Water/Wastewater Workgroup

Spring RTOC

June 5, 2025

Agenda

- Recap of mission statement, themes, & interest from last RTOC
- SharePoint resources folder walkthrough
- GIS presentations & discussion on mapping/analyses needs
- Open floor for ideas for other interests, needs, & future topics
- Feedback on Drinking Water Conference (April, Reno)
- Next meeting: July on Teams (online)

Updated Draft Workgroup Mission Statement

“Collaborate to support/expand access to Tribal Water Infrastructure funding and inform operational priorities in the region.”

GIS Mapping & Spatial Analysis Softwares

Madeleine Tango

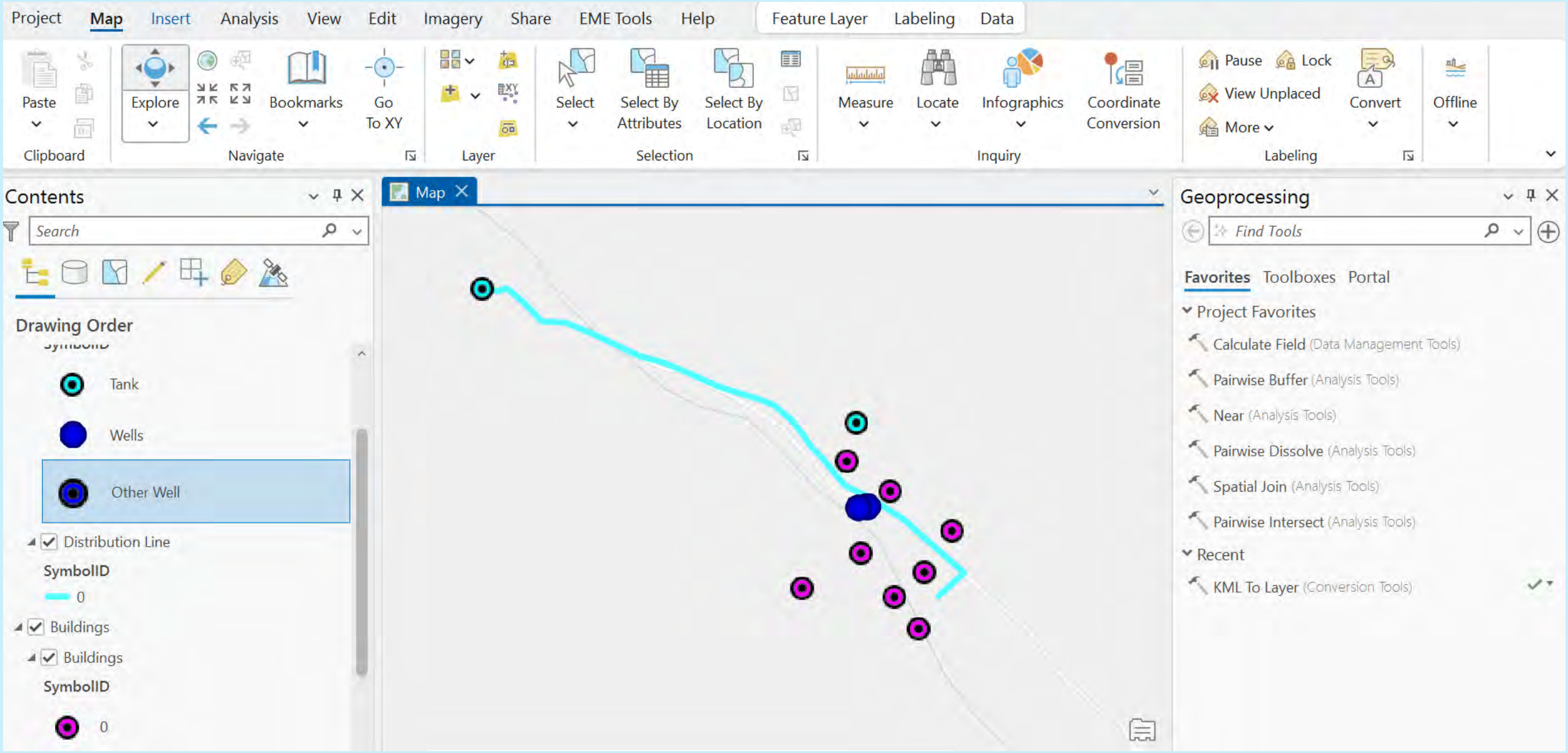
tango.madeleine@epa.gov

Poll! Raise your hand if you've used…

- ArcGIS Pro
  - Other ESRI software
- QGIS
- Google Earth
- Google Earth Engine
- Nearmap
- Other mapping software?

