Yavapai County Cesspool Inventory



Subtractive Geographic Analysis for Determining Possible Cesspool Locations in Rural and Semi-Rural Communities

Robyn Moreno, RS

YAVAPAI COUNTY

Yavapai County Cesspool Inventory



The materials being presented represent my own opinions and do not reflect the opinions of NOWRA.

Robyn Moreno

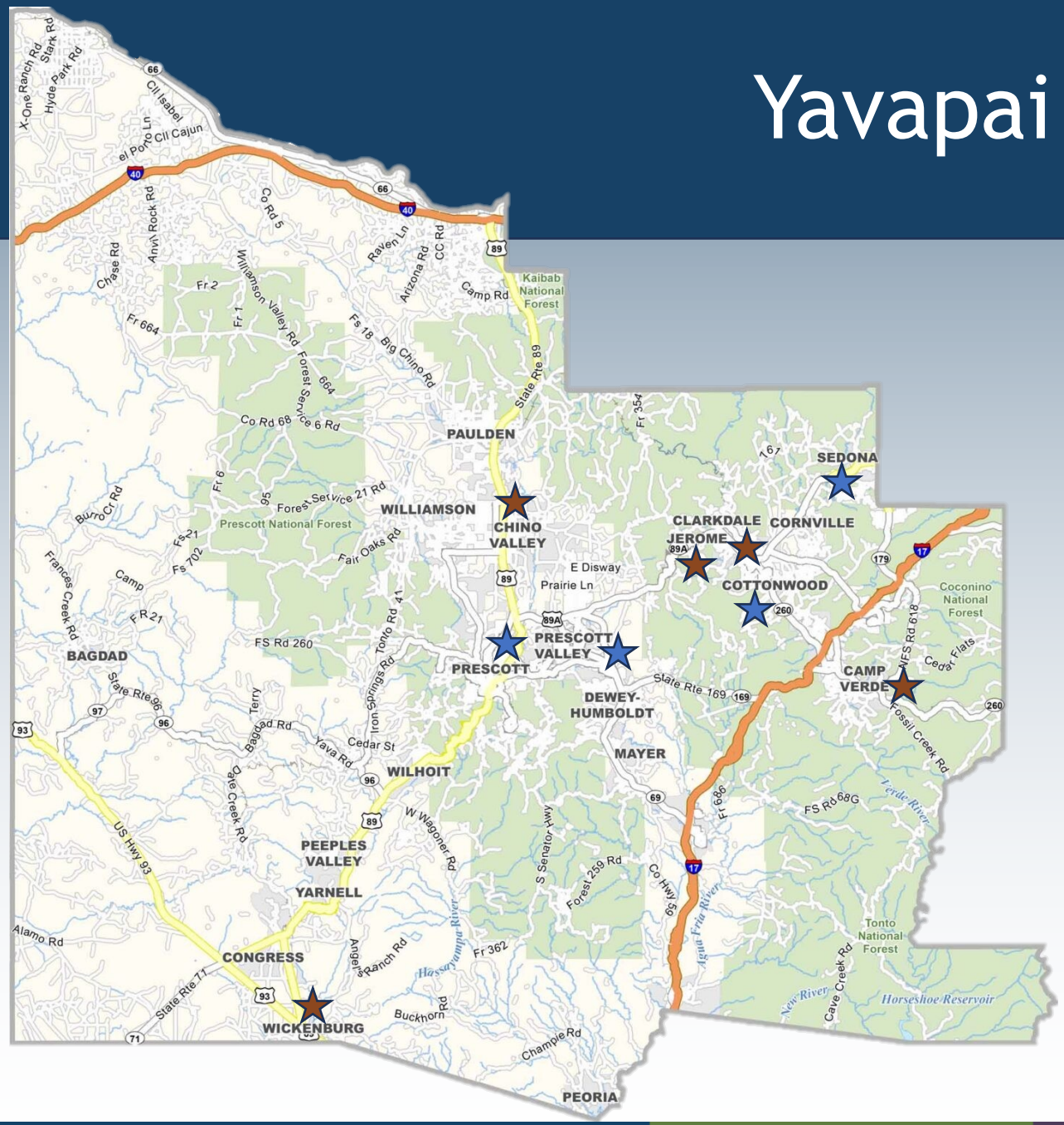


Yavapai County Cesspool Inventory

Overview
- County
- Cesspools
- Need for Analysis
- Analysis Process
- Results of analysis
- Shortfalls of analysis
- Use of results



