



PARCEL PROJECT

Team Members:

Alaa Alharthi

Juan Parrilla

Mohammad



Counties:

1. Amador County
2. Contra Costa County
3. El Dorado County
4. Kern County
5. Madera County
6. Tuolumne County
7. San Bernardino County
8. San Benito County
9. Orange County

Parcel Project in GIS using CRISP DM Model

To use GIS technology in California counties for complete parcel data management and analysis using the CRISP DM (Cross-Industry Standard Process for Data Mining) model.

The project aims to use GIS technology to analyze parcel data and provide insights on land use, land value, hazards, and property taxation.

Project Overview

The project follows the CRISP DM model, which consists of the following six phases:

- Business Understanding
- Data Understanding
- Data Preparation
- Modeling
- Evaluation
- Deployment

Business Understanding:

In this phase, we identify the business objectives and define the problem statement. The objective of this project is to provide insights on land use, land value, and property taxation using parcel data. The problem statement is to analyze parcel data using GIS technology to identify patterns and trends in land use, value and hazards.

Data Understanding

In this phase, we gather and understand the data that will be used for analysis. The data used for this project includes parcel data, which contains information on land use, property value, tax, ownership, hazards and addresses.

The data is obtained from local government agencies and is in the form of shapefiles and CSV files.

Amador County: <https://www.amadorgov.org/departments/information-technology/gis/gis-data>

Contra Costa County: <https://www.contracosta.ca.gov/1818/GIS>

El Dorado County: https://www.edcgov.us/Government/planning/pages/parcel_data_information_system.aspx

Kern County: <https://maps.kerncounty.com/H5/index.html?viewer=KCPublic>

Madera County: <https://www.maderacounty.com/government/geographic-information-system-gis>

Tuolumne County: <https://www.tuolumnecounty.ca.gov/FormCenter/GIS-5/File-Access-Request-Form-39>

Data Preparation

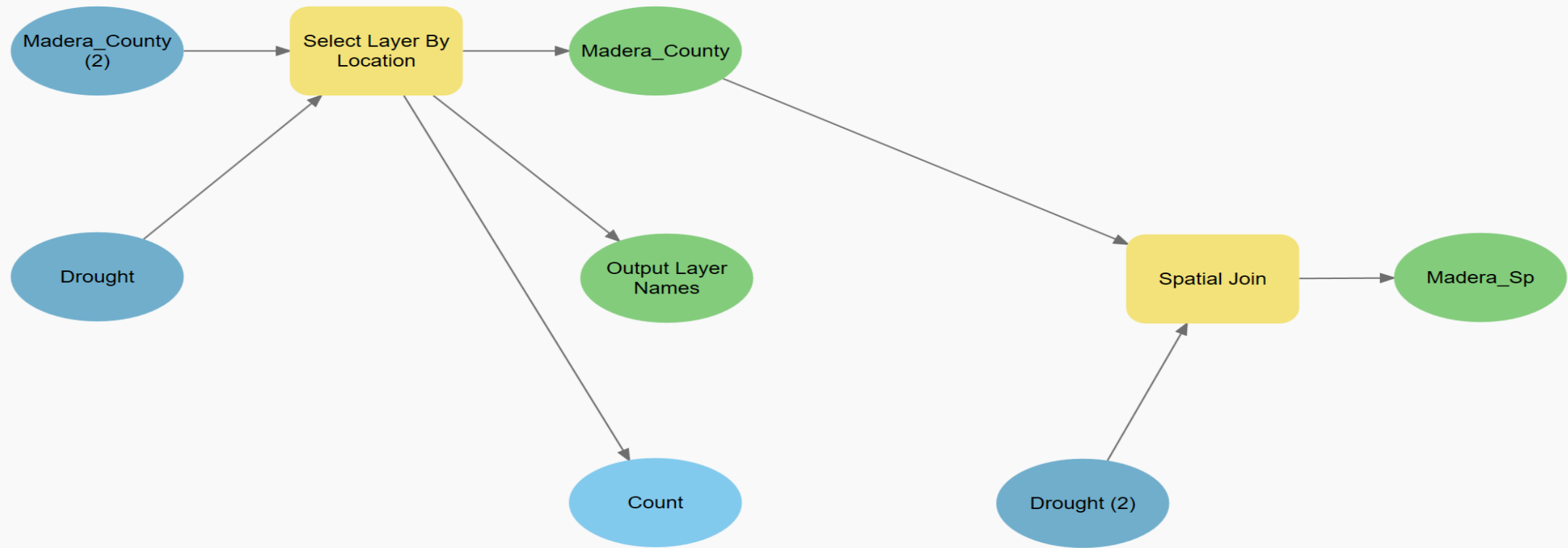
Name of Field	Alias	Type of Data	Description
APN	APN	STRING	Assessor's Parcel Number
HOUSE_NUM	HOUSE NUM	INTEGER	House Number
PREFIX_DIR	PREFIX DIR	STRING	Prefix Direction
ST_NAME	STREET NAME	STRING	Street Name
ST_TYPE	STREET TYPE	STRING	Street Type
UNIT	UNIT	STRING	Unit
FULL_ADD	FULL ADDRESS	STRING	Full Address
FULL_STNA	FULL STREET NAME	STRING	Full Street Name
CITY	CITY	STRING	City
ZIP_CODE	ZIP CODE	STRING	Zip Code
LAND_USE	LAND USE	STRING	Land Use (County)
ZONING	ZONING	STRING	Zoning
SCAG_LUCO	SCAG LANDUSE CODE	STRING	Land Use (SCAG Code)
SCAG_LU	SCAG LANDUSE	STRING	Land Use (SCAG)
FHSZ_CODE	FIRE HZ ZONE CODE	STRING	Fire Hazard Zone Code
FHSZ_DESC	FIRE HZ ZONE DESC	STRING	Fire Hazard Zone Description
FLO_CODE	FLOOD CODE	STRING	Flood Risk Code
FLO_DESC	FLOOD DESC	STRING	Flood Risk Description
FAULTZONE	FAULT ZONE	STRING	Fault Zone
LANDSLIDE	LANDSLIDE	STRING	Landslide
LIQ_ZONE	LIQUIFACTION ZONE	STRING	Liquifaction Zone
DROUGHT	DROUGHT	STRING	Drought
DRO_DESC	DROUGHT DESC	STRING	Drought Description
SOL_RAD	SOLAR RADIATION	DOUBLE	Solar Radiation
WIND_SP	WIND SPEED	DOUBLE	Wind Speed
LAND_VAL	LAND VALUE	DOUBLE	Land Value
BUI_AREA	BUILT AREA	DOUBLE	Built Area
TAX	TAX	STRING	Tax
OWNERSHIP	OWNERSHIP	STRING	Ownership
AREA_AC	AREA ACRES	DOUBLE	Acres
AREA_SQFT	AREA SQ FT	DOUBLE	Square Feet

Data Modelling

In this phase, we develop a model to analyze the data and provide insights. The model used for this project is a spatial analysis model that uses GIS technology to identify patterns and trends in hazards and parcel data. The model is developed using Python and the Arc Py library, which provides access to GIS functionality to join hazards like Drought and Liquefaction using model builder in a form of toolbox, SCAG Calculator to join different types of Land Use using SCAG Codes and Colors and Geocoder to print missing addresses for Parcel Data.



