

GIS Pre-Processing Workflow (Part I)

This Document describes the process to download Points of Diversion (POD) flat file records from the CA State Waterboards Website, compare its spatial location data, and embed a hyperlink to eWRIMS in each records pop-up window. NOTE: all eWRIMS data for this process and any further analysis should be obtained on the same day to avoid record discrepancies.

Once this dataset is populated with the current POD records, it can be used in Part II of the workflow to validate the location of all Water Rights in an Area of Interest (AOI), capture water rights that have been mis plotted outside the AOI, and choose which single POD best represents each water right.

Open ArcGIS Pro and Add POD table to map

Navigate: Map > Add Data > Data

Navigate to R-Script Output folder and add the eWRIMS POD spreadsheet,

1. Add Public Land Survey System (PLSS) Section layer to map

This layer is the version used in eWRIMS and is included in the Project package file.

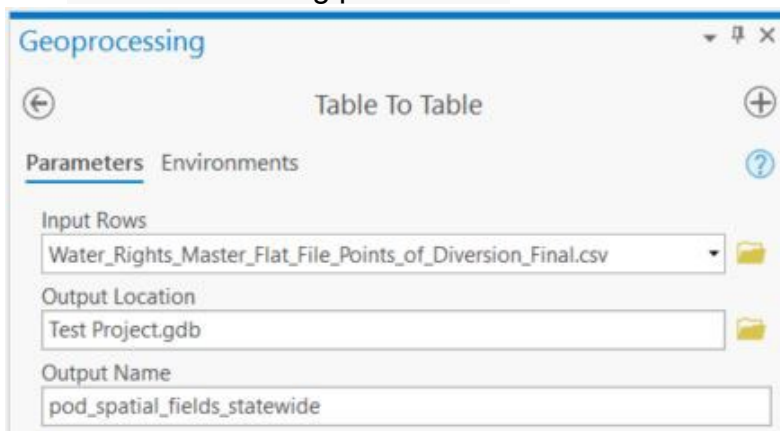
Nav: Map > Add Data > *PLSS_Sections_Fill*

2. Convert .csv table to File Geodatabase Table and remove unwanted fields

Nav: Analysis > Tools

Enter “Table to Table” in the Find Tools search bar and select the “Table to Table” tool

Enter the following parameters:



Expand the “Fields” section and remove all fields, except the ones listed below, by clicking the red X next to each field name. then Click “Run.” Alternately, you can leave all the fields and choose to hide unwanted fields after the geoprocessing tool has run.

Field Name
OBJECTID
POD_ID
POD_NUMBER
POD_STATUS
POD_TYPE
POD_LAST_UPDATE_DATE
POD_COUNT
APPL_ID
OBJECTID_1
POD_NUMBER_GIS
COUNTY
PARCEL_NUMBER
SP_ZONE
NORTH_COORD
EAST_COORD
LATITUDE
LONGITUDE
QUARTER_QUARTER
QUARTER

SECTION_CLASSIFIER
SECTION_NUMBER
TOWNSHIP_NUMBER
TOWNSHIP_DIRECTION
RANGE_NUMBER
RANGE_DIRECTION
MERIDIAN
LOCATION_METHOD
SPECIAL_USE_AREA
SOURCE_NAME
TRIB_DESC
WATERSHED
HUC_12_NUMBER
HUC_12_NAME
HUC_8_NUMBER
HUC_8_NAME
QUAD_MAP_NAME
QUAD_MAP_NUMBER
WR_WATER_RIGHT_ID
APPLICATION_NUMBER

CERTIFICATE_ID
PERMIT_ID
LICENSE_ID
WATER_RIGHT_TYPE
WATER_RIGHT_STATUS

3. Convert Latitude and Longitude Columns to ‘Numeric’

Before plotting the POD points, Check to make sure the Latitude and Longitude columns are ‘numeric’ fields. If they need to be converted, open the *pod_spatial_fields_statewide* attribute table and click “Fields”. Create two new columns *Longitude1* and *Latitude1*; set column type as ‘double.’

