

# SACRAMENTO COUNTY CLASSIFICATION

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GEOG 342 Final Project

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# Purpose

- My goal was to select three Landsat data sets approximately 20 years apart to classify in order to show the urbanization of Sacramento County.
- I selected data sets for Landsat 8 from March, 2021; Landsat 7 from March, 2000; and Landsat 5 from March 1985.
- I intentionally used datasets from the same month to minimize seasonal differences among the datasets.
- 1985 was the oldest Landsat data available from the datasets I choose to work with available on the USGS Earth Explorer portal.
- TL;DR: I found this project to be very challenging and I was unable to complete my goal of classifying all three datasets or create analysis to show urbanization of Sacramento County.

# Data Acquisition: USGS Earth Explorer

Search Criteria

Data Sets

Additional Criteria

Results

## 1. Enter Search Criteria

To narrow your search area: type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the [help documentation](#)), and/or choose a date range.

Geocoder

KML/Shapefile Upload

Select a Geocoding Method

Feature (GNIS)

**Search Limits:** *The search result limit is 100 records; select a Country, Feature Class, and/or Feature Type to reduce your chances of exceeding this limit.*

US Features

World Features

Feature Name

Sacramento County

State

CALIFORNIA

Feature Type

BOROUGH\*CIVIL\*COUNTY\*MINICPIO\*PARISH\*TOWI

Show

Clear

Click on a Feature to show the location on the map and add coordinates to the Area of Interest Control.

| Placename         | Type  | Region     | Latitude | Longitude |
|-------------------|-------|------------|----------|-----------|
| SACRAMENTO COUNTY | CIVIL | CALIFORNIA | 38.4493  | -121.3442 |

| Search Criteria | Data Sets | Additional Criteria | Results |
|-----------------|-----------|---------------------|---------|
|-----------------|-----------|---------------------|---------|








## 2. Select Your Data Set(s)

Check the boxes for the data set(s) you want to search. When done selecting data set(s), click the *Additional Criteria* or *Results* buttons below. Click the plus sign next to the category name to show a list of data sets.

☐ Use Data Set Prefilter ([What's This?](#))

Data Set Search:

**Digital Maps**

- ☐ EO-1
- ☐ Global Fiducials
- ☐ HCMM
- ☐ ISERV
- ☐ Land Cover
- ☐ Landsat 
  - ☐ Landsat Collection 2 Level-2
    - ☒   Landsat 8 OLI/TIRS C2 L2
    - ☒   Landsat 7 ETM+ C2 L2
    - ☒   Landsat 4-5 TM C2 L2
  - ☐ Landsat Collection 2 Level-1
  - ☐ Landsat Collection 1
  - ☐ Landsat Legacy

Search Criteria

Data Sets

Additional Criteria

Results

## 4. Search Results

If you selected more than one data set to search, use the dropdown to see the search results for each specific data set.

Show Result Controls

### Data Set

[Click here to export your results](#)

Landsat 8 OLI/TIRS C2 L2

Landsat 8 OLI/TIRS C2 L2

Landsat 7 ETM+ C2 L2

Landsat 4-5 TM C2 L2

NOTE: Landsat 8 C2 L2 products become available for download 15 to 17 days after data are acquired. View this [Landsat Collection 2 Generation Timeline](#) to see how this timeframe is determined.

« First

Previous


1

of 178,115








Next


Last »

Displaying 1 - 10 of 1,781,147 (estimated)









ID: LC08\_L2SP\_089242\_20210504\_20210508\_02\_T2  
Date Acquired: 2021/05/04  
Path: 089  
Row: 242





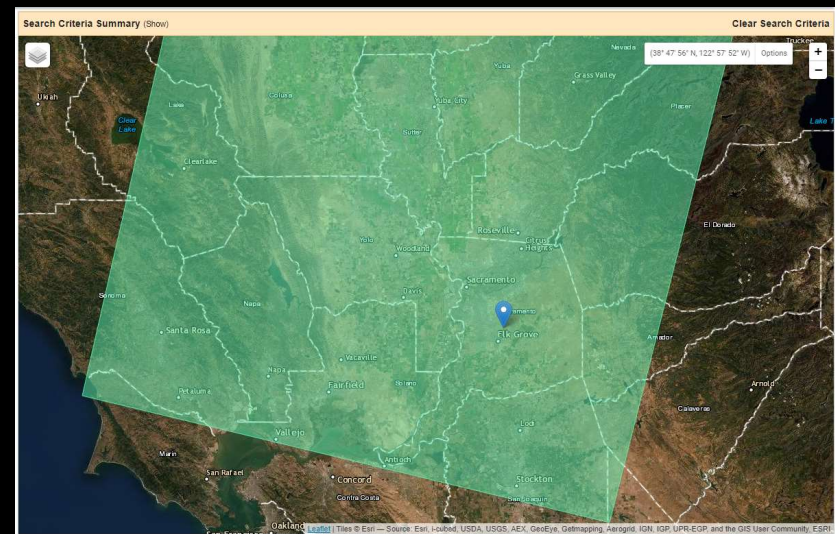
ID: LC08\_L2SP\_089243\_20210504\_20210508\_02\_T2  
Date Acquired: 2021/05/04  
Path: 089  
Row: 243



# Data Acquisition: USGS Earth Explorer

|  |  |
|--|--|
|   | ID: LC08_L2SP_043034_20210501_20210508_02_T1<br>Date Acquired: 2021/05/01<br>Path: 043<br>Row: 034 |
|  | ID: LC08_L2SP_044033_20210422_20210430_02_T1<br>Date Acquired: 2021/04/22<br>Path: 044<br>Row: 033 |



