

Getting NLCD raster

1. Go to the website for MRLC

<https://www.mrlc.gov/>



Multi-Resolution Land Characteristics (MRLC)

The Multi-Resolution Land Characteristics (MRLC) consortium is a group of federal agencies who coordinate and consistent and relevant land cover information at the national scale for a wide variety of environmental, land management, and modeling applications. The creation of this consortium has resulted in the mapping of the lower 48 United States and Puerto Rico into a comprehensive land cover product termed, the National Land Cover Database (NLCD), from Landsat satellite imagery and other supplementary datasets.

MRLC hosts land cover and land condition data from various sources, including NLCD and Rangeland Condition Assessment and Projection (RCMAP) time-series, Ecological Potential, and projections of future fractional rangeland

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2. Go to Tools



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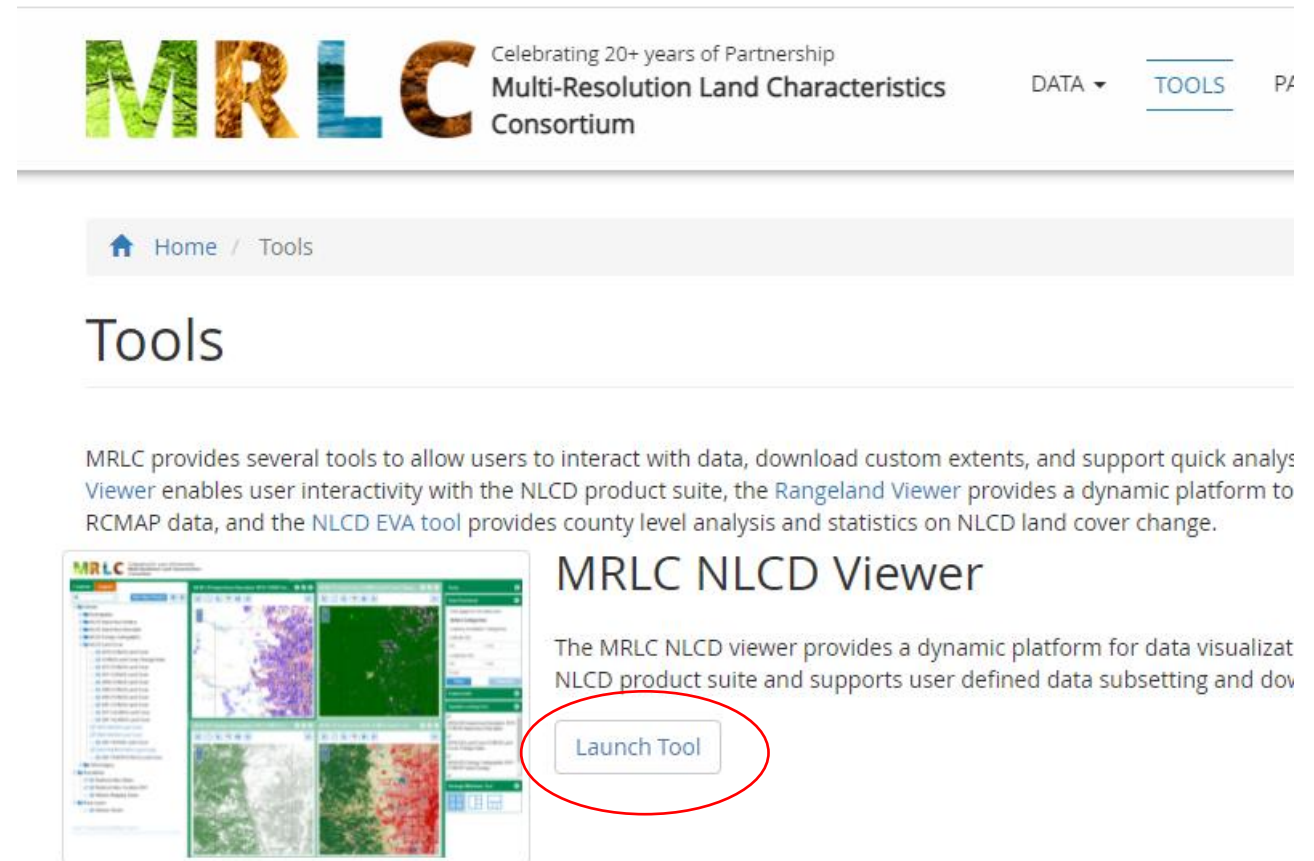
Getting NLCD raster

1. Go to the website for MRLC

<https://www.mrlc.gov/>

2. Go to Tools

3. Under tools and MRLC NLCD Viewer -> Launch Tool



The screenshot displays the MRLC website. The header features the MRLC logo, the text "Celebrating 20+ years of Partnership Multi-Resolution Land Characteristics Consortium", and navigation links for "DATA" and "TOOLS". Below the header, a breadcrumb trail shows "Home / Tools". The "Tools" section is titled, and a paragraph describes the available tools: "MRLC provides several tools to allow users to interact with data, download custom extents, and support quick analysis. The NLCD Viewer enables user interactivity with the NLCD product suite, the Rangeland Viewer provides a dynamic platform to RCMAP data, and the NLCD EVA tool provides county level analysis and statistics on NLCD land cover change." Below this text is a screenshot of the MRLC NLCD Viewer interface, which includes a map, a list of data layers, and a "Launch Tool" button circled in red.

MRLC Celebrating 20+ years of Partnership
Multi-Resolution Land Characteristics Consortium

DATA TOOLS

Home / Tools

Tools

MRLC provides several tools to allow users to interact with data, download custom extents, and support quick analysis. The NLCD Viewer enables user interactivity with the NLCD product suite, the Rangeland Viewer provides a dynamic platform to RCMAP data, and the NLCD EVA tool provides county level analysis and statistics on NLCD land cover change.

MRLC NLCD Viewer

The MRLC NLCD viewer provides a dynamic platform for data visualization of the NLCD product suite and supports user defined data subsetting and download.

Launch Tool

Getting NLCD raster

1. Go to the website for MRLC

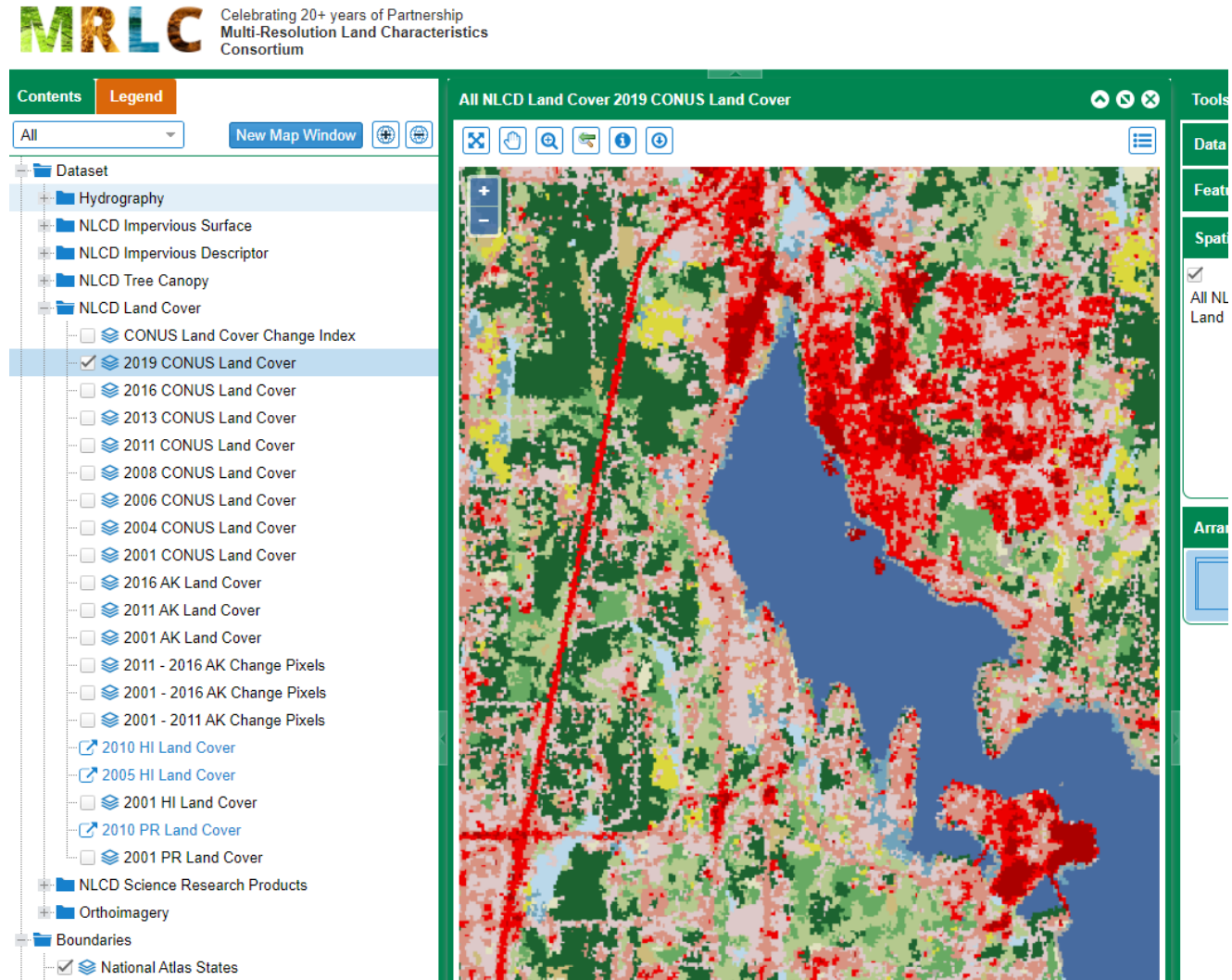
<https://www.mrlc.gov/>

2. Go to Tools

3. Under tools and MRLC NLCD Viewer -> Launch Tool

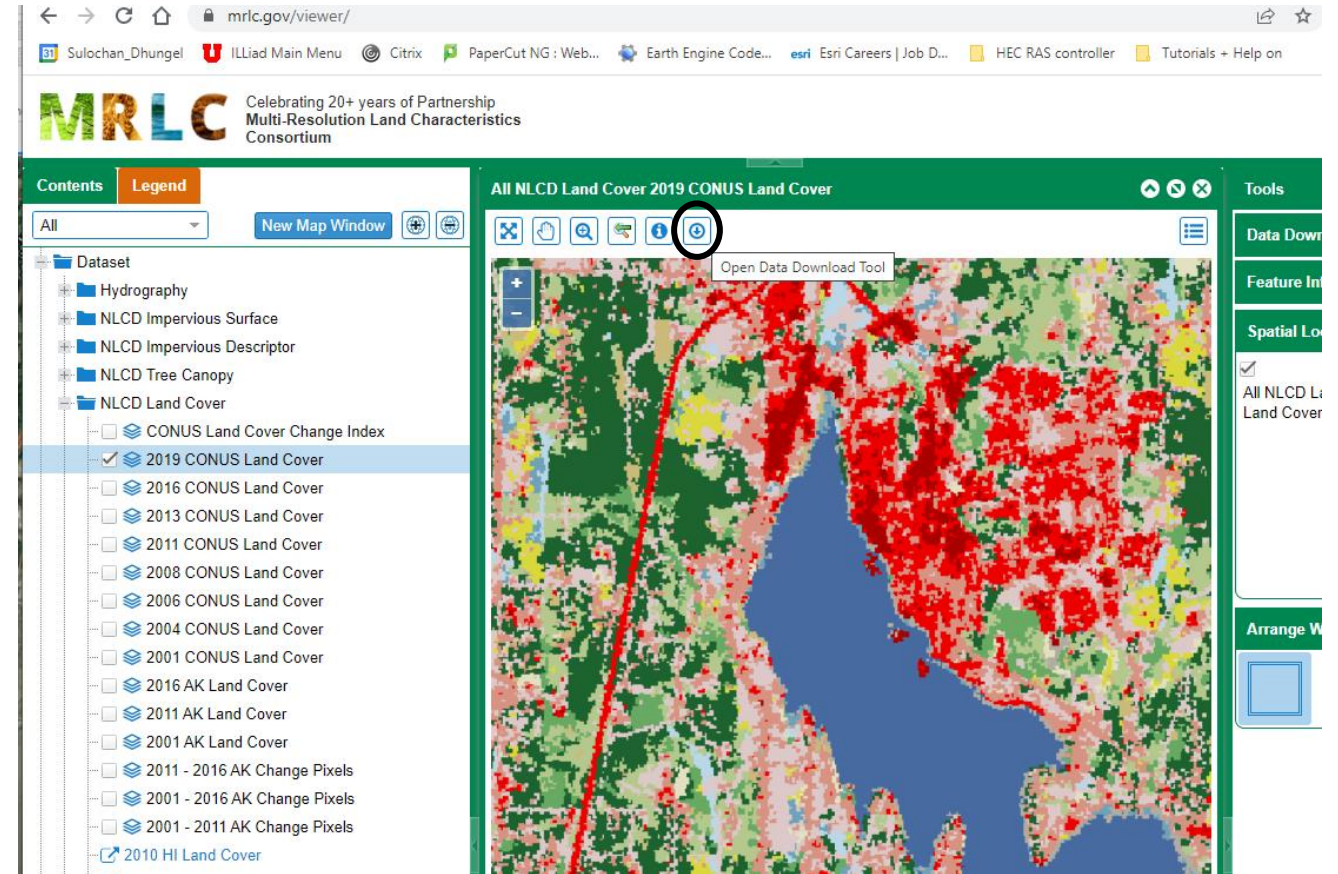
4. On the launch tool, select the land cover data you want (“2019 CONUS Land Cover”).

Also zoom to the area you want the data for.