Also, while in the Fields tab, reorder the Application_Number field to follow the “Object_ID” field.

1:5,291,173

125.5843818°W 35.0242843°N

pod_spatial_fields_statewide

Fields: pod_spatial...fields_statewide

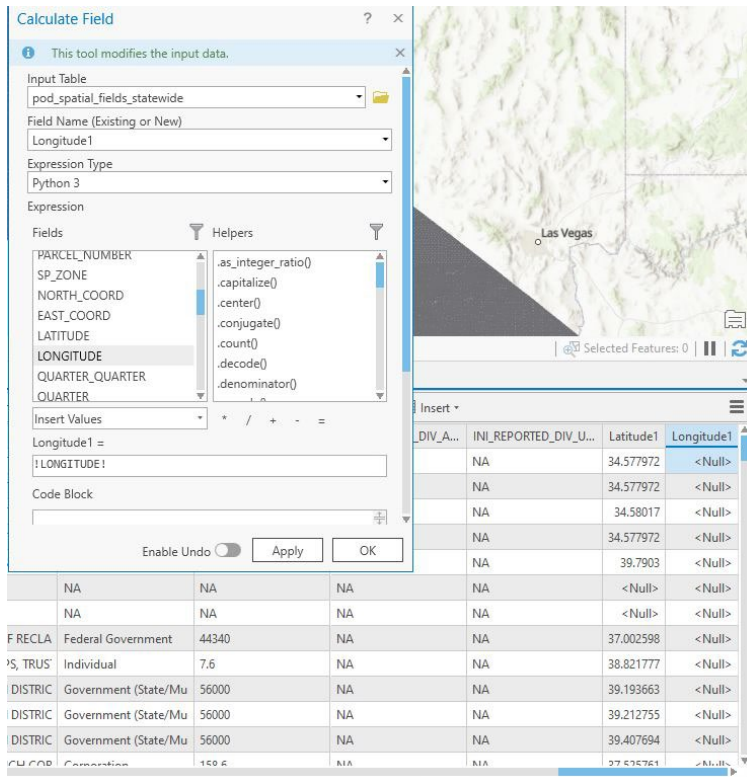
Current Layer

pod_spatial_fields_statewide

	<input checked="" type="checkbox"/> Visible	<input checked="" type="checkbox"/> Read Only	Field Name	Alias	Data Type	<input checked="" type="checkbox"/> Allow NULL	<input type="checkbox"/> Highlight	Number Format	Domain	Default	Length
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CERTIFICATE_ID	CERTIFICATE_ID	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				8000
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PERMIT_ID	PERMIT_ID	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				8000
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LICENSE_ID	LICENSE_ID	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				8000
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	WATER_RIGHT_TYPE	WATER_RIGHT_TYPE	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				8000
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	WATER_RIGHT_STATUS	WATER_RIGHT_STATUS	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				8000
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	APPLICATION_PRIMARY_OWNER	APPLICATION_PRIMARY_OWNER	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				8000
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PRIMARY_OWNER_ENTITY_TYPE	PRIMARY_OWNER_ENTITY_TYPE	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				8000
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FACE_VALUE_AMOUNT	FACE_VALUE_AMOUNT	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				8000
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	INI_REPORTED_DIV_AMOUNT	INI_REPORTED_DIV_AMOUNT	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				8000
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	INI_REPORTED_DIV_UNIT	INI_REPORTED_DIV_UNIT	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				8000
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Latitude1	Latitude1	Double	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Longitude1	Longitude1	Double	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			

Click here to add a new field.