Yavapai County

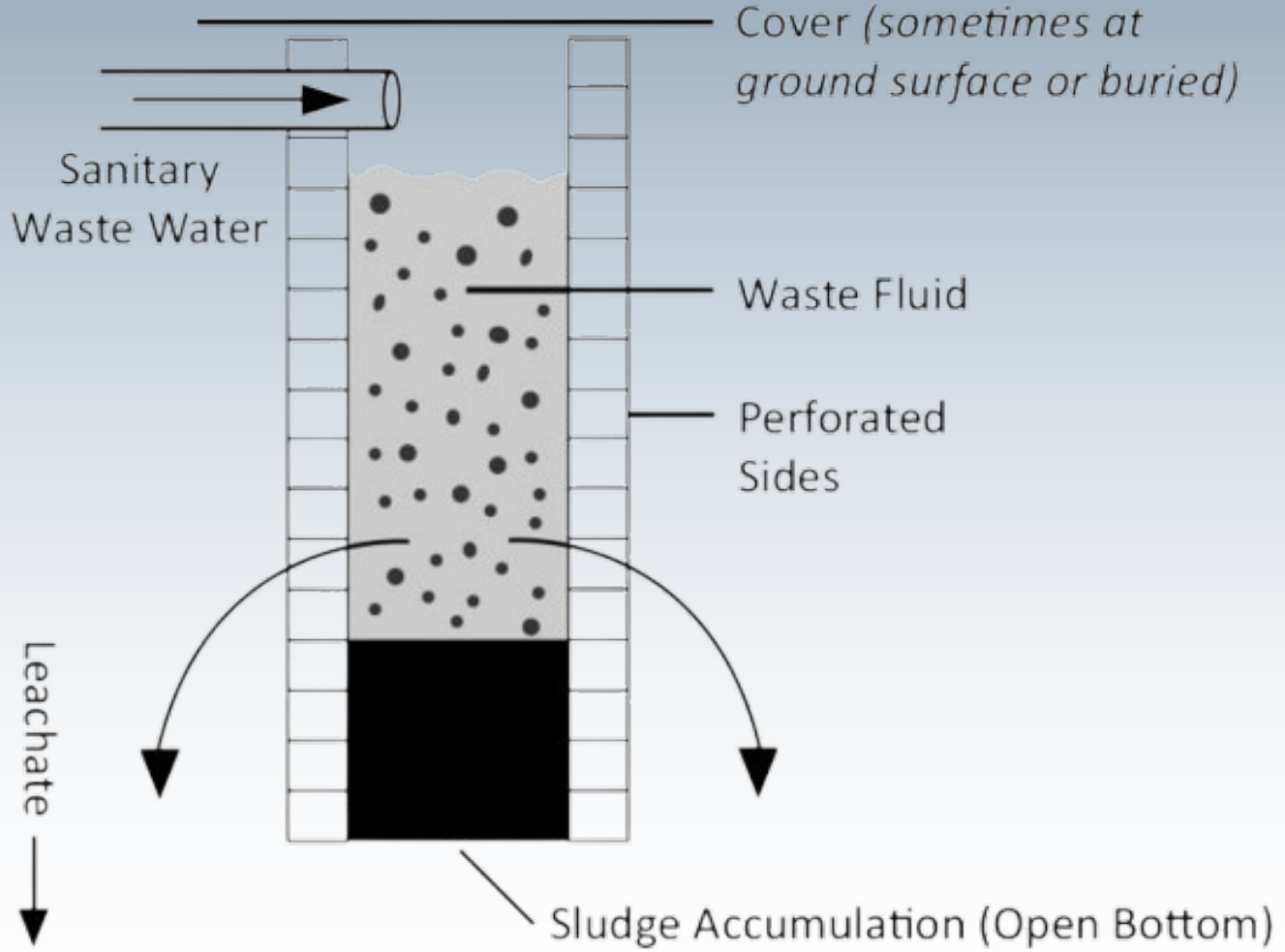


★ > 1 MGD

★ < 1 MGD

Yavapai County is a rural county in central Arizona with nine wastewater treatment plants, four of which are above 1 MGD.

Cesspools


Cover (sometimes at ground surface or buried)
Sanitary Waste Water
Waste Fluid
Perforated Sides
Leachate
Sludge Accumulation (Open Bottom)

Need for Geographic Analysis

Trash truck plummets 10 feet into collapsed septic tank in Springfield MO

The driver wasn't injured, but the truck remained lodged in the hole for several hours before a tow truck was able to pull it out.



Credit: Andrew Jansen/News-Leader

A trash truck fell into a hole after the concrete collapsed underneath him at an apartment complex near E. University Street on Monday, April, 2, 2018. (Photo: Andrew Jansen/News-Leader)

NATIONAL

'Cold' horse falls into collapsed septic tank, CO cops say. See 'complicated' rescue

By **Paloma Chavez**

February 10, 2025 9:32 AM | Gift Article



A horse was rescued from a collapsed septic tank, Colorado officials said. Joshua Johnson *Pueblo County Sheriff's Office*

Need for Geographic Analysis



88-year-old man rescued after fall down collapsed cesspool on Long Island

Monday, August 3, 2020



Rescuers help man escape from collapsed cesspool

A 71-year-old Cape May County man was injured last Friday when he fell into a collapsed cesspool, authorities say.

By Justin Auciello · January 15, 2018



Man, son, neighbor swallowed by cesspool

A 71-year-old man who went outside in the rain to pick up the Sunday newspaper plunged into a cesspool in his front yard, and his son and neighbor were sucked in when they tried to help.

Methodology

Data Collection	Analysis	Results
From various sources: Internal, municipalities Difficulties/limitations	Subtractive Outliers and data validation	Kernel Density Map creation Use of Results

Data Collection

Primary data needed:

- Parcels
- Wastewater permits
- Building permits/developed status

Other data:

