

# QUERYING DATA

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# QUERIES IN GIS

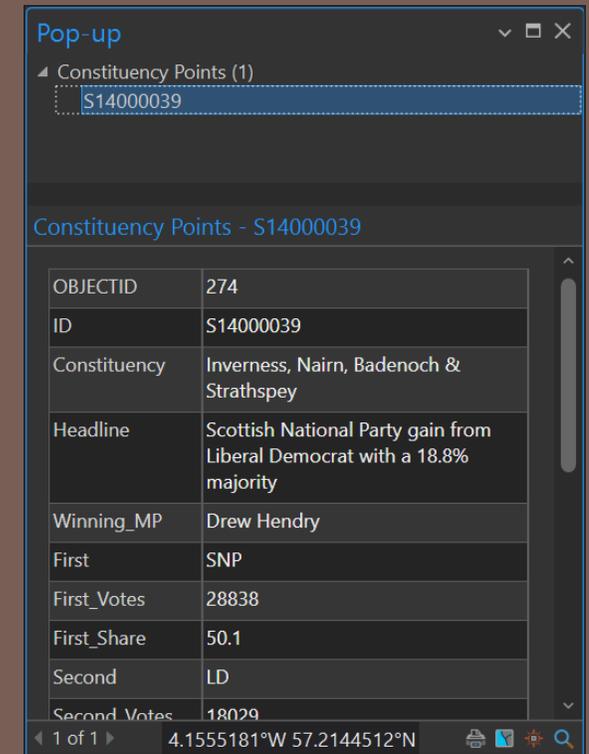
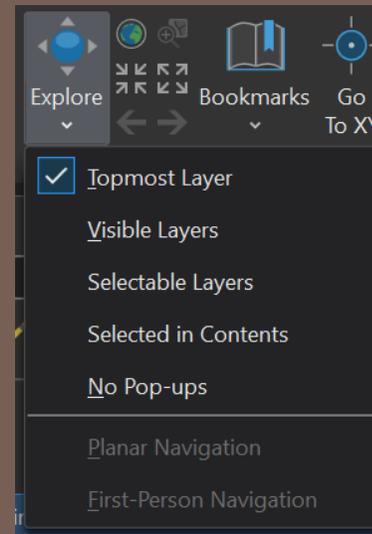
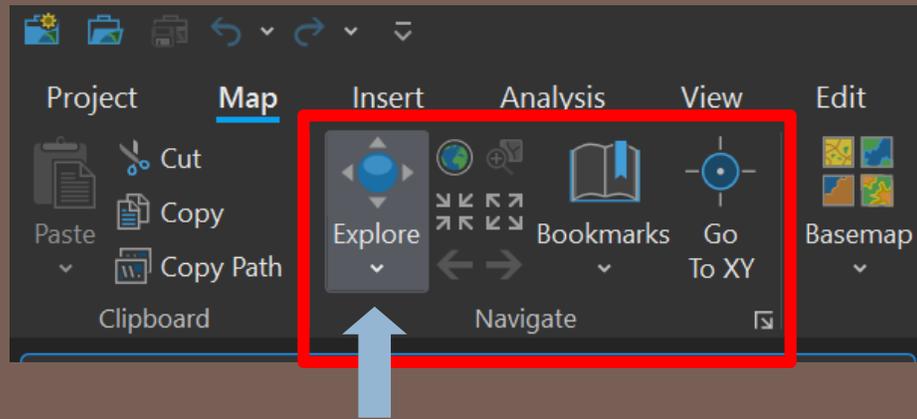
- What are they?
- How Many?
- How Much?
- Any spatial patterns exist?
- Prepare features for analysis

# WHAT ARE QUERIES?

- Queries enable users to identify and/or select a set of features from a data table for further use
- Types: Attribute queries, Spatial queries
- Query tools in ArcGIS
  - Explore/Identify
  - Locate/Find
  - Select Features
  - Select by Attributes
  - Select by Location
  - Definition Query (layer tool)

