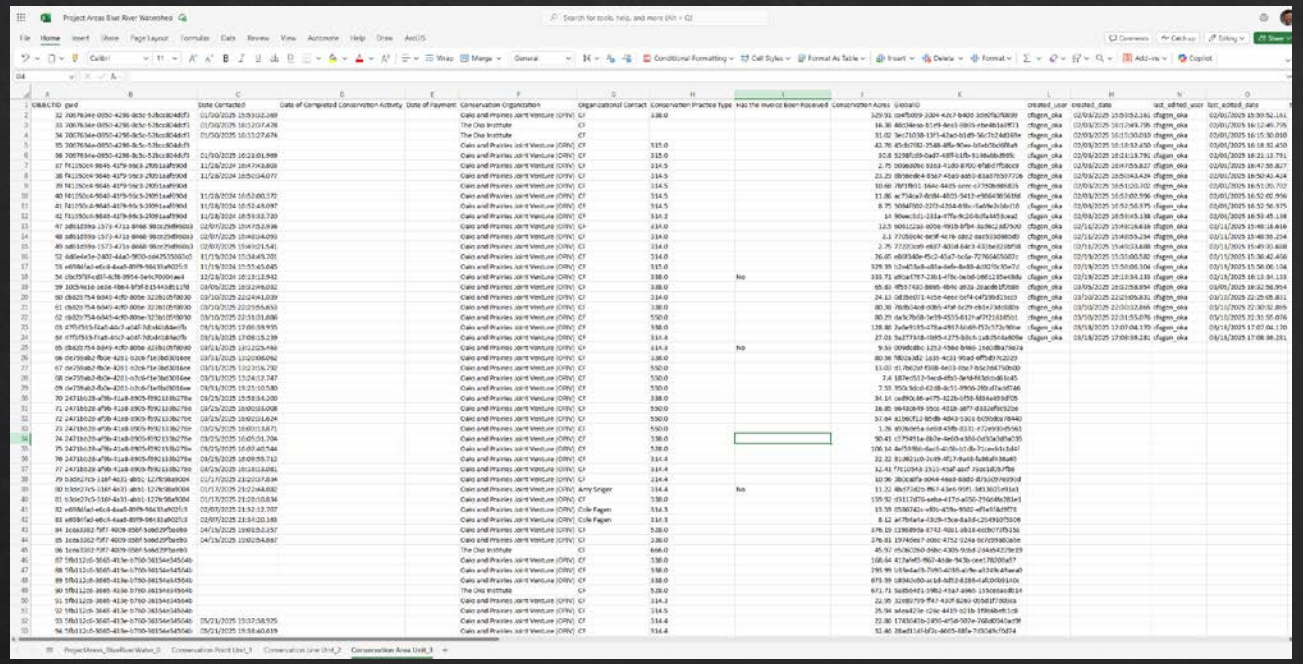
Would You Rather

Live here

OR

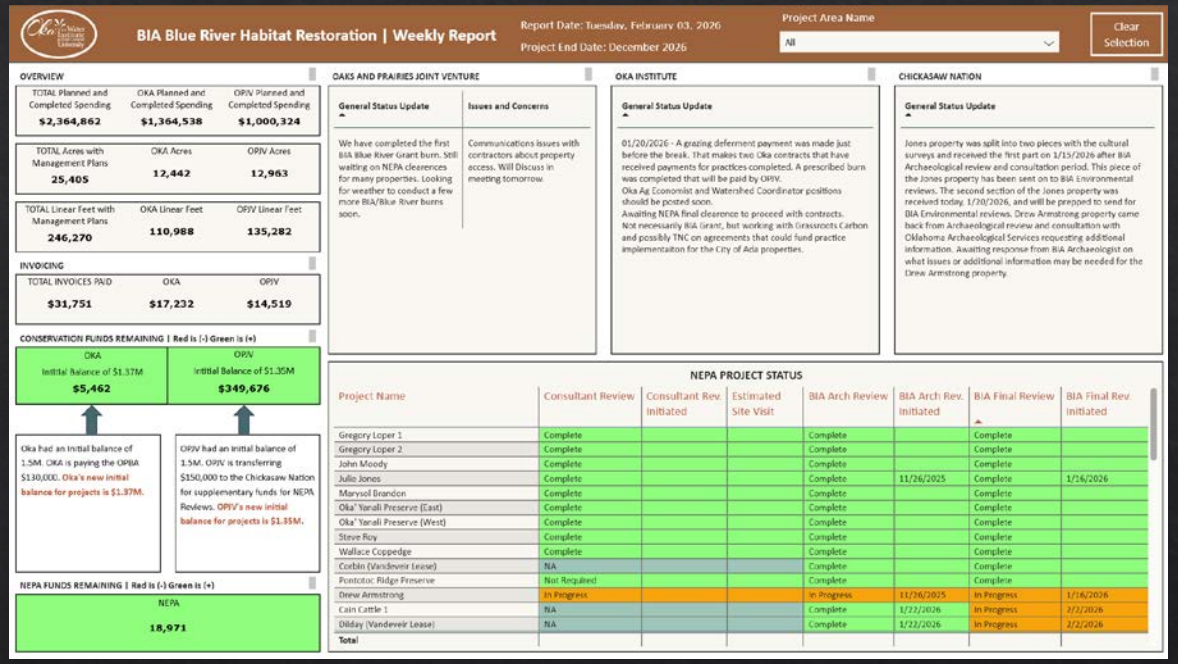
Here

Would You Rather



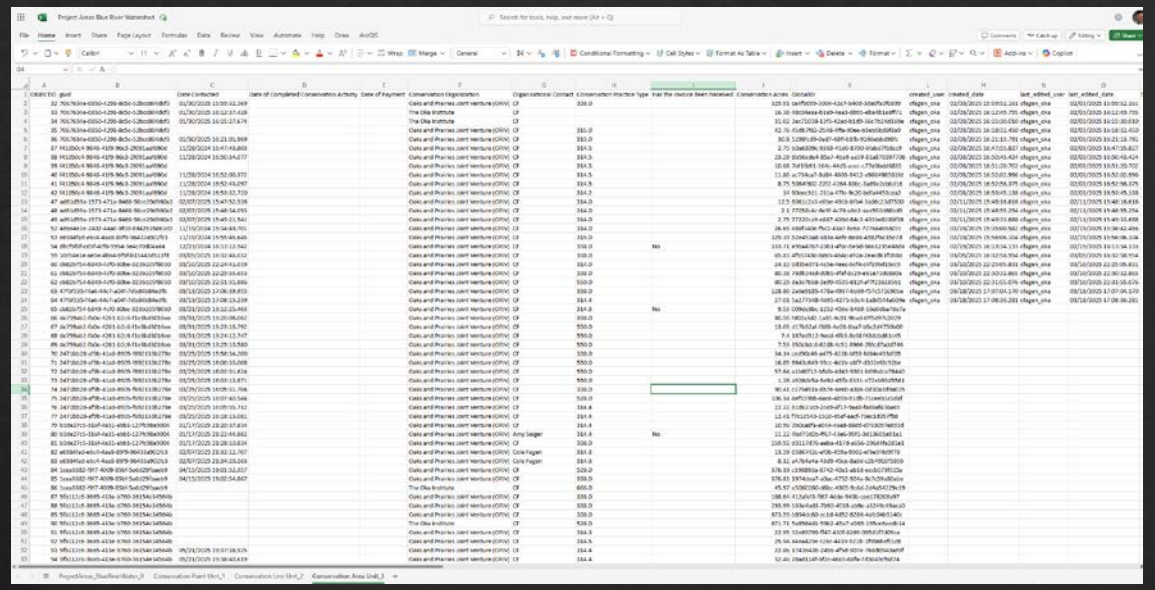
Live here (Excel)