MODEL BUILDER - DROUGHT

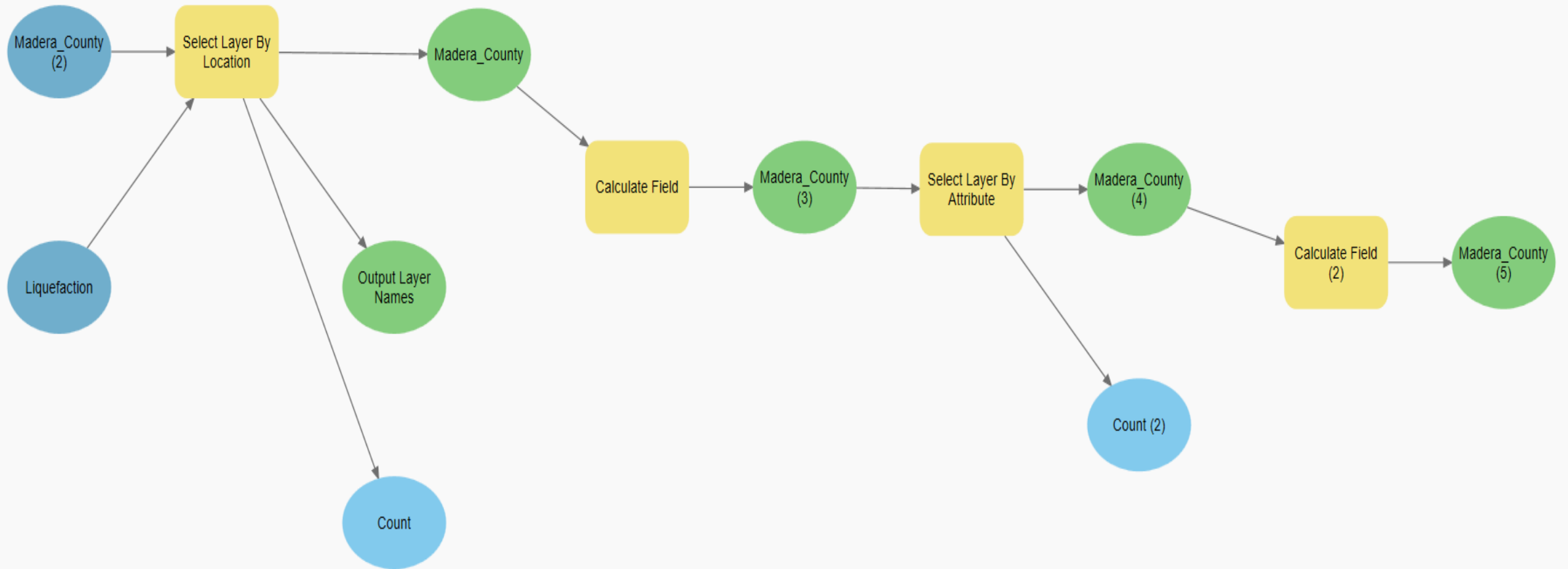




METHODOLOGY - DROUGHT

- The user must first add both the drought layer and the county parcel layer to the model before they can intersect and add a drought description in the drought layer. Drag and drop the layers from the Layers pane onto the model canvas to accomplish this. After adding the layers, the user can connect them to the Select Layer by Location tool. The tool allows the user to select the characteristics from the drought layer that intersects with the county parcel layer by specifying the type of spatial relationship to employ.
- After configuring the Select Layer by Location tool, the user can use the Get Count tool to calculate the number of records that intersect between both layers. This data can be used to determine the severity of drought conditions within a specific county.
- The Spatial Join tool can be used to spatially join the drought layer and the county parcel layer. Based on their spatial relationship, this tool allows the user to mix attributes from two levels. Once the spatial join is complete, the user can filter the results to only show records that intersect between the two layers by using the Select Layer By Attribute tool.

MODEL BUILDER - LIQUIFACTION



METHODOLOGY - LIQUIFACTION

- The ArcGIS Pro liquefaction model builder is a powerful tool for finding regions that may be prone to soil liquefaction following an earthquake. This tool employs ArcGIS Pro's "Select by Location" feature to locate the layers that intersect the liquefaction and county parcel layers. The first step in using this model builder is to ensure that your ArcGIS Pro project contains both the liquefaction and county parcel layers.
- After you've added these layers, you can start identifying intersecting features by using the "Select by Location" option. To do so, use ArcGIS Pro and navigate to the "Select by Location" feature. You can use this tool to choose features from one layer that intersects with features from another.
- In this situation, you'll want to select liquefaction layer characteristics that connect with county parcel layer features. Once the intersecting features have been identified, you can use the "Calculate Field" option to mark these features in the county parcel layer. This is accomplished by including a new field in the county parcel layer and setting its value to 1 for all intersecting features and 0 for all other features.



EVALUATION AND DEPLOYMENT

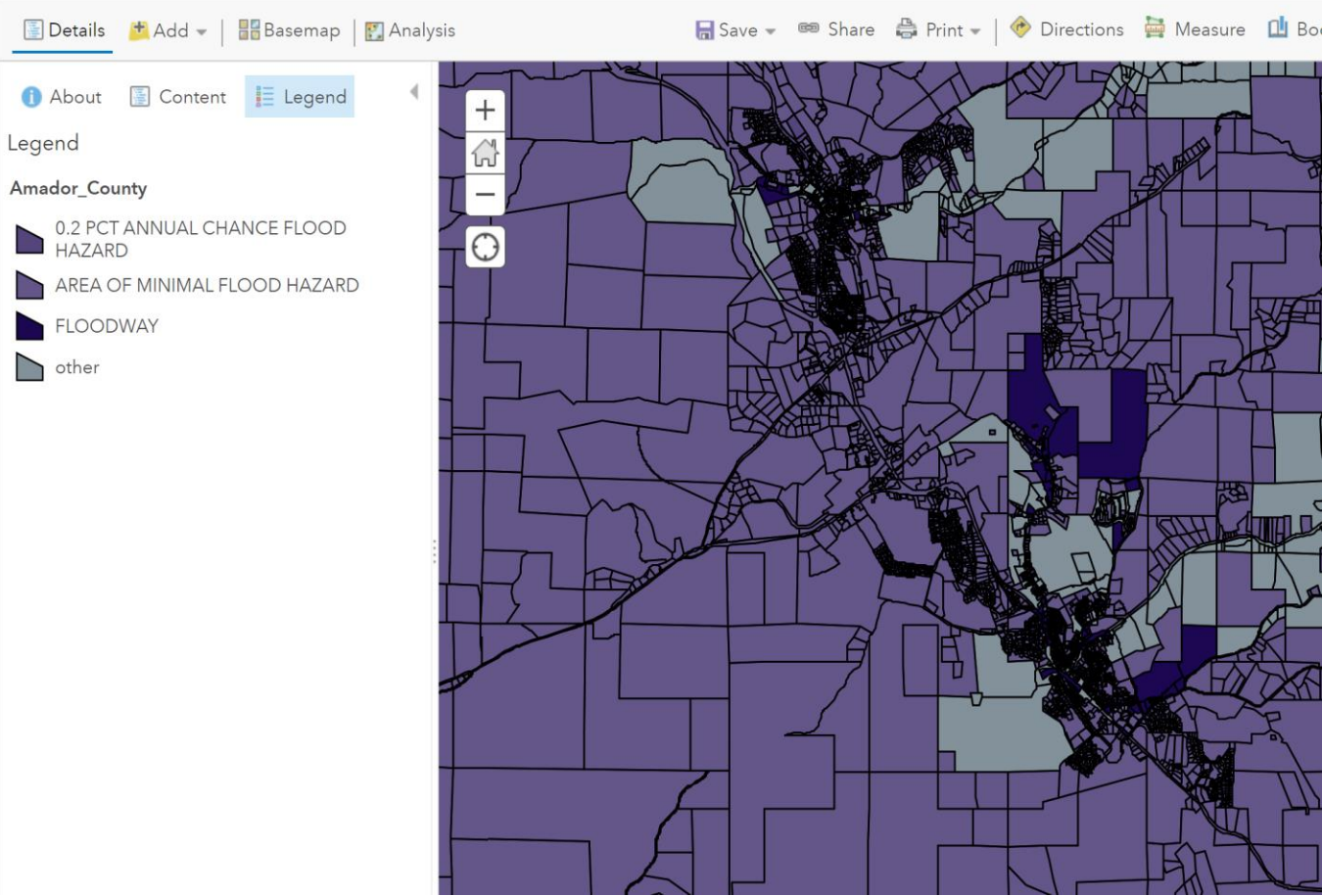
- In this phase, we evaluate the model and its results. The model is evaluated based on its accuracy, completeness, and relevance to the business objectives. The results of the analysis are also evaluated to ensure that they are actionable and provide meaningful insights.
- We deploy the model and its results to experience builder to create an app. The results are presented in the form of Experience Builder app. The stakeholders can use the results to make informed decisions on land use, property value, and tax, ownership, addresses and hazards. The parcel project data is viewed in the app by integrating it with the parcel data source in the form of web app in ArcGIS Online. All layers of parcel data and other relevant data such as zoning, land use, and demographics is added to the app. There are widgets added to the app to provide interactive functionality, such as filtering, querying, and analysis.