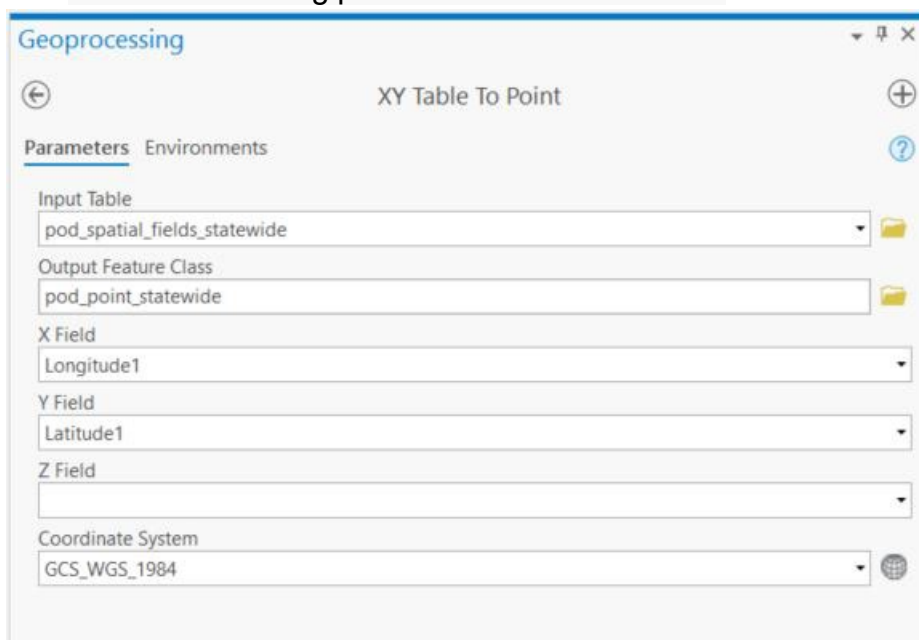
Use the 'Calculate Field' and set the new 'Latitude1' = 'Latitude' column and 'Longitude1' = 'Longitude' Column. This will transfer over the coordinates and convert them so the following tool will work.



4. Create POD Points Feature Layer

Nav: Analysis > Tools > XY Table to Point

Enter the following parameters and Click "Run"



5. Combine PLSS related Fields in the *pod_points_statewide* layer

Combine the Meridian, Township_Number, Township_Direction, Range_Number, Range_Direction and Section_Number fields (MTRS) from the *pod_points_statewide* layer into a new field and format it to match the “MTRS” field within the PLSS Section layer we added to our map in step 2. Then, relate the two layers using this shared field (there is no doubt a more elegant way to complete this task but here is one method).

a. Creating a Meridian Short Name

The *PLSS Section* Layer uses an abbreviation for the Meridian name, so we must replace the text in the MERIDIAN field within the *pod_points_statewide* attribute table with those abbreviations.

Save your Project and clear all selections.

calculate the MERIDIAN field using the following python expression and click apply:
MERIDIAN = !MERIDIAN!.replace("Humboldt","H")

calculate it twice more using the following python expressions and click apply:
MERIDIAN = !MERIDIAN!.replace("Mount Diablo","M")
MERIDIAN = !MERIDIAN!.replace("San Bernardino","S")

b. Concatenate Into New Flat File MTRS field

Create a new Text Field within the *pod_points_statewide* attribute table named “FFMTRS” with ‘text’ field type and save field changes.

Calculate the new FFMTRS Field using the following python expression and click apply:
FFMTRS=!MERIDIAN!+str(!TOWNSHIP_NUMBER!)+!TOWNSHIP_DIRECTION!+str(!RANGE_NUMBER!)+!RANGE_DIRECTION!+str(!SECTION_NUMBER!)

The *PLSS_Section_Fill* table already has the Meridian abbreviation, township, range and section fields ‘MTRS’.