OR



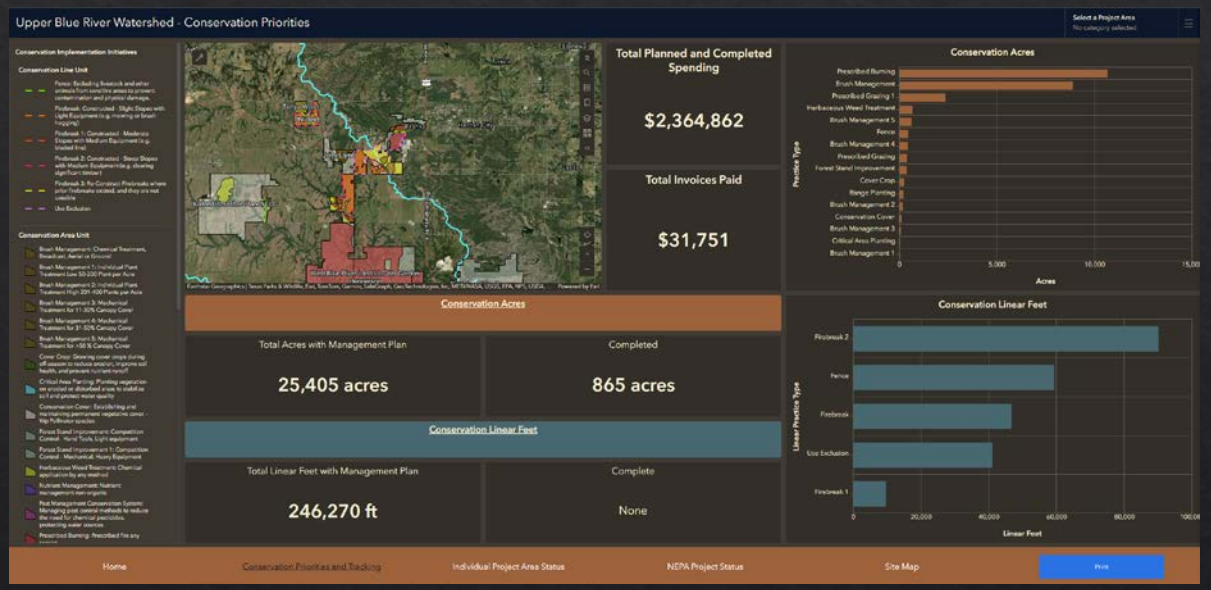
Here (Power BI)

Would You Rather



Live here (Excel)

OR



Here (ArcGIS Dashboards)

Project Overview

- Funding: Bureau of Indian Affairs (BIA) Grant
- Project Area: Upper Blue River Watershed
- Project Objectives: Implement 15,000 acres of conservation throughout the watershed.

"To improve wildlife habitation, reduce habitat fragmentation and reestablish healthy riparian systems through habitat connectivity"

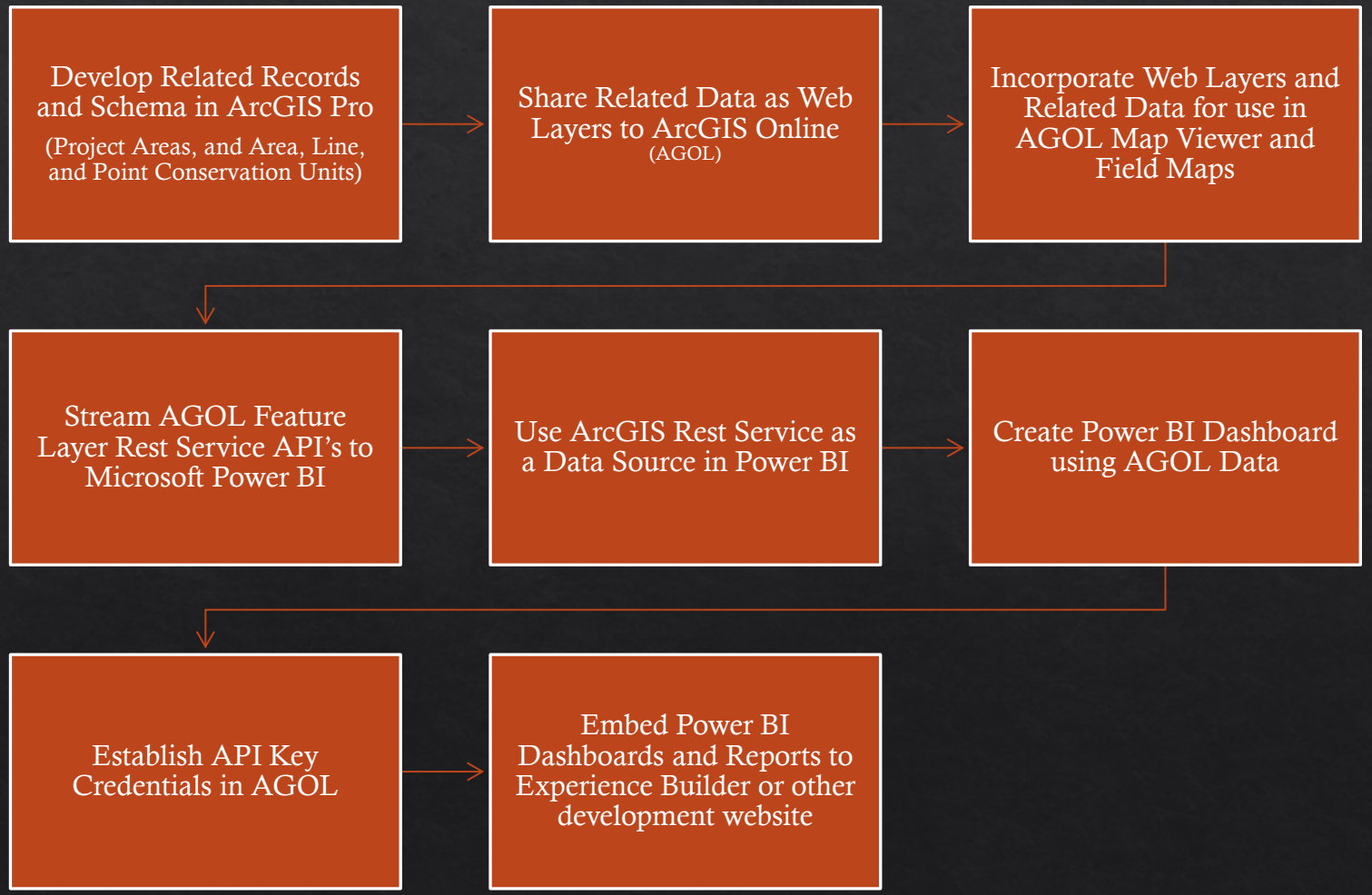
Project Partners

- The Oka Institute at East Central University
- The Oaks and Prairies Joint Venture
- The Chickasaw Nation

GIS and Data Objectives

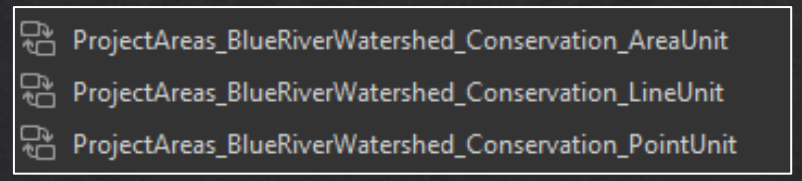
- Maintain a digital system for housing monitoring data and map-based outputs.
- Capture land and water monitoring information through onsite visits.
- Incorporate project outcomes into Oka’s public-facing web portal (Oka Spatial).

GIS and Data Objectives



Develop Related Records and Schema in ArcGIS Pro

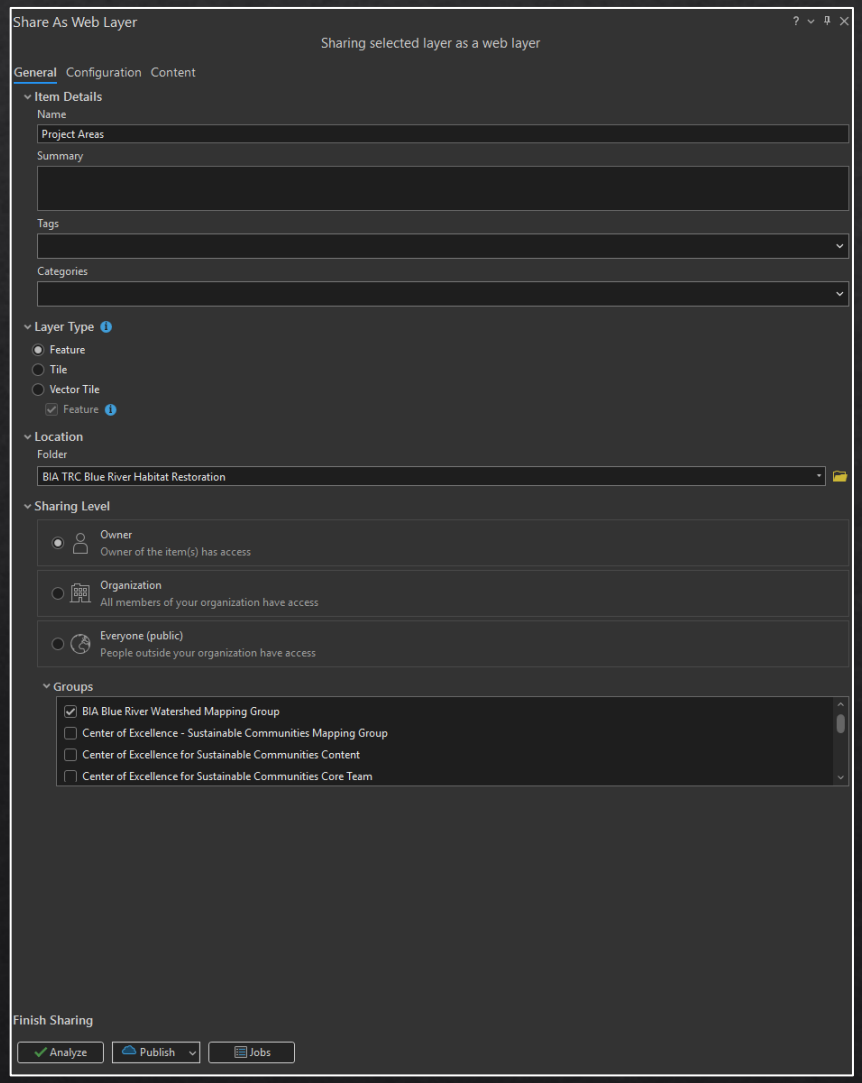
- Create Empty Feature Class & Empty Table (or use existing layer)
  - Conservation point, line, and area units, and project areas as existing layer.
- Prepare Feature Class and Table for Relationship
- Create Relationship Class
- Add Fields to Feature Class and Related Table
- Add Domains
- Publish to Online (AGOL) Account or Portal