- Sewer lines from municipalities

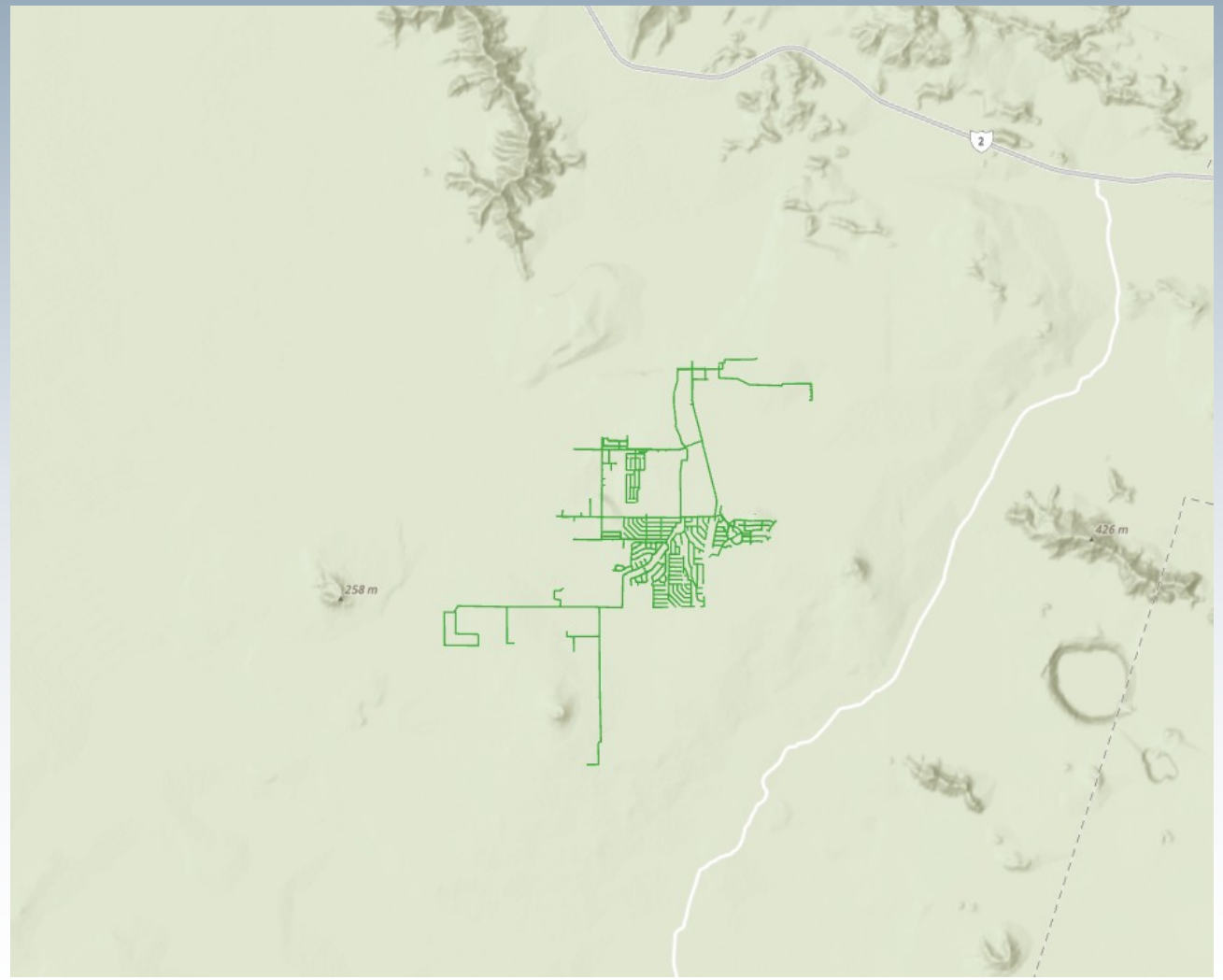


Difficulties with Data Collection

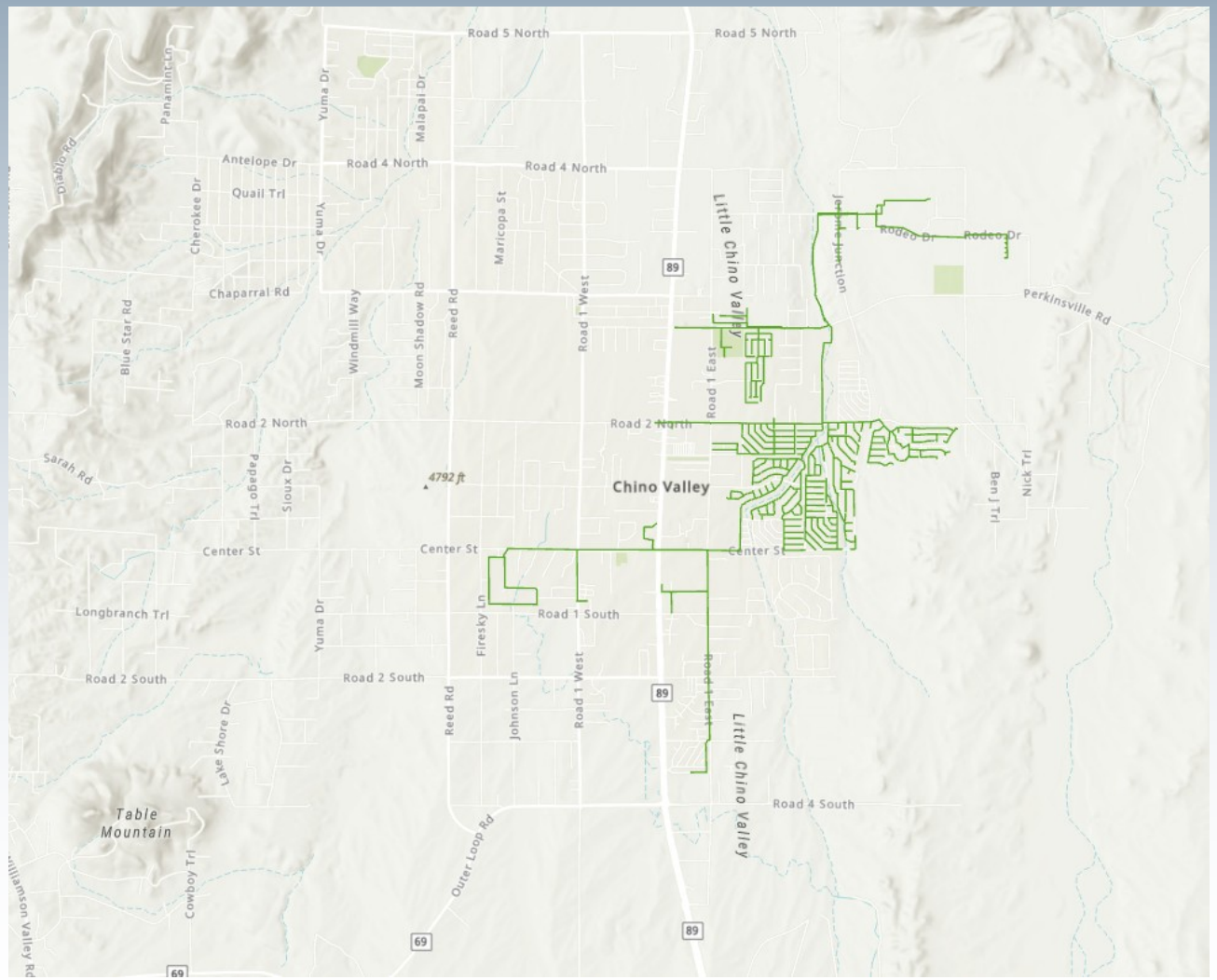
- Lack of response/communication
- Resistance from municipalities
- Problems with the data after they are received



Difficulties with Data Collection



Difficulties with Data Collection



Subtractive Geographic Analysis Overview

- Uses a subtractive analysis, meaning that we exclude areas which are likely to not have cesspools
- First step is to get good parcel data