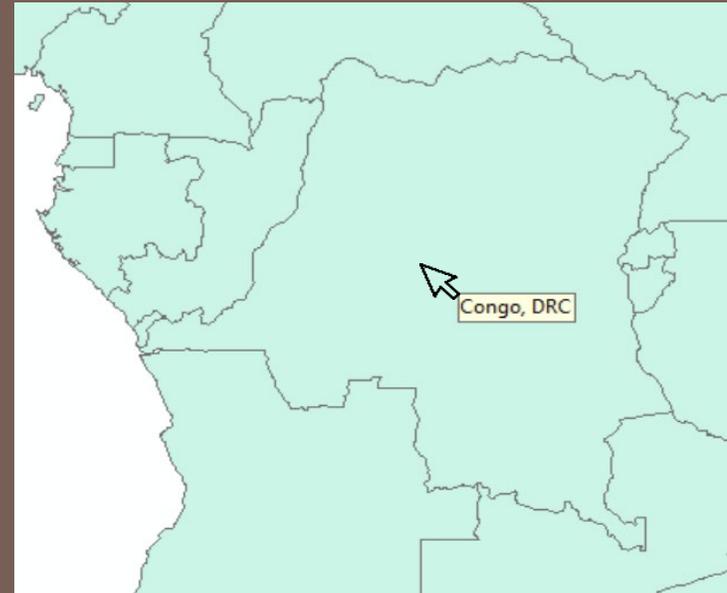
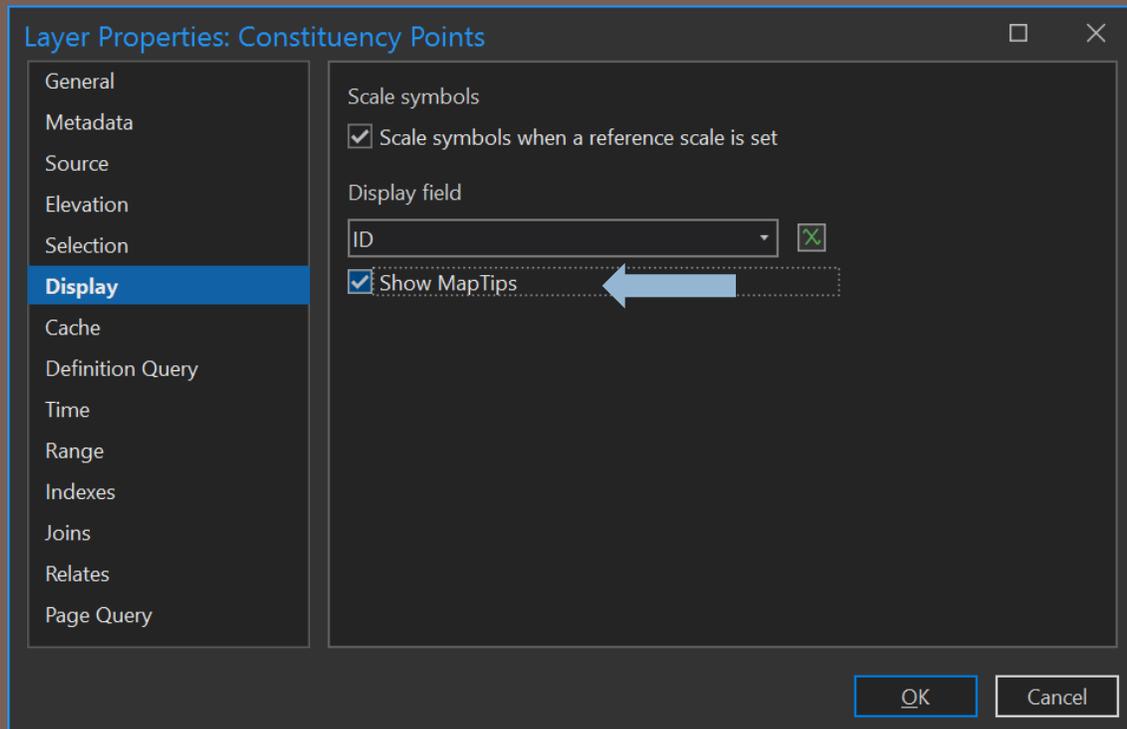
# IDENTIFY

- Attributes for a specific feature



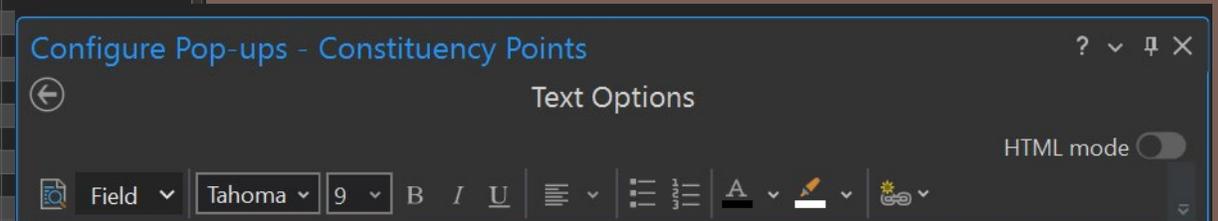
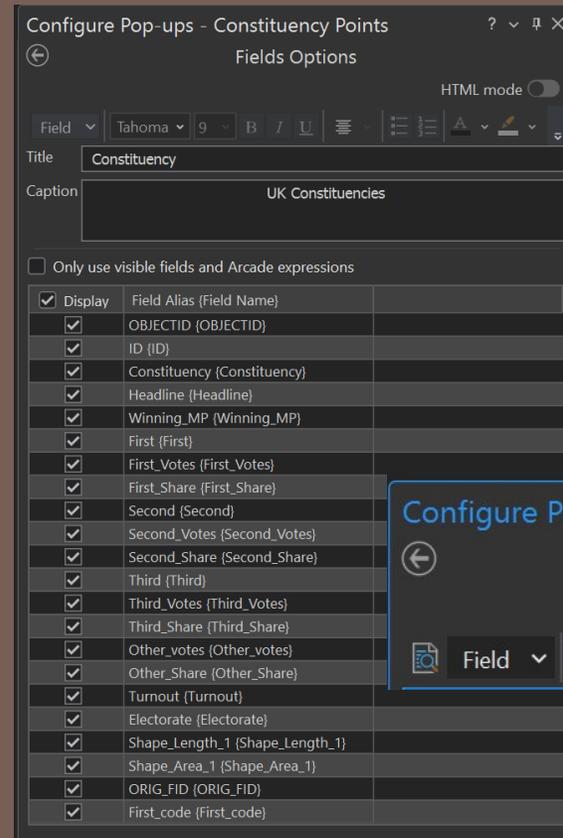
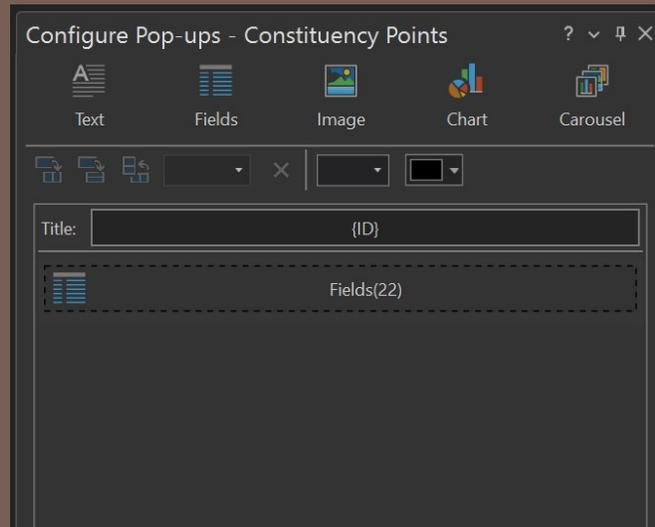
# MAP TIPS