AMADOR COUNTY

- AMADOR COUNTY

Home ▾ Amador_County 



Attributes

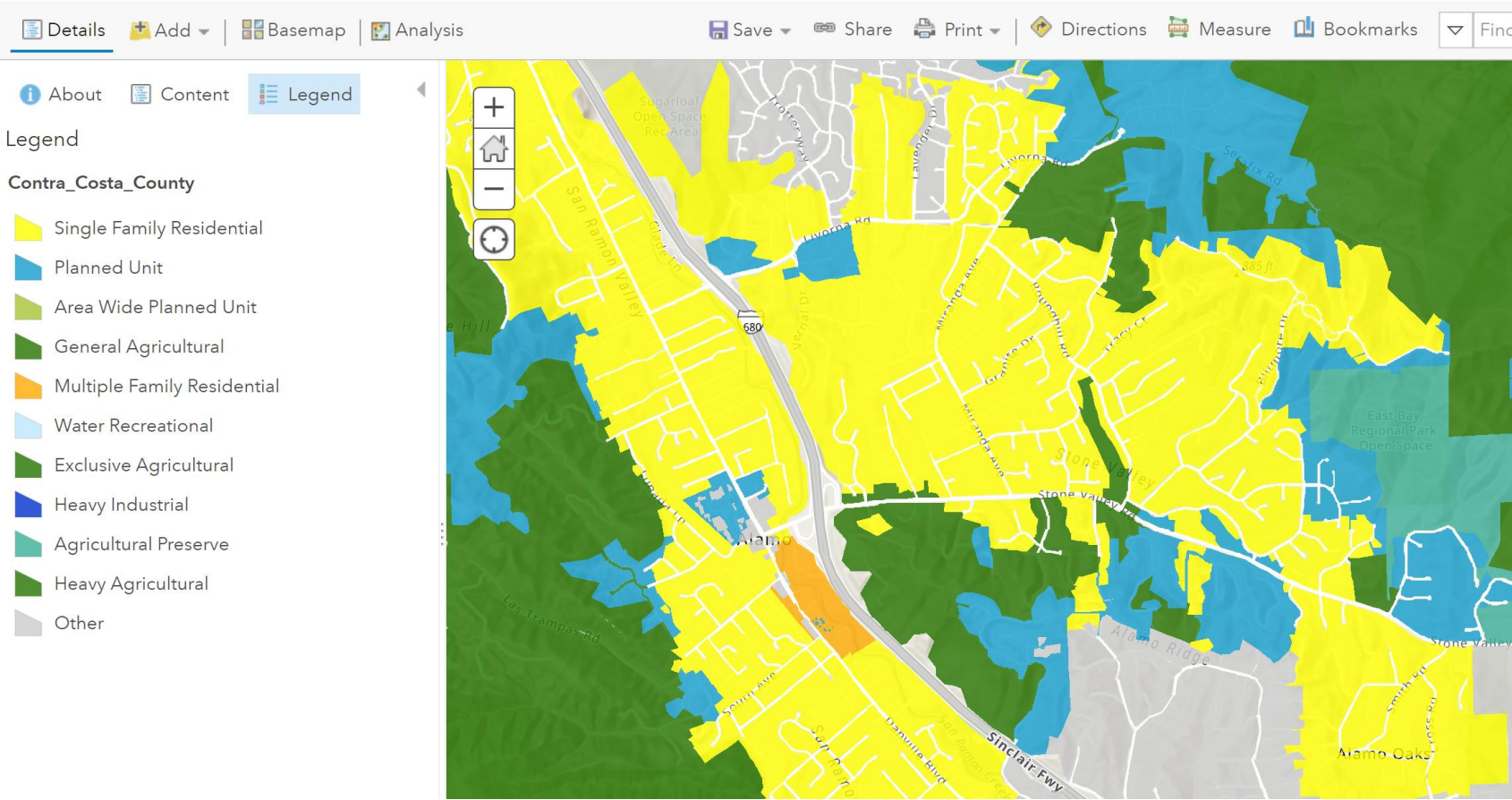
Attributes	Geometry
APN	003470005000
HOUSE NUM	<Null>
PREFIX DIR	
STREET NAME	95640
STREET TYPE	
UNIT	<Null>
FULL ADDRESS	95640, lone, CA, USA
FULL STREET NAME	<Null>
CITY	lone
ZIP CODE	95640
LAND USE	<Null>
ZONING	NC
SCAG LANDUSE CODE	<Null>
SCAG LANDUSE	<Null>
FIRE HZ ZONE CODE	1
FIRE HZ ZONE DESC	Moderate
FLOOD CODE	A
FLOOD DESC	other
FAULT ZONE	0
LANDSLIDE	0
LIQUIFACTION ZONE	0
DROUGHT	2
DROUGHT DESC	Severe drought
SOLAR RADIATION	17213.333984
WIND SPEED	2.536066
LAND VALUE	<Null>
BUILT AREA	<Null>
TAX	<Null>
OWNERSHIP	<Null>
AREA ACRES	640

CONTRA COSTA COUNTY

[CONTRA COSTA COUNTY](#)

Home ▾ Contra_Costa_County [✎](#)