# Data Acquisition: USGS Earth Explorer

Download Options

Product Options

Landsat Collection 2 Level-2 Product Bundle

Product Download Options for LC08\_L2SP\_043034\_20210501\_20210508\_02\_T1

Landsat Collection 2 Level-2 Product Bundle

950.07 MIB Landsat Collection 2 Level-2 Product Bundle

The following items are available for individual download

(Item Name Filter)

218.24 KIB

LC08\_L2SP\_043034\_20210501\_20210508\_02\_T1\_QA\_RADSAT.TIF

Landsat Collection 2 Level-2 Band File

81.82 MIB

LC08\_L2SP\_043034\_20210501\_20210508\_02\_T1\_SR\_B1.TIF

Landsat Collection 2 Level-2 Band File

83.27 MIB

LC08\_L2SP\_043034\_20210501\_20210508\_02\_T1\_SR\_B2.TIF

Landsat Collection 2 Level-2 Band File

85.41 MIB

LC08\_L2SP\_043034\_20210501\_20210508\_02\_T1\_SR\_B3.TIF

Landsat Collection 2 Level-2 Band File

88.64 MIB

LC08\_L2SP\_043034\_20210501\_20210508\_02\_T1\_SR\_B4.TIF

Landsat Collection 2 Level-2 Band File

91.30 MIB

LC08\_L2SP\_043034\_20210501\_20210508\_02\_T1\_SR\_B5.TIF

Landsat Collection 2 Level-2 Band File

Add All to Bulk

Close

| Name   | Date               | Type          | Size       |
|--|--------------------|---------------|------------|
| LC08_L2SP_044033_20210422_20210430_02_T1.tar               | 5/16/2021 10:37 AM | TAR File      | 964,740 KB |
| LC08_L2SP_044033_20210422_20210430_02_T1_ANG.txt           | 4/30/2021 3:59 PM  | Text Document | 115 KB     |
| LC08_L2SP_044033_20210422_20210430_02_T1_MD5.txt           | 4/30/2021 4:01 PM  | Text Document | 2 KB       |
| LC08_L2SP_044033_20210422_20210430_02_T1_MTL.txt           | 4/30/2021 4:01 PM  | Text Document | 16 KB      |
| LC08_L2SP_044033_20210422_20210430_02_T1_MTL.xml           | 4/30/2021 4:01 PM  | XML Document  | 23 KB      |
| LC08_L2SP_044033_20210422_20210430_02_T1_QA_PIXEL.TIF      | 4/30/2021 3:59 PM  | TIF File      | 1,376 KB   |
| LC08_L2SP_044033_20210422_20210430_02_T1_QA_RADSAT.TIF     | 4/30/2021 3:59 PM  | TIF File      | 220 KB     |
| LC08_L2SP_044033_20210422_20210430_02_T1_SR_B1.TIF         | 4/30/2021 3:59 PM  | TIF File      | 83,630 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_SR_B2.TIF         | 4/30/2021 3:59 PM  | TIF File      | 84,789 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_SR_B3.TIF         | 4/30/2021 3:59 PM  | TIF File      | 86,921 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_SR_B4.TIF         | 4/30/2021 3:59 PM  | TIF File      | 89,768 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_SR_B5.TIF         | 4/30/2021 3:59 PM  | TIF File      | 94,132 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_SR_B6.TIF         | 4/30/2021 4:00 PM  | TIF File      | 94,046 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_SR_B7.TIF         | 4/30/2021 4:00 PM  | TIF File      | 92,759 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_SR_QA_AEROSOL.TIF | 4/30/2021 4:00 PM  | TIF File      | 2,844 KB   |
| LC08_L2SP_044033_20210422_20210430_02_T1_ST_ATRAN.TIF      | 4/30/2021 4:00 PM  | TIF File      | 26,231 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_ST_B10.TIF        | 4/30/2021 4:00 PM  | TIF File      | 86,997 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_ST_CDIST.TIF      | 4/30/2021 4:01 PM  | TIF File      | 20,500 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_ST_DRAD.TIF       | 4/30/2021 4:00 PM  | TIF File      | 17,353 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_ST_EMIS.TIF       | 4/30/2021 4:00 PM  | TIF File      | 36,251 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_ST_EMDS.TIF       | 4/30/2021 4:00 PM  | TIF File      | 18,132 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_ST_QA.TIF         | 4/30/2021 4:01 PM  | TIF File      | 27,416 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_ST_TRAD.TIF       | 4/30/2021 4:00 PM  | TIF File      | 77,075 KB  |
| LC08_L2SP_044033_20210422_20210430_02_T1_ST_URAD.TIF       | 4/30/2021 4:00 PM  | TIF File      | 24,129 KB  |



# Image Preparation: Band Composition

The screenshot displays the ArcGIS Desktop interface during a band composition process. The main map window shows a satellite image of a coastal region. The 'Contents' pane on the left lists the map, 'CA\_Counties\_TIGER2016', and 'Landsat7\_2000\_Mar' (RGB). The 'Geoprocessing' pane on the right shows the 'Composite Bands' tool with the 'Parameters' tab selected. The 'Input Rasters' list contains six Landsat 5 SR\_B1 through SR\_B7 files. The 'Output Raster' is 'Landsat7\_2000\_Mar'. An 'Input Rasters' dialog box is open, showing a list of files with 'LT05\_L2SP\_044033\_19850403\_20200918\_02\_T1\_SR\_B1.TIF' selected. The background map shows a satellite image of a coastal area.