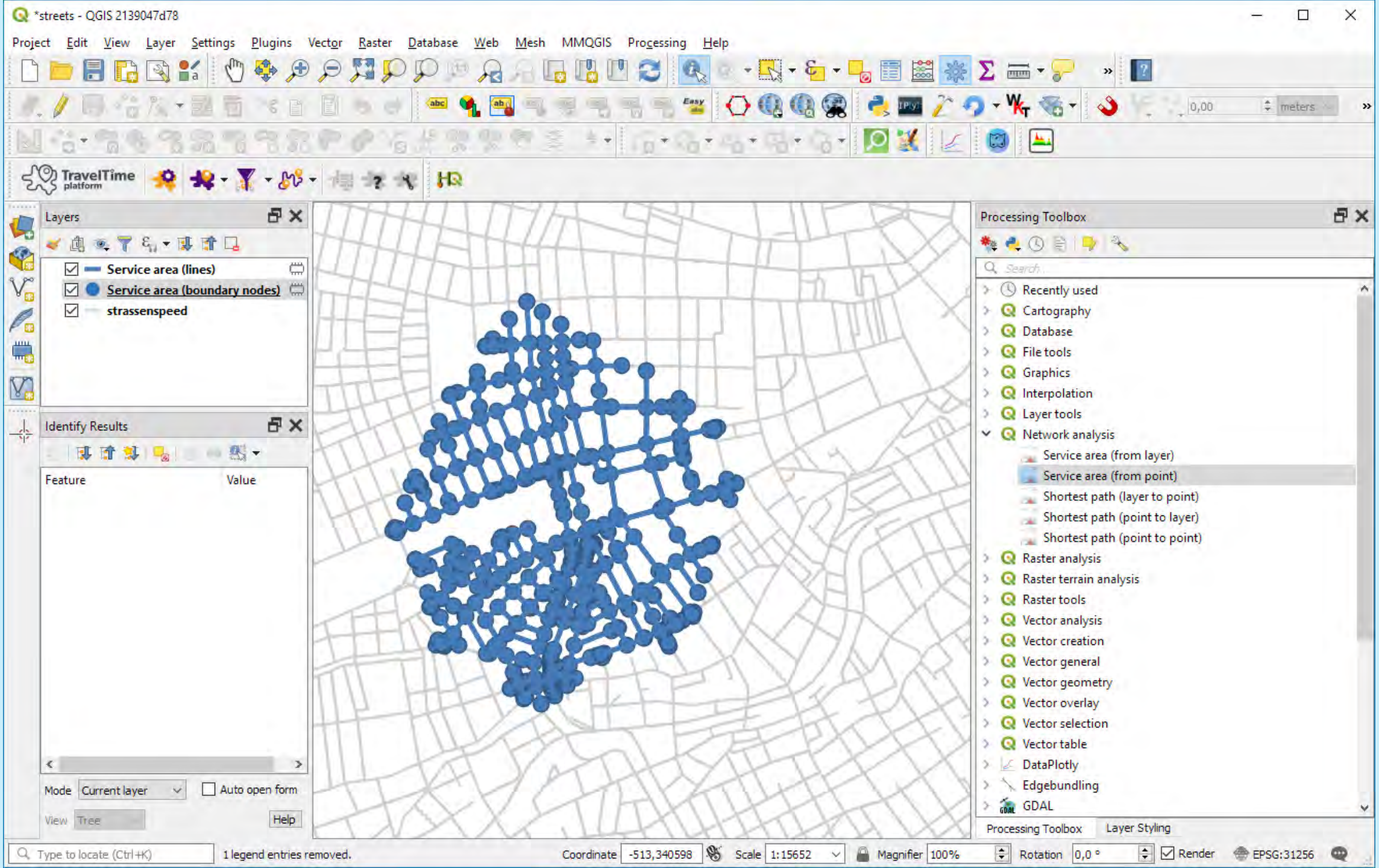
ArcGIS Pro

- Requires a license-- may be able to get for free from BIA (with technical support)
- ESRI also tends to provide technical support with a license
- Uses proprietary file types so can sometimes be difficult to share files with non-ArcGIS Pro users
- May run into functionality limitations depending on what the license includes
- ESRI has a suite of software, including:
    - Survey123 (data collection)
    - StoryMaps (tool for interactive webpages)
    - Indoors (floor plans)
    - ArcGIS Online (browser version)
    - Field Maps (offline maps)


Project
Map
Insert
Analysis
View
Edit
Imagery
Share
EME Tools
Help
Feature Layer
Labeling
Data
Paste
Clipboard
Explore
Bookmarks
Go To XY
Navigate
Layer
Select
Select By Attributes
Select By Location
Selection
Measure
Locate
Infographics
Coordinate Conversion
Inquiry
Pause
Lock
View Unplaced
More
Convert
Labeling
Offline
Contents
Search
Drawing Order
Tank
Wells
Other Well
Distribution Line
SymbolID
0
Buildings
Buildings
SymbolID
0
Map
Geoprocessing
Find Tools
Favorites
Toolboxes
Portal
Project Favorites
Calculate Field (Data Management Tools)
Pairwise Buffer (Analysis Tools)
Near (Analysis Tools)
Pairwise Dissolve (Analysis Tools)
Spatial Join (Analysis Tools)
Pairwise Intersect (Analysis Tools)
Recent
KML To Layer (Conversion Tools)