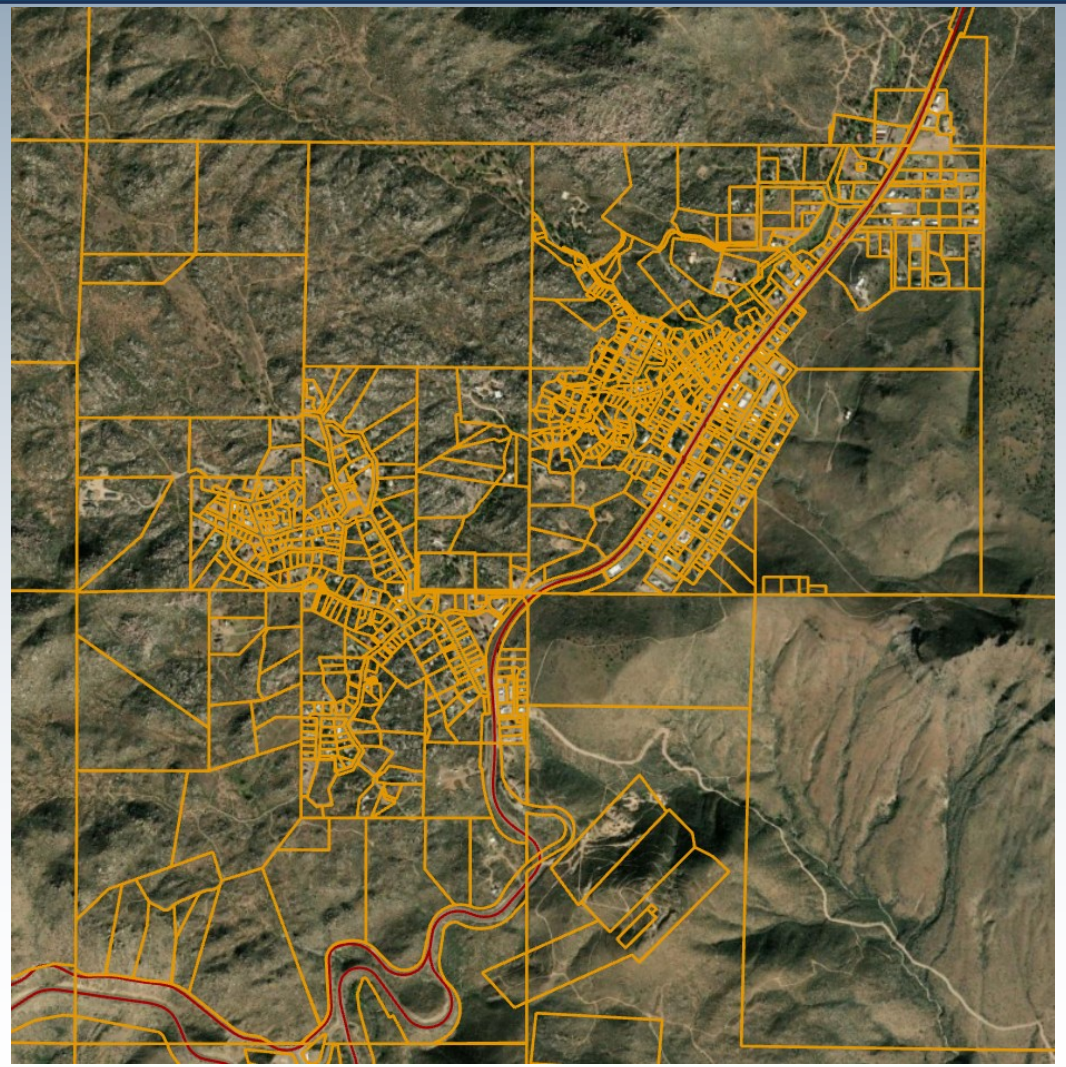


Data Analysis Intro

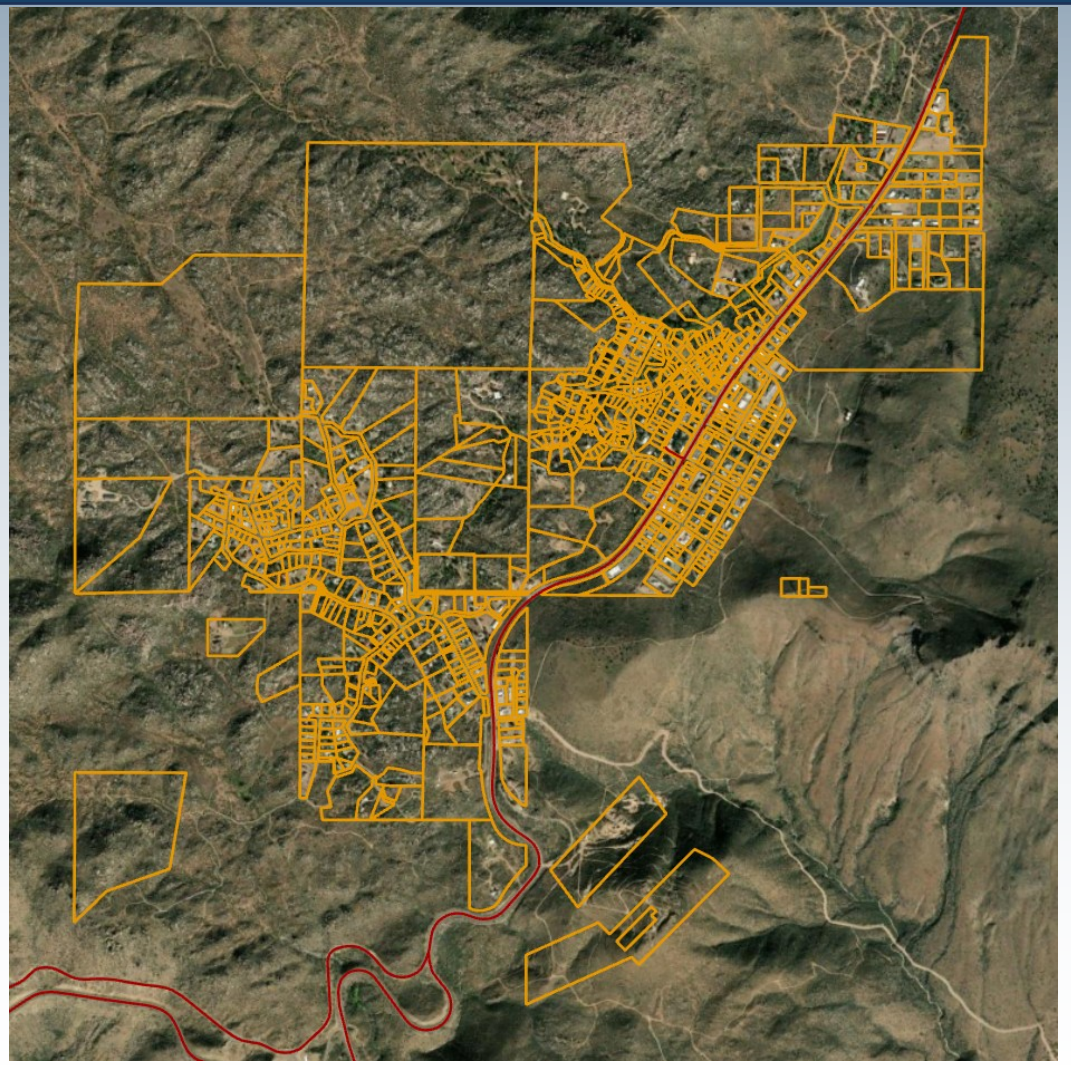




Data Analysis



Data Analysis



Data Analysis

Add in other data

- Wastewater permits
- Building permits

Join on parcel number