**Contents**

- Map
- CA\_Counties\_TIGER2016
- Landsat7\_2000\_Mar
- RGB
- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3
- SacCounty\_Landsat8\_2021\_Mar
- Landsat8\_2021\_Mar
- World Imagery

**Geoprocessing**

**Composite Bands**

**Parameters** | Environments

**Input Rasters**

- LE07\_L2SP\_044033\_20000420\_20200918\_02\_
- LE07\_L2SP\_044033\_20000420\_20200918\_02\_
- LE07\_L2SP\_044033\_20000420\_20200918\_02\_
- LE07\_L2SP\_044033\_20000420\_20200918\_02\_
- LE07\_L2SP\_044033\_20000420\_20200918\_02\_
- LE07\_L2SP\_044033\_20000420\_20200918\_02\_

**Output Raster**

Landsat7\_2000\_Mar

**Input Rasters**

Project > Folders > Final Project > LandSat\_redux > Landsat5

Search Landsat5

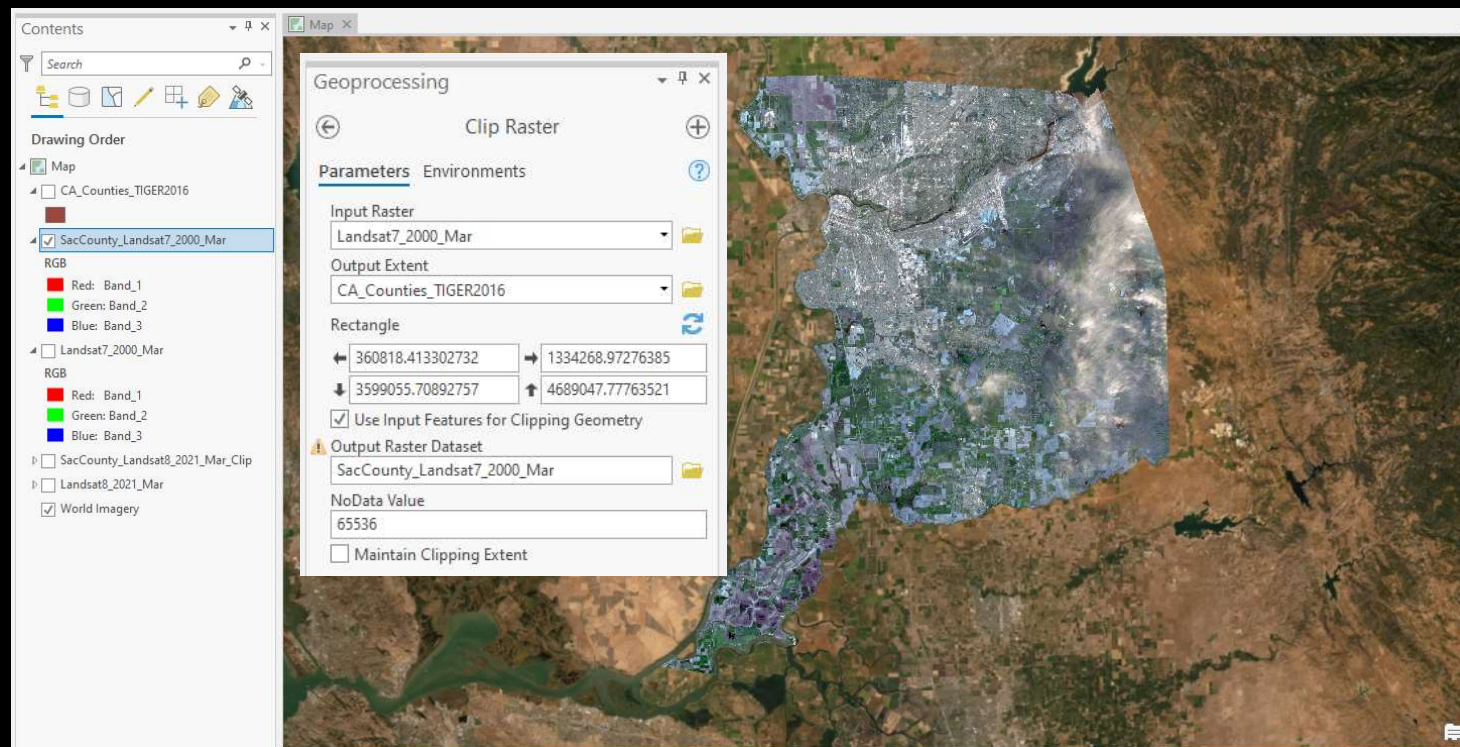
Organize > New Item

| Name   | Type           |
|--|----------------|
| LT05_L2SP_044033_19850403_20200918_02_T1_QA_RADSAT.TIF     | Raster Dataset |
| LT05_L2SP_044033_19850403_20200918_02_T1_SR_ATMOS_OPACIT   | Raster Dataset |
| LT05_L2SP_044033_19850403_20200918_02_T1_SR_B1.TIF         | Raster Dataset |
| LT05_L2SP_044033_19850403_20200918_02_T1_SR_B2.TIF         | Raster Dataset |
| LT05_L2SP_044033_19850403_20200918_02_T1_SR_B3.TIF         | Raster Dataset |
| LT05_L2SP_044033_19850403_20200918_02_T1_SR_B4.TIF         | Raster Dataset |
| LT05_L2SP_044033_19850403_20200918_02_T1_SR_B5.TIF         | Raster Dataset |
| LT05_L2SP_044033_19850403_20200918_02_T1_SR_B7.TIF         | Raster Dataset |
| LT05_L2SP_044033_19850403_20200918_02_T1_SR_CLOUD_PROB_TIF | Raster Dataset |