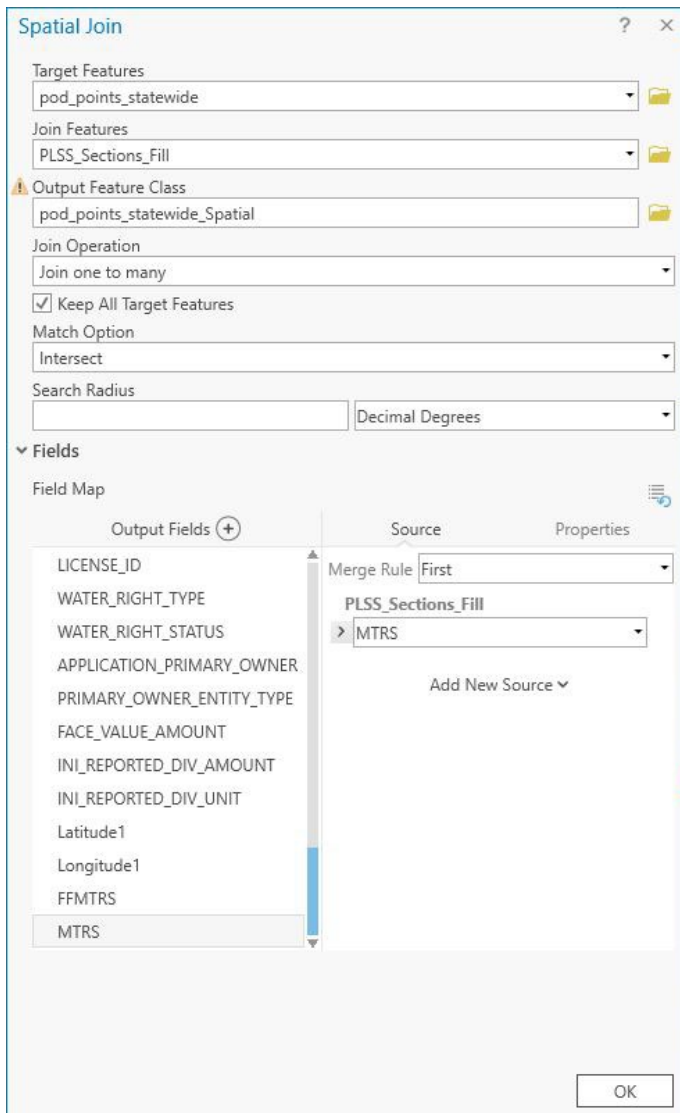
Save your Project

6. Compare the PLSS Section listed in the Flat File (FFMTRS) with the PLSS Section the Latitude and longitude points actually fall on (MTRS)

After reviewing many water right documents and comparing their data in eWRIMS, we know that both Latitude/Longitude and PLSS Section data in eWRIMS are prone to errors. However, we can compare the PLSS Sections listed for each POD in the Flat file to the PLSS sections for each POD Latitude/Longitude point and spatially intersect to help identify some of these errors.

Perform a spatial join between the POD Points layer and PLSS Section layer.

Right click the *pod_points_statewide* layer in the contents pane > joins and Relates > Spatial Join complete as shown remove all output fields except “MTRS” from the *PLSS_Section_Fill* layer to avoid confusion.



Create a new 'text' field named MTRS_Match and calculate that field using the following python expression:

Expression: `reclass(!FFMTRS!,!MTRS!)`

Code Block:

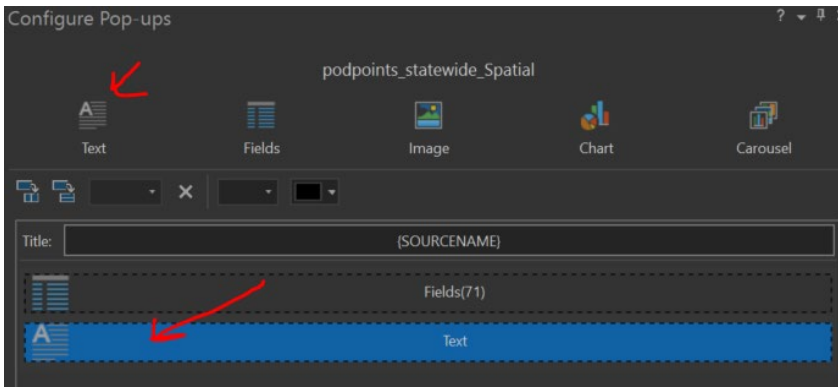
```
def reclass(ffmtrs,mtrs):
    if (ffmtrs == mtrs):
        return "Y"
    else:
        return "N"
```