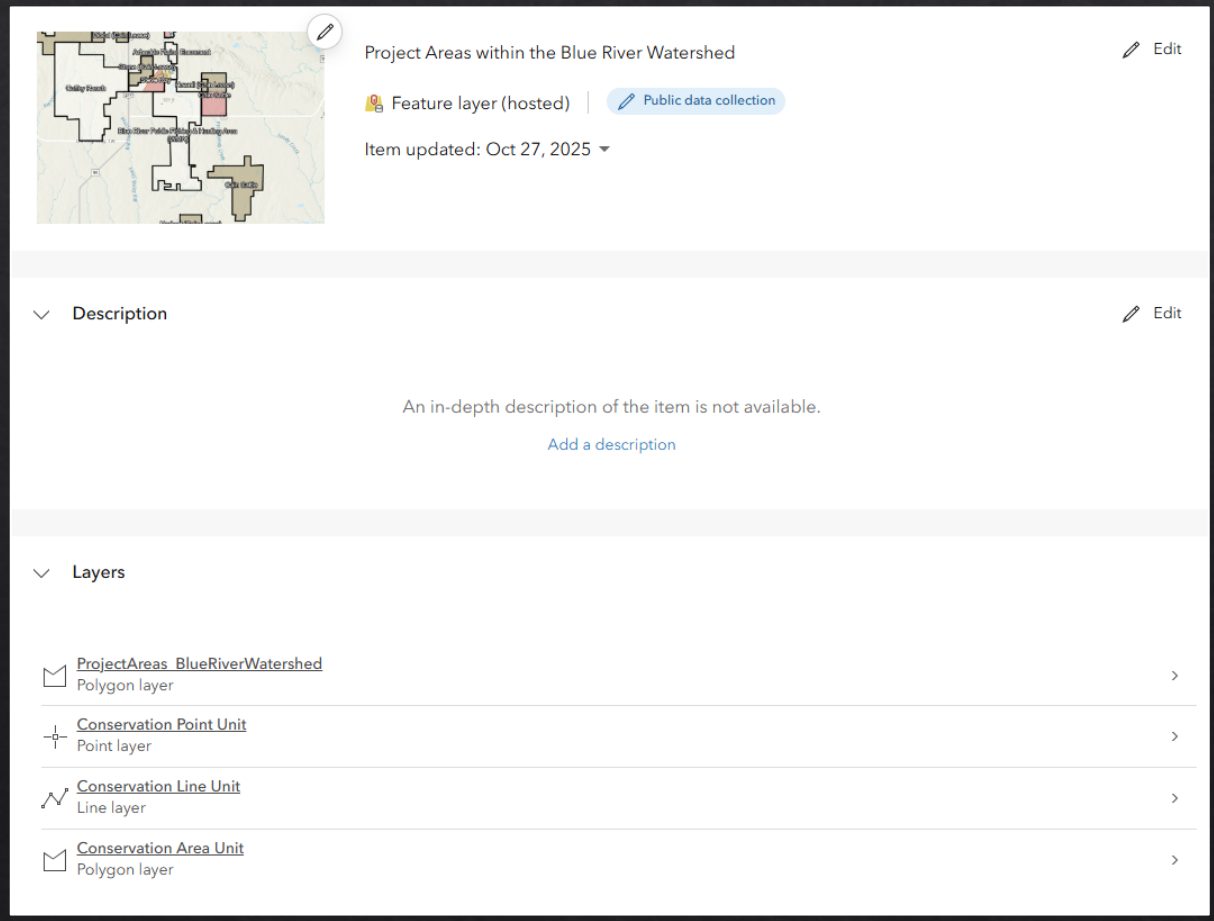


Publishing and Configuring a Feature Class for Field Maps
CSA leverages ArcGIS Pro and Field Maps to create, publish and configure feature classes for collecting data on invasive species in OK
Candace Johnston (c.johnston@ou.edu) and Daniela Spade (dspade@ou.edu)
April 13, 2022

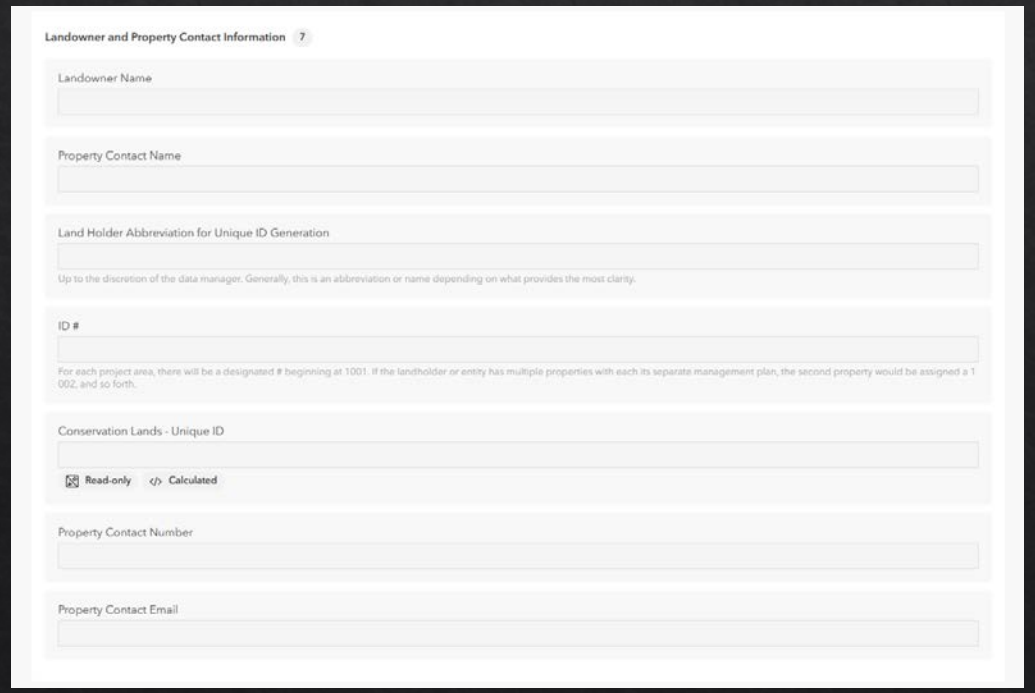
https://storymaps.arcgis.com/stories/06b7a0d3e248492c810c63a4a1702dea

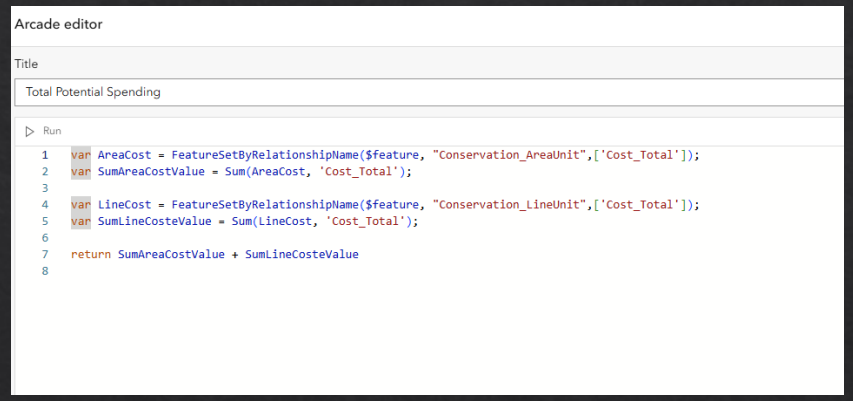
Share Related Data as Web Layers to ArcGIS Online (AGOL)



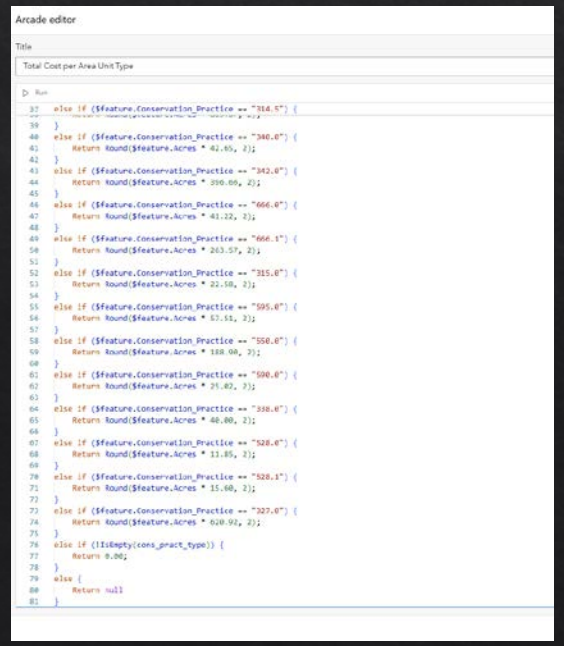


Prepare Layers for Use in Field Maps (A lot of Arcade!)