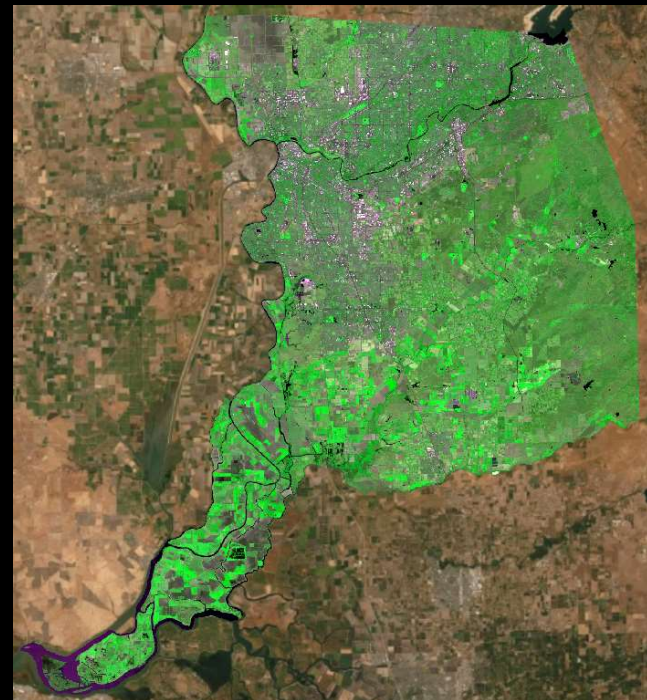
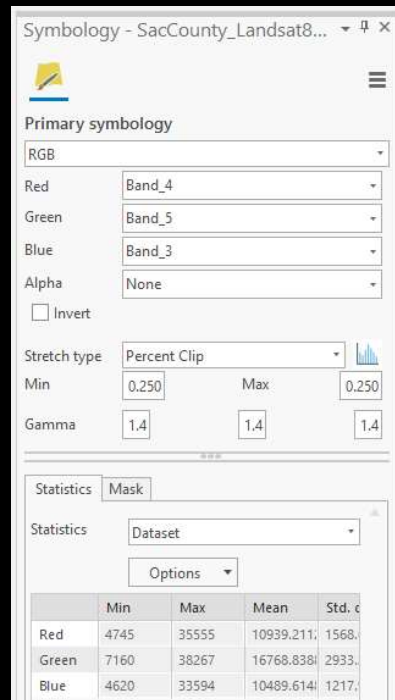
Name: "LT05\_L2SP\_044033\_19850403\_20200918\_02\_T1\_SR\_B1.TIF" "LT05\_L2SP\_0" All Supported Types