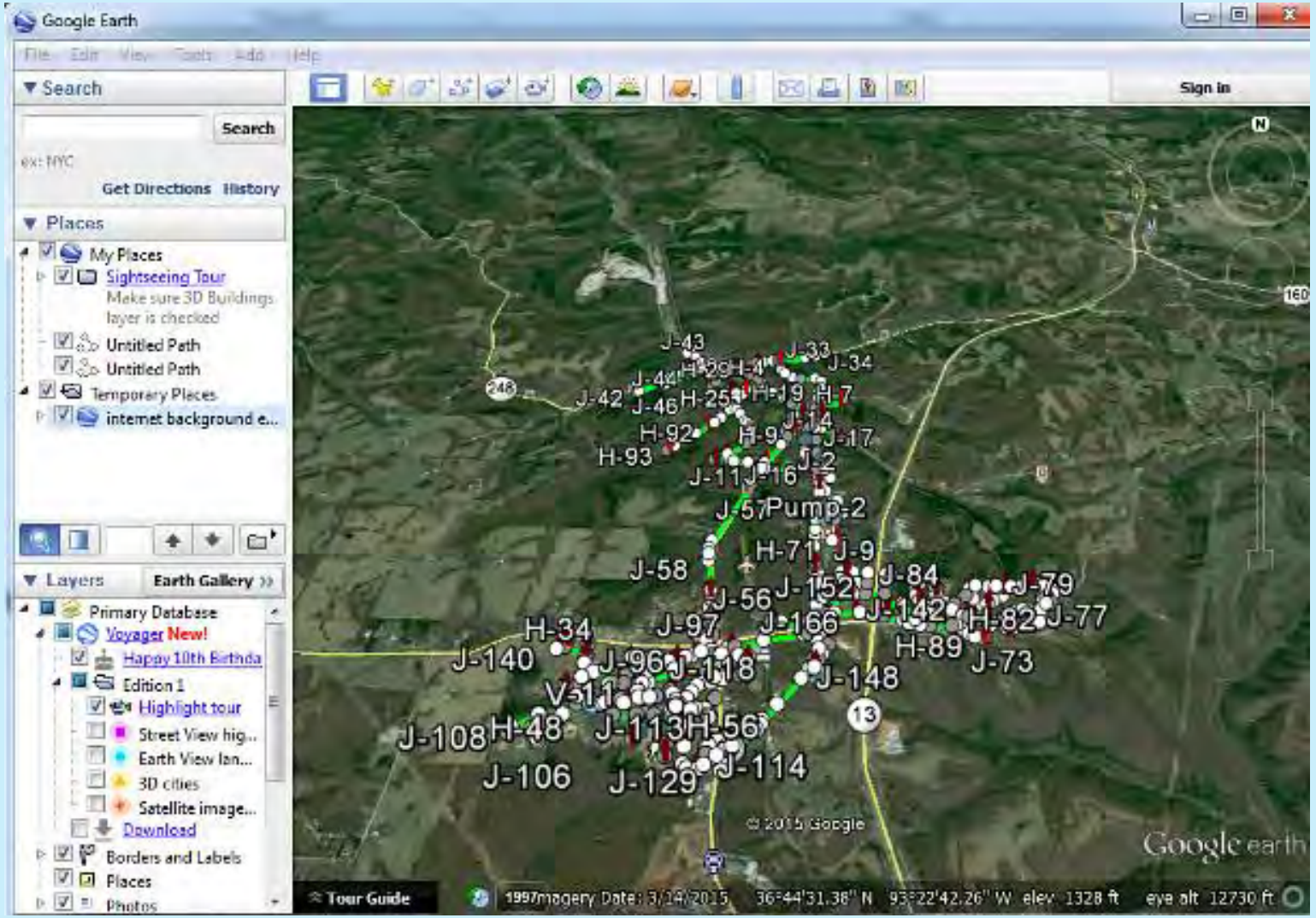
QGIS

- Free and open-source, with a robust online community
- File types tend to be more easily transferrable to other softwares
- Extensive functionality– if not within the QGIS software itself, you can download packages
- Building online maps and dashboards requires other software (Leaflet, Microsoft PowerBI, etc.)– not integrated


*streets - QGIS 2139047d78
Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh MMQGIS Processing Help
TravelTime platform
Layers
Service area (lines)
Service area (boundary nodes)
strassenspeed
Identify Results
Feature
Value
Mode Current layer
Auto open form
View Tree
Help
Processing Toolbox
Search...
Recently used
Cartography
Database
File tools
Graphics
Interpolation
Layer tools
Network analysis
Service area (from layer)
Service area (from point)
Shortest path (layer to point)
Shortest path (point to layer)
Shortest path (point to point)
Raster analysis
Raster terrain analysis
Raster tools
Vector analysis
Vector creation
Vector general
Vector geometry
Vector overlay
Vector selection
Vector table
DataPlotly
Edgebundling
GDAL
Processing Toolbox
Layer Styling
Type to locate (Ctrl+K)
1 legend entries removed.
Coordinate -513,340598
Scale 1:15652
Magnifier 100%
Rotation 0,0 °
Render
EPSG:31256