- Cursor displays specific attribute



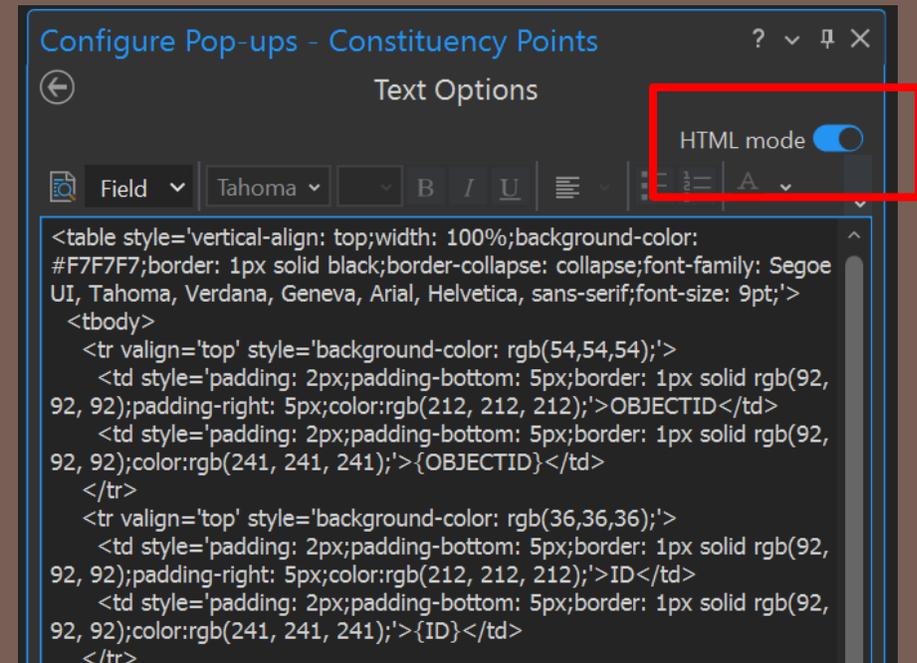
# CONFIGURE POP-UPS

- Allows to access documents or web pages related to features



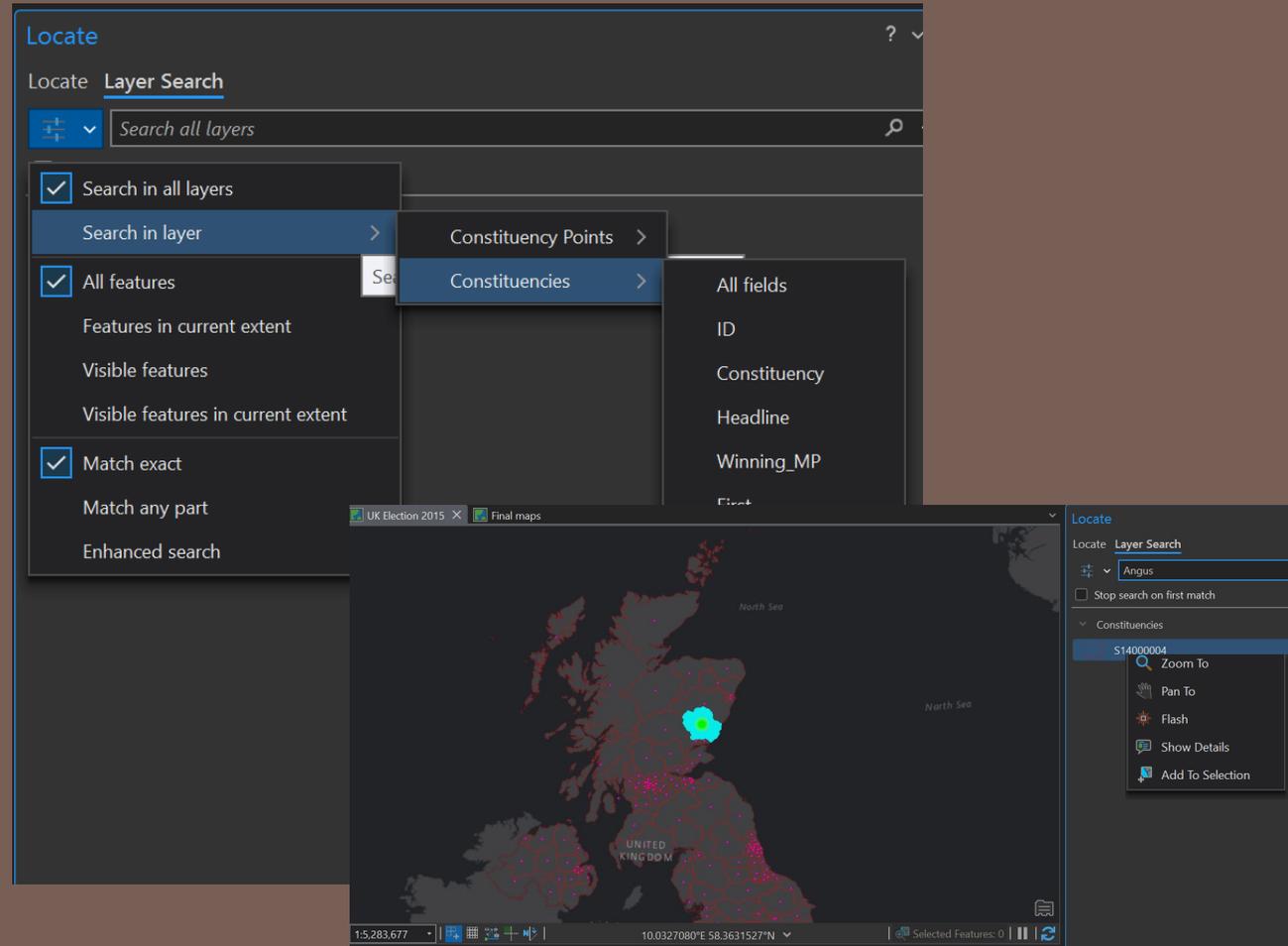
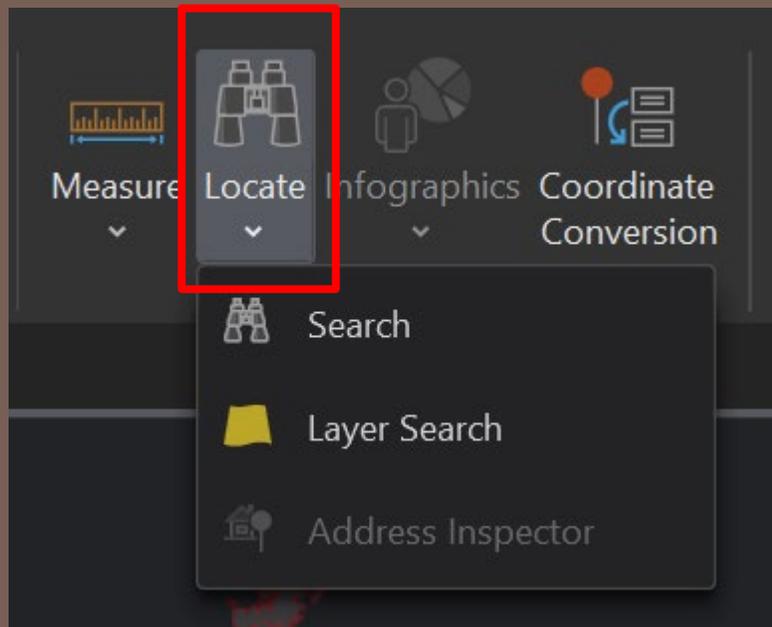
# HTML POP-UPS

- Displays feature information as formatted report HTML displays
- Turn on the HTML mode toggle button
- Refer to ArcGIS Documentation on allowed HTML tags
- Turning HTML mode off results in the loss of all HTML customization



# LOCATE/FIND

- Search
- Layer Search
- Address Inspector



# SELECTIONS

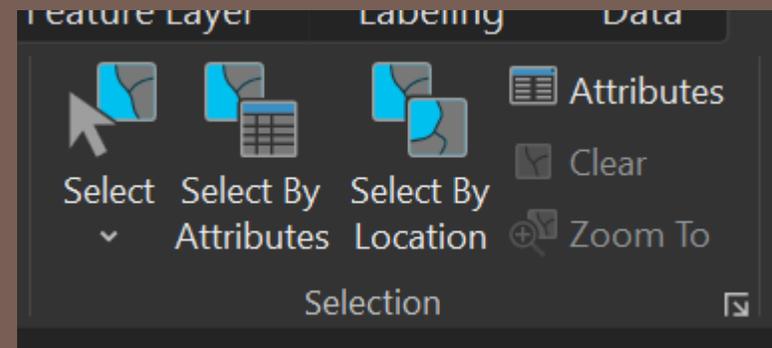
How to select features?