Getting NLCD raster

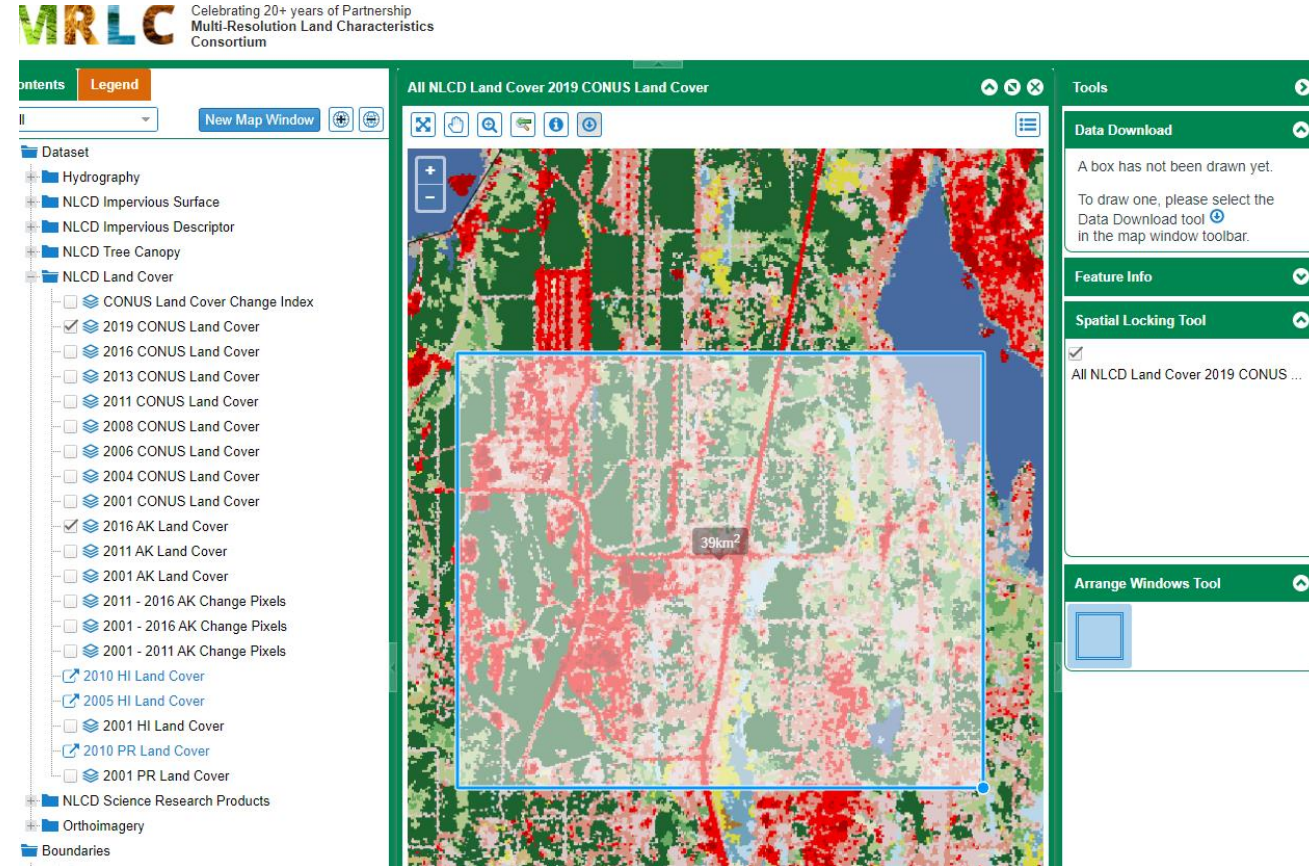
5. Press the Data download tool.



Getting NLCD raster

5. Press the Data download tool.

6. Then draw a rectangle around the area you want data for.



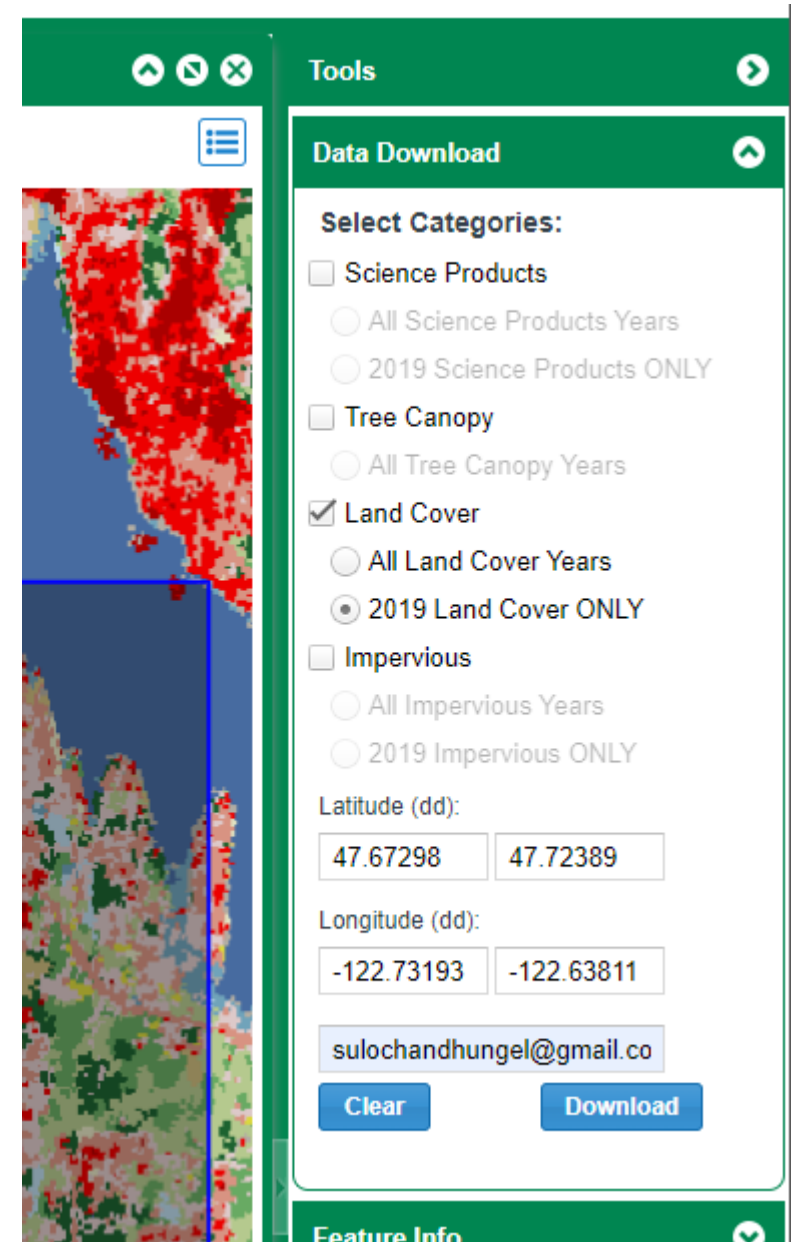
Getting NLCD raster

5. Press the Data download tool.

6. Then draw a rectangle around the area you want data for.

7. Under Data Download on the right, check “Land Cover -> 2019 Land Cover ONLY” and provide your email address.

8. Press Download.

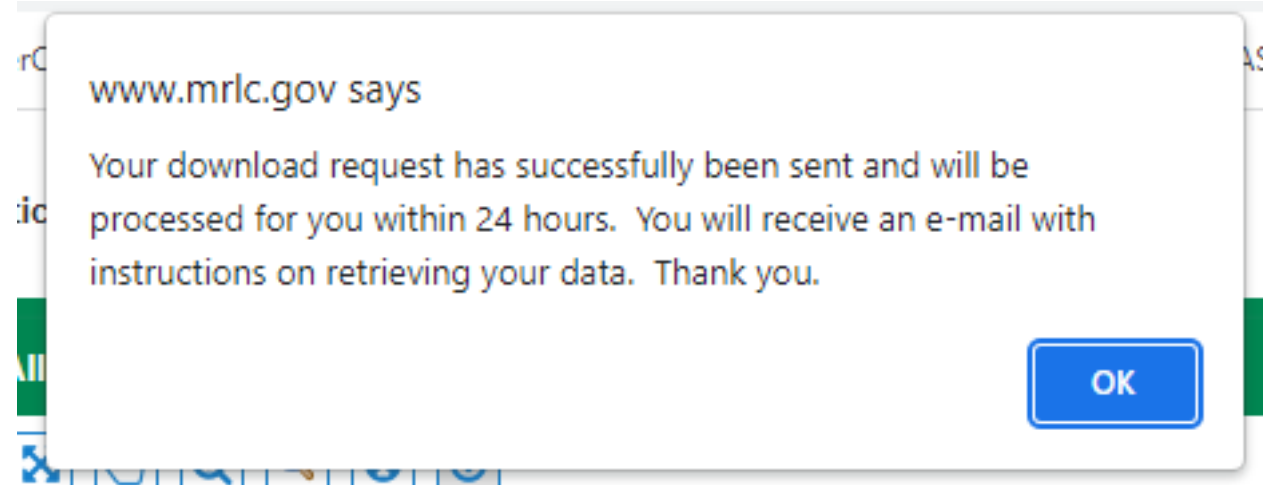


The screenshot shows a web application interface for downloading data. On the left is a map with a red rectangle highlighting a specific area. On the right is a 'Tools' panel with a 'Data Download' section. This section includes a 'Select Categories:' list with checkboxes for 'Science Products', 'Tree Canopy', 'Land Cover', and 'Impervious'. Under 'Land Cover', there are radio buttons for 'All Land Cover Years' and '2019 Land Cover ONLY', with the latter being selected. Below the categories are input fields for 'Latitude (dd):' (47.67298, 47.72389) and 'Longitude (dd):' (-122.73193, -122.63811). An email address 'sulochandhungel@gmail.co' is entered in a text field. At the bottom of the form are 'Clear' and 'Download' buttons. A 'Feature Info' section is partially visible at the very bottom.

Getting NLCD raster

9. You will get a message saying that your request has been successfully sent. Press OK.

(Usually the email comes in immediately)



Getting NLCD raster

9. You will get a message saying that your request has been successfully sent. Press OK.

(Usually the email comes in immediately)

10. From the email, download the data as zip file.



MRLC Product Download Is Ready Σ Inbox x

no-reply@usgs.gov

to me ▼

Hello,

Your selected data is ready to be download: <https://www.mrlc.gov/downloads/sciwe>

The URL can lead you to the map viewer with selected download bbox: <https://www>

NOTE: This download will be available for the next 24 hours (2022-03-31 15:31:56)

Thank You!

MRLC Team

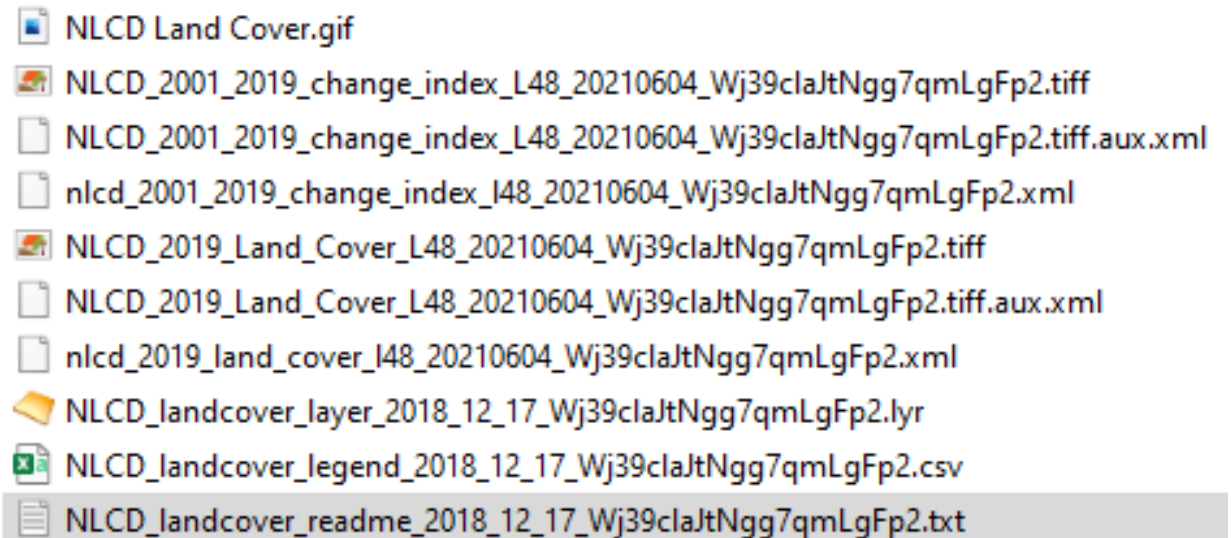
Getting NLCD raster

9. You will get a message saying that your request has been successfully sent. Press OK.

(Usually the email comes in immediately)