OK Cancel

# Image Preparation: Raster Clip

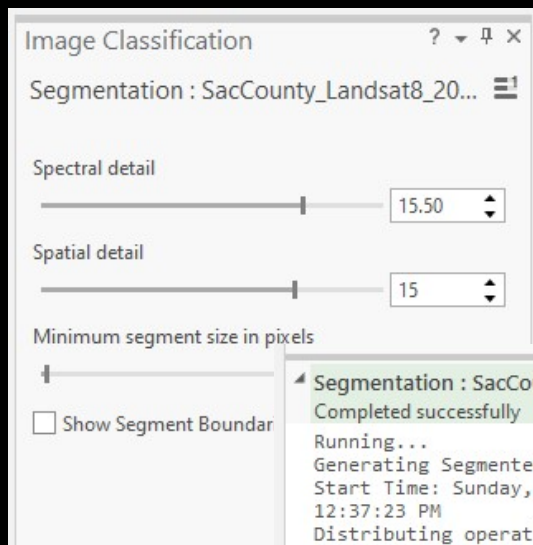


# Image Preparation: Symbology

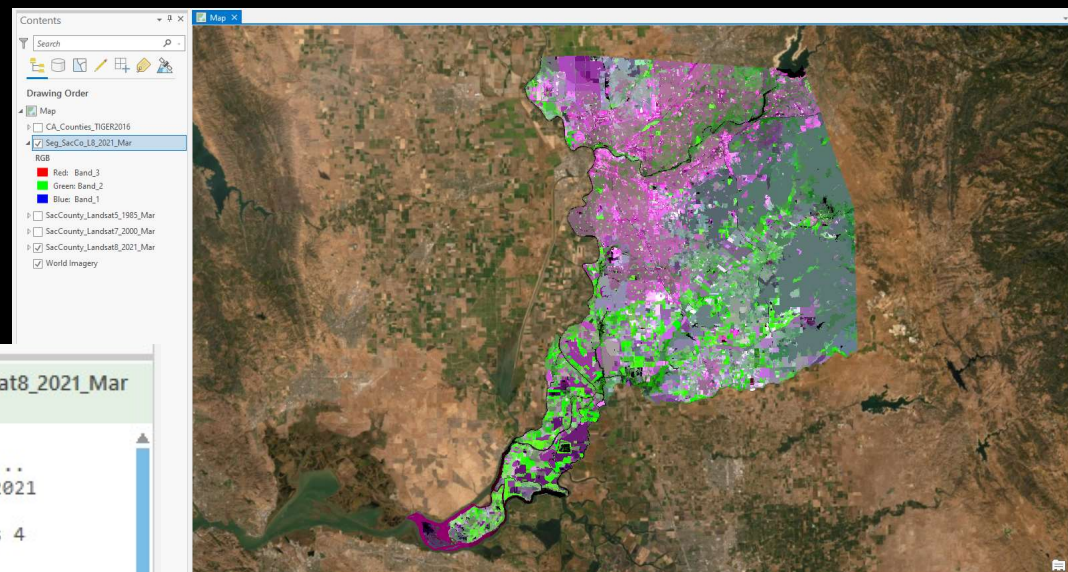




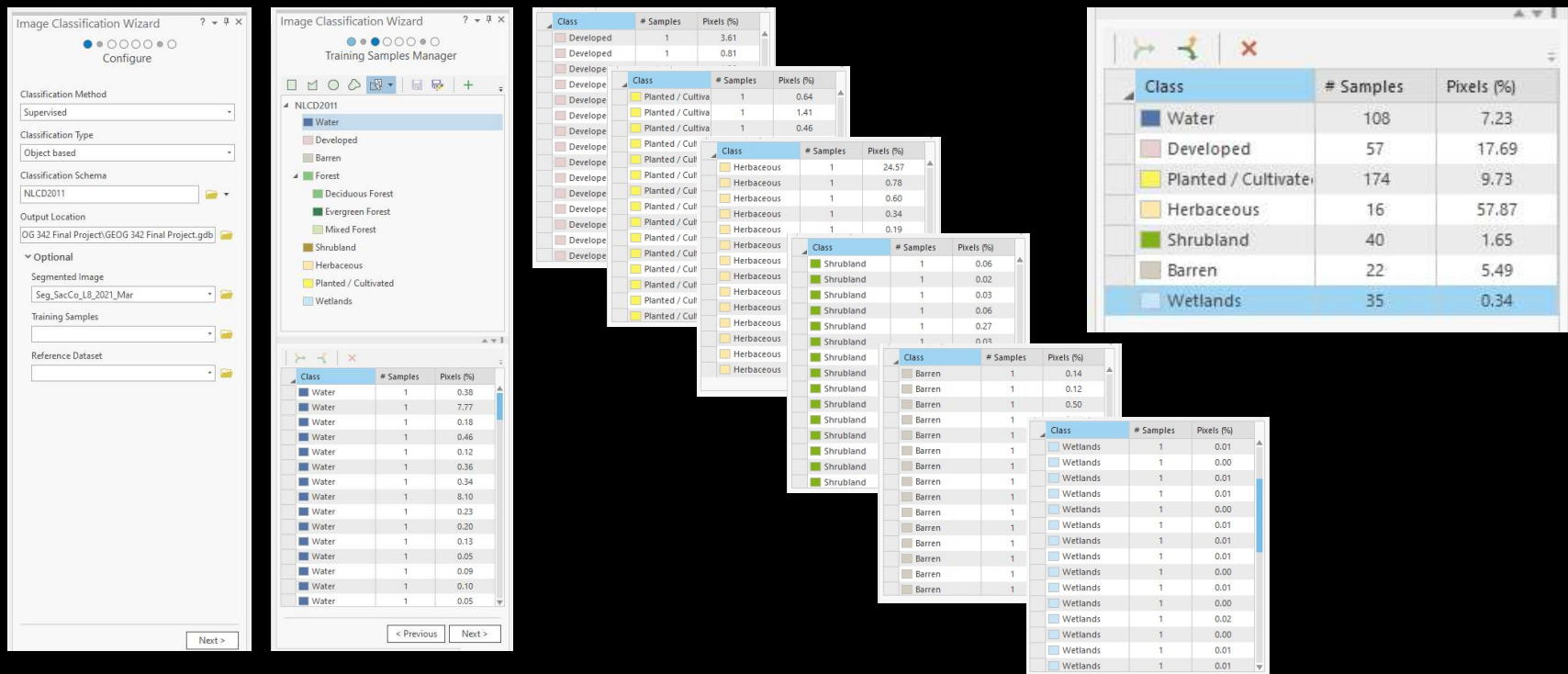
# Classification: Segmentation



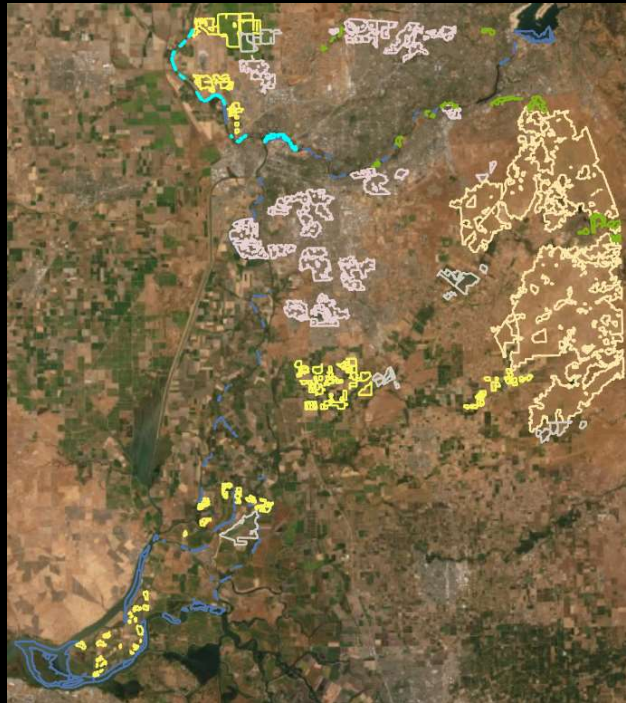
```
Segmentation : SacCounty_Landsat8_2021_Mar
Completed successfully
Running...
Generating Segmented Dataset...
Start Time: Sunday, May 16, 2021
12:37:23 PM
Distributing operation across 4
parallel instances.
Building Pyramids...
Succeeded at Sunday, May 16, 2021
12:37:55 PM (Elapsed Time: 31.99
seconds)
```