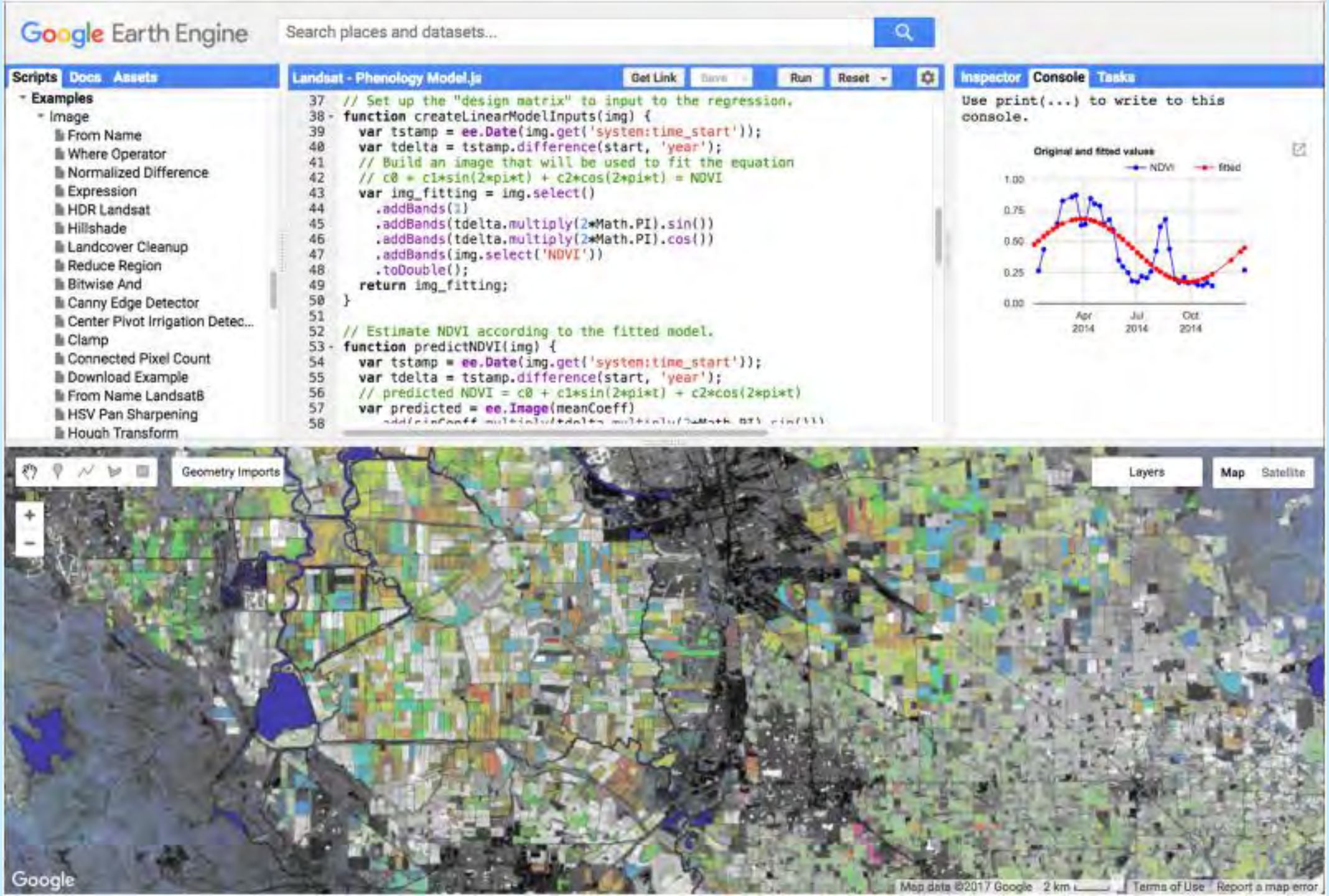
Google Earth

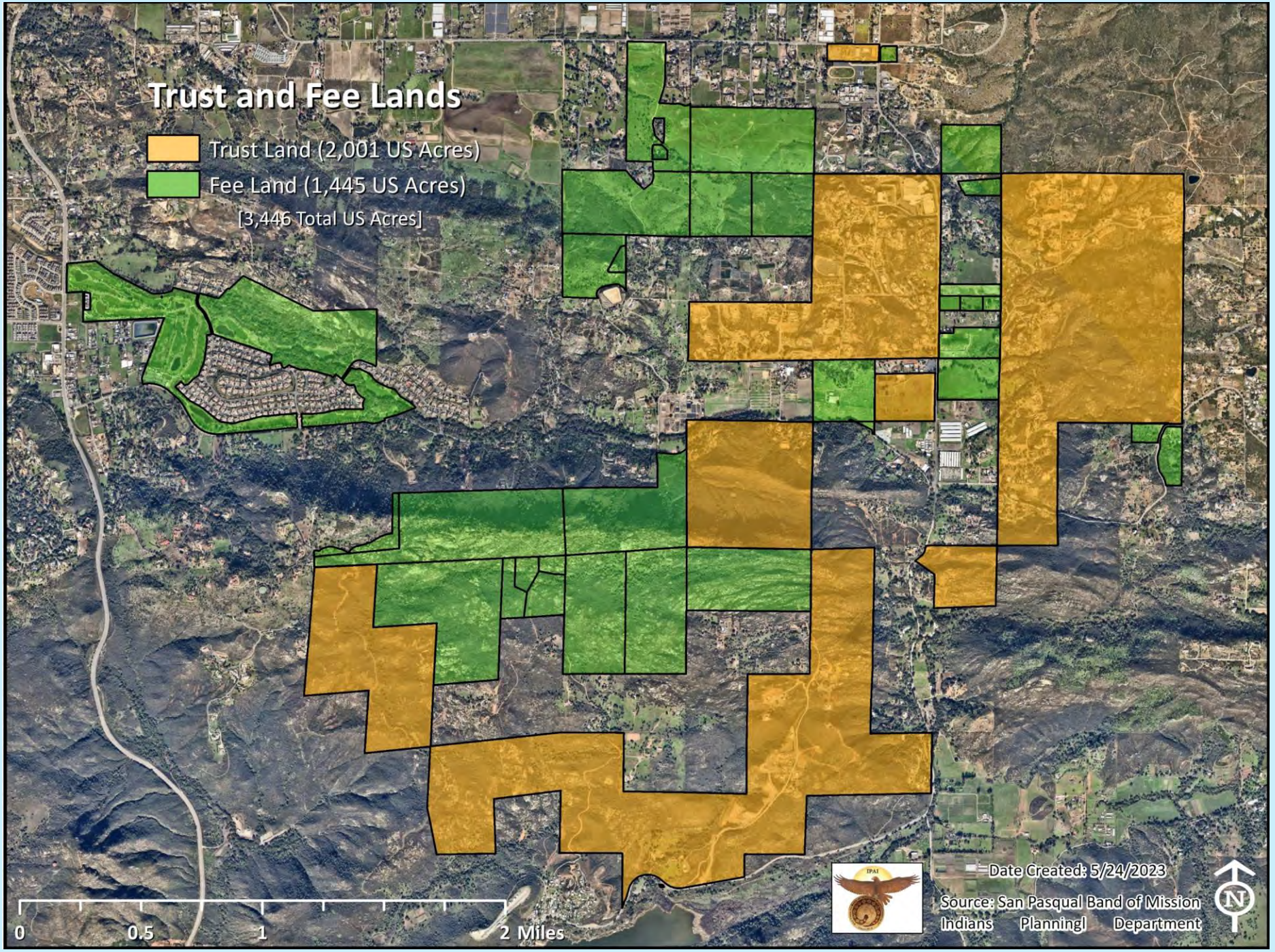
- Uses KML and KMZ files
- Good for mapping locations, but not for analysis