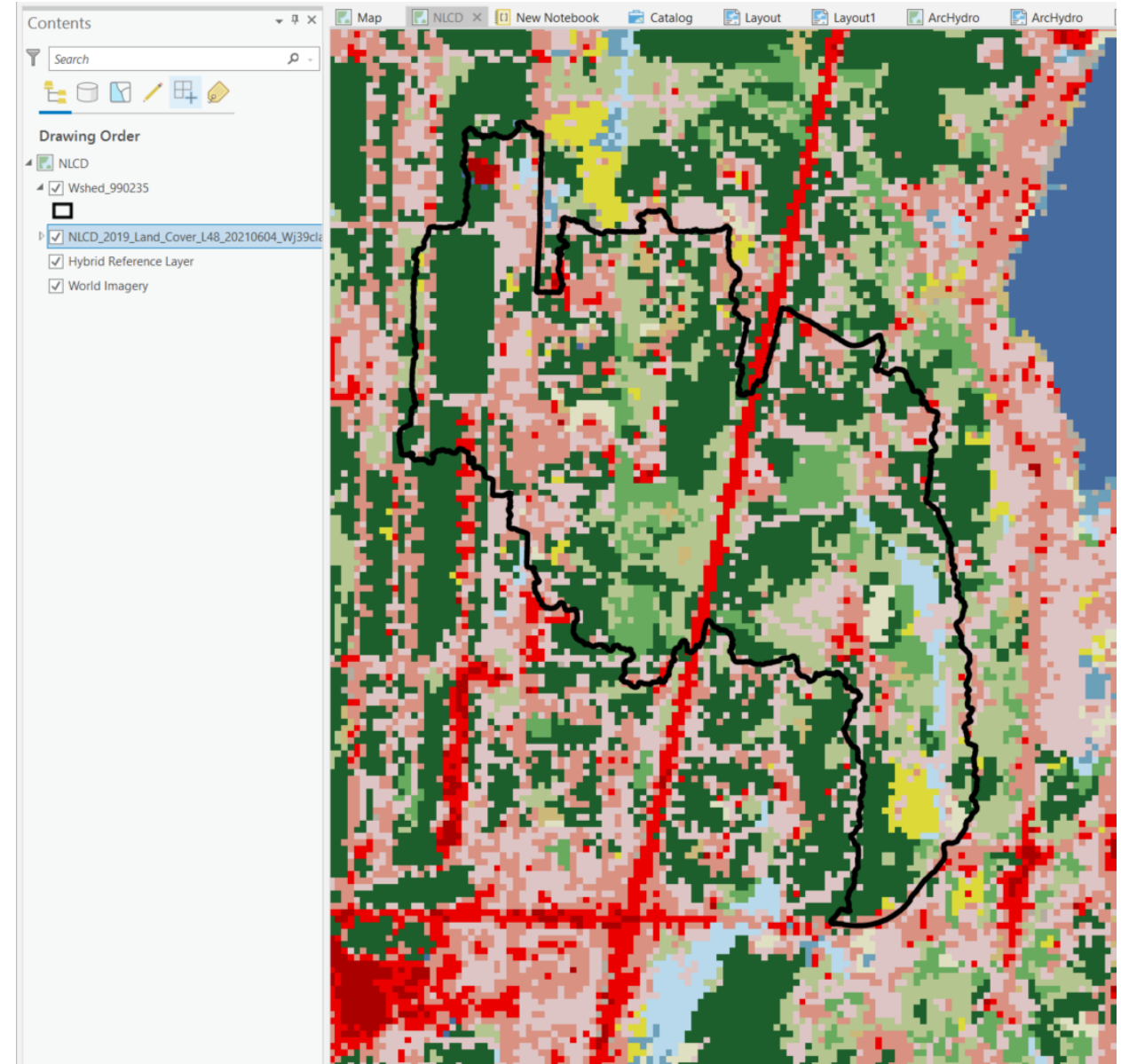
10. From the email, download the data as zip file.

11. Unzip the file and you will get the required raster, layers and legend table.



Getting NLCD raster

12. Load the file with prefix
“NLCD_2019_Land_Cover_L48_
” into GIS and check.

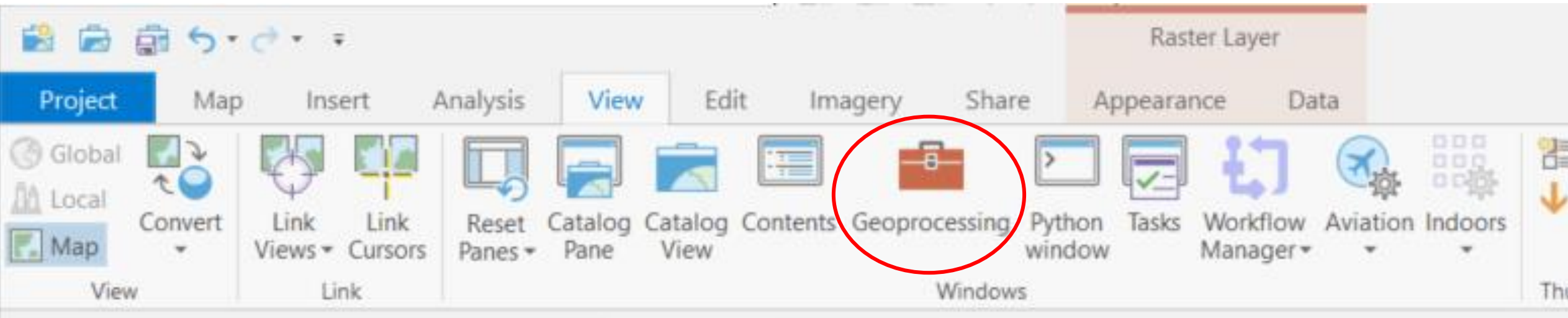


Steps for NLCD area calculation

1. Clip NLCD raster
2. Create attribute table
3. Add field for LUName, Area_Sqft, Area_Acres
4. Join with Legend Table using Value and Value2
5. Use Calculate field to get the LUName field populated
6. Remove all joins
7. Get Cell size X and Y from Properties -> Raster Information
8. Calculate the area using field calculator

Getting the area of each Land use within watershed

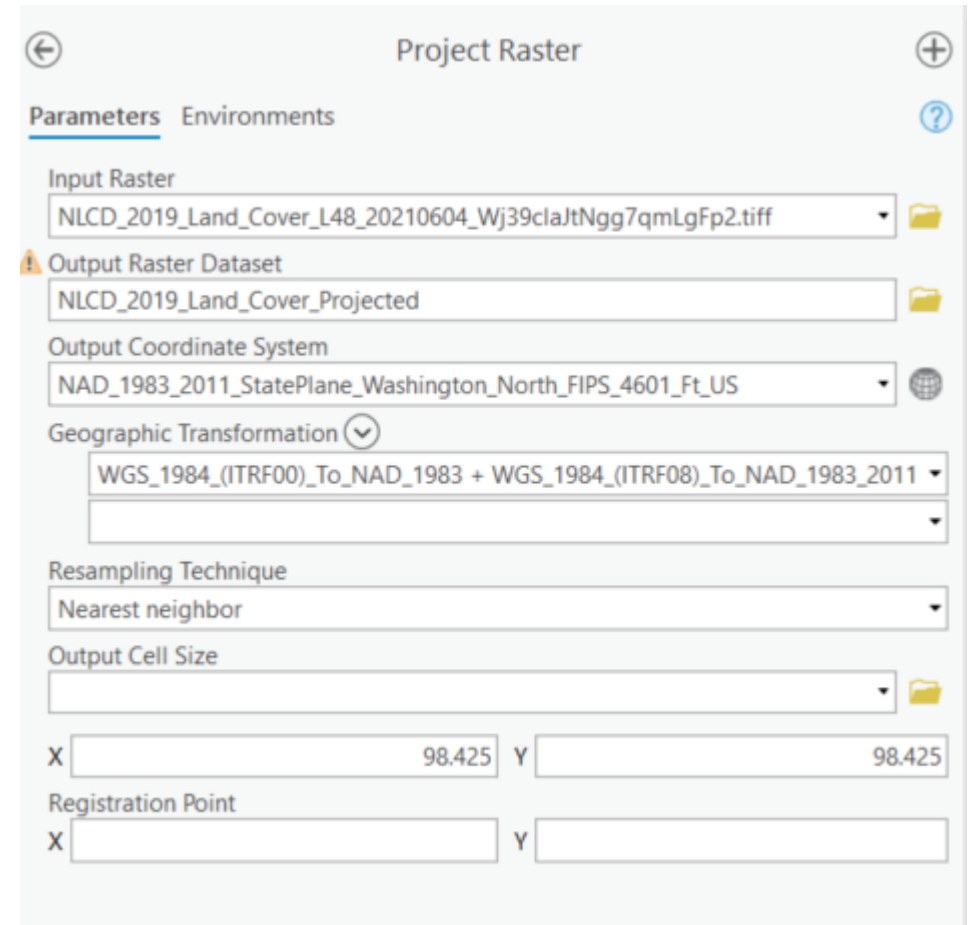
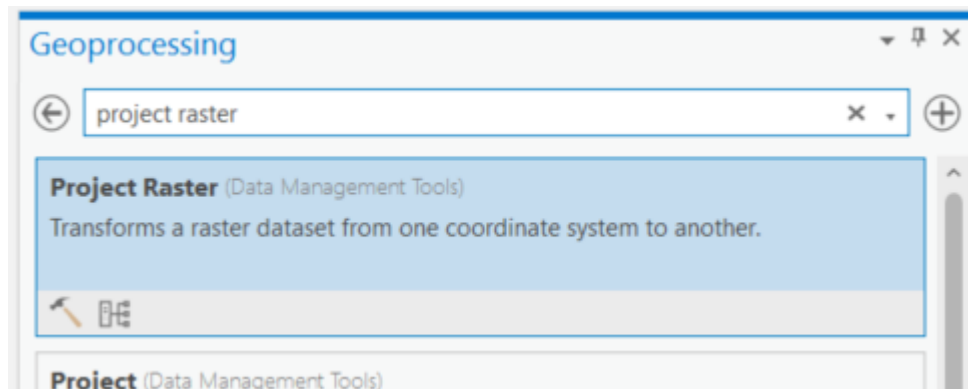
1. On the ribbon, go to View and open Geoprocessing, if it is not already open



Getting the area of each Land use within watershed

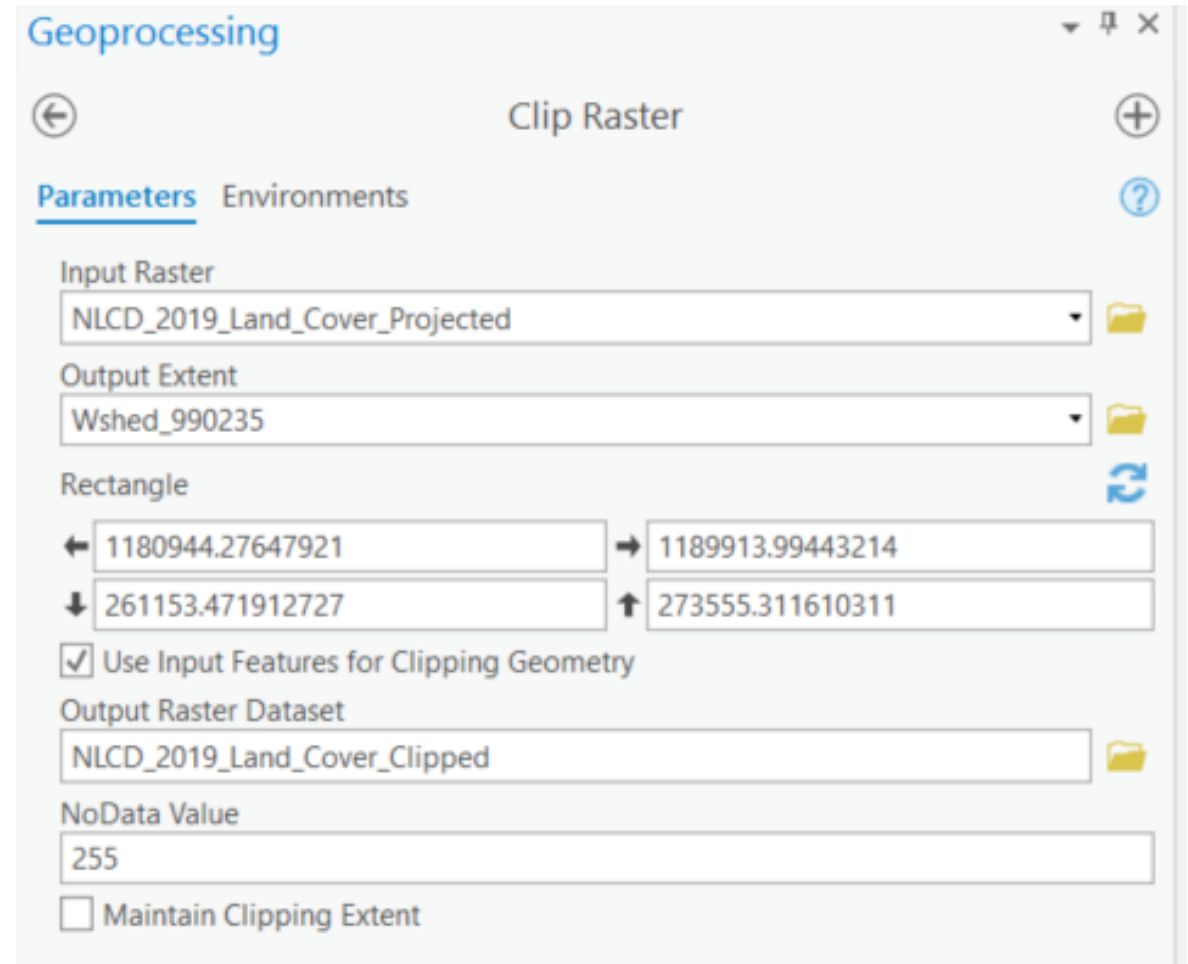
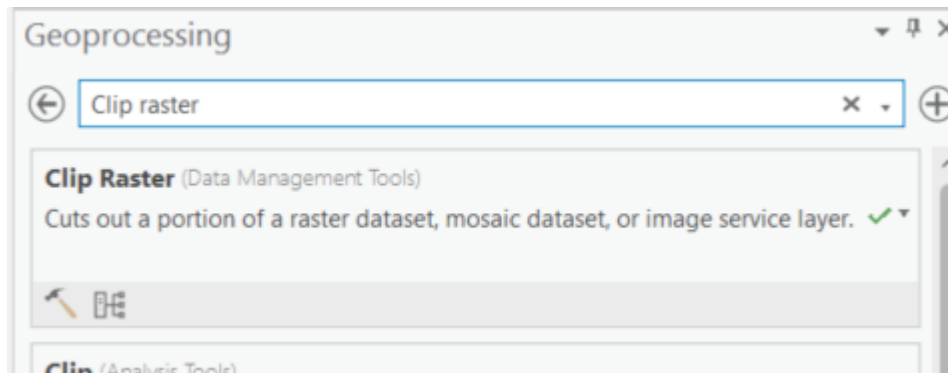
2. The projection of the download raster file is “Albers_Conical_Equal_Area”. Reproject it to the projection we need using project raster tool.

Make sure to use “Nearest Neighbor” as the resampling technique.