Open

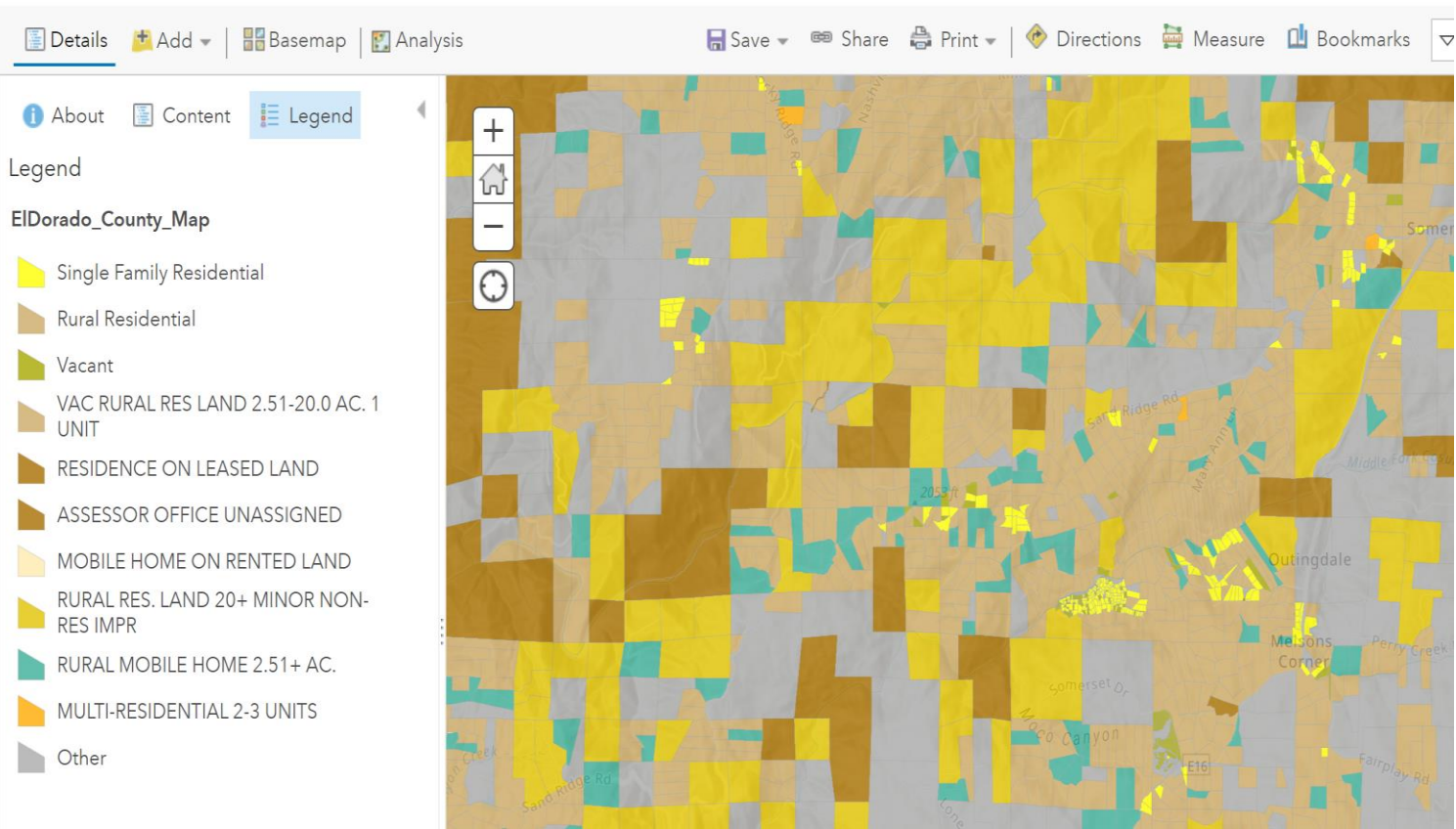


Attributes	
Attributes	Geometry
APN	001011054
HOUSE NUM	<Null>
PREFIX DIR	
STREET NAME	<Null>
STREET TYPE	RD
UNIT	
FULL ADDRESS	94514, Byron, CA, USA
FULL STREET NAME	94514, Byron, California
CITY	Byron
ZIP CODE	94514
LAND USE	General Agricultural
ZONING	A-2
SCAG LANDUSE CODE	<Null>
SCAG LANDUSE	<Null>
FIRE HZ ZONE CODE	1
FIRE HZ ZONE DESC	Moderate
FLOOD CODE	AE
FLOOD DESC	FLOODWAY
FAULT ZONE	<Null>
LANDSLIDE	1
LIQUIFICATION ZONE	1
DROUGHT	3
DROUGHT DESC	Extreme drought
SOLAR RADIATION	16898.416016
WIND SPEED	4.118322
LAND VALUE	<Null>
BUILT AREA	<Null>
TAX	<Null>
OWNERSHIP	<Null>
AREA ACRES	<Null>

EL DORADO COUNTY

- [ELDORADO COUNTY](#)

Home ▾ Eldorado County 



Attributes

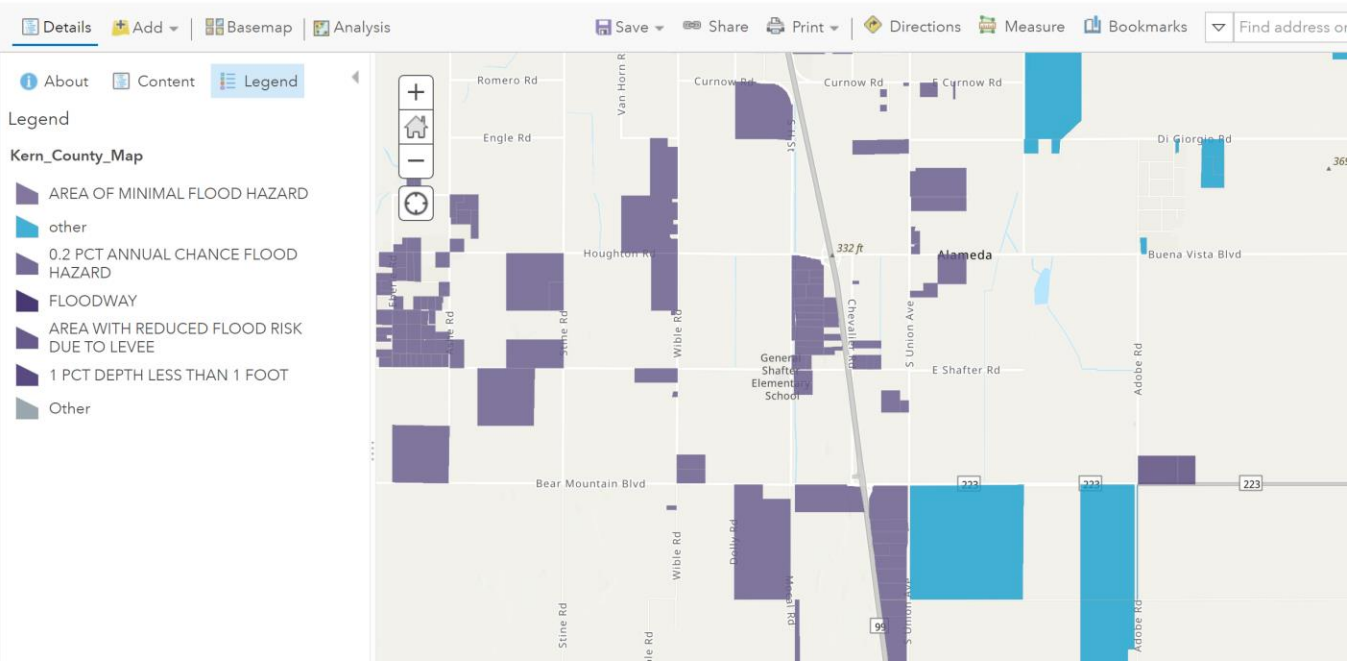
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APN	
HOUSE NUM	0
PREFIX DIR	
STREET NAME	
STREET TYPE	
UNIT	
FULL ADDRESS	
FULL STREET NAME	
CITY	
ZIP CODE	
LAND USE	
ZONING	<Null>
SCAG LANDUSE CODE	1270
SCAG LANDUSE	<Null>
FIRE HZ ZONE CODE	1
FHSZ HZ ZONE DESC	Moderate
FLOOD CODE	X
FLOOD DESC	AREA OF MINIMAL FLOOD HAZARD
FAULT ZONE	<Null>
LANDSLIDE	<Null>
LIQUIFICATION ZONE	0
DROUGHT	2
DROUGHT DESC	Severe drought
SOLAR RADIATION	<Null>
WIND SPEED	<Null>
LAND VALUE	0
BUILT AREA	0
TAX	0
OWNERSHIP	
AREA ACRES	0