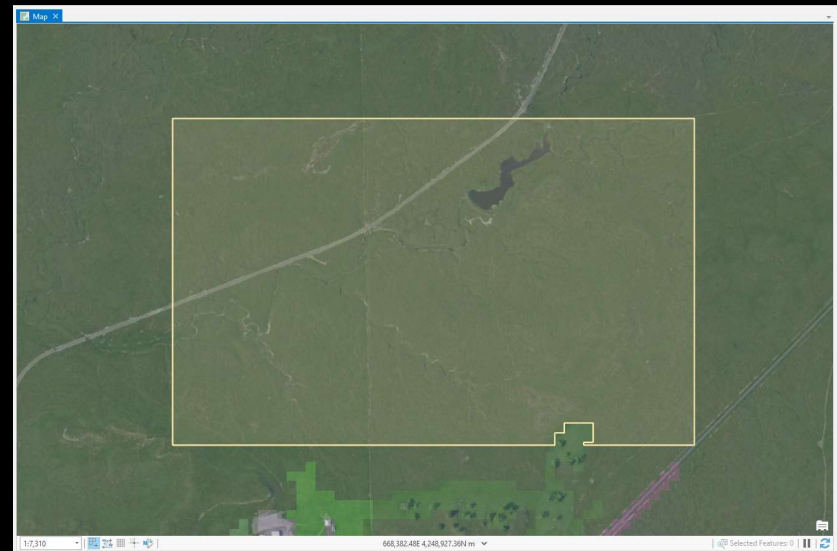
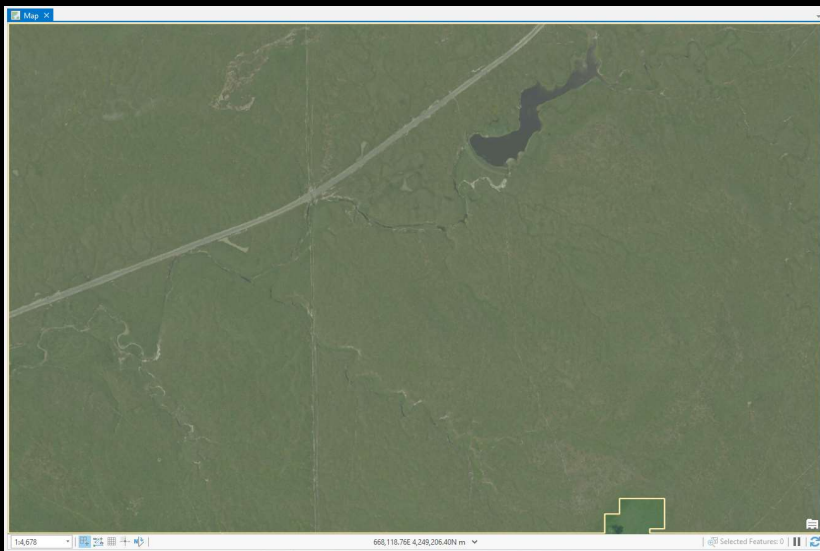
# Classification: Training Samples



# Classification: Training Samples

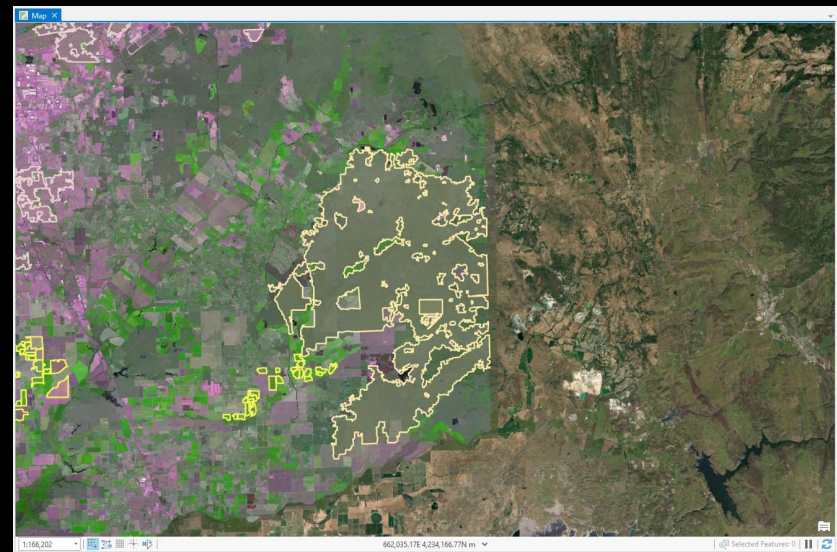
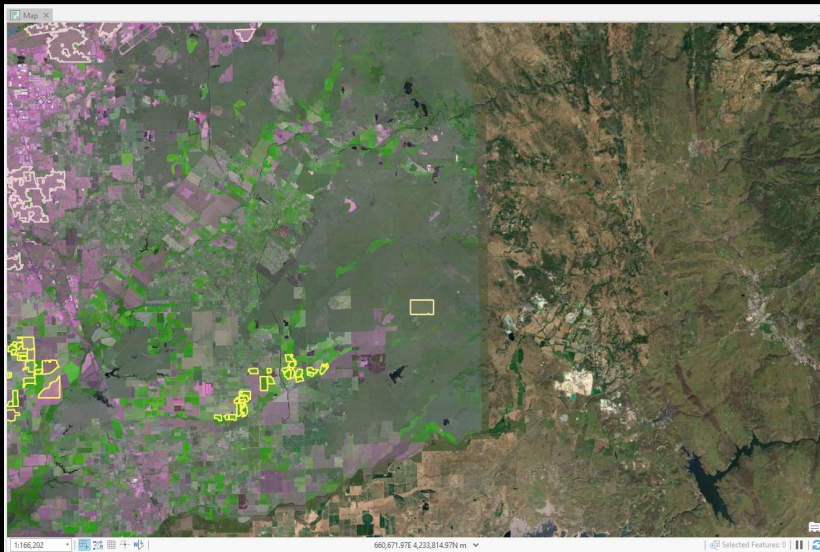