# WHY DO YOU NEED A SELECTION?

- Create a new layer
- Select other features
- Edit
- Calculate Statistics
- Report
- Export
- Focused Analysis

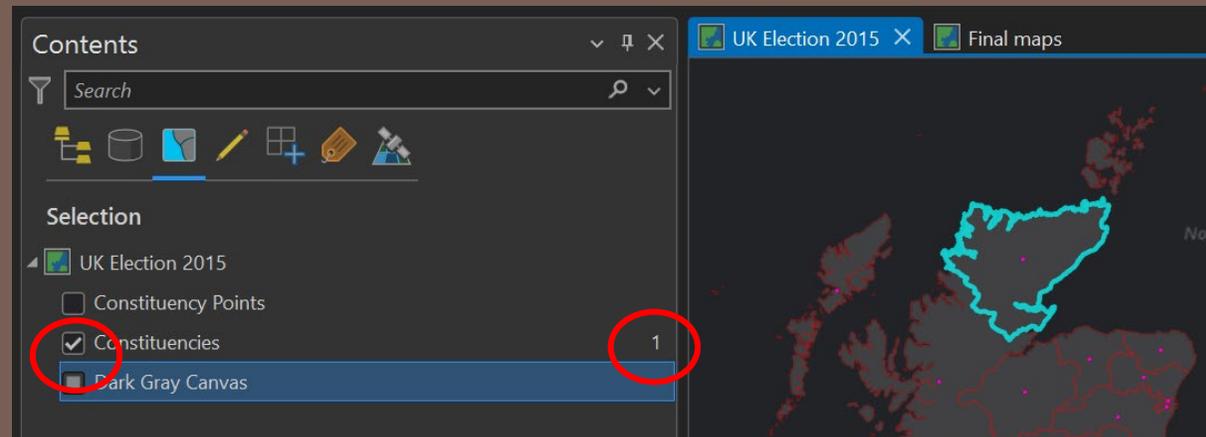
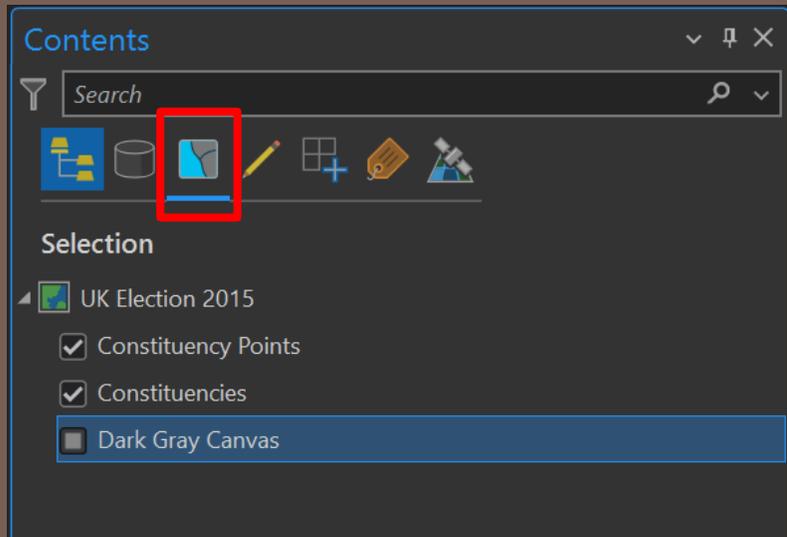
# SELECTION TOOLS

- Interactive Selection (Select Tools)
- Select By Attributes
- Select By Location



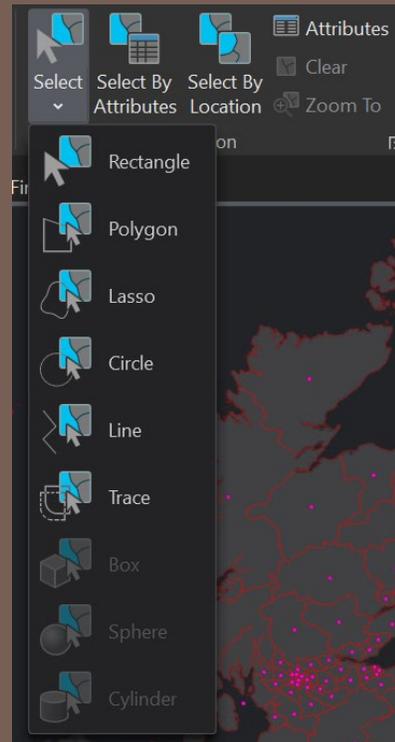
# SELECTION LAYERS

- Specify layers from List By Selection menu that are 'selectable'



# SELECT FEATURES TOOL

- Select features by a simple click or by drawing a shape



# SELECTION TYPES

New selection

Add to the current selection

Remove from the current selection

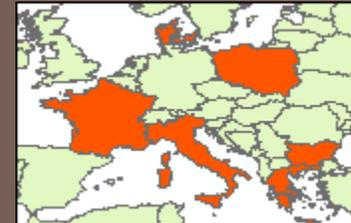
Select subset from the current selection