Data Analysis

Assign weights to classes of data.

Lower weight is less likely to have a cesspool.

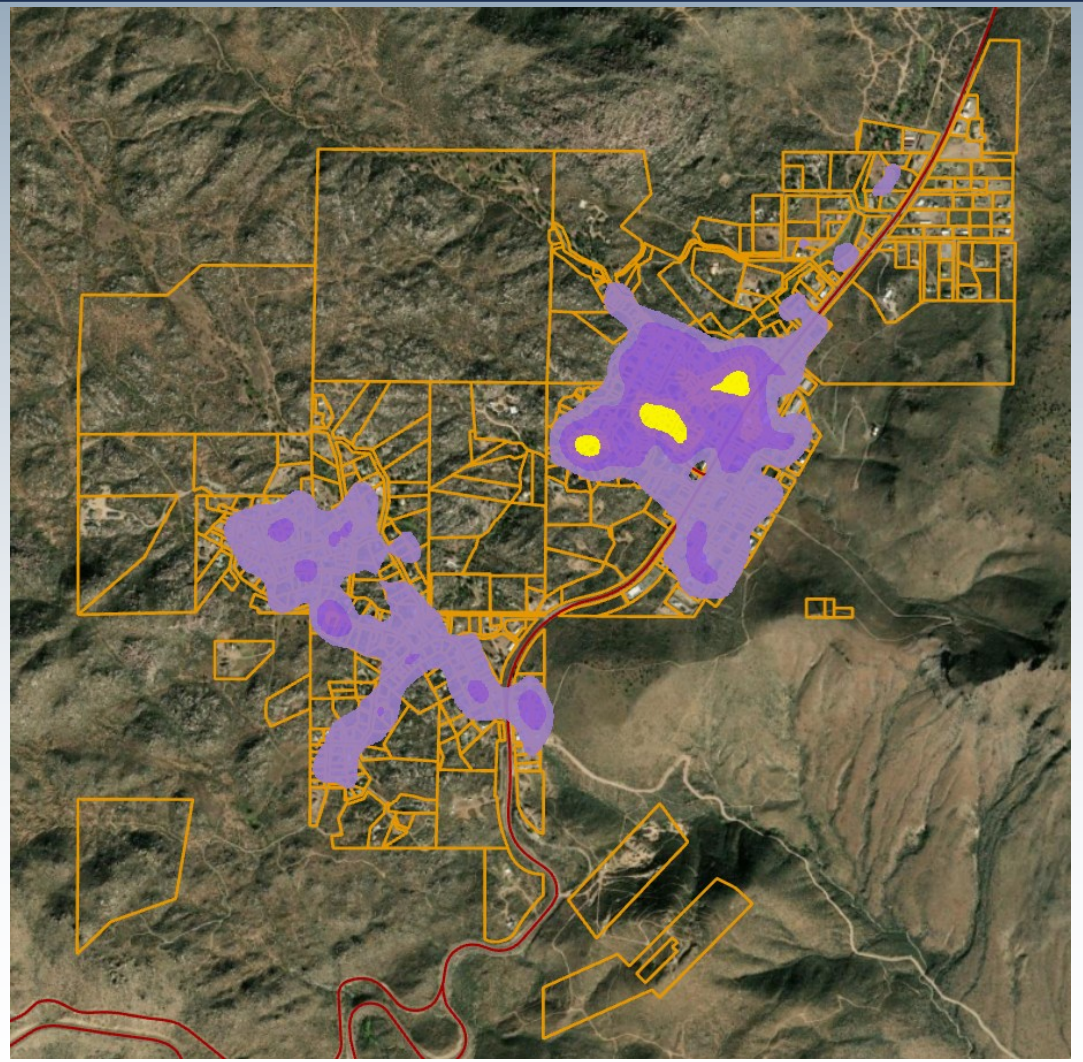


Data Analysis

Once probability is assigned, we can perform a kernel density analysis.