KERN COUNTY

[KERN COUNTY](#)

Home ▾ Kern_County 

Open in Map Vi



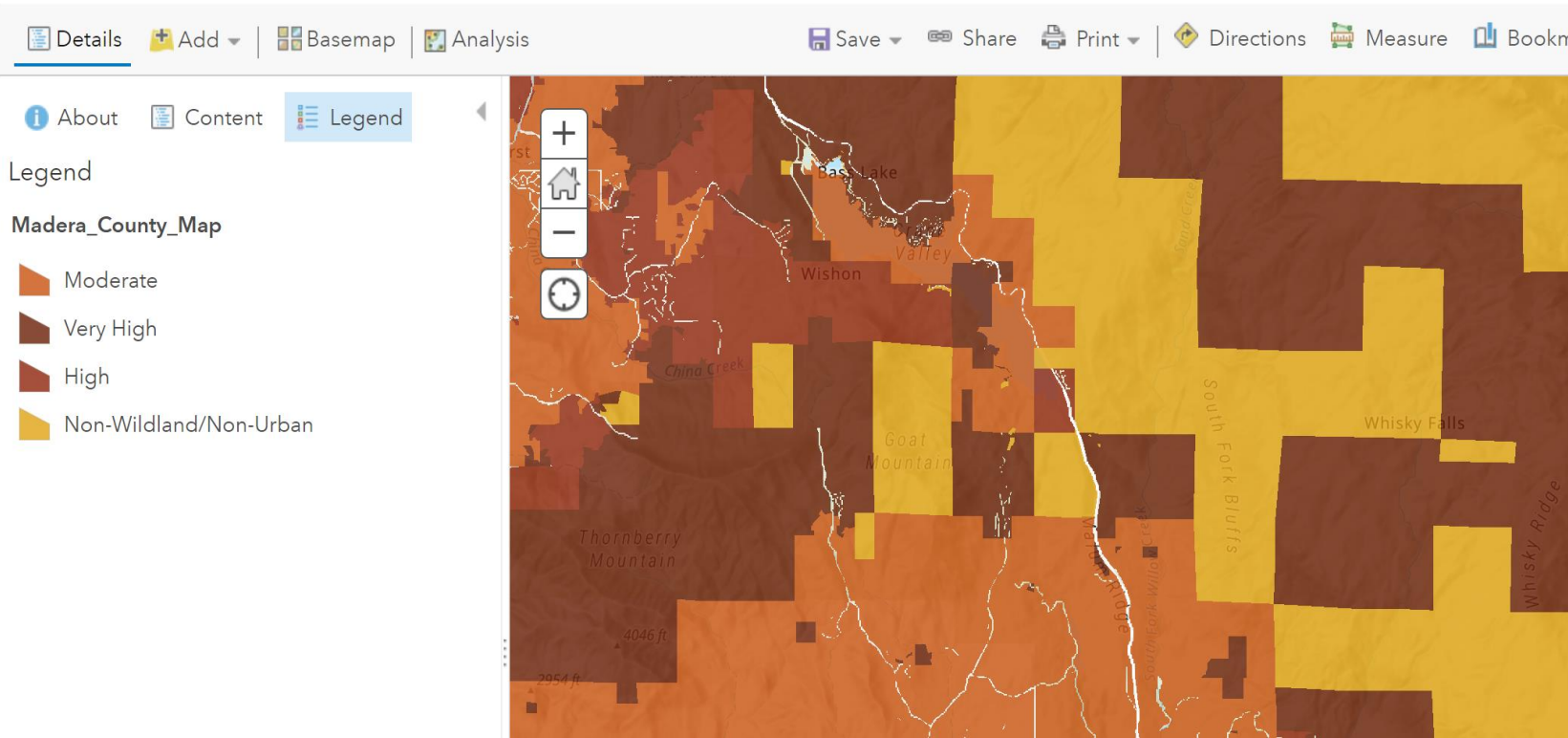
Attributes

Attributes	Geometry
APN	25506008
HOUSE NUM	28499
PREFIX DIR	<Null>
STREET NAME	28001-28499 Kingbird Ave
STREET TYPE	<Null>
UNIT	
FULL ADDRESS	28001-28499 Kingbird Ave, Rosamond, California, 93560
FULL STREET NAME	28499 Kingbird Ave
CITY	Rosamond
ZIP CODE	93560
LAND USE	<Null>
ZONING	<Null>
SCAG LANDUSE CODE	<Null>
SCAG LANDUSE	<Null>
FIRE HZ ZONE CODE	1
FIRE HZ ZONE DESC	Moderate
FLOOD CODE	A
FLOOD DESC	other
FAULT ZONE	<Null>
LANDSLIDE	<Null>
LIQUIFACTION ZONE	0
DROUGHT	3
DROUGHT DESC	Extreme drought
SOLAR RADIATION	18535.916016
WIND SPEED	4.489941
LAND VALUE	<Null>
BUILT AREA	<Null>
TAX	<Null>
OWNERSHIP	<Null>
AREA ACRES	633.73000

MADERA COUNTY

MADERA COUNTY

Home ▾ Madera County 



Attributes	
Attributes	Geometry
APN	001-024-002
HOUSE NUM	540
PREFIX DIR	<Null>
STREET NAME	540 N 10th St
STREET TYPE	<Null>
UNIT	ft
FULL ADDRESS	540 N 10th St
FULL STREET NAME	540 N 10th St
CITY	Chowchilla
ZIP CODE	93610
LAND USE	<Null>
ZONING	<Null>
SCAG LANDUSE CODE	<Null>
SCAG LANDUSE	<Null>
FHSZ HZ ZONE CODE	<Null>
FIRE HZ ZONE DESC	<Null>
FLOOD CODE	X
FLOOD DESC	AREA OF MINIMAL FLOOD HAZARD
FAULTZONE	0
LANDSLIDE	0
LIQUIFACTION ZONE	0
DROUGHT	3
DROUGHT DESC	Extreme drought
SOLAR RADIATION	17612.416016
WIND SPEED	<Null>
LAND VALUE	24061
BUILT AREA	63172
TAX	<Null>
OWNERSHIP	<Null>
AREA ACRES	0.23

TUOLUMNE COUNTY

- TUOLUMNE COUNTY

Tuolumne County - Overview x Tuolumne County x +

experience.arcgis.com/experience/ca0c06ea40d84434adbb642cfc9d4fc

Claremont Graduate University Parcel Viewer

Tuolumne County Features Map

Planning

- APN
- Street Name
- Zip Code
- City
- SCAG Land Use

Hazards

- Fire Hazard Zone
- Drought Zones
- Flood Zones
- Fault Zone
- Landslide Risk
- Liquefaction Zone