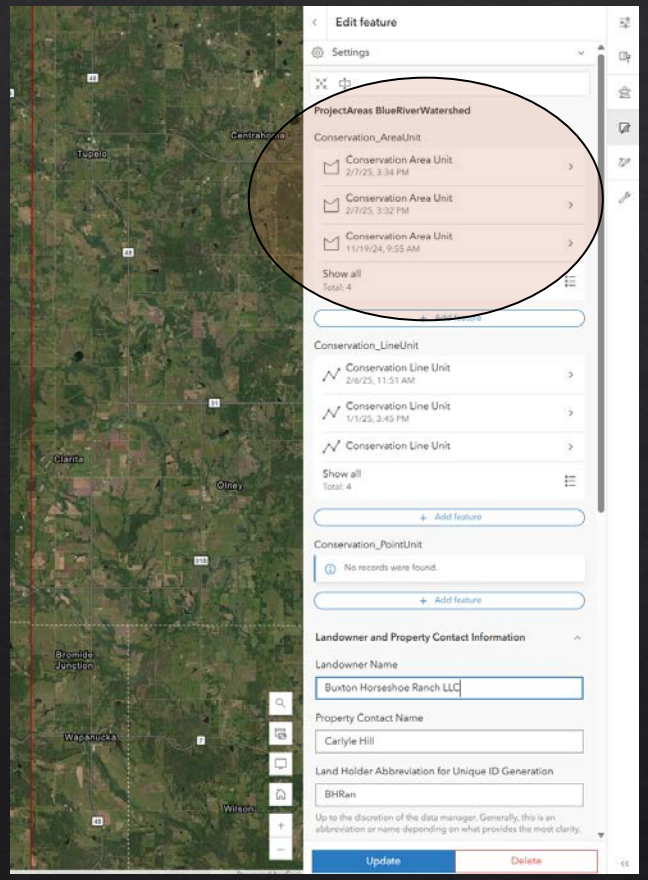


(return sum of related records)



(If Else)

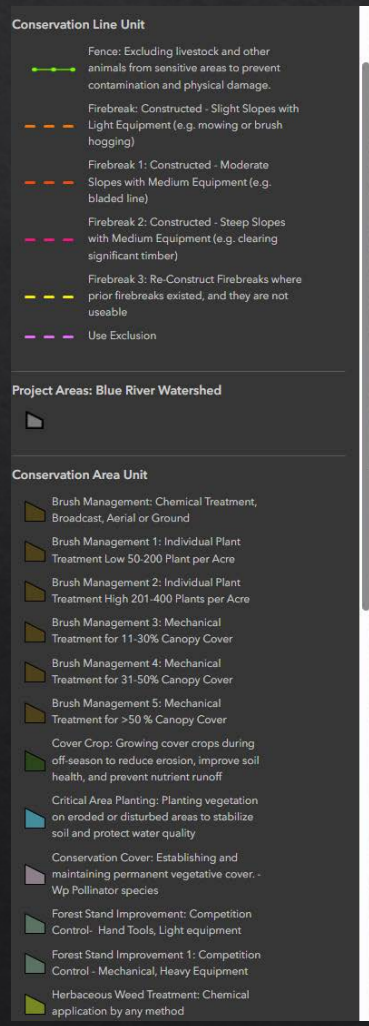
Incorporate Web Layers and Related Data for use in AGOL Map Viewer and Field Maps

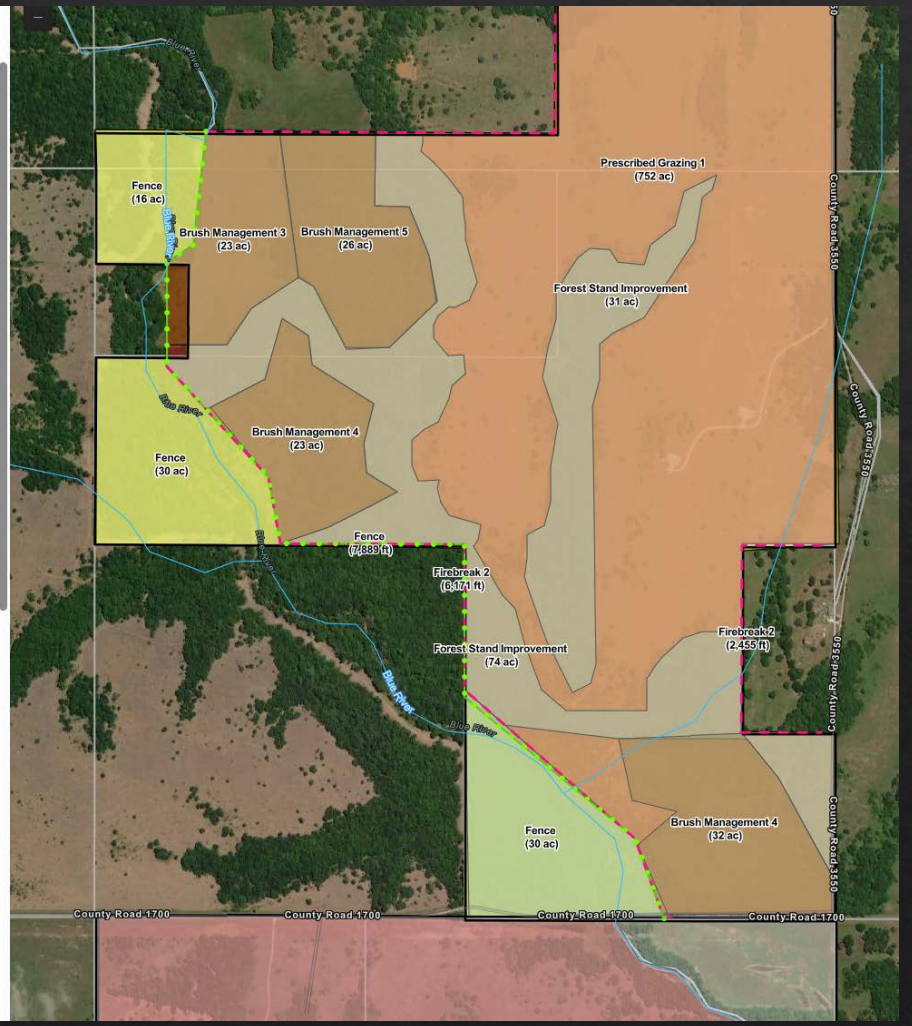


Related Record →

Parent Feature →

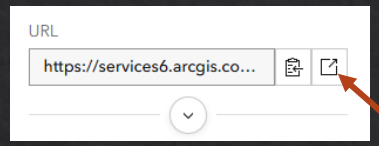
Related Record →





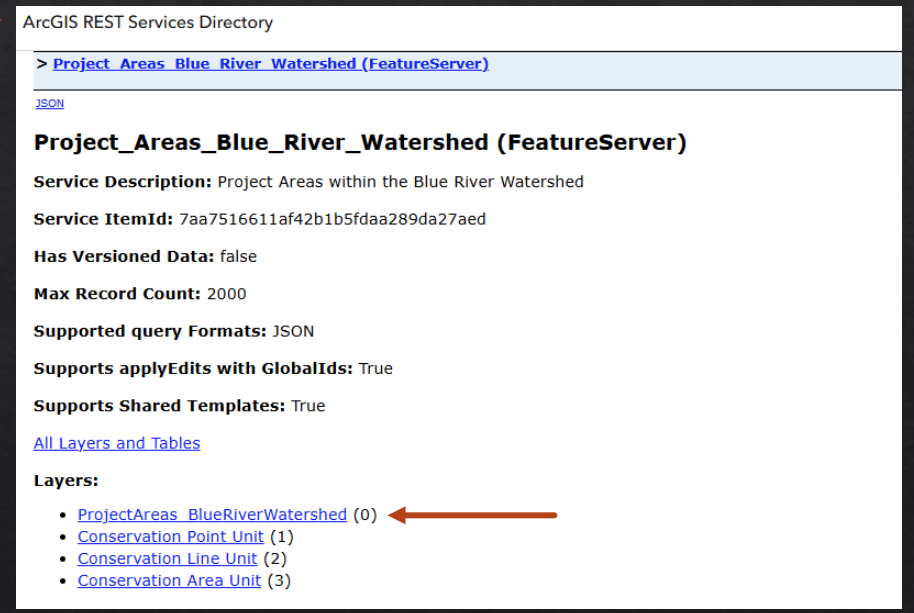
Stream AGOL Feature Layer Rest Service API to Microsoft Power BI