Data Analysis



Data Analysis Limitations

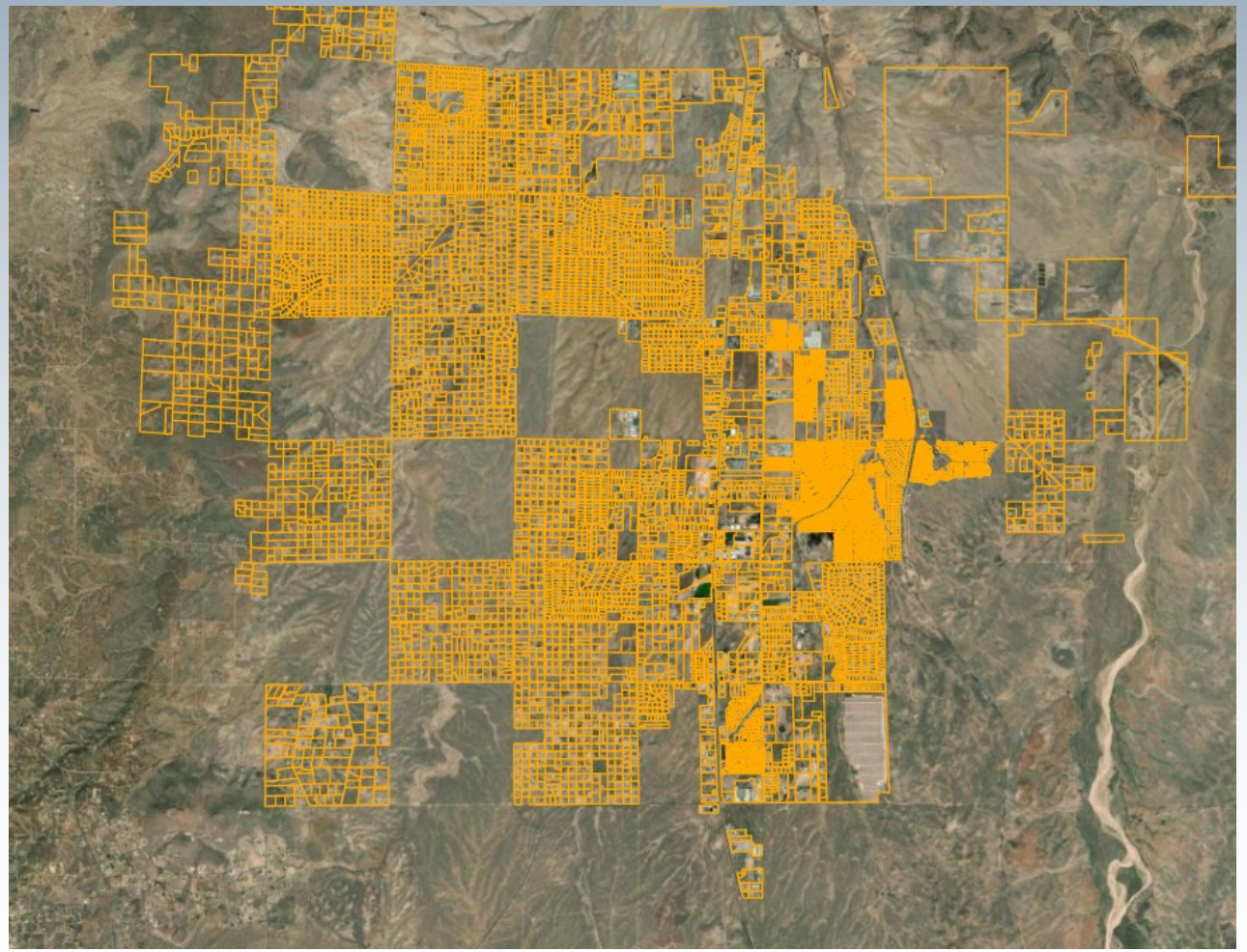


Subtractive Geographic Analysis Overview with Sewer

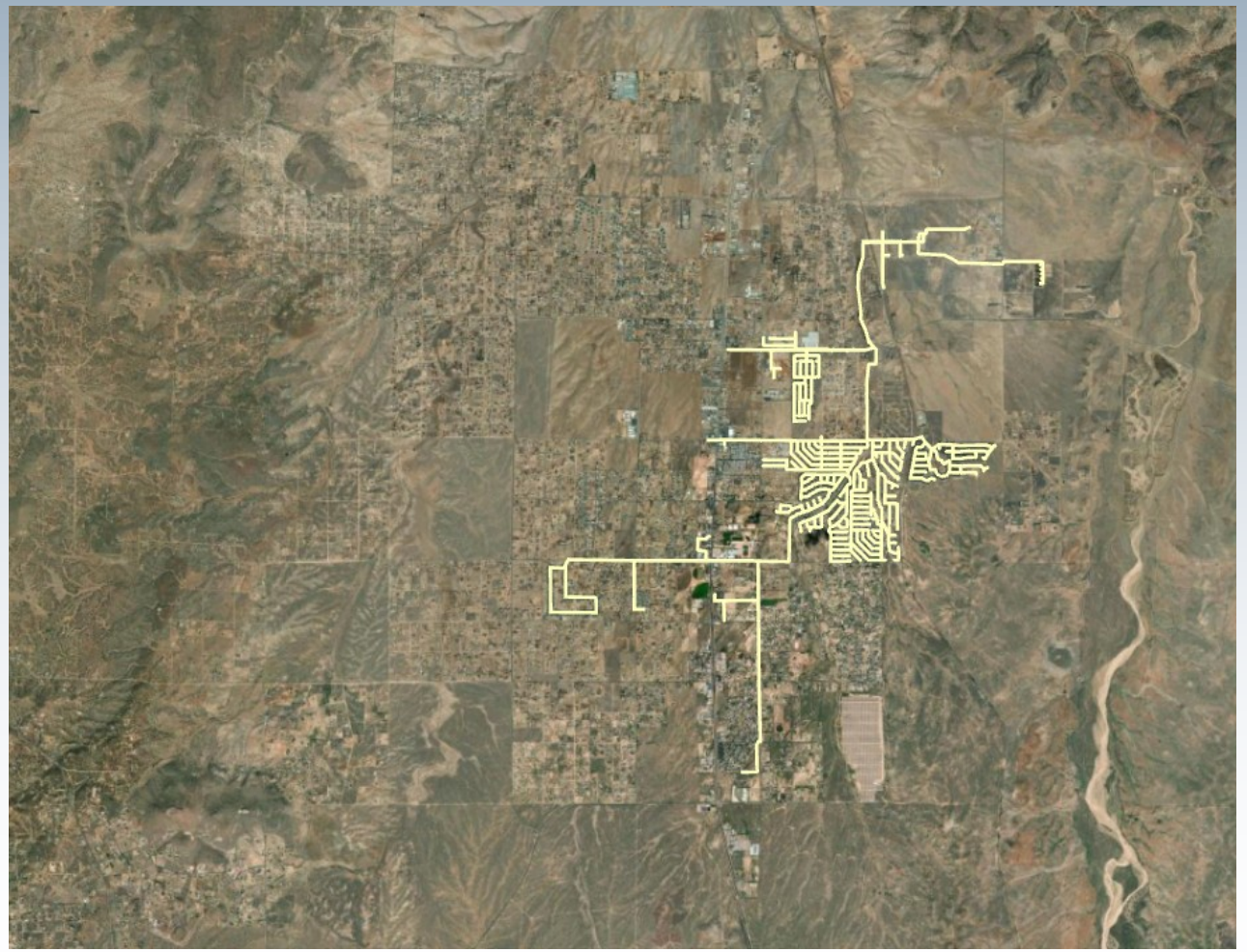
- Adding sewer data can help with a more thorough analysis
- It can be difficult to obtain