Getting the area of each Land use within watershed

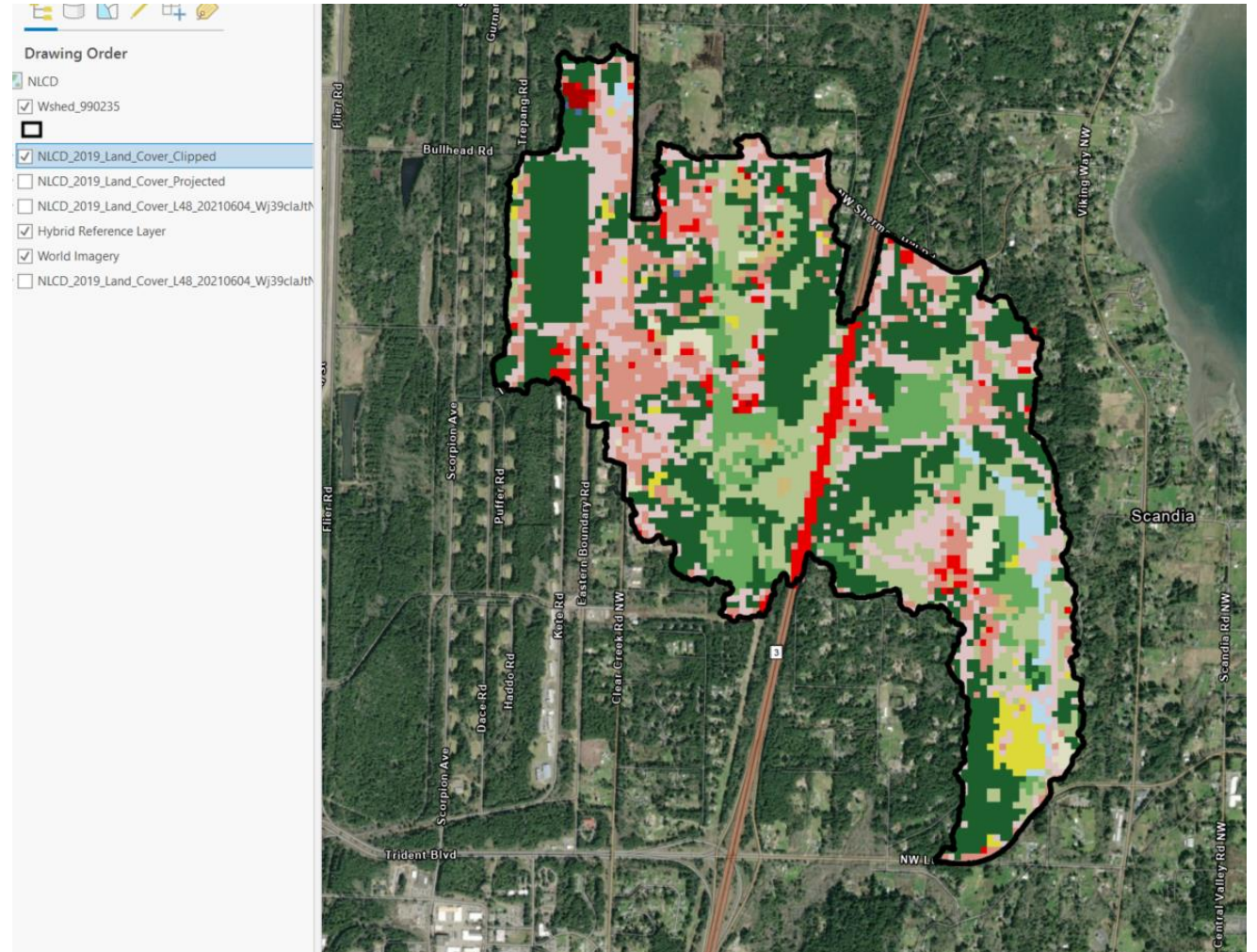
3. Use “Clip Raster” to clip the raster to the watershed boundary. Make sure to check “Use Input Features for Clipping Geometry”



Getting the area of each Land use within watershed

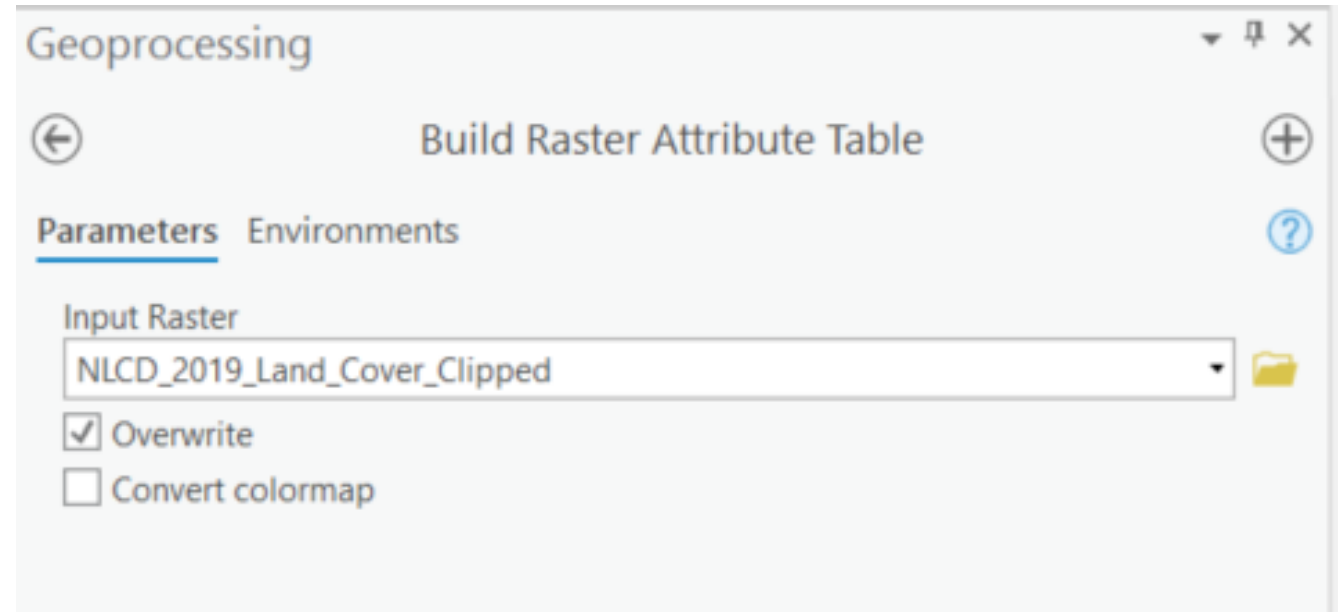
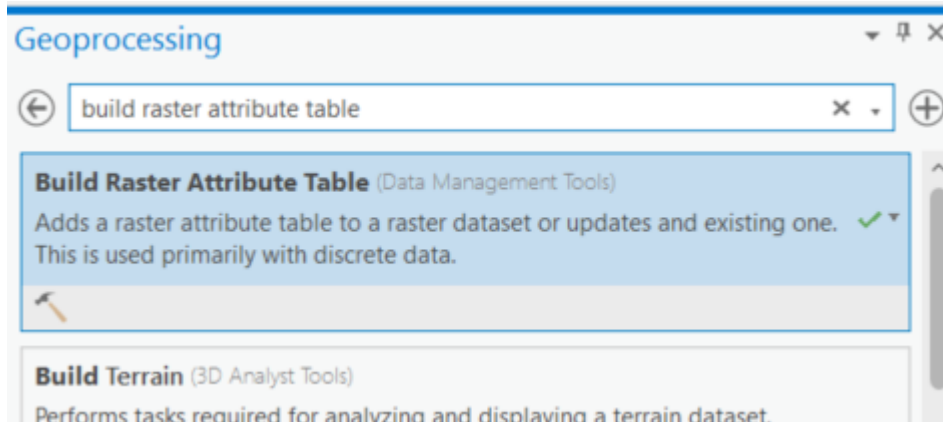
3. Use “Clip Raster” to clip the raster to the watershed boundary. Make sure to check “Use Input Features for Clipping Geometry”

The result is Land use data within Watershed area.



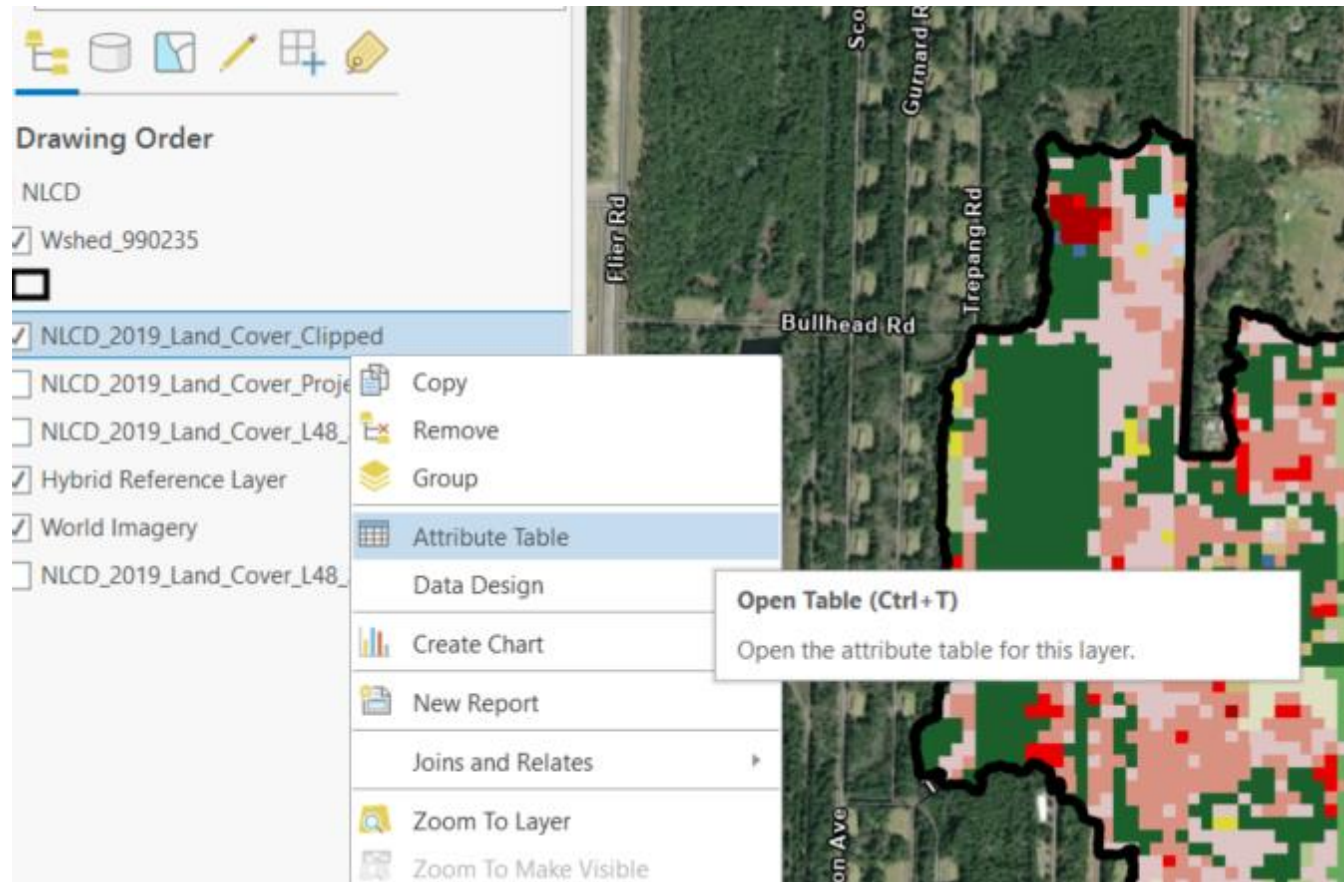
Getting the area of each Land use within watershed

4. Use “Build Raster Attribute Table” to overwrite the attribute table.



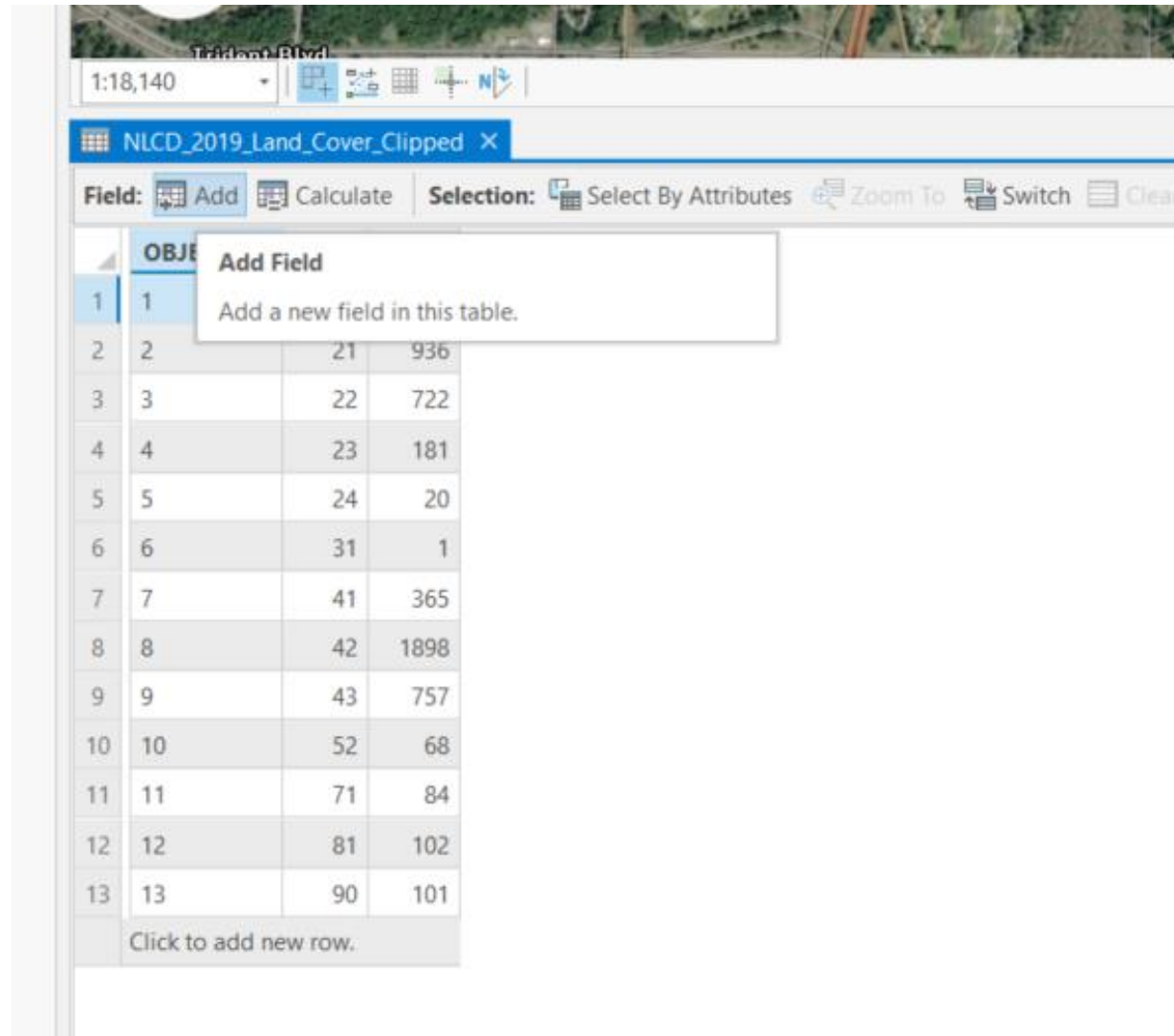
Getting the area of each Land use within watershed