# Classification: Viewport Limit

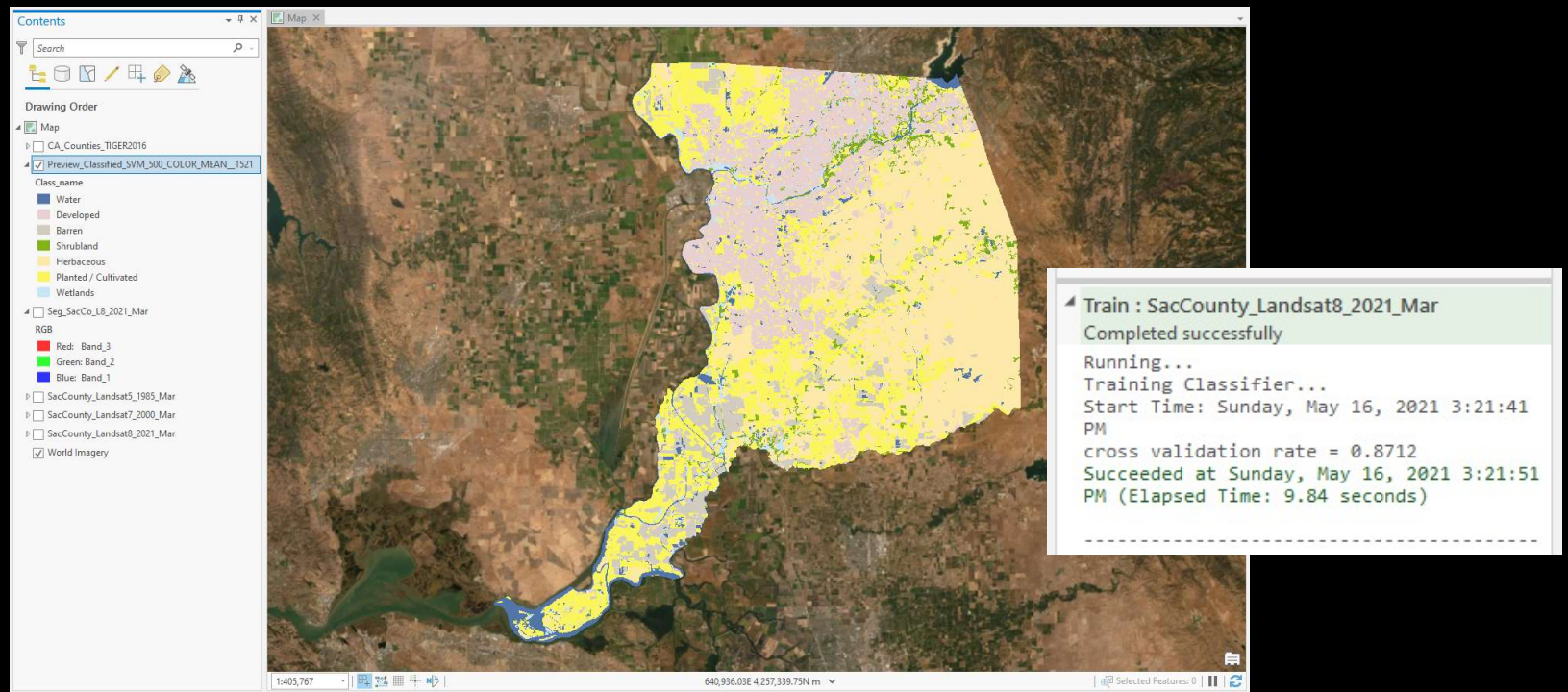




# Classification: Viewport Limit



# Classification: Preview Classification

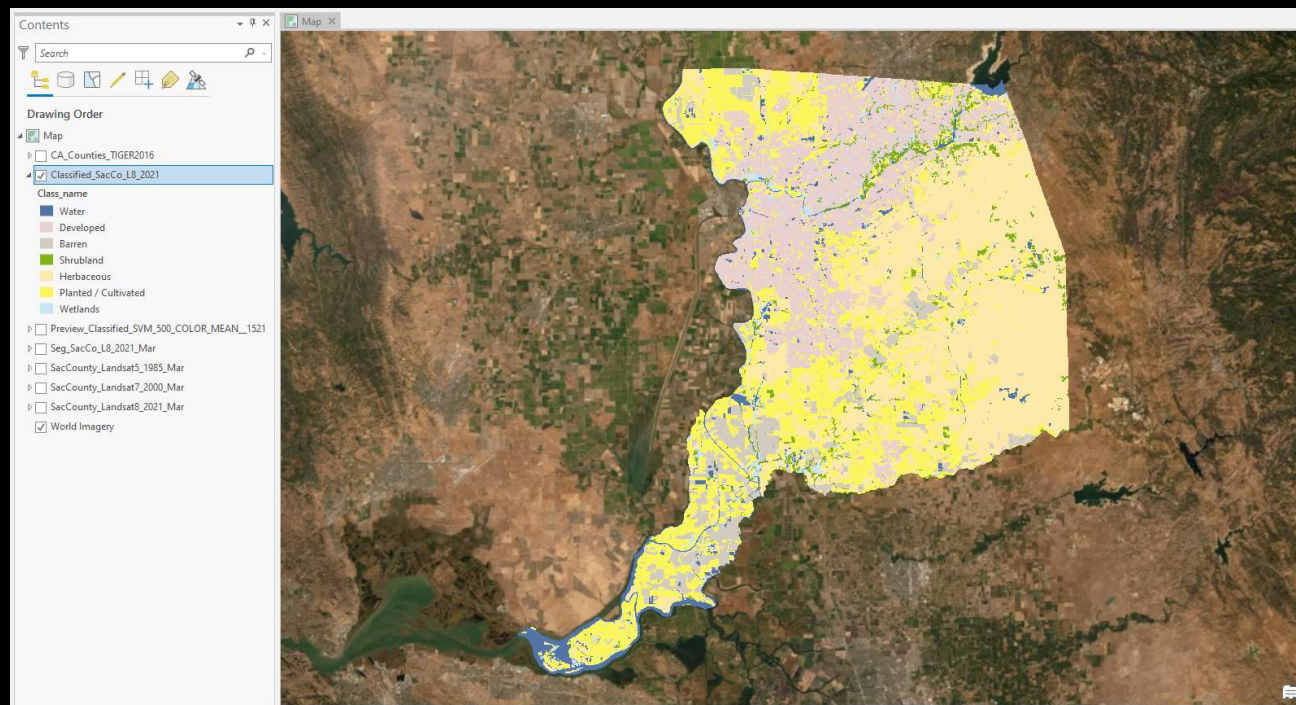