- View Feature Layer ArcGIS Rest Service Details

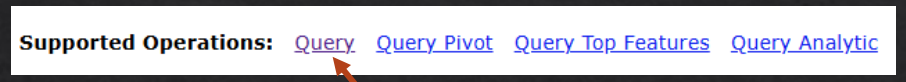


View

- Navigate to the Parent Feature Layer

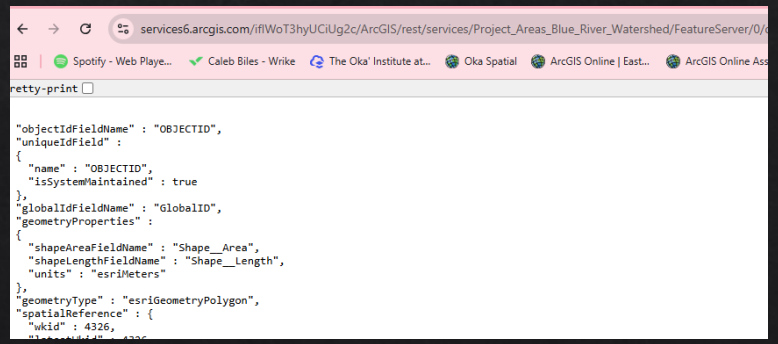


- Once selected, click "Query" (open in new tab)



Open in new tab

- Build a query and generate a JSON
  - Refer to https://www.exprodat.com/blog/using-arcgis-rest-services-as-power-bi-data-sources-part-1/
- Copy the URL and head over to Power BI!!



Copy URL

Use ArcGIS Rest Service as a Data Source in Power BI

Refer to https://www.exprodat.com/blog/using-arcgis-rest-services-as-power-bi-data-sources-part-1/

Get Data
(Web)

Use Generated URL from AGOL

Transform Raw JSON Data using Power Query Editor

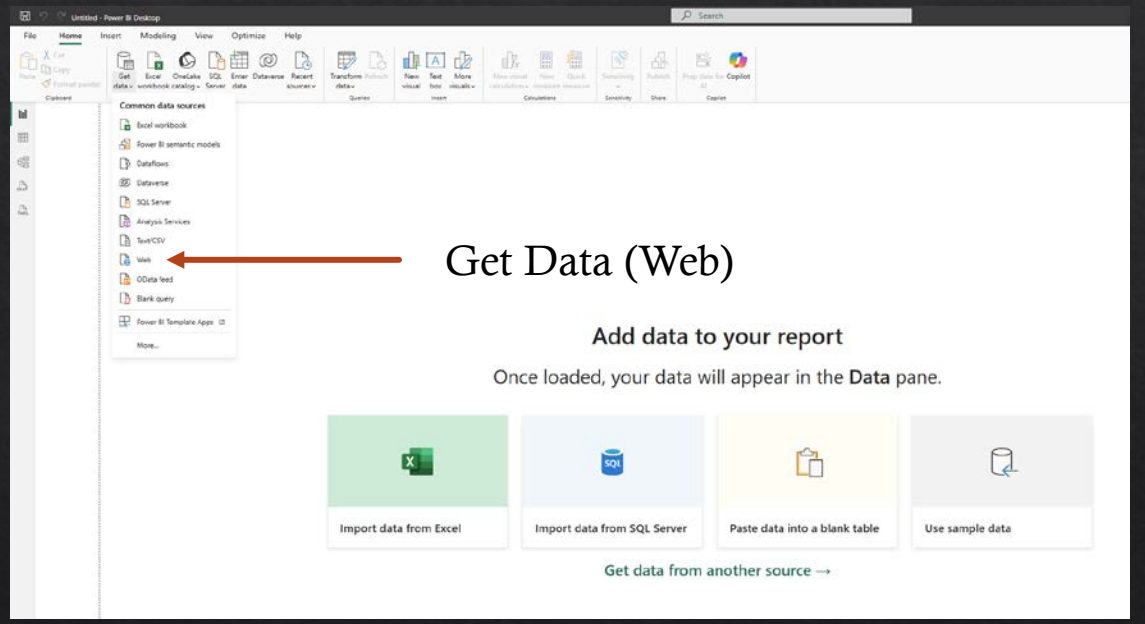
Convert JSON Geometry to String Field

Update Column Data Types (Detect Data Type)

Add Date Columns and Calculate using AGOL Date Field

= #datetime(1970, 1, 1, 0, 0, 0) + #duration(0, 0, 0, [AGOL_DATE] / 1000)

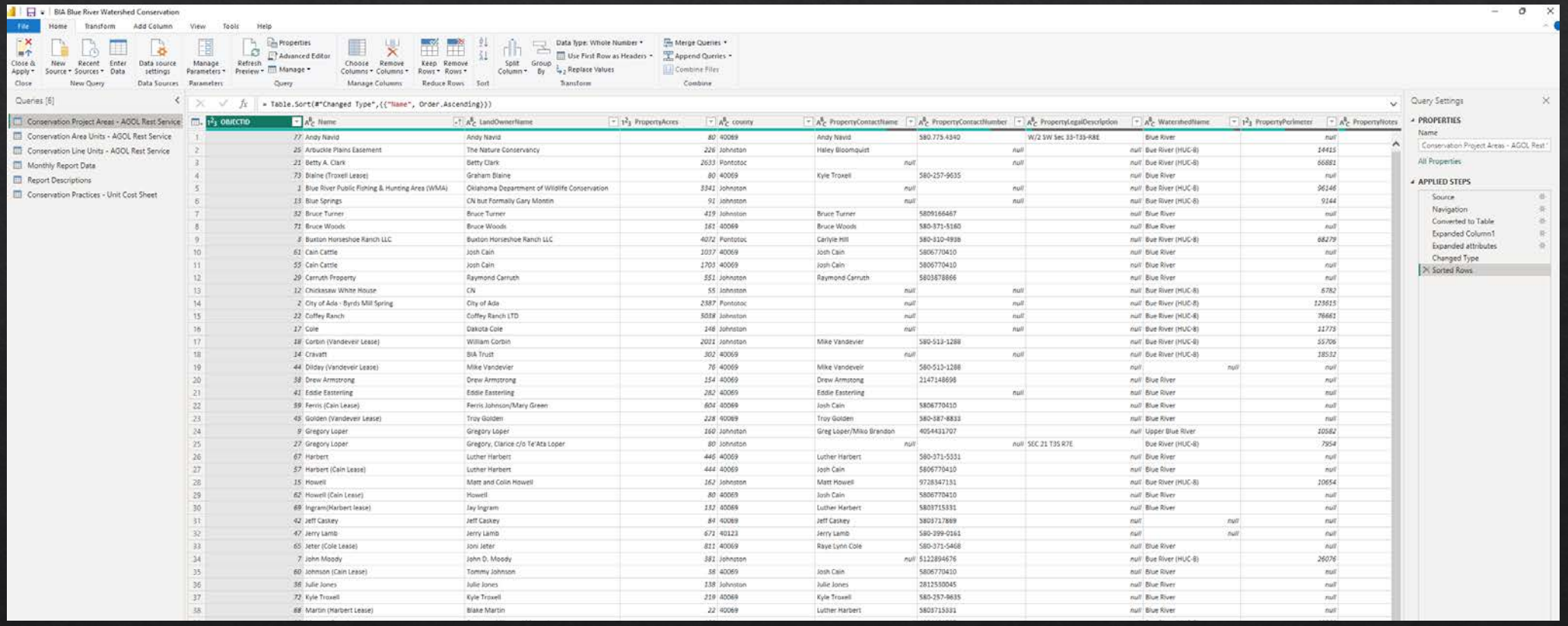
Power BI doesn't know what to do with Geometry fields!