5. Right click on the clipped raster in Contents window and open Attribute table.



Getting the area of each Land use within watershed

6. When the attribute table opens, click on “Add Field Button”.



The screenshot shows the ArcGIS attribute table for the layer 'NLCD_2019_Land_Cover_Clippped'. The 'Field' menu is open, displaying the 'Add' button. The table contains 13 rows of data. The first column is 'OBJECTID', the second is 'AREA', and the next two columns are unlabeled. The data is as follows:

OBJECTID	AREA		
1	1	21	936
2	2	22	722
3	3	23	181
4	4	24	20
5	5	31	1
6	6	41	365
7	7	42	1898
8	8	43	757
9	9	52	68
10	10	71	84
11	11	81	102
12	12	90	101
13	13		

Click to add new row.

Getting the area of each Land use within watershed

7. In the field window, create three fields:

LUName – Data Type as “Text”

Area_sqft – Data Type as “Float”

Area_acres – Data Type as “Float”

NLCD_2019_Land_Cover_Clippped

Fields: NLCD_2019_..._Clipped (NLCD)

Current Layer

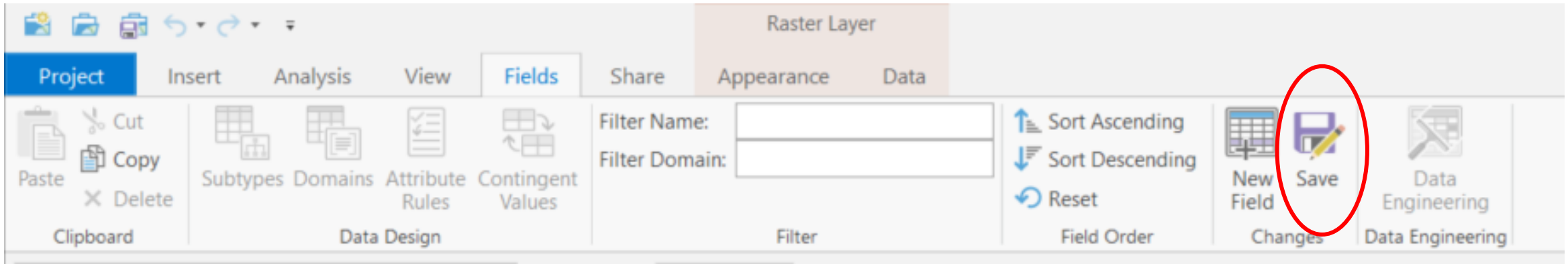
NLCD_2019_Land_Cover_Clippped (1)

	<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 checked="" type="checkbox"/>	OBJECTID	OBJECTID	Object ID	<input type="checkbox"/>	<input type="checkbox"/>	Numeric			
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Value	Value	Long	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Count	Count	Double	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LUName		Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Area_sqft		Float	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Area_Acres		Float	<input checked="" type="checkbox"/>	<input type="checkbox"/>				

Click here to add a new field.


Getting the area of each Land use within watershed

8. In the Ribbon, under Fields -> Press Save




Getting the area of each Land use within watershed

9. Close the Fields editor

NLCD_2019_Land_Cover_Clippped Fields: NLCD_2019_L..._Clipped (NLCD) 

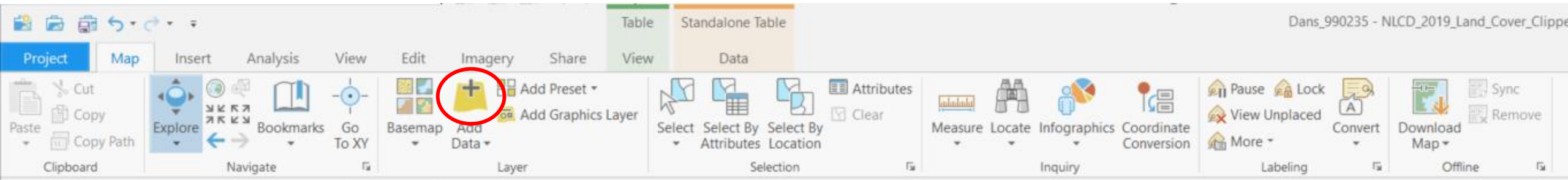
Current Layer: NLCD_2019_Land_Cover_Clippped (I ▾)

	<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 checked="" type="checkbox"/>	OBJECTID	OBJECTID	Object ID	<input type="checkbox"/>	<input type="checkbox"/>	Numeric				
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Value	Value	Long	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric				
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Count	Count	Double	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric				
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LUName	LUName	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Area_sqft	Area_sqft	Float	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric				
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Area_Acres	Area_Acres	Float	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric				

[Click here to add a new field.](#)

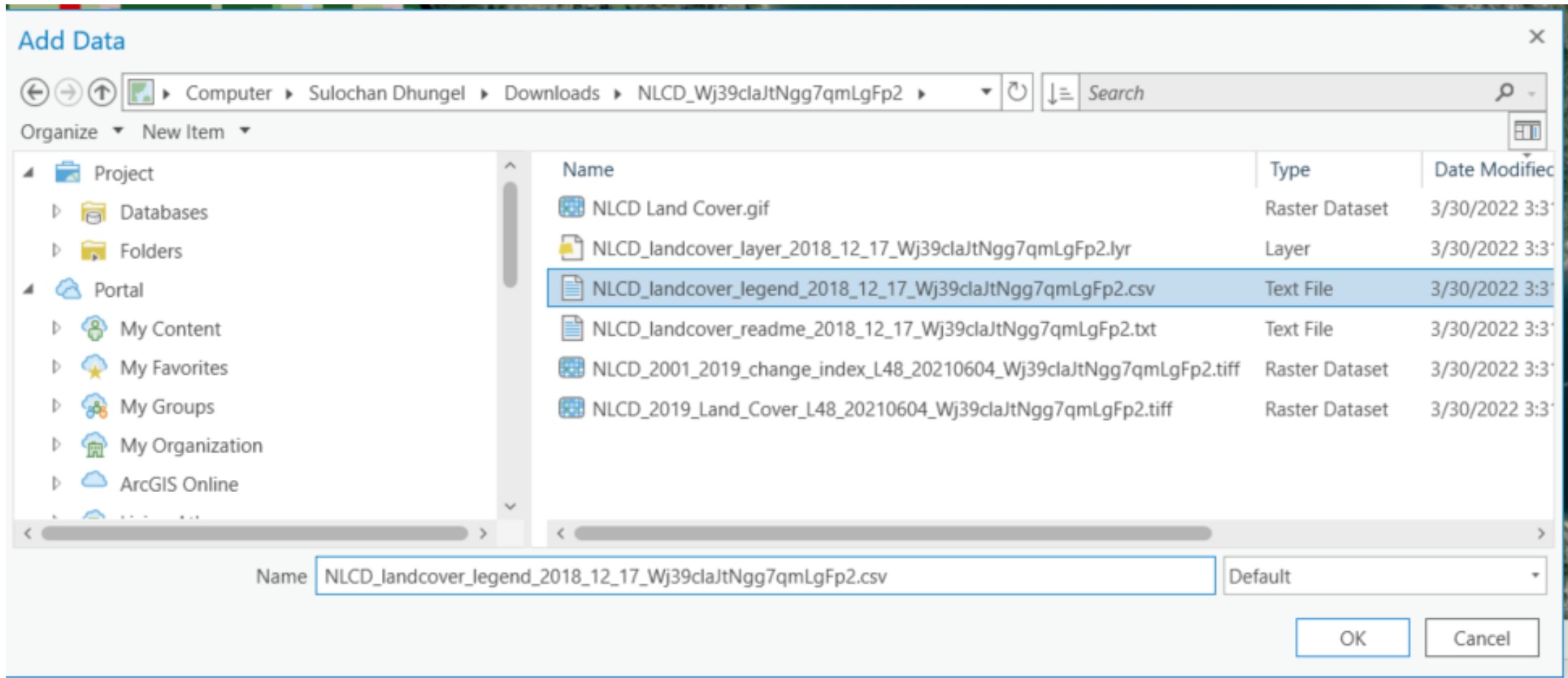
Getting the area of each Land use within watershed

10. On the Ribbon -> Map -> Press “Add Data”



Getting the area of each Land use within watershed

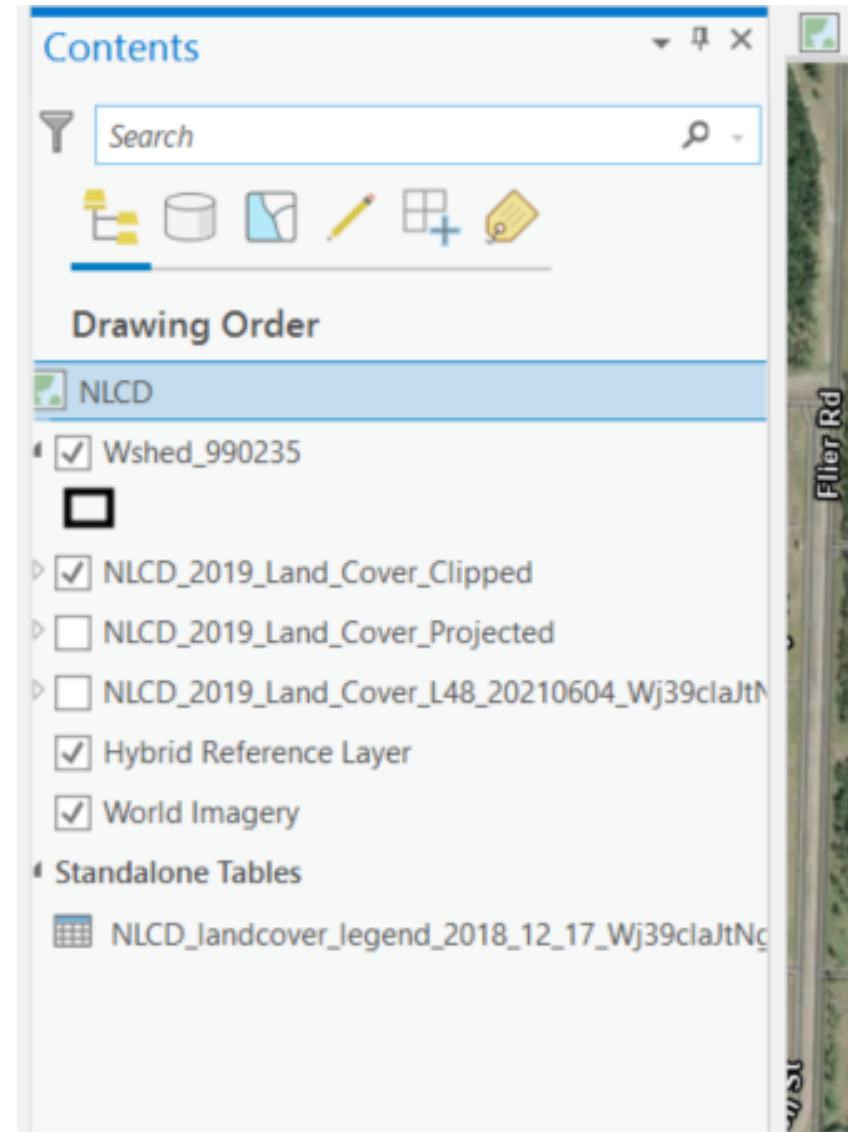
10. Find the Landcover legend csv file from the folder which was downloaded. Press OK.