Switch the current selection

New selection



Add to the current selection



Remove from the current selection

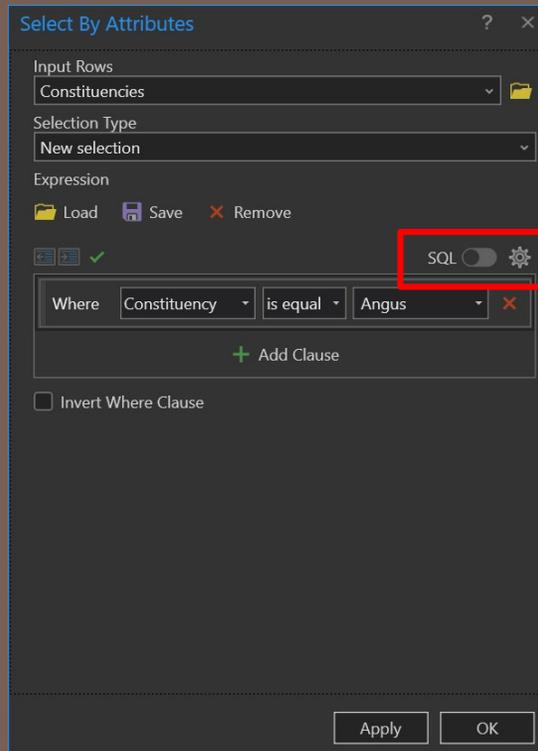


Select subset from the current selection



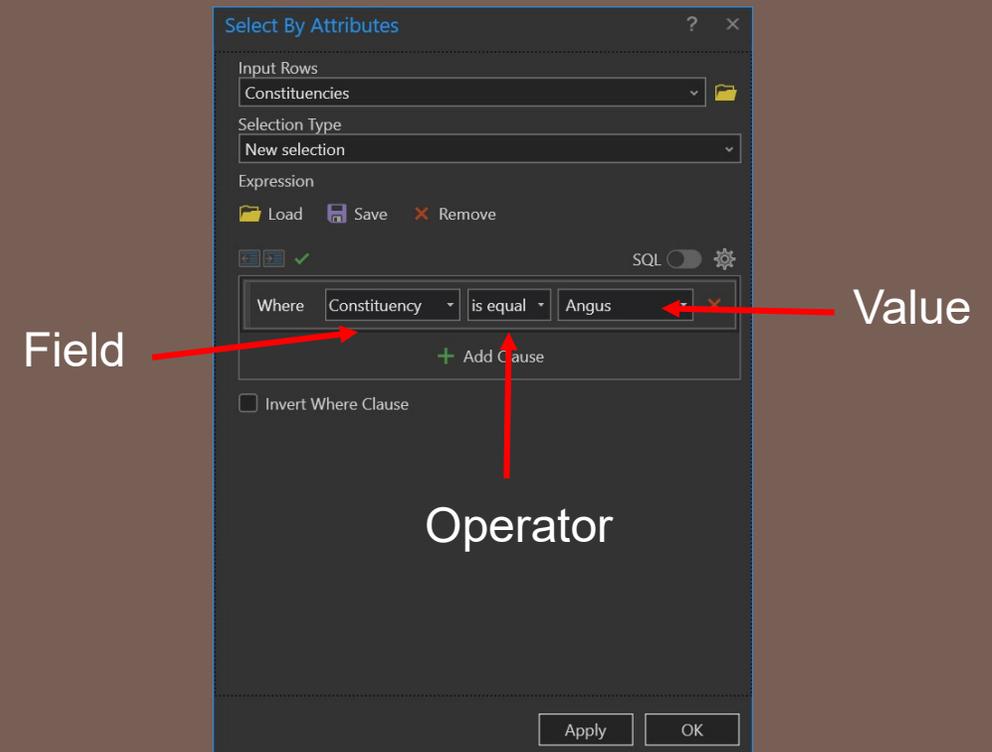
# SELECT BY ATTRIBUTES

- Selection based on a condition using the fields in the attribute table
- Query expressions are written in SQL (Structured Query Language)

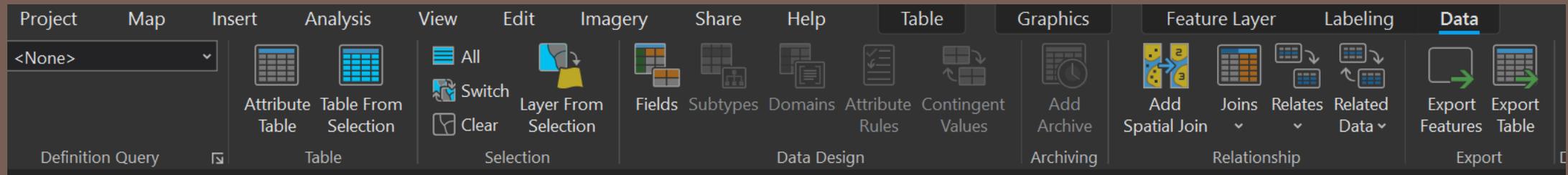
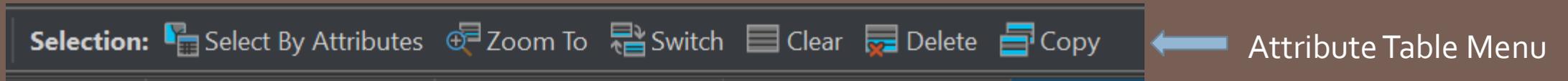


# QUERY STATEMENT

- Expression  
SELECT \* FROM Constituencies WHERE  
Constituency = 'Angus'
- Verify
  - Checks SQL expression syntax
- Save and Load
  - Save current expression
  - Load saved expression