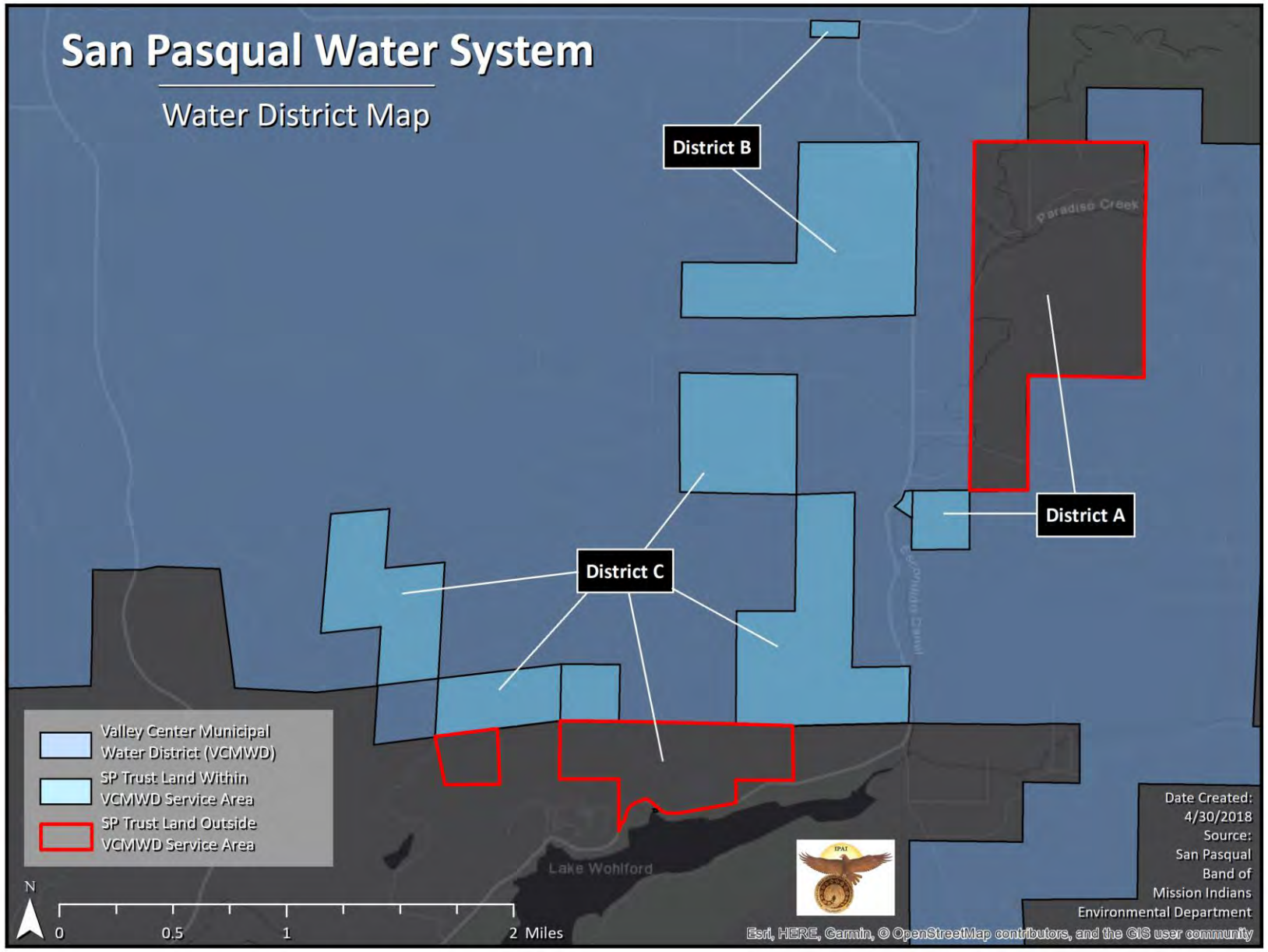


Google Earth Engine

- Analyses of satellite imagery/remote sensing layers
  - ArcGIS Pro and QGIS can also do this, but Google Earth Engine is quicker and can do more advanced analyses
- Can look at changes in land cover over time
- Requires coding (Python or JavaScript)
- Free for noncommercial use (research & education) but requires a subscription fee and compute charges for commercial/operation use


Google Earth Engine
Search places and datasets...
Scripts
Docs
Assets
Examples
Image
From Name
Where Operator
Normalized Difference
Expression
HDR Landsat
Hillshade
Landcover Cleanup
Reduce Region
Bitwise And
Canny Edge Detector
Center Pivot Irrigation Detec...
Clamp
Connected Pixel Count
Download Example
From Name LandsatB
HSV Pan Sharpening
Hough Transform
Landsat - Phenology Model.js
Get Link
Save
Run
Reset
37 // Set up the "design matrix" to input to the regression.
38 function createLinearModelInputs(img) {
39 var tstamp = ee.Date(img.get('system:time_start'));
40 var tdelta = tstamp.difference(start, 'year');
41 // Build an image that will be used to fit the equation
42 // c0 + c1*sin(2*pi*t) + c2*cos(2*pi*t) = NDVI
43 var img_fitting = img.select()
44 .addBands(1)
45 .addBands(tdelta.multiply(2*Math.PI).sin())
46 .addBands(tdelta.multiply(2*Math.PI).cos())
47 .addBands(img.select('NDVI'))
48 .toDouble();
49 return img_fitting;
50 }
51
52 // Estimate NDVI according to the fitted model.
53 function predictNDVI(img) {
54 var tstamp = ee.Date(img.get('system:time_start'));
55 var tdelta = tstamp.difference(start, 'year');
56 // predicted NDVI = c0 + c1*sin(2*pi*t) + c2*cos(2*pi*t)
57 var predicted = ee.Image(meanCoeff)
58
Inspector
Console
Tasks
Use print(...) to write to this console.
Original and fitted values
NDVI
fitted
1.00
0.75
0.50
0.25
0.00
Apr 2014
Jul 2014
Oct 2014
Geometry Imports
Layers
Map
Satellite
Google
Map data ©2017 Google
2 km
Terms of Use
Report a map error


Trust and Fee Lands
Trust Land (2,001 US Acres)
Fee Land (1,445 US Acres)
[3,446 Total US Acres]
0
0.5
1
2 Miles
Date Created: 5/24/2023
Source: San Pasqual Band of Mission Indians Planningl Department


San Pasqual Water System
Water District Map
District B
District A
District C
Paradise Creek
Lake Wohlford
Valley Center Municipal Water District (VCMWD)
SP Trust Land Within VCMWD Service Area
SP Trust Land Outside VCMWD Service Area
N
0
0.5
1
2 Miles
Date Created: 4/30/2018
Source: San Pasqual Band of Mission Indians Environmental Department
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community