Getting the area of each Land use within watershed

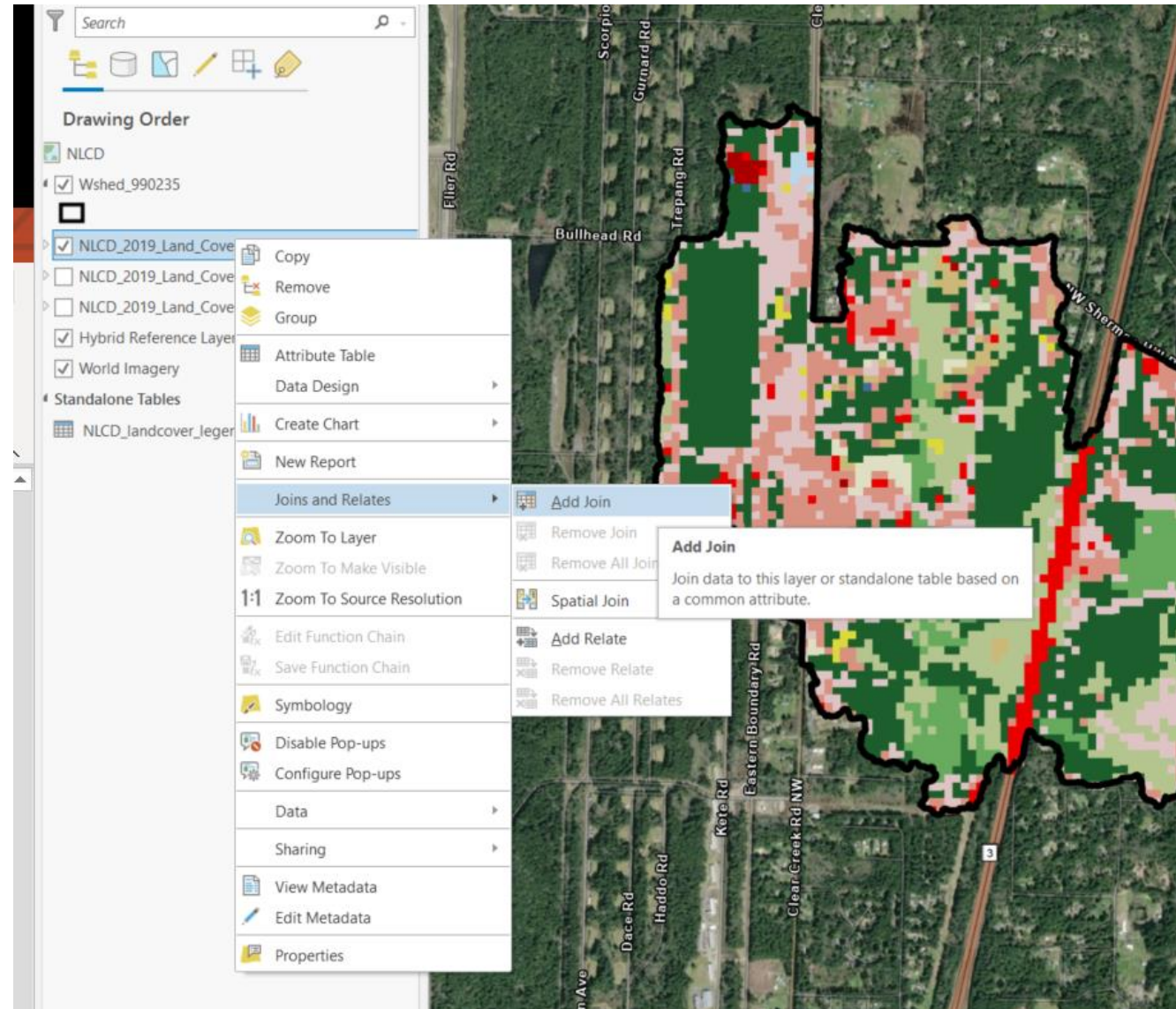
11. The csv file gets loaded as a standalone table.

This csv table relates the Land use ID to Landuse Name. It's a complete table of all landuse types and ID (It is not only for the area downloaded).



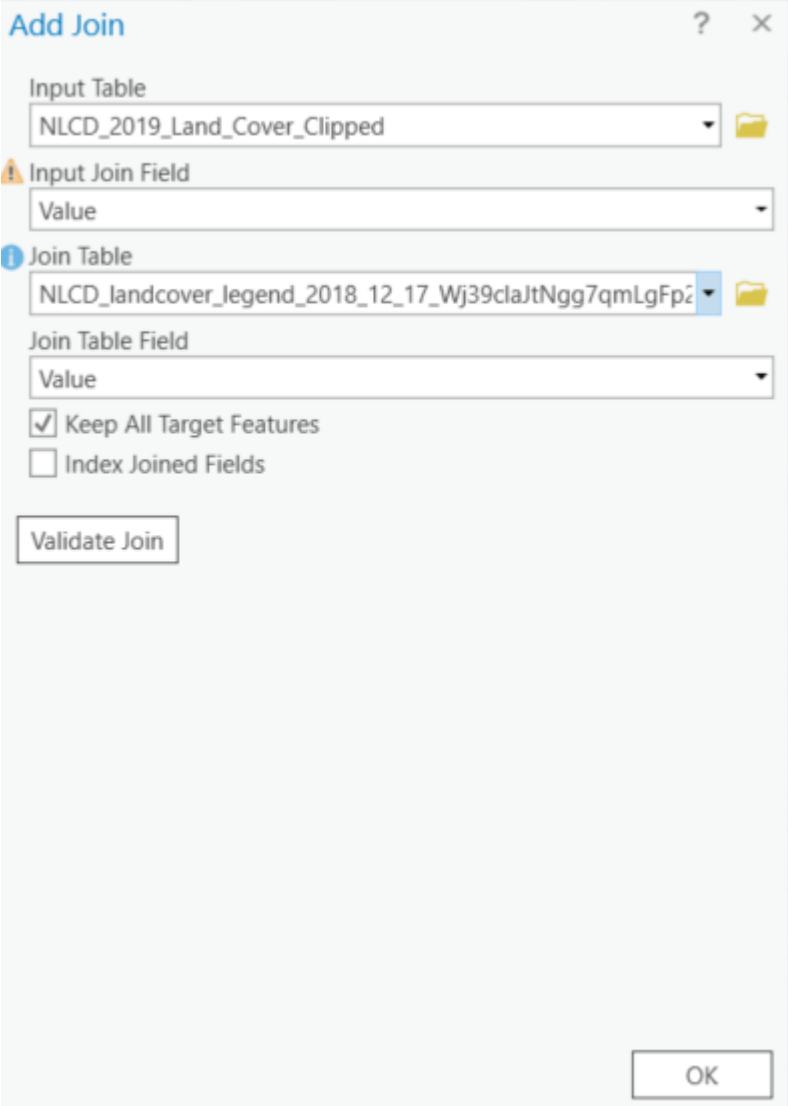
Getting the area of each Land use within watershed

12. Right click the clipped NLCD raster -> Go to Joins and Relates -> Press “Add Join”



Getting the area of each Land use within watershed

13. In the Add join dialog box, Use “Value” as the input join field and “Value” as the Join Table Field.



The screenshot shows the 'Add Join' dialog box with the following settings:

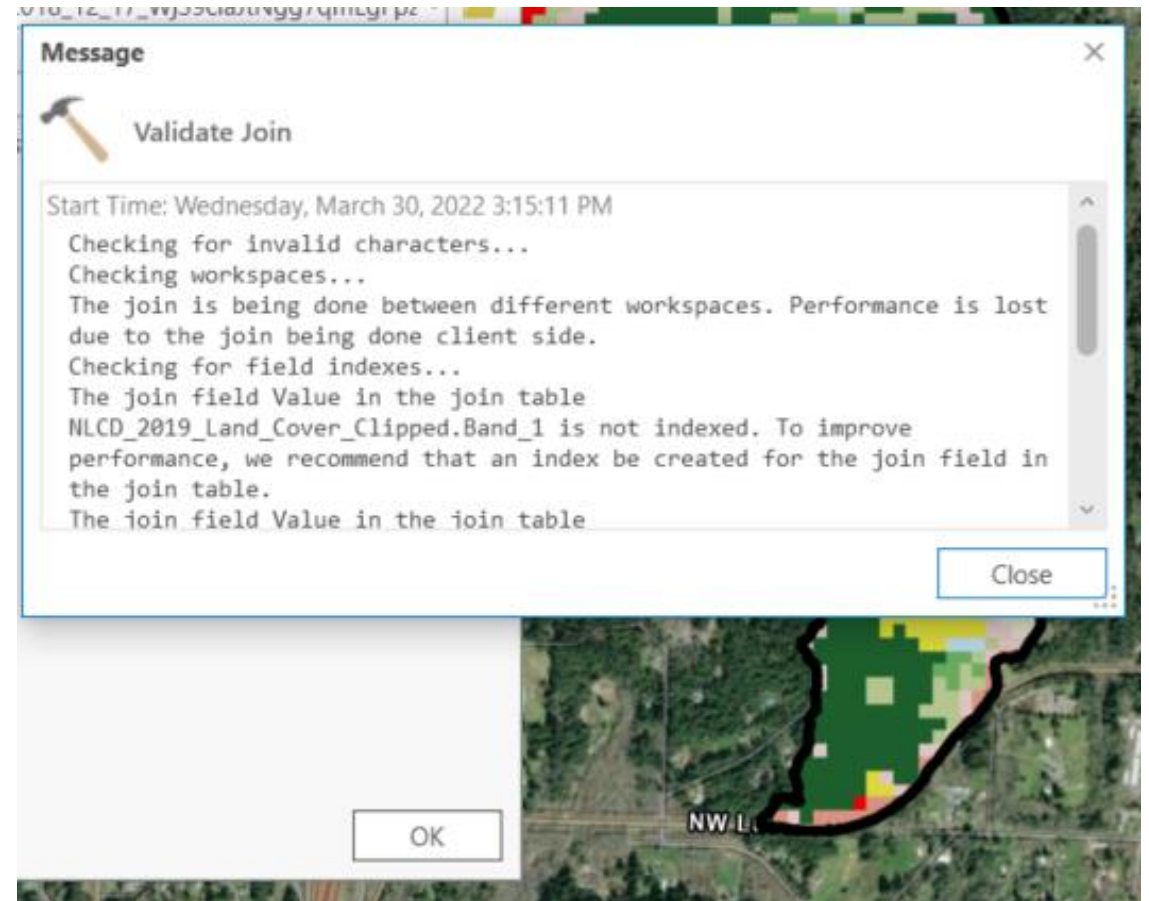
- Input Table:** NLCD_2019_Land_Cover_Clippped
- Input Join Field:** Value
- Join Table:** NLCD_landcover_Legend_2018_12_17_Wj39claJtNgg7qmLgFp2
- Join Table Field:** Value
- ☒ Keep All Target Features
- ☐ Index Joined Fields
- Buttons:** Validate Join, OK

Getting the area of each Land use within watershed

13. In the Add join dialog box, Use “Value” as the input join field and “Value” as the Join Table Field.

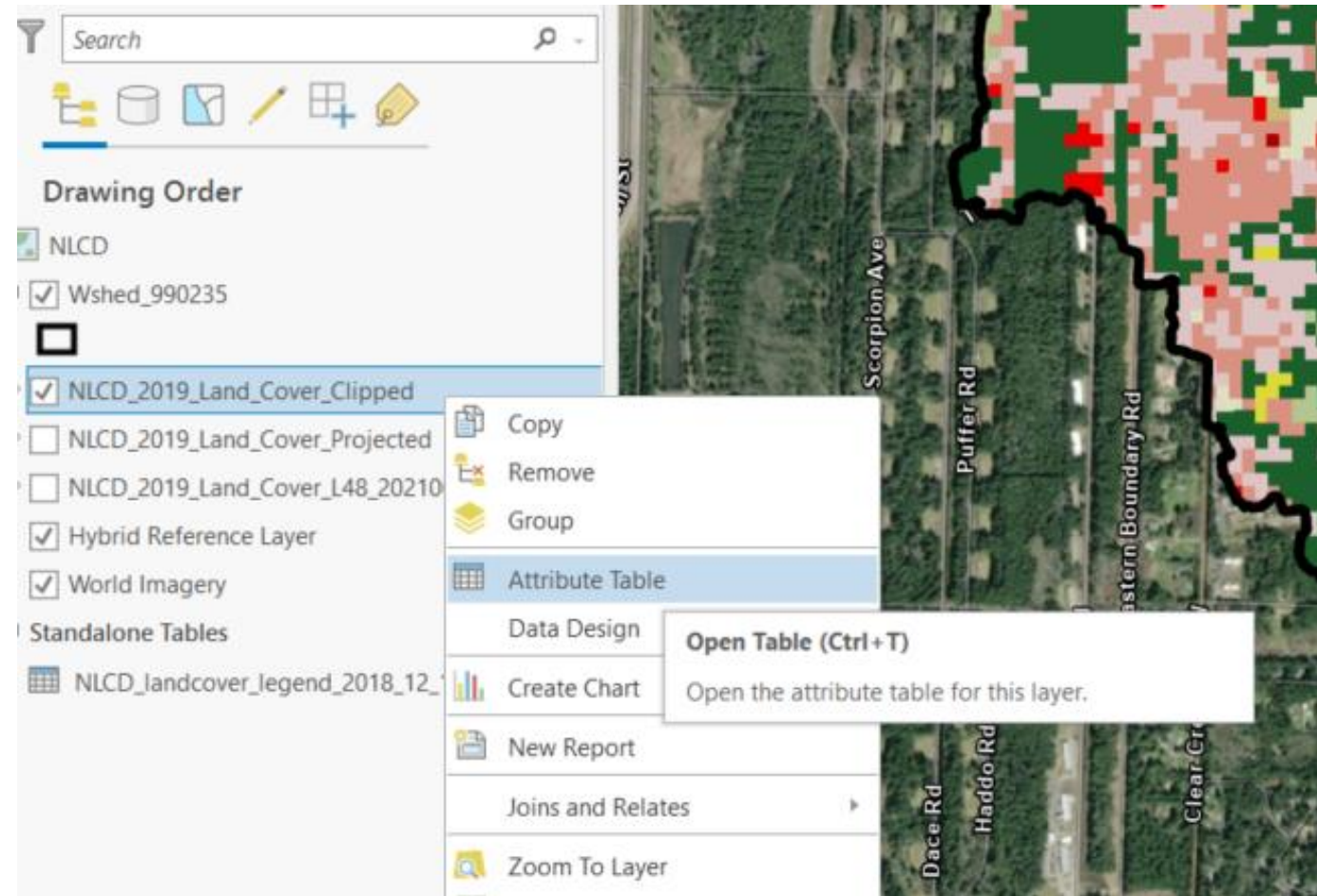
14. Click Validate Join. Usually there should not be errors, but if the CSV is not loaded properly or incorrect CSV is loaded, it might show some issues.

After it validates, close the box and press OK.