# WORKING WITH SELECTED FEATURES



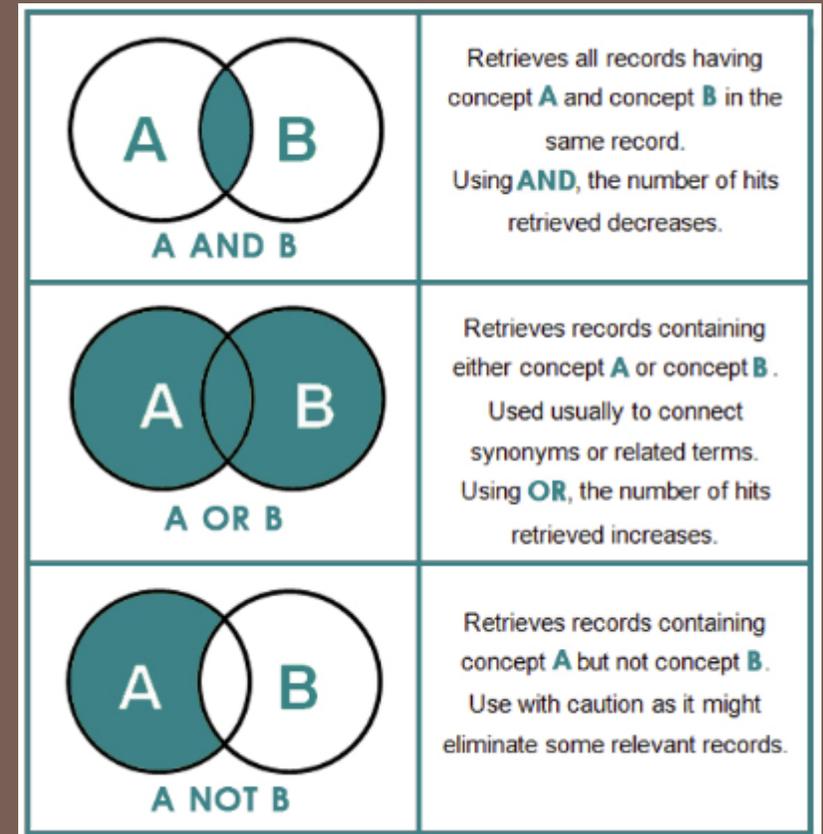
Field: Selection: Highlighted:

FID	Shape	location	Agency	Project	Scale	Date	
1	5	Polygon	PWT-056_JemezWalsh_...	PWT	Jemez Walsh	12000	19670615
2	6	Polygon	PWT-056_JemezWalsh_...	PWT	Jemez Walsh	12000	19670615
3	7	Polygon	PWT-056_JemezWalsh_...	PWT	Jemez Walsh	12000	19670615
4	8	Polygon	PWT-056_JemezWalsh_...	PWT	Jemez Walsh	12000	19670615
5	9	Polygon	PWT-056_JemezWalsh_...	PWT	Jemez Walsh	12000	19670615
6	10	Polygon	PWT-056_JemezWalsh_...	PWT	Jemez Walsh	12000	19670615
7	11	Polygon	PWT-056_JemezWalsh_...	PWT	Jemez Walsh	12000	19670615
8	12	Polygon	PWT-056_JemezWalsh_...	PWT	Jemez Walsh	12000	19670615

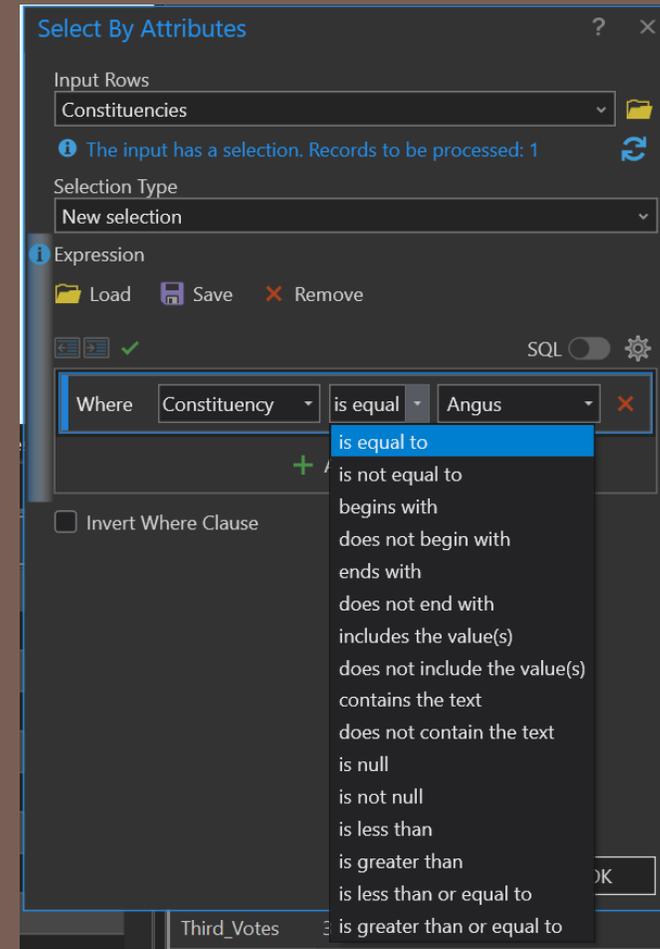
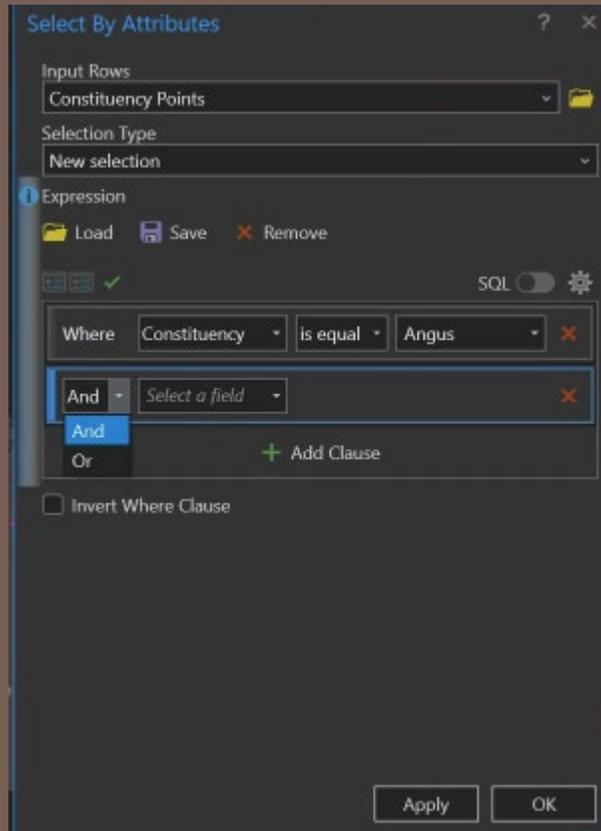
11 of 227 selected Filters: 100%