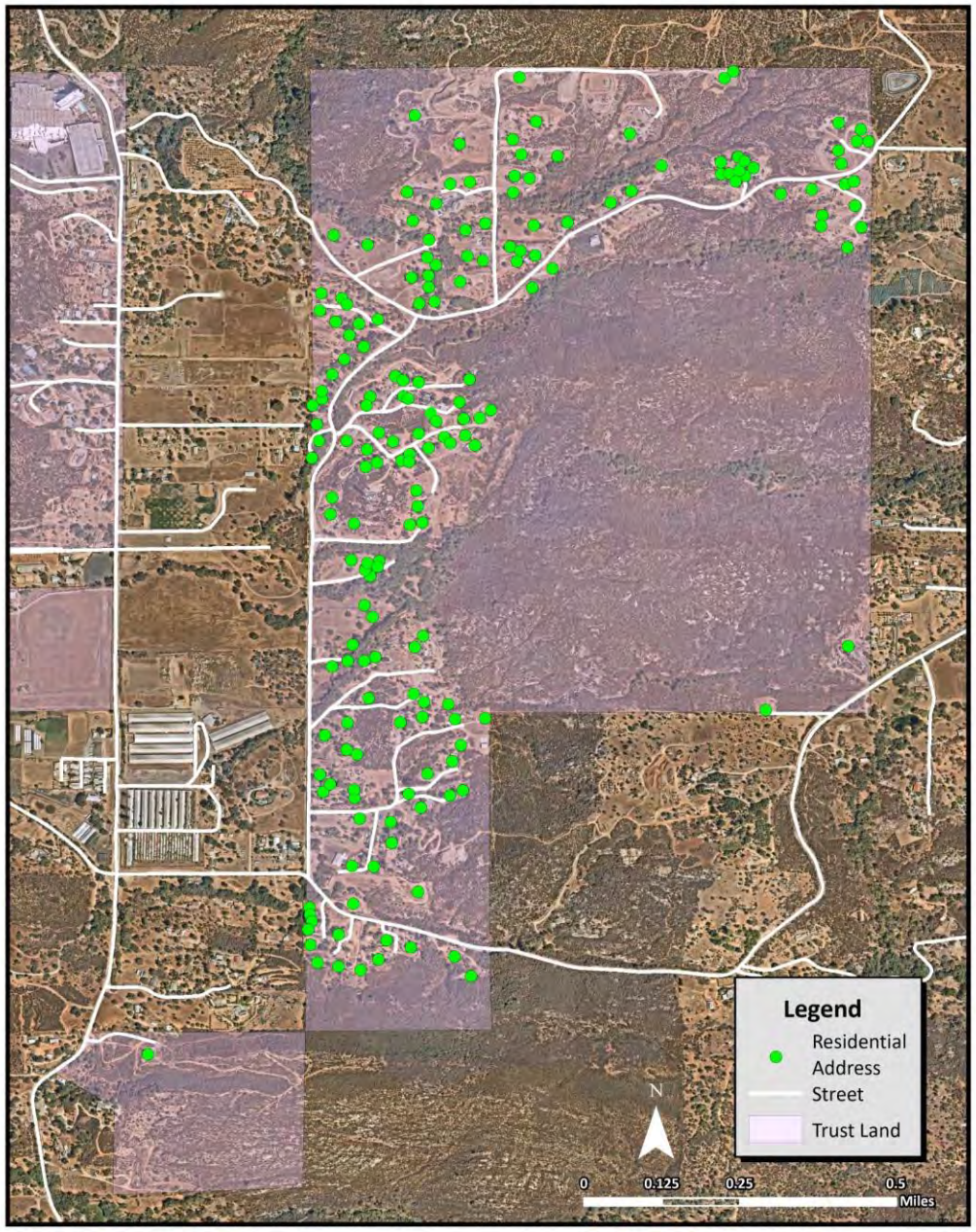
District A

184 Residential Services

2 Ground Water Wells (Well #3 & Well #4)

Connection to VCMWD

200,000 Gallon Storage Tank



San Pasqual Reservation Residences

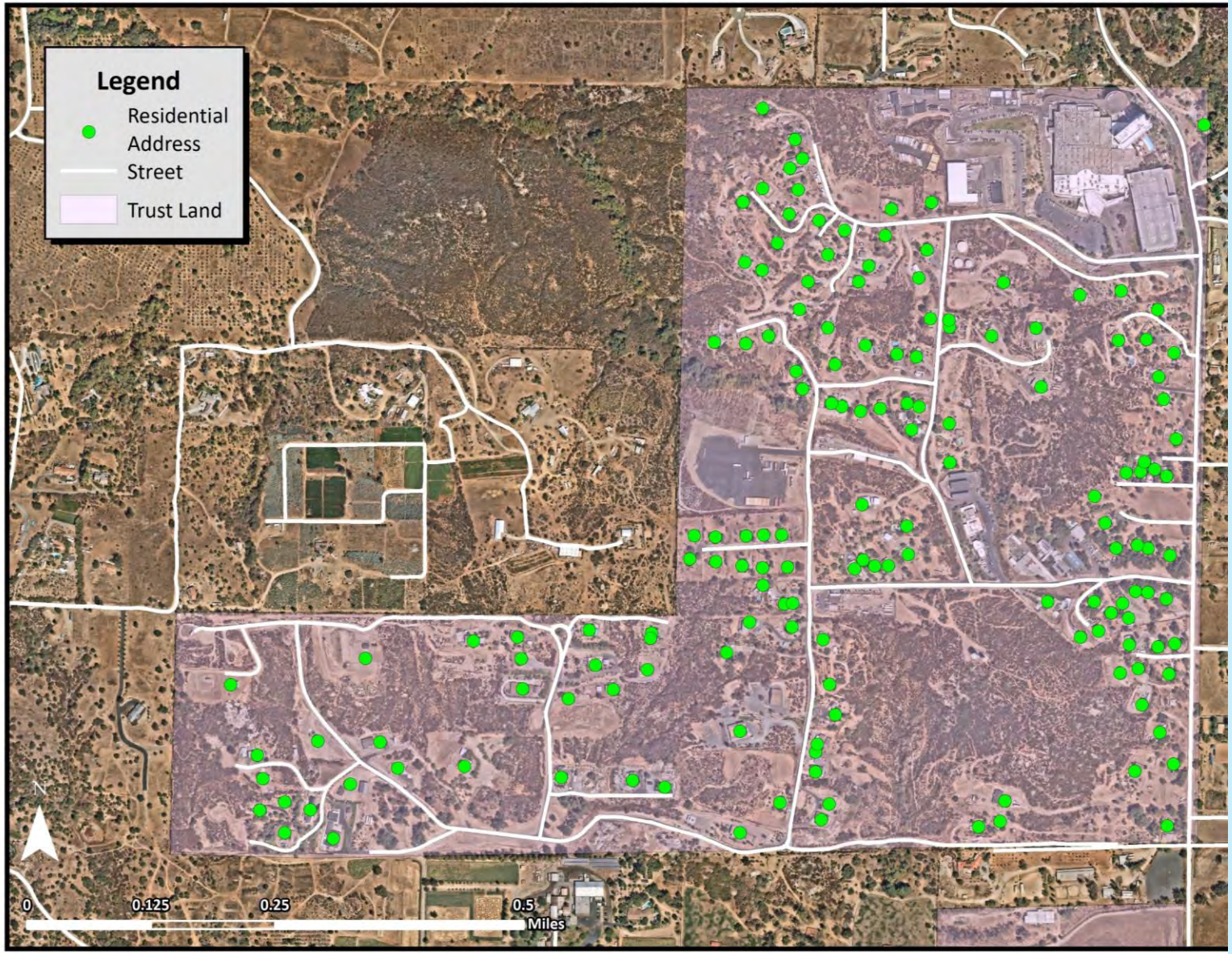
District A - 184 Residential Addresses

Source: San Pasqual Band of Mission Indians Planning Department
Date Created: 10/7/2022