Getting the area of each Land use within watershed

15. Right click on the clipped raster and open the attribute table



Getting the area of each Land use within watershed

16. The attribute table shows value and legend has been joined from the CSV table.

1:18,140 1,180,704.73E 262,174.47N ftUS

NLCD_2019_Land_Cover_Clipped X

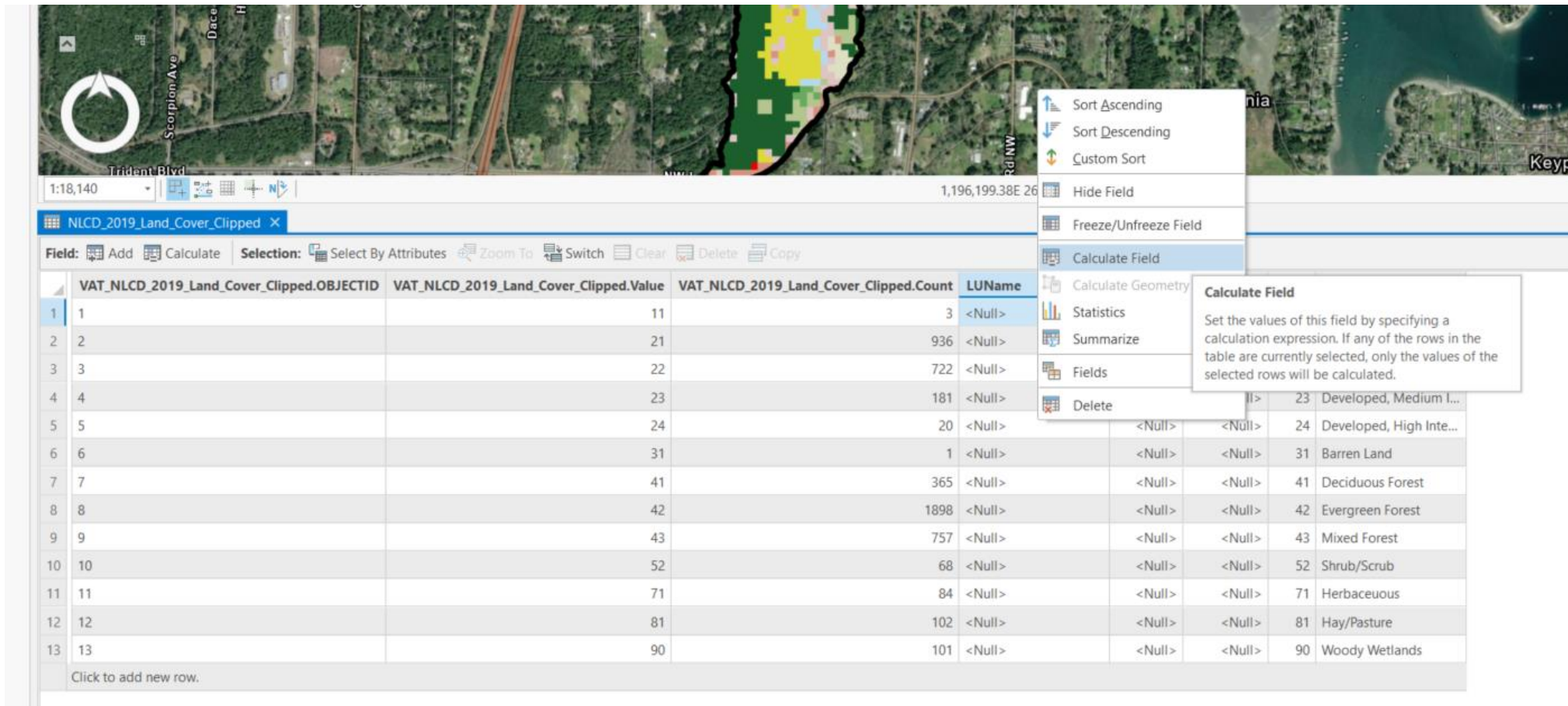
Field: Add Calculate **Selection:** Select By Attributes Zoom To Switch Clear Delete Copy

	VAT_NLCD_2019_Land_Cover_Clipped.OBJECTID	VAT_NLCD_2019_Land_Cover_Clipped.Value	VAT_NLCD_2019_Land_Cover_Clipped.Count	LUName	Area_sqft	Area_Acres	Value	Legend
1	1	11	3	<Null>	<Null>	<Null>	11	Open Water
2	2	21	936	<Null>	<Null>	<Null>	21	Developed, Open Sp...
3	3	22	722	<Null>	<Null>	<Null>	22	Developed, Low Inten...
4	4	23	181	<Null>	<Null>	<Null>	23	Developed, Medium I...
5	5	24	20	<Null>	<Null>	<Null>	24	Developed, High Inte...
6	6	31	1	<Null>	<Null>	<Null>	31	Barren Land
7	7	41	365	<Null>	<Null>	<Null>	41	Deciduous Forest
8	8	42	1898	<Null>	<Null>	<Null>	42	Evergreen Forest
9	9	43	757	<Null>	<Null>	<Null>	43	Mixed Forest
10	10	52	68	<Null>	<Null>	<Null>	52	Shrub/Scrub
11	11	71	84	<Null>	<Null>	<Null>	71	Herbaceous
12	12	81	102	<Null>	<Null>	<Null>	81	Hay/Pasture
13	13	90	101	<Null>	<Null>	<Null>	90	Woody Wetlands

Click to add new row.

Getting the area of each Land use within watershed

16. Right click on the heading “LUName” and press “Calculate Field”



The screenshot shows a GIS application interface. At the top, there is a map view displaying a watershed boundary over an aerial image. Below the map is a data table titled "NLCD_2019_Land_Cover_Clipped". The table has four columns: "VAT_NLCD_2019_Land_Cover_Clipped.OBJECTID", "VAT_NLCD_2019_Land_Cover_Clipped.Value", "VAT_NLCD_2019_Land_Cover_Clipped.Count", and "LUName". The "LUName" column is currently empty, containing only "<Null>" values. A context menu is open over the "LUName" column header, with the "Calculate Field" option selected. A tooltip for "Calculate Field" is also visible, explaining that it sets the values of the field by specifying a calculation expression.

	VAT_NLCD_2019_Land_Cover_Clipped.OBJECTID	VAT_NLCD_2019_Land_Cover_Clipped.Value	VAT_NLCD_2019_Land_Cover_Clipped.Count	LUName
1	1	11	3	<Null>
2	2	21	936	<Null>
3	3	22	722	<Null>
4	4	23	181	<Null>
5	5	24	20	<Null>
6	6	31	1	<Null>
7	7	41	365	<Null>
8	8	42	1898	<Null>
9	9	43	757	<Null>
10	10	52	68	<Null>
11	11	71	84	<Null>
12	12	81	102	<Null>
13	13	90	101	<Null>

Click to add new row.

Getting the area of each Land use within watershed

17. On the dialog box that opens, click on the field “...LUName” and then double click the field name which was legend in the CSV file under “fields”. Follow Steps 1, 2, 3, 4 and 5 as shown below.

The screenshot shows the 'Calculate Field' dialog box in QGIS. The 'Input Table' is 'NLCD_2019_Land_Cover_Clippped'. The 'Field Name (Existing or New)' is 'LUName'. The 'Expression Type' is 'Python 3'. The 'Expression' field contains the text: `VAT_NLCD_2019_Land_Cover_Clippped.LUName = NLCD_landcover_legend_2018_12_17_Wj39claJtNgg7qmLgFp2.csv.Legend!`. The 'Fields' list on the left includes 'VAT_NLCD_2019_Land_Cover_Clippped.LUName'. The 'Helpers' list on the right includes functions like '.as_integer_ratio()'. Five red annotations with arrows point to specific elements: 1. 'Click Here' points to the 'Input Table' dropdown. 2. 'Scroll to find the legend here' points to the 'Fields' list. 3. 'Double click on this field' points to 'VAT_NLCD_2019_Land_Cover_Clippped.LUName'. 4. 'The field shows up here' points to the 'Expression' field. 5. 'Click Apply' points to the 'Apply' button.

2. Scroll to find the legend here

3. Double click on this field

1. Click Here

4. The field shows up here

5. Click Apply

Getting the area of each Land use within watershed

18. Close the dialog box after complete. If you check the attribute table now LUName is populated with the legend.

NLCD_2019_Land_Cover_Clipped

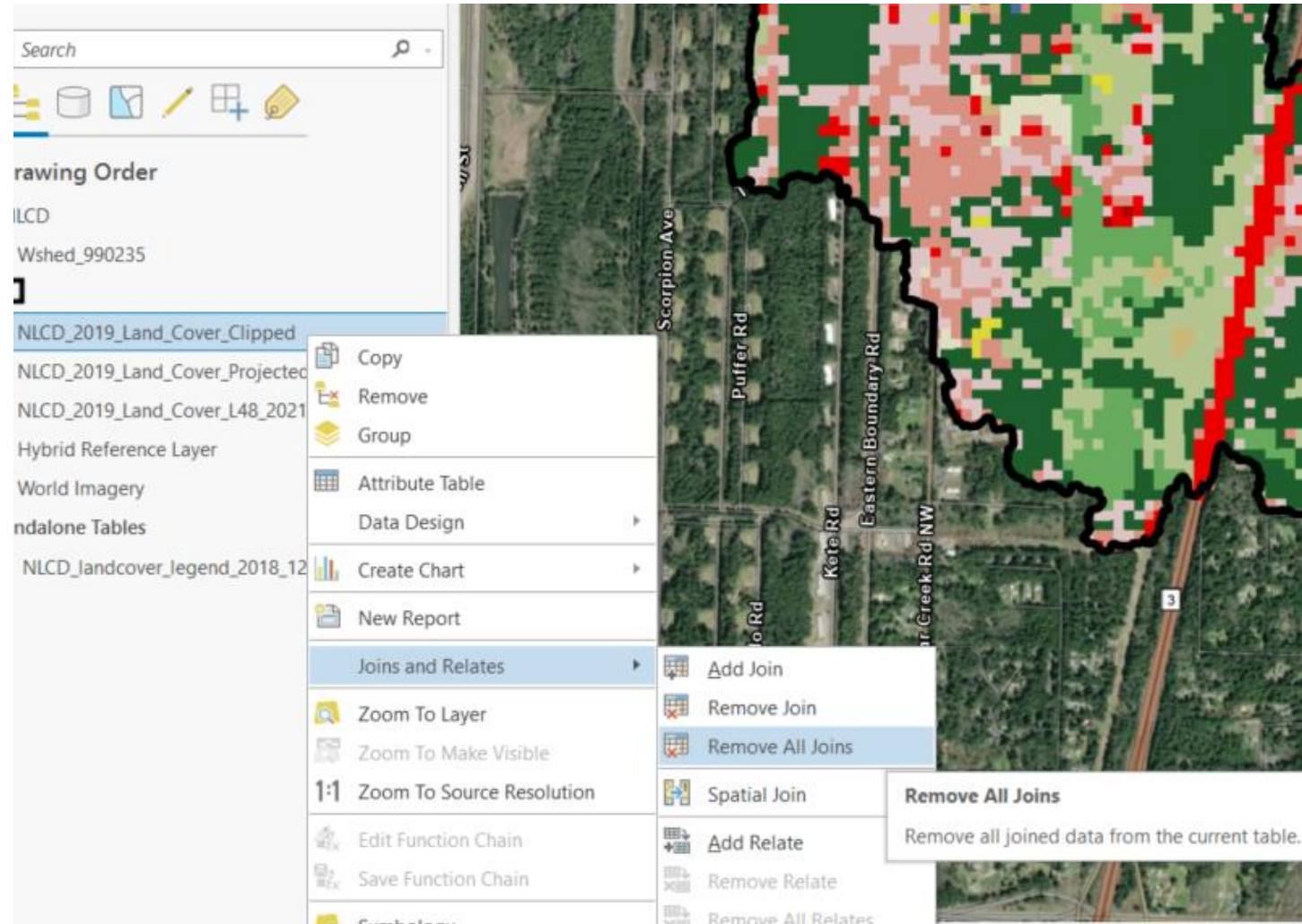
Field: Add Calculate | **Selection:** Select By Attributes Zoom To Switch Clear Delete Copy

VAT_NLCD_2019_Land_Cover_Clipped.OBJECTID	VAT_NLCD_2019_Land_Cover_Clipped.Value	VAT_NLCD_2019_Land_Cover_Clipped.Count	LUName	Area_sqft	Area_Acres	Value	Legend
1	11	3	Open Water	<Null>	<Null>	11	Open Water
2	21	936	Developed, Open Sp...	<Null>	<Null>	21	Developed, Open Sp...
3	22	722	Developed, Low Inten...	<Null>	<Null>	22	Developed, Low Inten...
4	23	181	Developed, Medium I...	<Null>	<Null>	23	Developed, Medium I...
5	24	20	Developed, High Inte...	<Null>	<Null>	24	Developed, High Inte...
6	31	1	Barren Land	<Null>	<Null>	31	Barren Land
7	41	365	Deciduous Forest	<Null>	<Null>	41	Deciduous Forest
8	42	1898	Evergreen Forest	<Null>	<Null>	42	Evergreen Forest
9	43	757	Mixed Forest	<Null>	<Null>	43	Mixed Forest
10	52	68	Shrub/Scrub	<Null>	<Null>	52	Shrub/Scrub
11	71	84	Herbaceous	<Null>	<Null>	71	Herbaceous
12	81	102	Hay/Pasture	<Null>	<Null>	81	Hay/Pasture
13	90	101	Woody Wetlands	<Null>	<Null>	90	Woody Wetlands

Click to add new row.