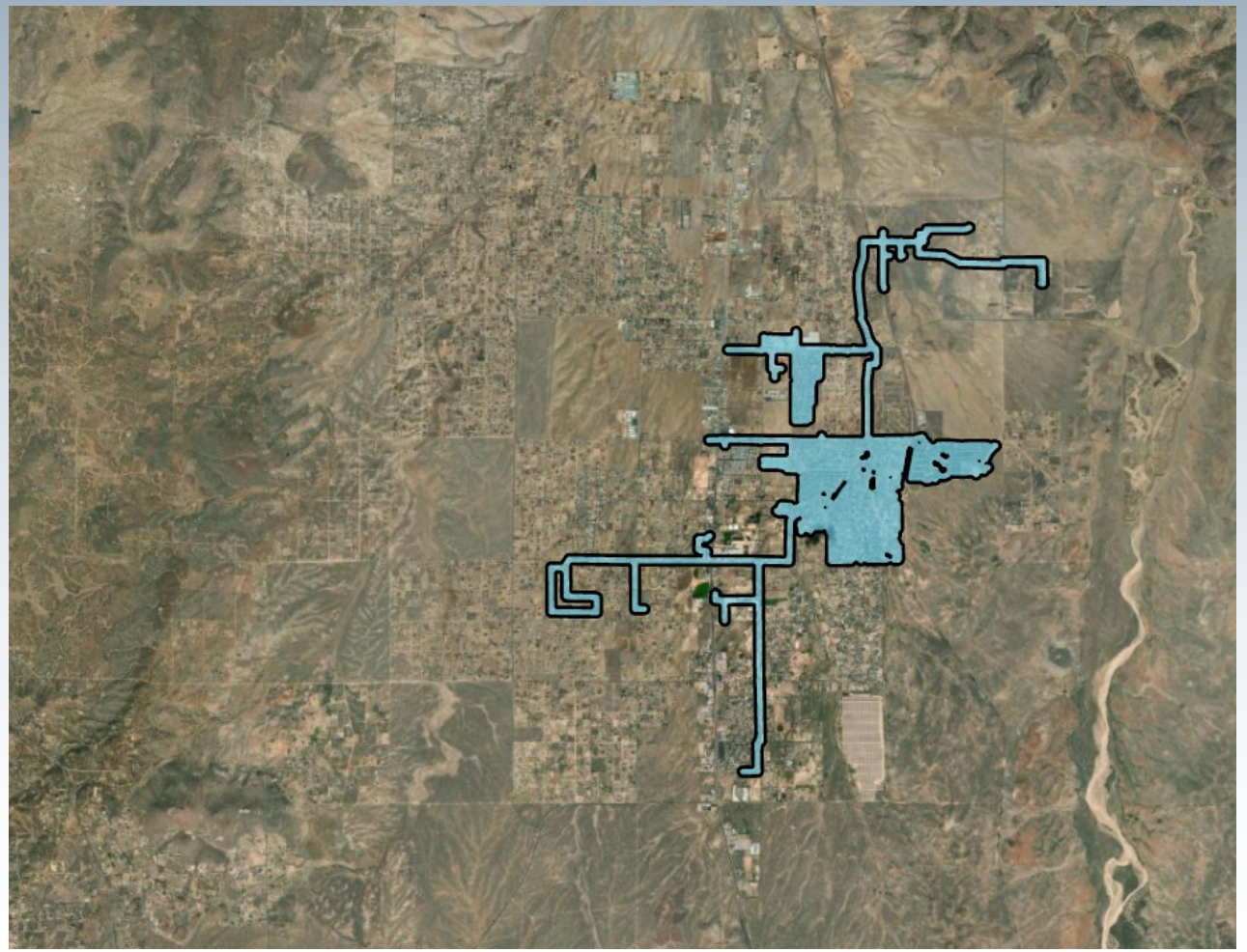
Subtractive Geographic Analysis Overview with Sewer