*For rows with "N" in this column we know the POD point is plotted on a different PLSS section than listed in the Flat file.

7. Add eWRIMS links to POD Point Pop up window

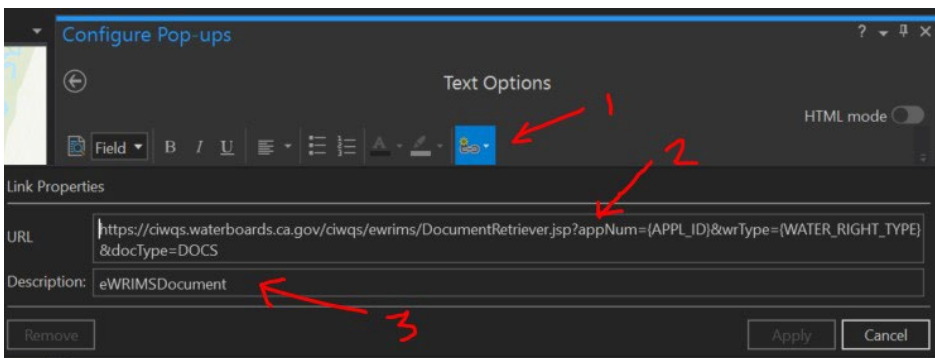
To ease review of individual POD add an eWRIMS document hyperlink to each POD popup window.

Right click the *pod_points_statewide_spatial* layer in the contents pane > configure popups. Then click on the add text field as shown below:

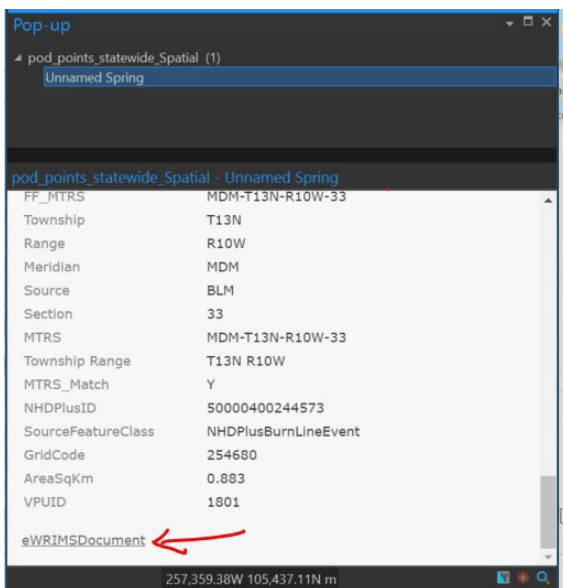


Double click on the new text field, then:

1. click the hyperlink button.
2. Type or paste
3. https://ciwqs.waterboards.ca.gov/ciwqs/ewrims/DocumentRetriever.jsp?appNum={APPL_ID}&wrType={WATER_RIGHT_TYPE}&docType=DOCS into the URL field.
4. Type "eWRIMSDocument" in the description field and click apply.



Now when you click on a POD point, the eWRIMS Document hyperlink will appear at the bottom of the popup window. Because APPL_ID and WATER_RIGHT_TYPE are fields, not values, the URL will be populated with the corresponding field value from that specific POD's record.



8. Save your project.

If you will be working on this project with others, consider saving the project as a package so all the layer files, data references, and connections will be included.