Create Power BI Reports and Dashboards Using ArcGIS Rest Service Data

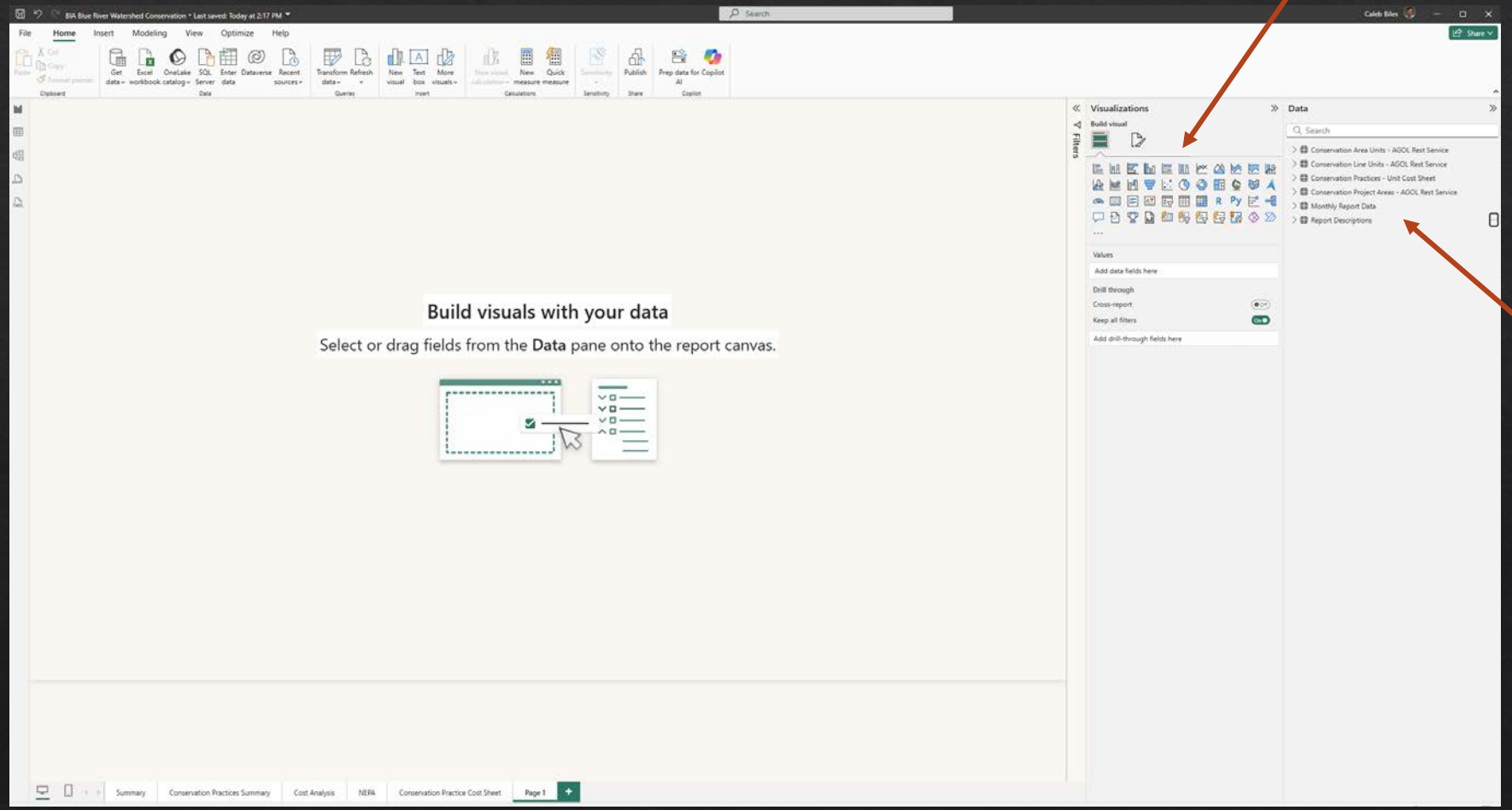
- "Close and Apply" once data has been successfully imported.

Close and Apply →



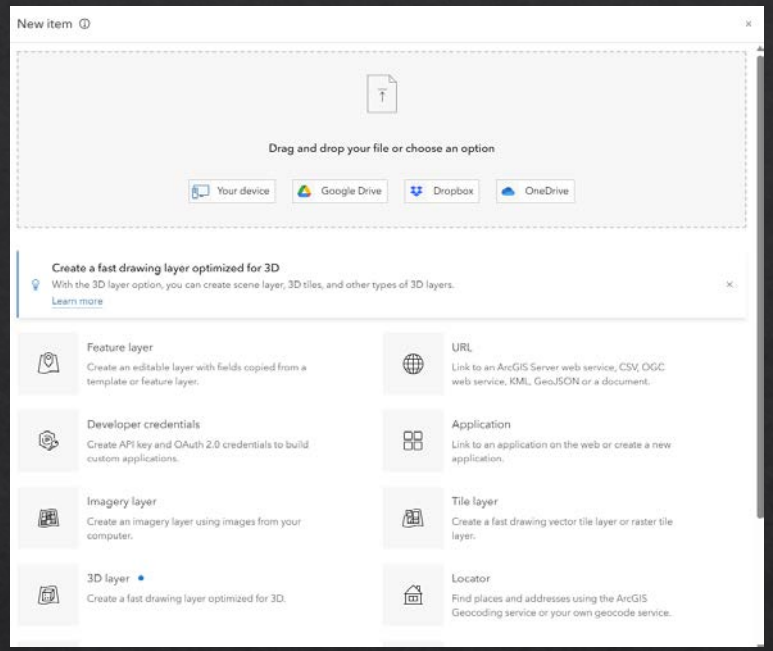
Create Power BI Reports and Dashboards Using ArcGIS Rest Service Data

- Begin creating dashboards with imported data



Establish API Key Credentials in AGOL

- By default, AGOL tokens are extremely temporary.
- Generate an API Key Credential to extend the token for up to 1 year.
- Once generated, Use the Advanced Editor in Power Bi to update the Rest Service Feature Layer API token.