San Pasqual Reservation Residences

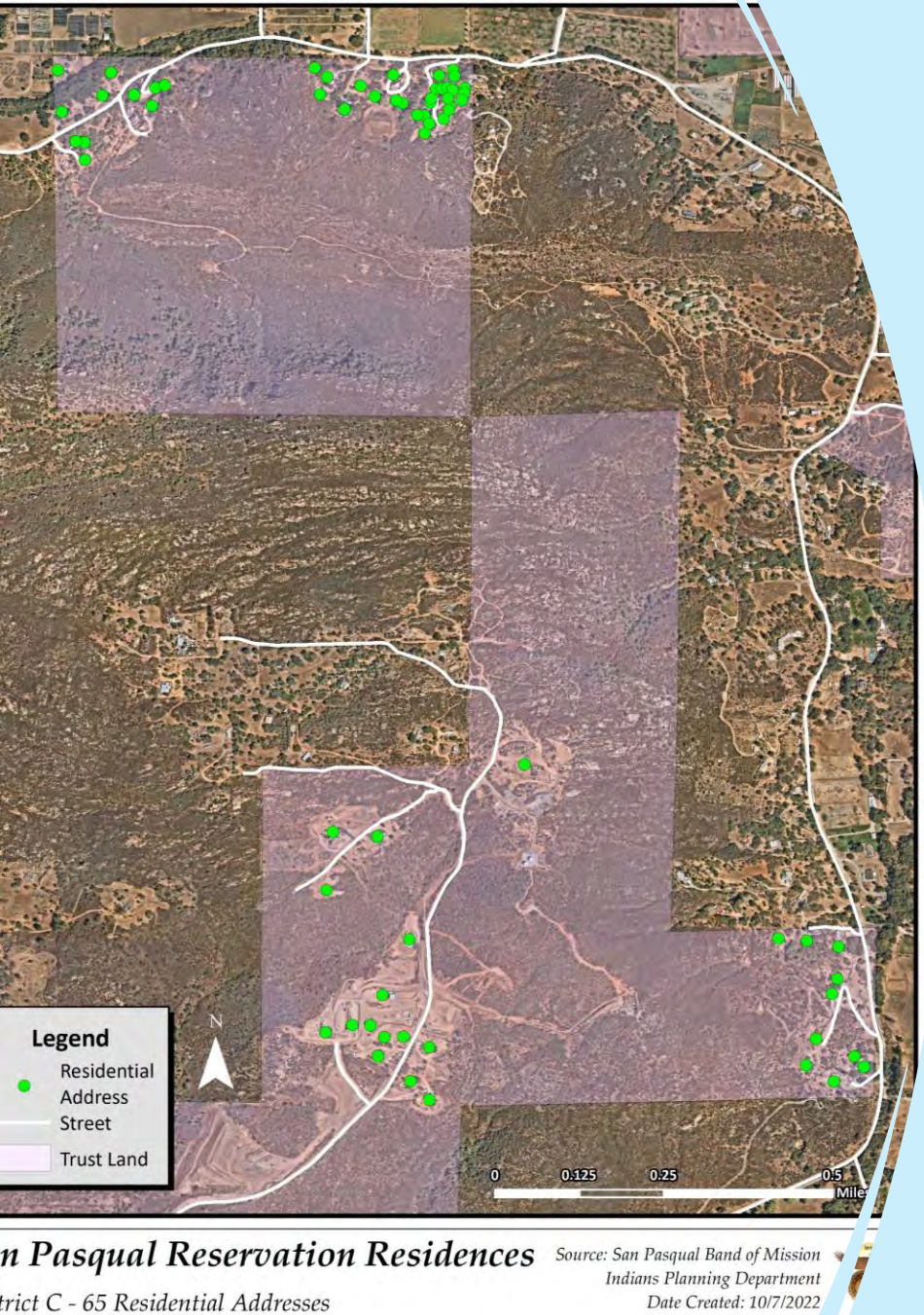
District B - 156 Residential Addresses

Source: San Pasqual Band of M
Indians Planning Depa
Date Created: 10/



District B

- 156 Residential Services
- 250,000 Storage Tank
- Connection to VCMWD
- No Ground Water Wells