Renewable Energy

- Solar Radiation Value
- Wind Speed Value

Parcel Information

< 32862 of 42196 >

OBJECTID	32862
APN	231702500
HOUSE_NUM	0
PREFIX_DIR	02317025
ST_NAME	
ST_TYPE	
UNIT	
FULL_ADD	
FULL_STNA	
CITY	

Map Legend

Tuolumne County

- Very High
- High
- Moderate
- Non Wildland / Non - Urban

Selected features:0

6 km
4 mi

Esri, NASA, NGA, USGS | California State Parks, Esri, HERE, Garmin, SafeGraph, METI/NASA, USG... Powered by Esri

2023 Claremont Graduate University - California Parcel Viewer - Tuolumne County

Fields: Tuolumne_County

Current Layer: Tuolumne_County

	Visible	Read Only	Field Name	Alias	Data Type
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	OBJECTID	OBJECTID	Object ID
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<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	APN	APN	Text
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<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PREFIX_DIR	PREFIX_DIR	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ST_NAME	ST_NAME	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ST_TYPE	ST_TYPE	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	UNIT	UNIT	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FULL_ADD	FULL_ADD	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FULL_STNA	FULL_STNA	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	CITY	CITY	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ZIP_CODE	ZIP_CODE	Text
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<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ZONING	ZONING	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SCAG_LUCO	SCAG_LUCO	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SCAG_LU	SCAG_LU	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FHSZ_CODE	FHSZ_CODE	Text
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<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FLO_CODE	FLO_CODE	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FLO_DESC	FLO_DESC	Text
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<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	LANDSLIDE	LANDSLIDE	Text
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<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DRO_DESC	DRO_DESC	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SOL_RAD	SOL_RAD	Double
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	WIND_SP	WIND_SP	Double
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<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OWNERSHIP	OWNERSHIP	Text

San Bernardino County

- [San Bernardino County](#)



Claremont Graduate University Parcel Viewer

San Bernardino County Features Map



Planning

☐ APN

☐ Street Name

☐ Zip Code

☐ City

☐ SCAG Land Use

Hazards

☐ Fire Hazard Zone

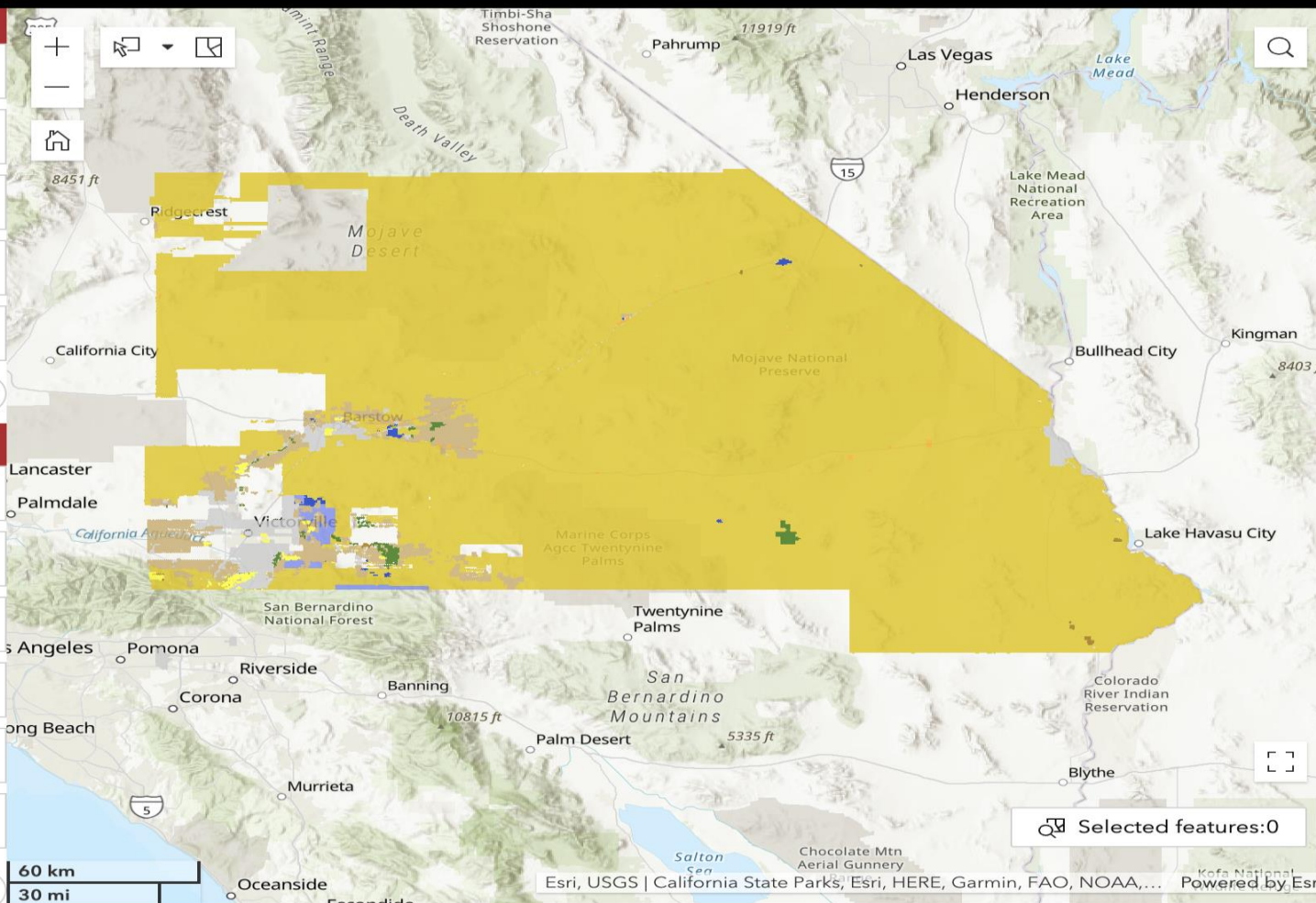
☐ Drought Zones

☐ Flood Zones

☐ Fault Zone

☐ Landslide Risk

☐ Liquefaction Zone



☐ Wind Speed Value

Parcel Information

1 of 828000

OBJECTID_12_13_14_15_16_17_18_19	1
APN	010832424
HOUSE NUM	
PREFIX DIR	
STREET NAME	
STREET TYPE	
UNIT	
FULL ADDRESS	
FULL STREET NAME	
CITY	City of Ont