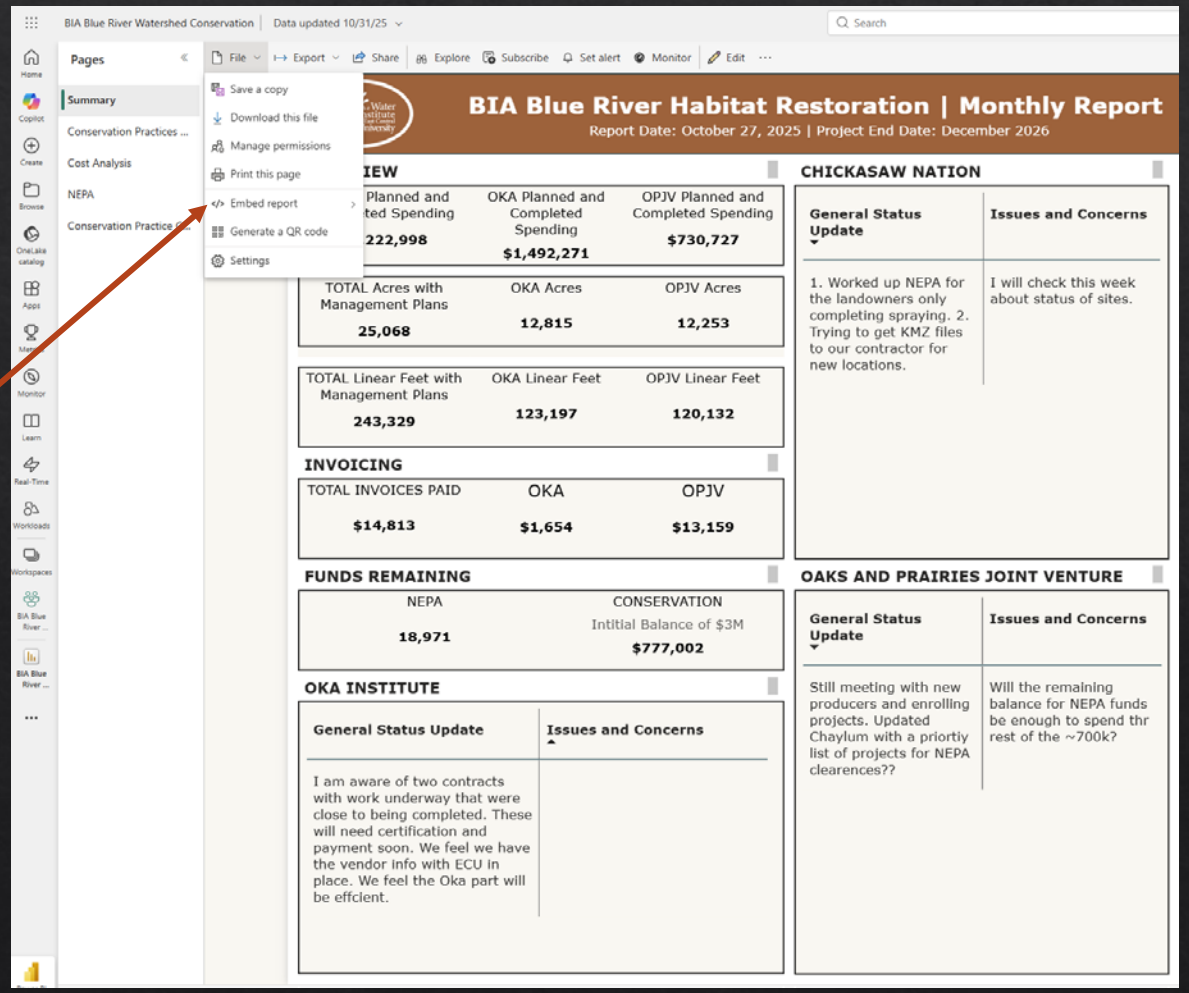


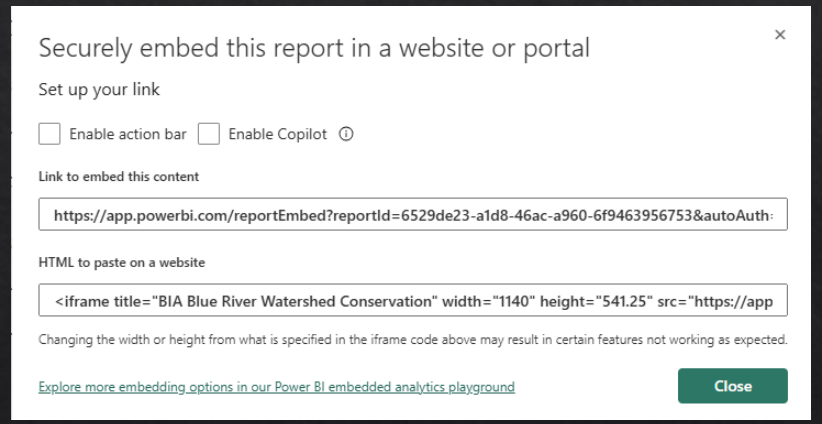
Token portion Of URL


```
returnQueryGeometry=false&returnDistinctValues=false&
token=AAPTxy8BH1VEsoebNVZXo8HurD8Q2erEUmDp7iEJevLHAou
```

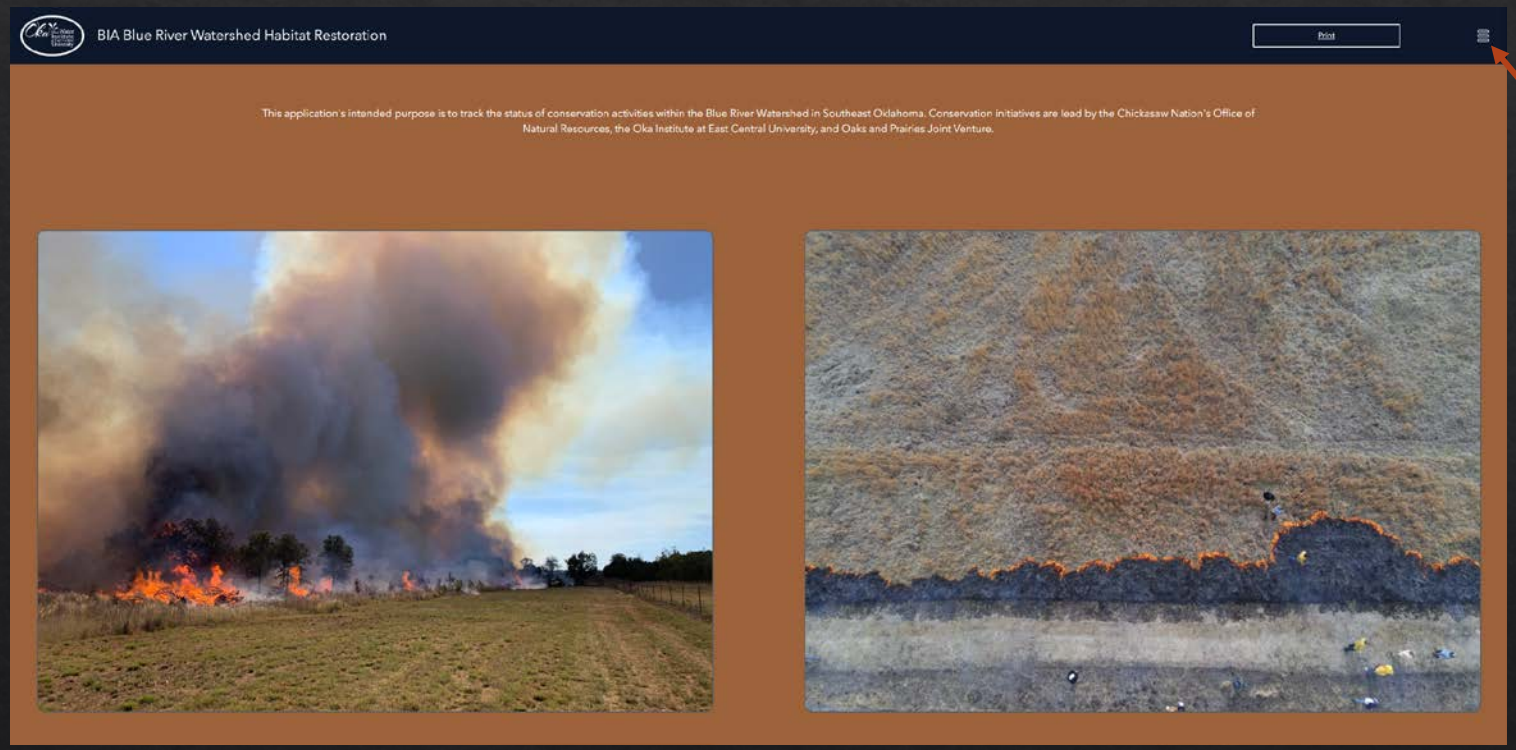
Embed Power BI Dashboards and Reports to Experience Builder or other development website