Getting the area of each Land use within watershed

19. Right click the raster ->
Go to Joins and Relates ->
and click “Remove all
Joins”. Press “Yes” to
confirm.



Getting the area of each Land use within watershed

21. Right click the raster -> Go to Properties

The screenshot displays the ArcGIS Desktop interface. On the left, the 'Drawing Order' pane lists several layers, including 'NLCD_2019_Land_Cover_Clipped'. A right-click context menu is open over this layer, with the 'Properties' option selected at the bottom. The background map shows a residential area with roads labeled 'Scorpion Ave', 'Puffer Rd', 'Dace Rd', 'Haddo Rd', and 'Kete Rd'. A table at the bottom right shows land use data:

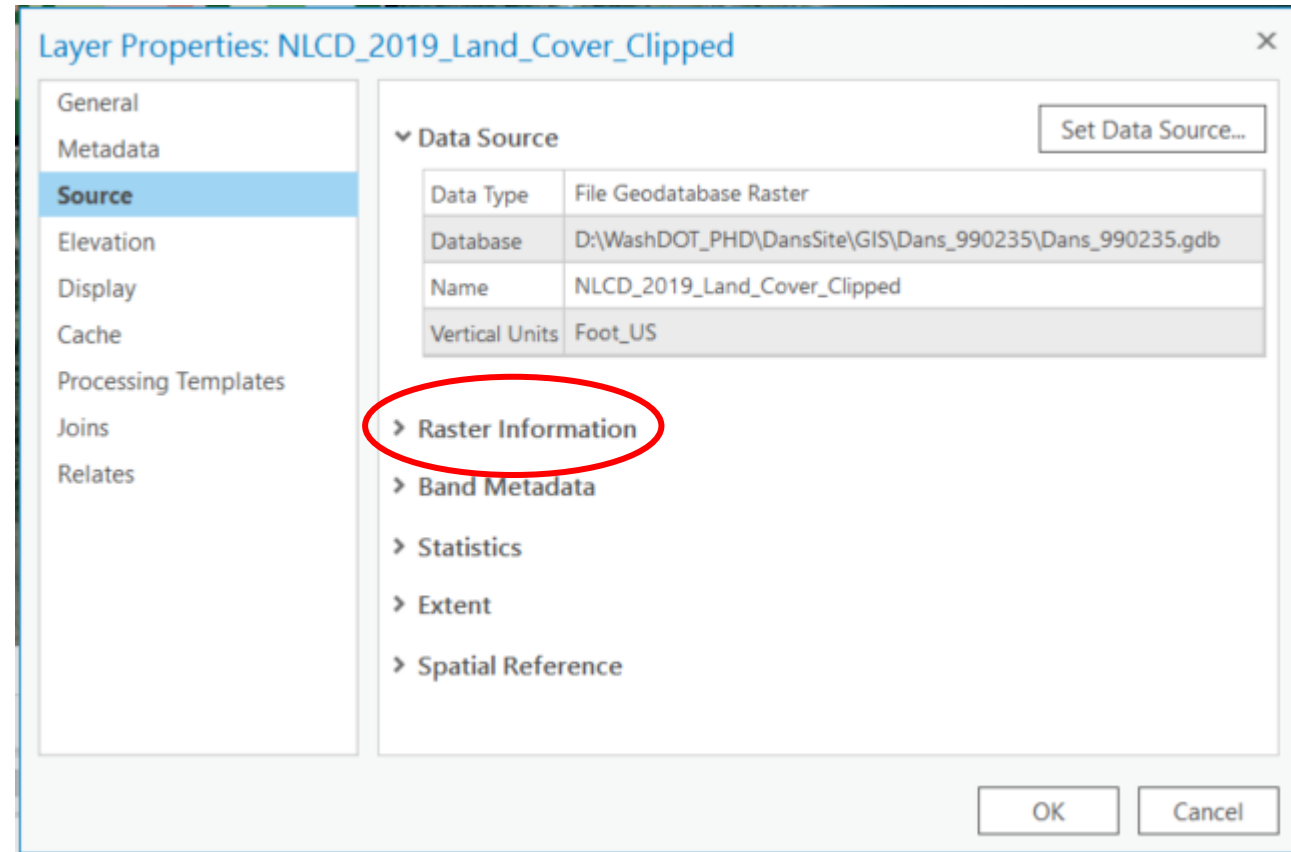
OBJECTID *	Value	Count	LUName
11	3	Open Wa	
21	936	Develop	
22	722	Develop	
23	181	Develop	

Below the table, a 'Properties' dialog box is partially visible, showing the text 'Show the properties for the selected layers.'

Getting the area of each Land use within watershed

21. Right click the raster -> Go to Properties

22. In properties window, under Source, Click Raster Information.

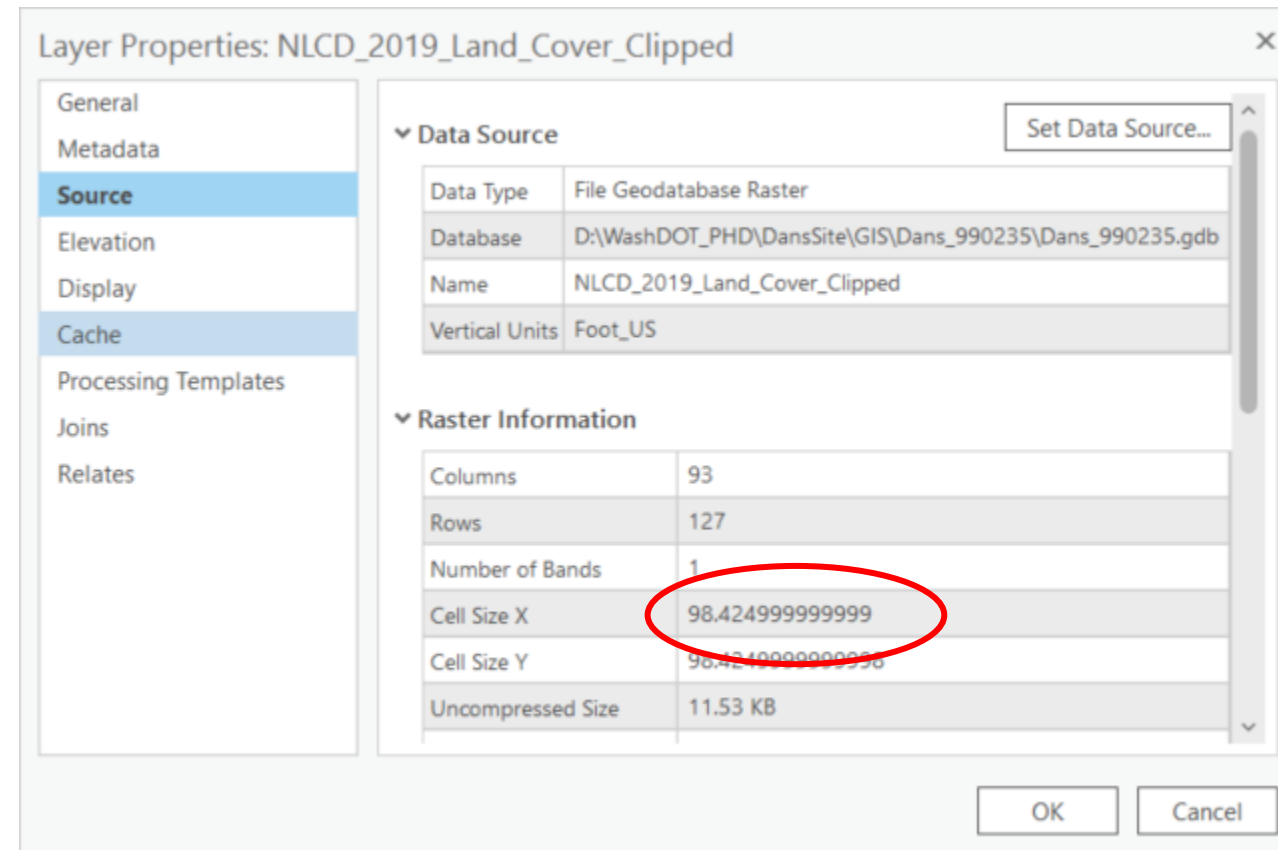


Getting the area of each Land use within watershed

21. Right click the raster -> Go to Properties

22. In properties window, under Source, Click Raster Information.

23. Copy or note the Cell size X or Y. The cells are square for the scale we are working with.

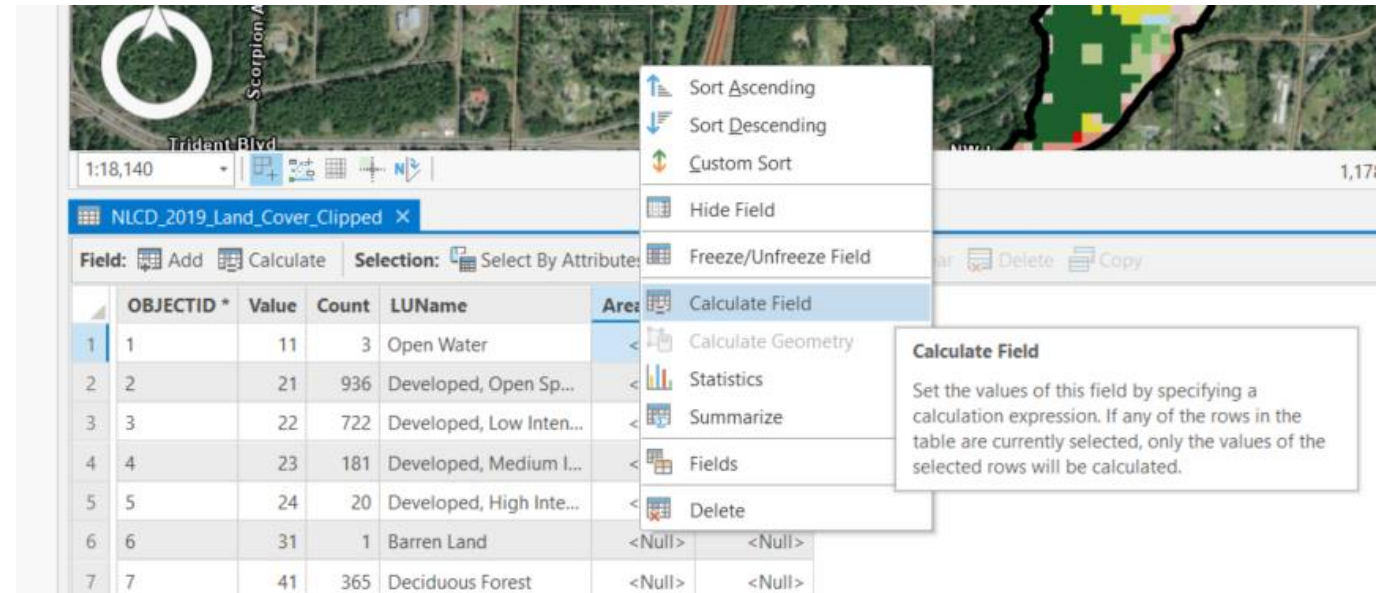


Getting the area of each Land use within watershed

24. If the attribute table is not open, right click the clipped raster and open the attribute table.

25. Since we know the projection of the raster is in Stateplane, the units are in US feet. We will multiply the counts of raster cells with the area of each cell to find total area.

Right click “Area_sqft” on the attribute table and press “Calculate Field”



The screenshot shows the ArcGIS Desktop interface. At the top, a map view displays a satellite image of a watershed area with a black boundary. Below the map, the attribute table for the layer 'NLCD_2019_Land_Cover_Clippped' is open. The table has columns: OBJECTID, Value, Count, LUName, and Area. A right-click context menu is open over the 'Area' column header. The menu options include: Sort Ascending, Sort Descending, Custom Sort, Hide Field, Freeze/Unfreeze Field, Calculate Field (highlighted), Calculate Geometry, Statistics, Summarize, Fields, and Delete. A tooltip for 'Calculate Field' is also visible, explaining that it sets field values based on a calculation expression for selected rows.

	OBJECTID *	Value	Count	LUName	Area
1	1	11	3	Open Water	<Null>
2	2	21	936	Developed, Open Sp...	<Null>
3	3	22	722	Developed, Low Inten...	<Null>
4	4	23	181	Developed, Medium I...	<Null>
5	5	24	20	Developed, High Inte...	<Null>
6	6	31	1	Barren Land	<Null>
7	7	41	365	Deciduous Forest	<Null>

Getting the area of each Land use within watershed

26. Click in the “Area_sqft” field, then double click Count so that it appears on the field. Then multiply this field with the cell size copied earlier.

27. Press Apply and Hit OK.

Calculate Field

This tool modifies the Input Table

Input Table
NLCD_2019_Land_Cover_Clippped

Field Name (Existing or New)
Area_sqft

Expression Type
Python 3

* Expression

Fields	Helpers
OBJECTID	.as_integer_ratio()
Value	.capitalize()
Count	.center()
LUName	.conjugate()
Area_sqft	.count()
Area_Acres	.decode()
	.denominator()

Insert Values

Area_sqft =

!Count! * 98.424999999999 * 98.424999999999

Code Block

Enable Undo ☒

Apply OK

Getting the area of each Land use within watershed

28. Using the same step as before, right click “Area_Acres” and press “Calculate Field”.

29. Divide the area_sqft by 43560 to get area in acres. Press Apply and Hit OK.

Some of these calcs can be done in Excel, but this way, these values stay with the raster so, this is preferred.

Calculate Field

This tool modifies the Input Table

Input Table
NLCD_2019_Land_Cover_Clippped

Field Name (Existing or New)
Area_Acres

Expression Type
Python 3

Expression

Fields	Helpers
OBJECTID	.as_integer_ratio()
Value	.capitalize()
Count	.center()
LUName	.conjugate()
Area_sqft	.count()
Area_Acres	.decode()
	.denominator()

Insert Values

Area_Acres =
!Area_sqft!/43560

Code Block

Enable Undo ☐

Apply OK

Getting the area of each Land use within watershed

30. The attribute table can be copied to excel and any calcs can be done.

	OBJECTID *	Value	Count	LUName	Area_sqft	Area_Acres
1	1	11	3	Open Water	29062.44	0.667182
2	2	21	936	Developed, Open Sp...	9067482	208.1608
3	3	22	722	Developed, Low Inten...	6994361	160.5684
4	4	23	181	Developed, Medium I...	1753434	40.25331
5	5	24	20	Developed, High Inte...	193749.6	4.447879
6	6	31	1	Barren Land	9687.48	0.222394
7	7	41	365	Deciduous Forest	3535931	81.17381
8	8	42	1898	Evergreen Forest	18386840	422.1038
9	9	43	757	Mixed Forest	7333423	168.3522
10	10	52	68	Shrub/Scrub	658748.7	15.12279
11	11	71	84	Herbaceous	813748.4	18.68109
12	12	81	102	Hay/Pasture	988123	22.68418
13	13	90	101	Woody Wetlands	978435.6	22.46179