Map Legend

San_Bernardino05_11_2023

Rural Residential

Mixed Residential

Single Family Residential

Unknown

Multi-Family Residential

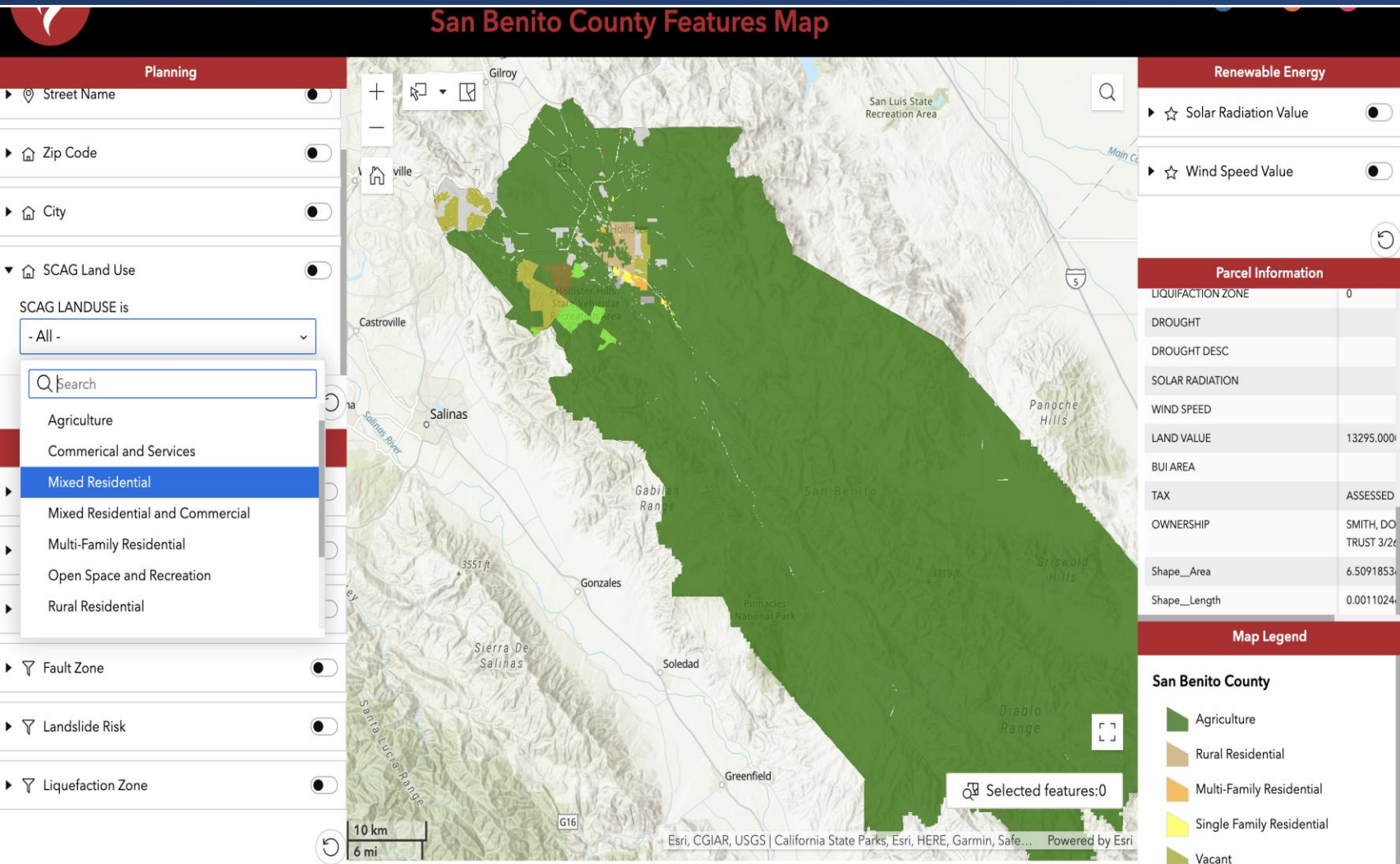
Mixed Residential and Commercial

Agriculture

Public Facilities

San Benito County

- [San Benito County](#)



Visible	Read Only	Field Name	Alias	Data Type
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<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shape	Shape	Geometry
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<input checked="" type="checkbox"/>	<input type="checkbox"/>	ZONING	ZONING	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	SCAG_LUCO	SCAG_LUCO	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	SCAG_LU	SCAG_LU	Text
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<input checked="" type="checkbox"/>	<input type="checkbox"/>	FLO_CODE	FLO_CODE	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	FLO_DESC	FLO_DESC	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	FAULTZONE	FAULTZONE	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	LANDSLIDE	LANDSLIDE	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	LIQ_ZONE	LIQ_ZONE	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	DROUGHT	DROUGHT	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	DRO_DESC	DRO_DESC	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	SOL_RAD	SOL_RAD	Double
<input checked="" type="checkbox"/>	<input type="checkbox"/>	WIND_SP	WIND_SP	Double
<input checked="" type="checkbox"/>	<input type="checkbox"/>	LAND_VAL	LAND_VAL	Double
<input checked="" type="checkbox"/>	<input type="checkbox"/>	BUI_AREA	BUI_AREA	Double
<input checked="" type="checkbox"/>	<input type="checkbox"/>	TAX	TAX	Text
<input checked="" type="checkbox"/>	<input type="checkbox"/>	OWNERSHIP	OWNERSHIP	Text

ORANGE COUNTY

- ORANGE COUNTY

County Project Command Search (Alt+Q) alaa - Advanced GIS Lab

Project Map Insert Analysis View Edit Imagery Share Help

Feature Layer Labeling Data Linear Referencing

Select Select By Select By Attributes Clear Measure Locate Infographics Coordinate Conversion

Basemap Add Data Add Graphics Layer

Clipboard Navigate Layer Selection Inquiry Labeling Offline

Contents

Search

Drawing Order

Map

☐ orangecounty_FeatureToPoint

☐ San_Benitooo_output_XYTableToPoint

☐ SanBernardinoc_FeatureToPoint

☒ orangecounty_Exp_SpatialJoin2

☐ SanBenitocountyf_SpatialJoin_final

☐ orangecounty_Exp_SpatialJoin

☐ orangecounty_Final

☐ SanBernardinoc_ExportFeature

☐ SantaBarbra_ExportFeatures

☐ SanBenitocount_ExportFeature1

☐ orangecounty_ExportFeatures

Map

1:698,745 118.5809361°W 33.9354289°N

Selected Features: 0

Current Layer orangecounty_Exp_SpatialJoin2

Visible	Read Only	Field Name	Alias	Data Type	Allow NULL	Highlight	Number Format	Domain	Default	Length
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shape	Shape	Geometry	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	APN	APN	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				512
<input checked="" type="checkbox"/>	<input type="checkbox"/>	HOUSE_NUM1	HOUSE NUM	Long	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	PREFIX_DIR	PREFIX DIR	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ST_NAME	STREET NAME	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ST_TYPE	STREET TYPE	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	UNIT	UNIT	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255