Embed report



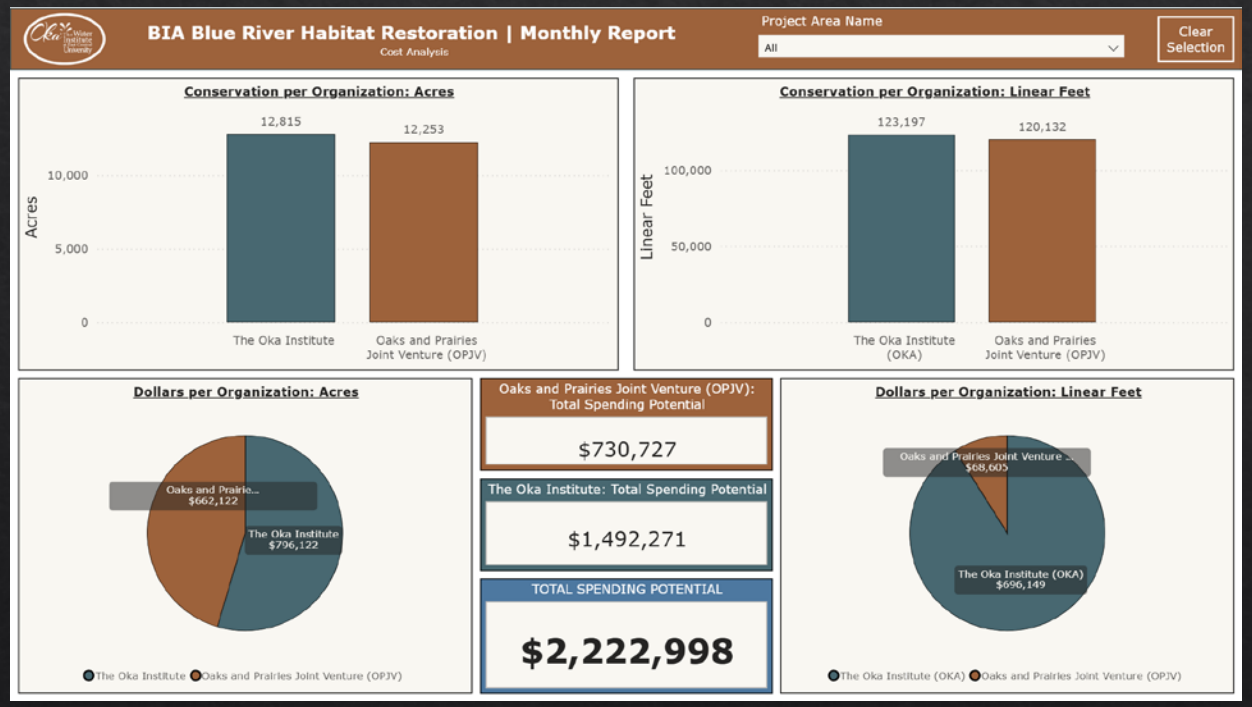


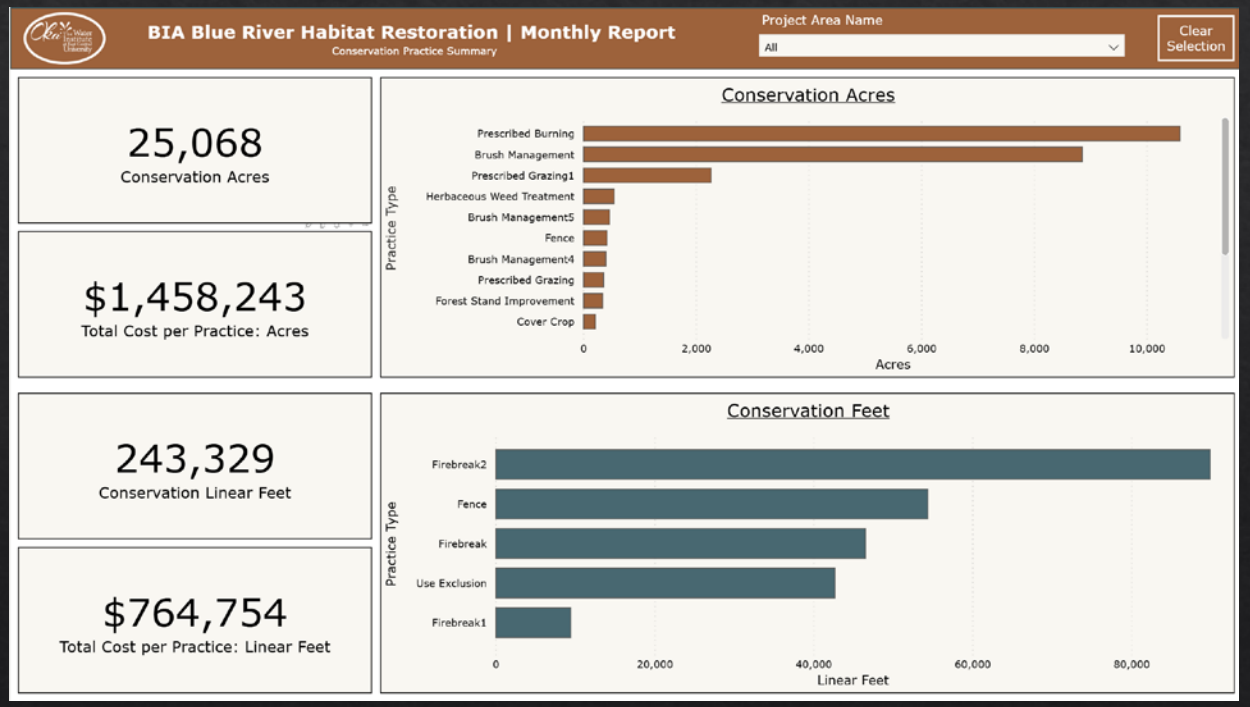
Embed Power BI Dashboards and Reports to Experience Builder or other development website



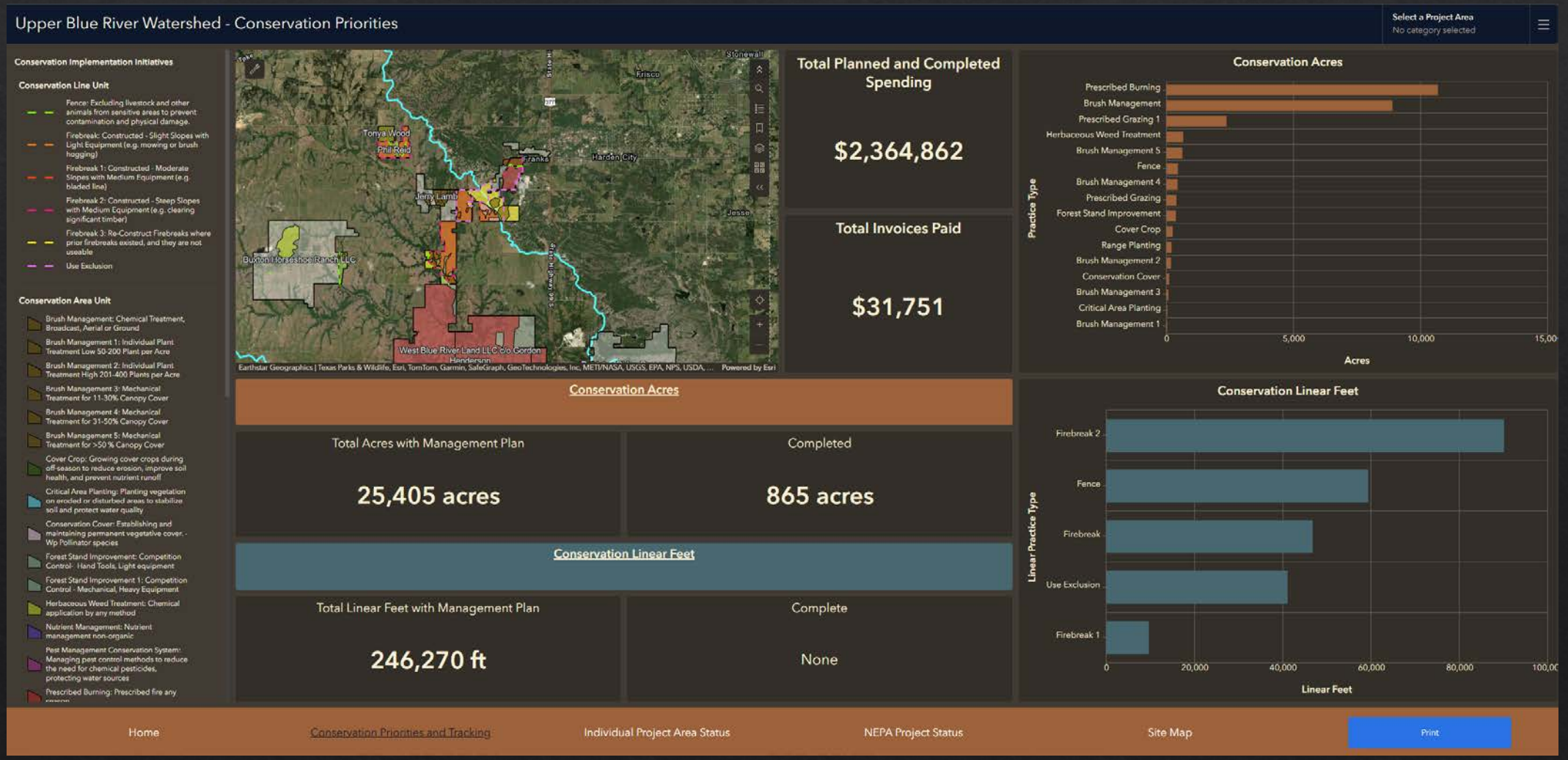
Menu

Example of Power BI Dashboard





Example of AGOL Dashboard



AGOL Dashboards vs. Power BI

Integration with GIS data: ArcGIS is specifically designed for Geographic Information System (GIS) data and provides advanced mapping and spatial analysis capabilities. It supports various data formats, such as shapefiles and geodatabases, allowing users to create and manipulate geographic data. Power BI, on the other hand, can integrate with ArcGIS Online to display maps, but it is not as specialized in GIS data as ArcGIS.

Data sources: Power BI is particularly strong in its ability to connect to a wide range of data sources, including spreadsheets, databases, and cloud services. It can pull data from various platforms and perform data transformations before visualization. ArcGIS, on the other hand, focuses more on geospatial data and is capable of integrating with GIS-specific data sources, such as aerial imagery and satellite data.

Analytical capabilities: ArcGIS offers a comprehensive suite of spatial analysis tools, including proximity analysis, network analysis, and spatial statistics. These tools allow for in-depth spatial analysis and modeling. Power BI, although it offers some basic analytical capabilities, is primarily focused on visualizing and exploring data rather than performing complex spatial analysis tasks.

Customization and extensibility: Power BI provides a user-friendly interface for creating visually appealing dashboards and reports. It offers a wide range of customizable visualizations and allows users to create their own custom visuals using the Power BI visualization SDK. ArcGIS, while it also provides customization options, requires more technical expertise and programming skills to extend its functionality.

Collaboration and sharing: Power BI integrates well with Microsoft's collaboration tools, such as SharePoint and Teams, making it easier for teams to collaborate on data visualization projects. It also allows for easy sharing of reports and dashboards both within the organization and externally. ArcGIS, on the other hand, provides its own collaboration platform, ArcGIS Online, which allows users to share and collaborate on maps and spatial data specifically.

Cost: Power BI comes with different pricing plans, including a free version with limited features and paid plans with additional capabilities. It offers flexibility in terms of pricing based on the organization's needs and budget. ArcGIS, however, tends to be more costly, especially for larger organizations or those with more specialized spatial analysis requirements, as it offers a wider range of advanced spatial analysis capabilities.

Thank you!

- Caleb Biles | GIS Analyst | Oka Water Institute at East Central University
- Email: callbil@ecok.edu
- Cell: 405-606-9734