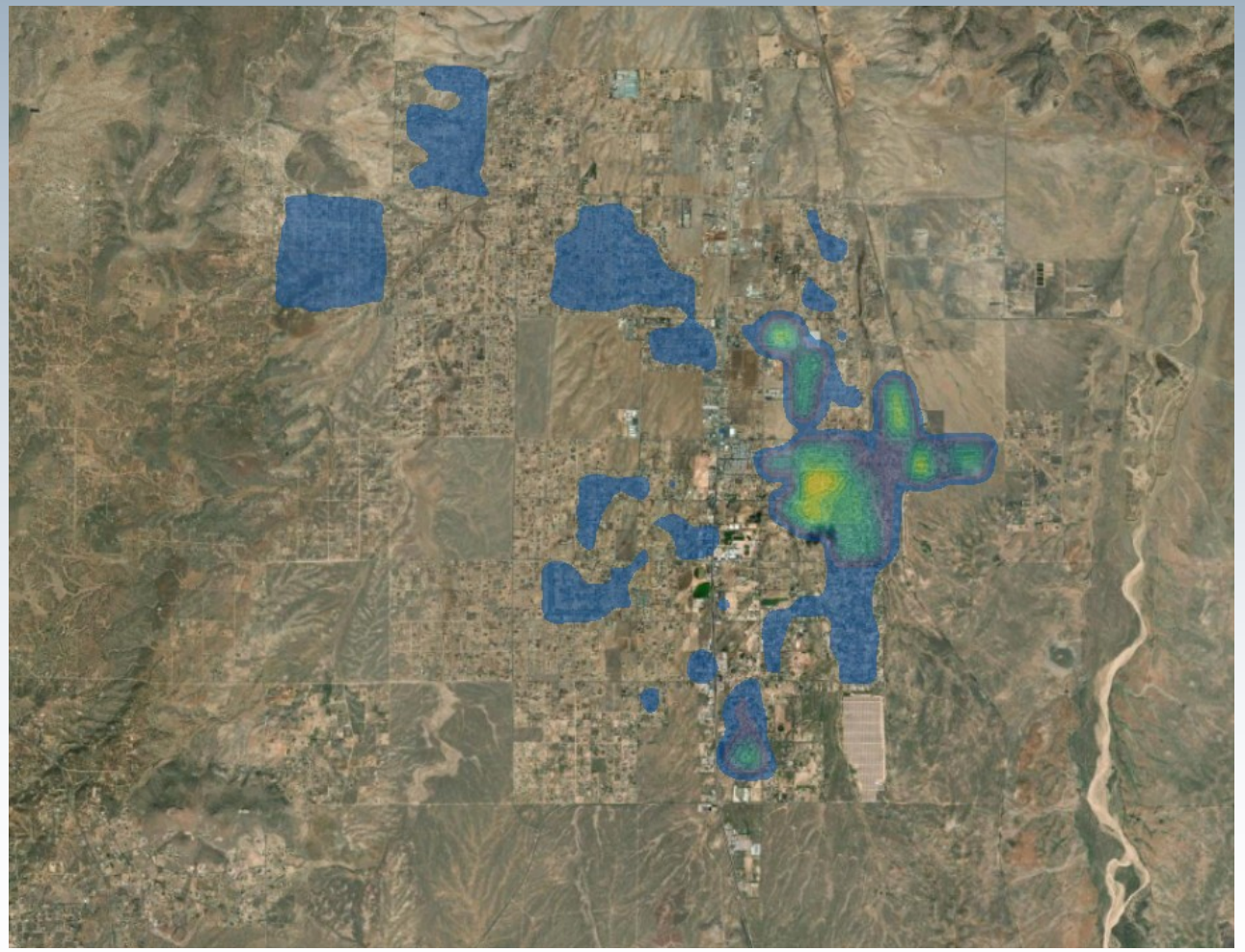
Analysis with Sewer



Analysis with Sewer



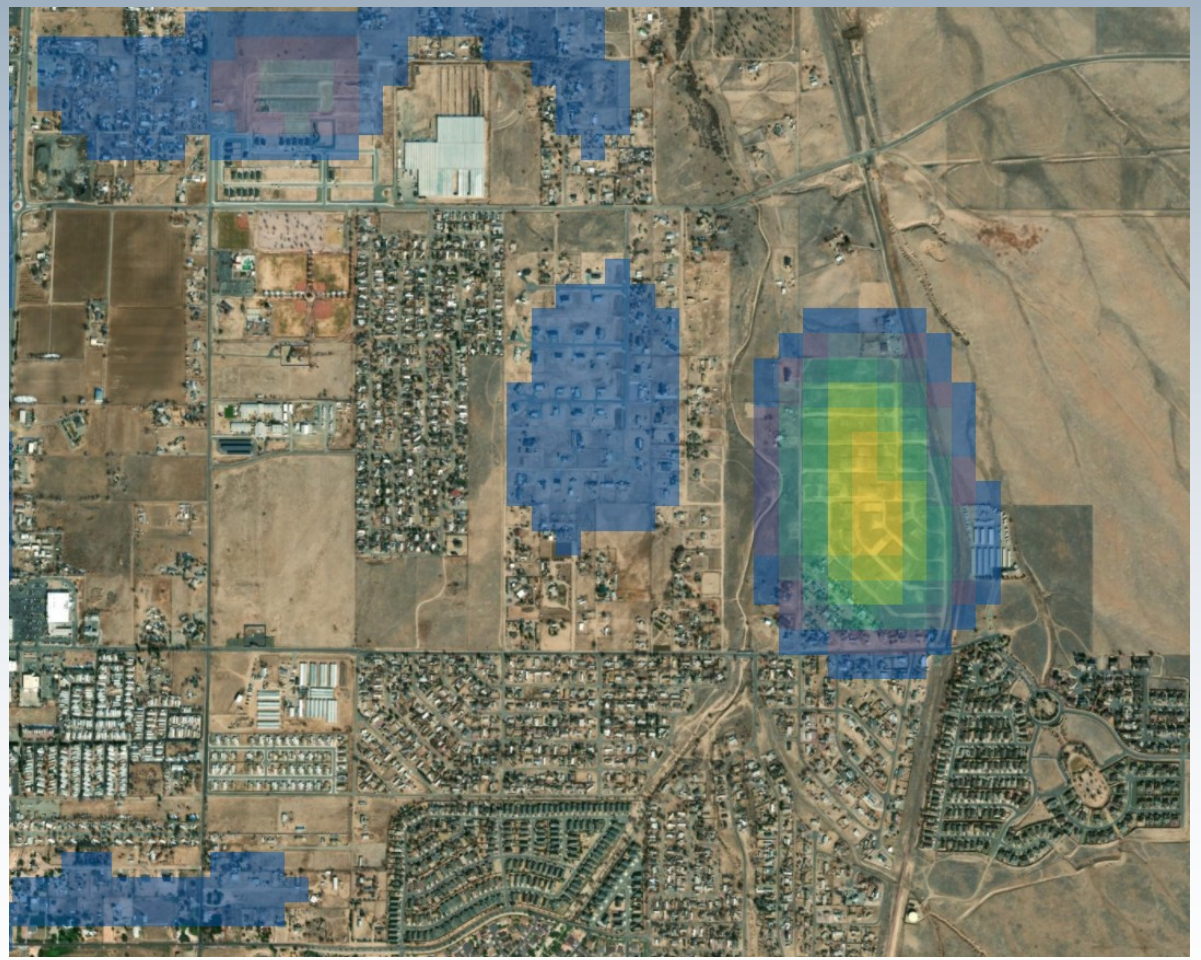
Analysis with Sewer



Analysis with Sewer



Limitations of Analysis



Use of Results



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Questions

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