Planning

APN

Street Name

Zip Code

City

SCAG Land Use

Hazards

Fire Hazard Zone

Drought Zones

Flood Zones

Fault Zone

Landslide Risk

Liquefaction Zone

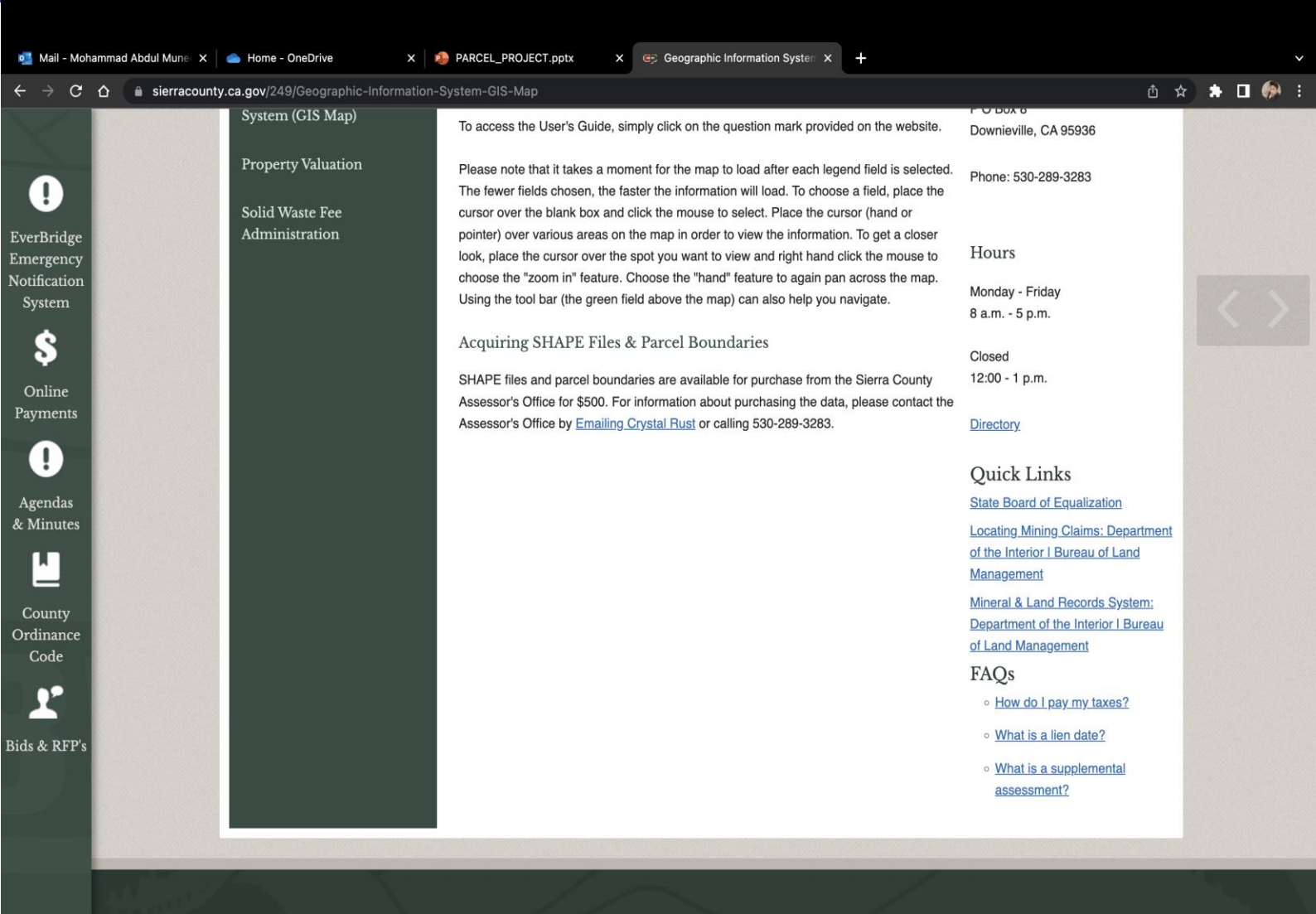
Selected features: 0

2 km 1 mi

Esri, NASA, NOAA, USGS, FEMA | County of Los Angeles, California ... Powered by Esri

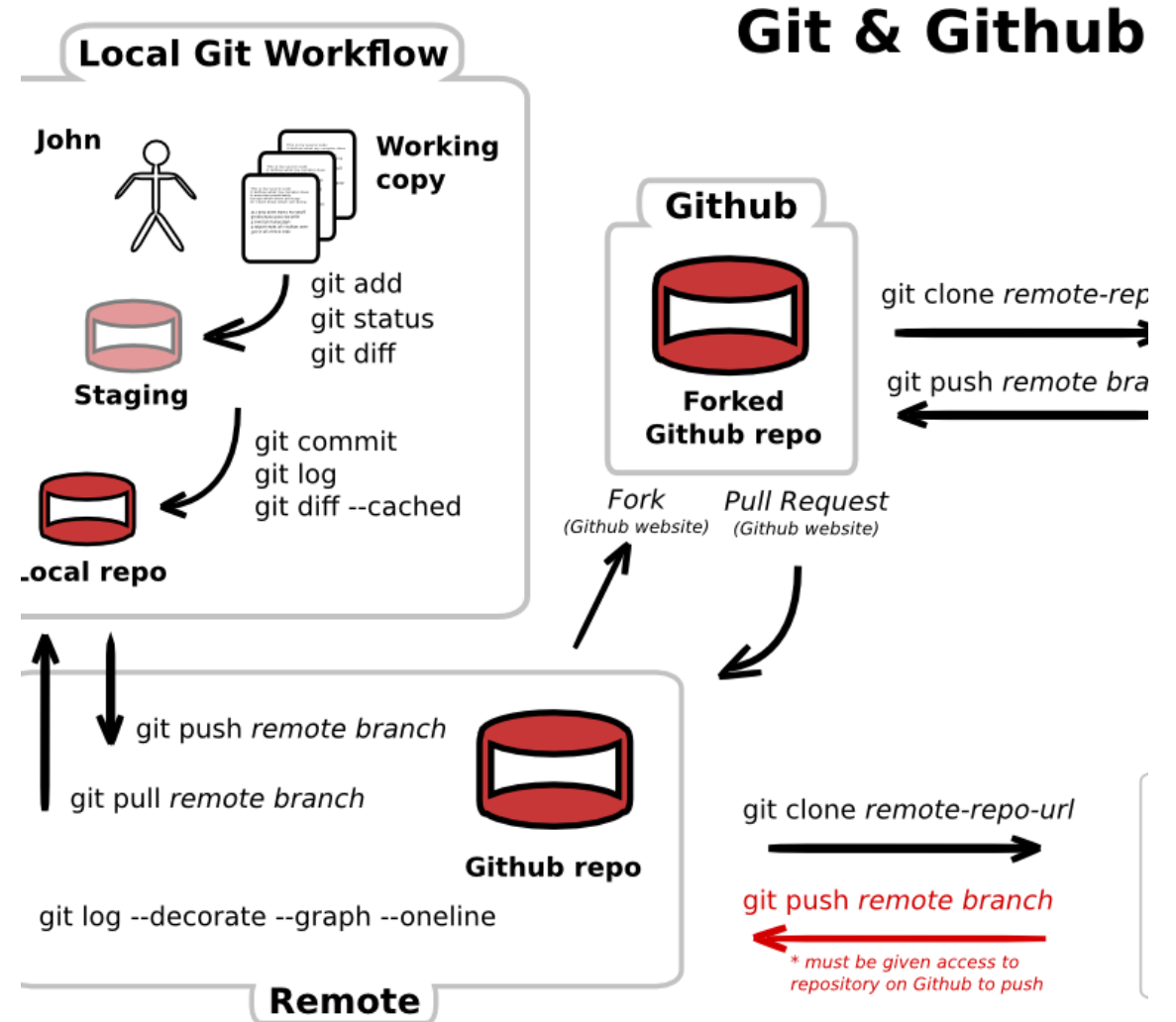
SIERRA COUNTY

SIERRA COUNTY SHAPE FILE AND BOUNDARIES ARE AVAILABLE BUT FOR PURCHASE



Git-Hub Repository

PARCEL PROJECT CGU



Citations:

Amador County: Amador County. (n.d.). GIS data. Retrieved from <https://www.amadorgov.org/departments/information-technology/gis/gis-data>

Contra Costa County: Contra Costa County. (n.d.). GIS. Retrieved from <https://www.contracosta.ca.gov/1818/GIS>

El Dorado County: El Dorado County. (n.d.). Parcel Data Information System. Retrieved from https://www.edcgov.us/Government/planning/pages/parcel_data_information_system.aspx

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