District C

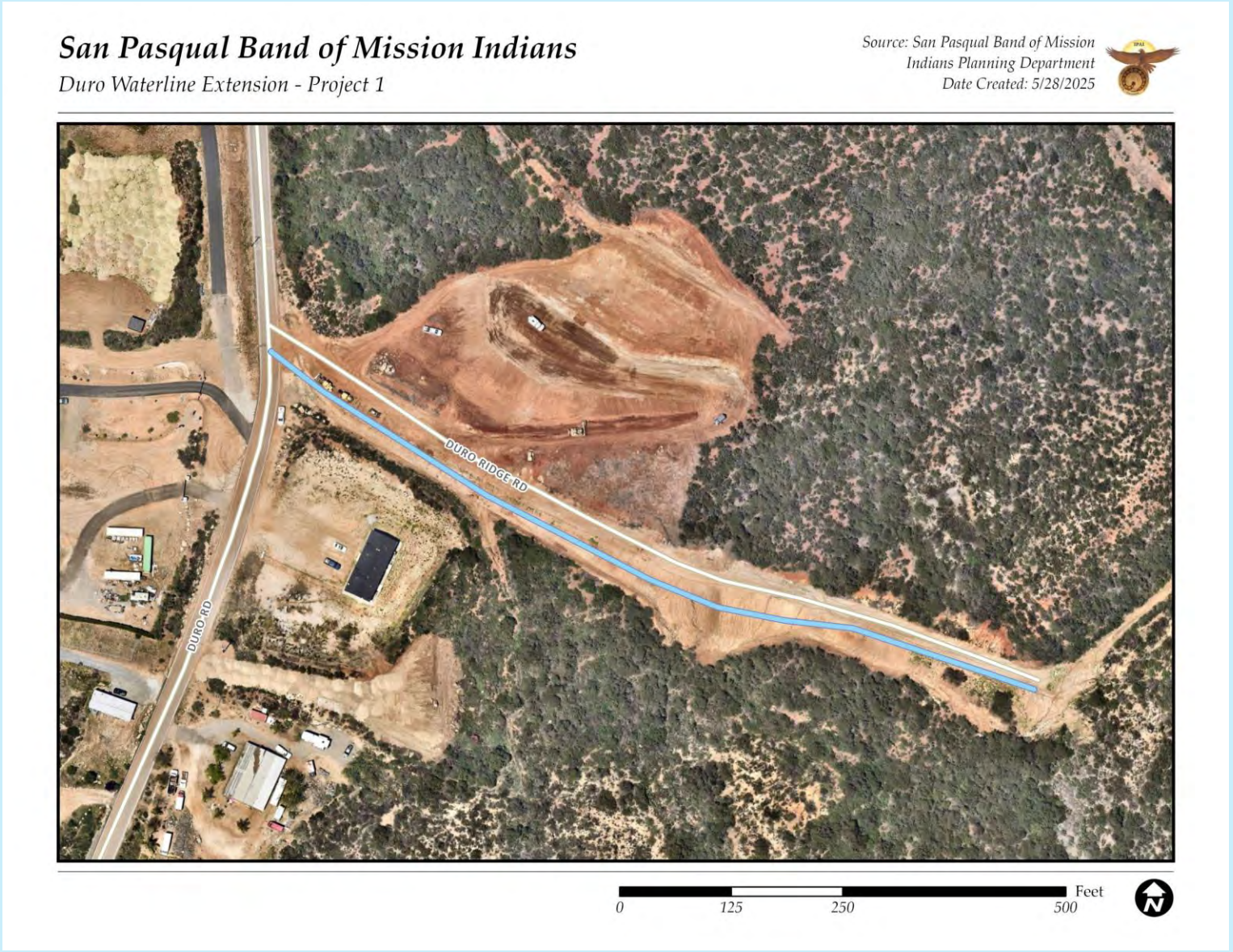
- 16 Residential services (Duro Water System)
- 2 Ground Water Wells (Duro #1 & Duro #2)
- 2 - 70,000 Gallon Storage Tanks

Material Delivery for Duro Water Line Projects

- 4,000 linear feet of 8-inch pipe
- 6 fire hydrants

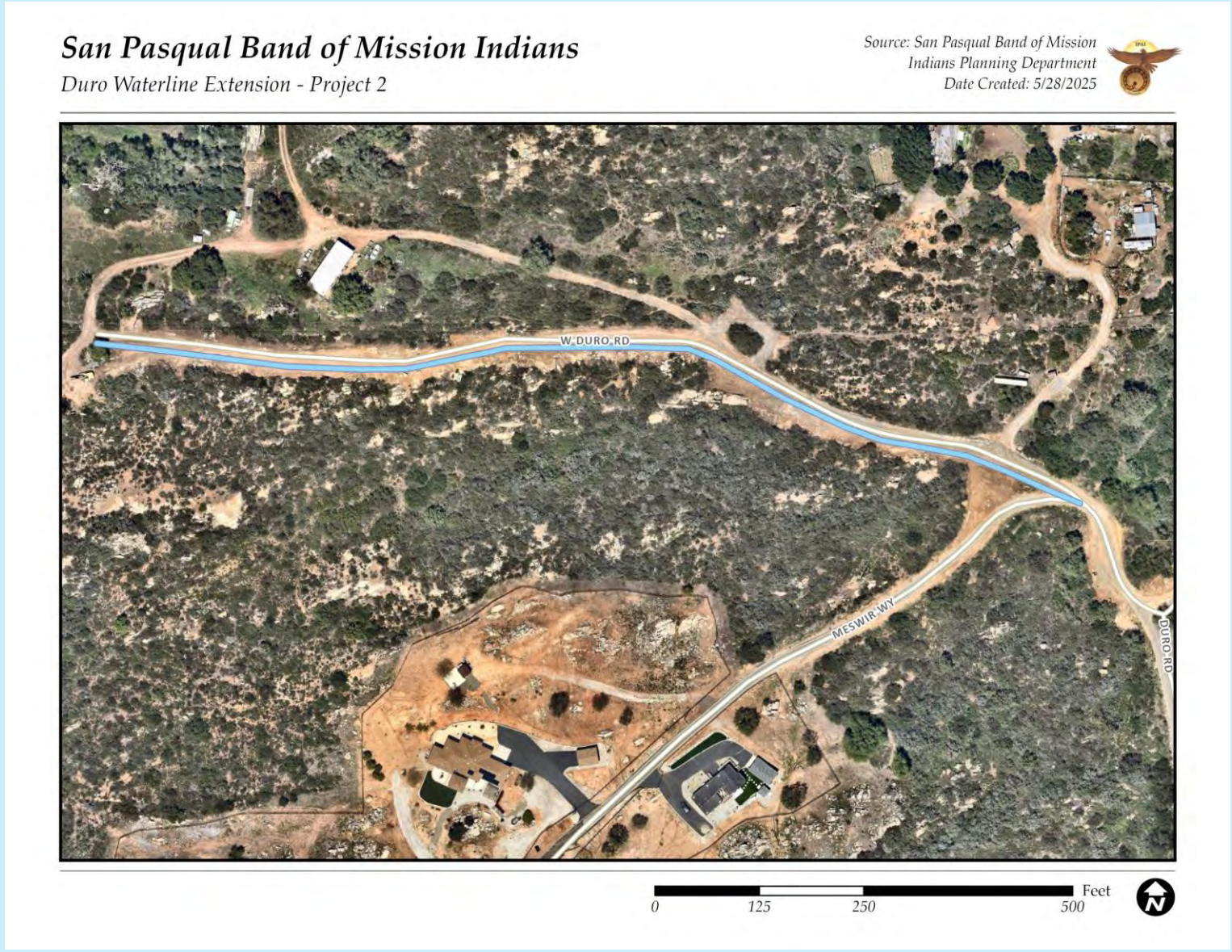
Eastern Duro Water Line Extension

Eastern Duro Water Line Expansion



Western Duro Water Line Extension

Western Duro Water Line Expansion



Discussion Questions

- How do you currently use GIS? If you don’t, how would you like to?
- What are the primary needs you would be addressing by using GIS?
- Do you have ideas for analyses that would be helpful?
- What trainings or resources would you be interested in?