# Classification: Misclassified Segments



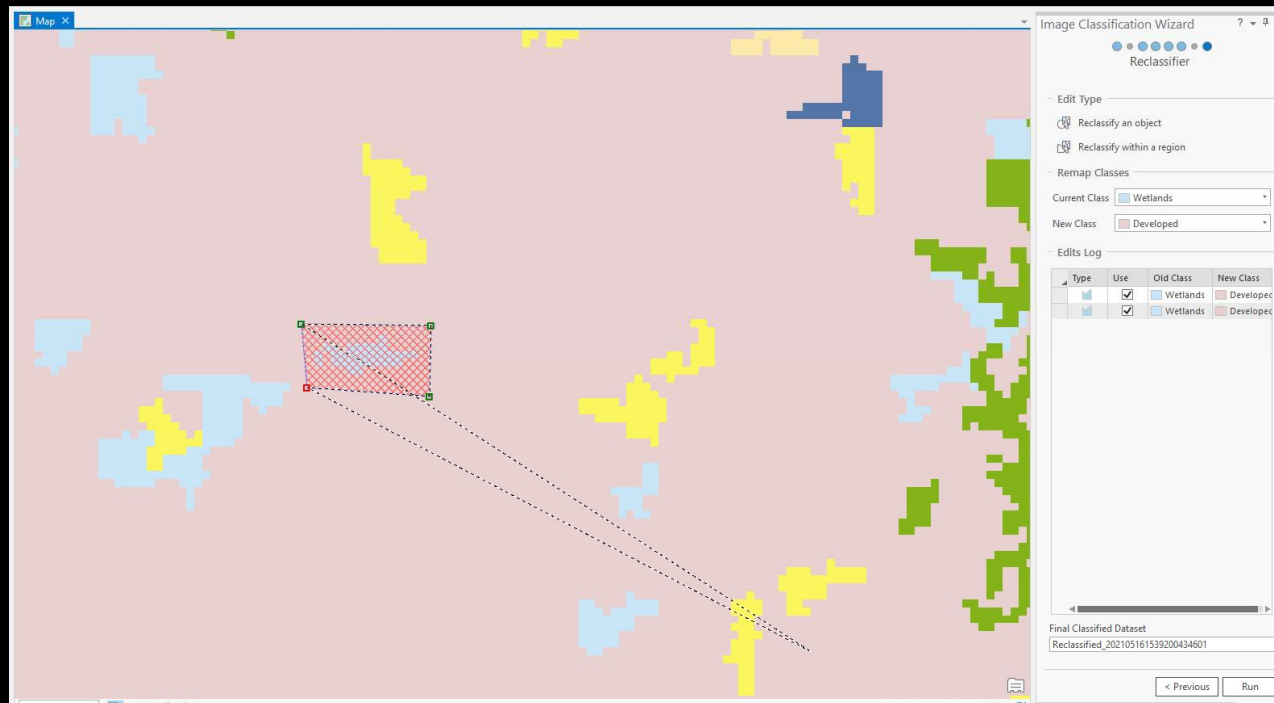


# Classification: Classified





# Classification: Reclassify



# Classification: Additional Training

Initial Training



Additional Training



# Classification: Final Results