# WRITING QUERY STATEMENTS

- Simple expressions are similar to standard English and thus can be self-explanatory.
  - Example: select State of Alabama from the US States  
`STATE_NAME= 'Alabama'`
- Complex queries can be built by combining expressions with the AND, OR operators.
  - Example: select all the houses that have more than 1,500 square feet and a garage for three or more cars  
`AREA > 1500 AND GARAGE > 3`



# OPERATORS



# OPERATORS

**Scenario:** Find all the cities in China that either have at least 100,000 people, or are provincial capitals from a global demographics database.

## No Grouping

✓ No Grouping

Clause SQL [Left Arrow] [Right Arrow] [Apply] [Cancel]

Where Country is equal to China

And Population is greater than 100000

Or Status is equal to Provincial capital

Add Clause

## Grouping

✓ Grouping

Clause SQL [Left Arrow] [Right Arrow] [Apply] [Cancel]

Where Country is equal to China

And [ ] Population is greater than 100000

[ ] Or Status is equal to Provincial capital

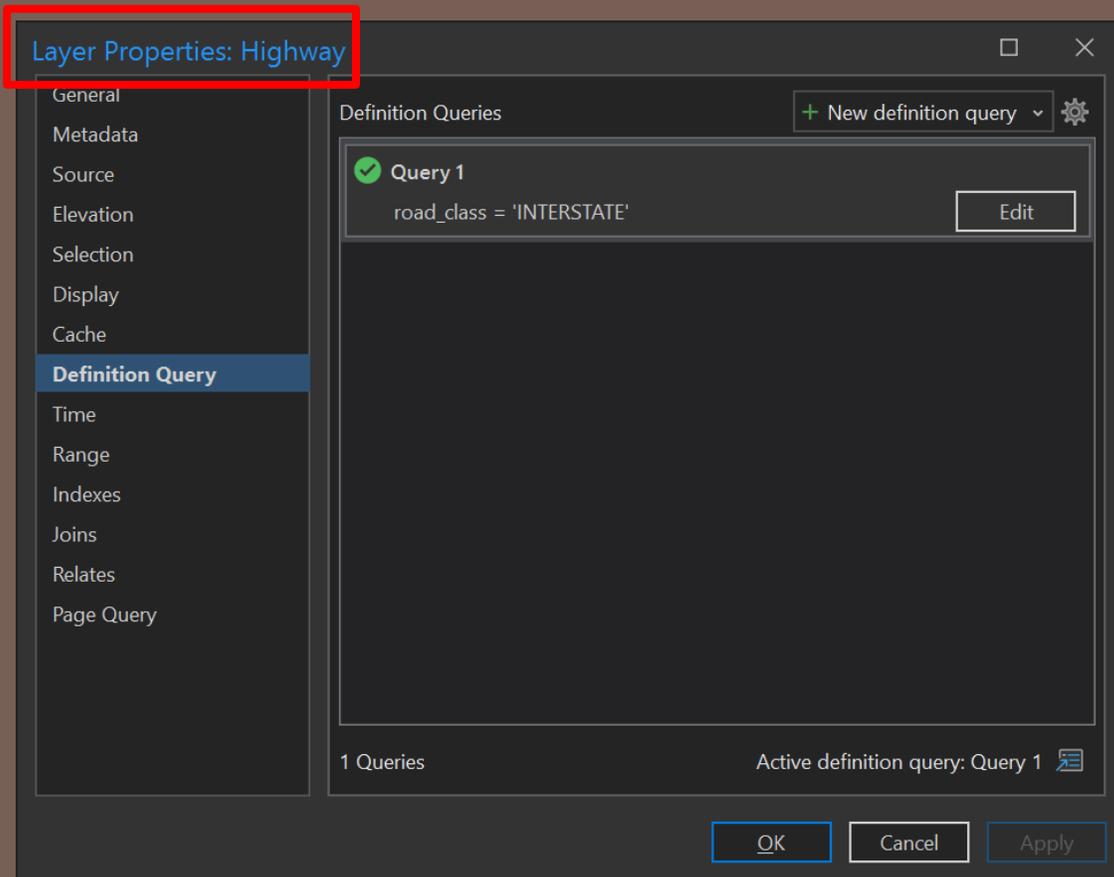
Add Clause

# OPERATORS

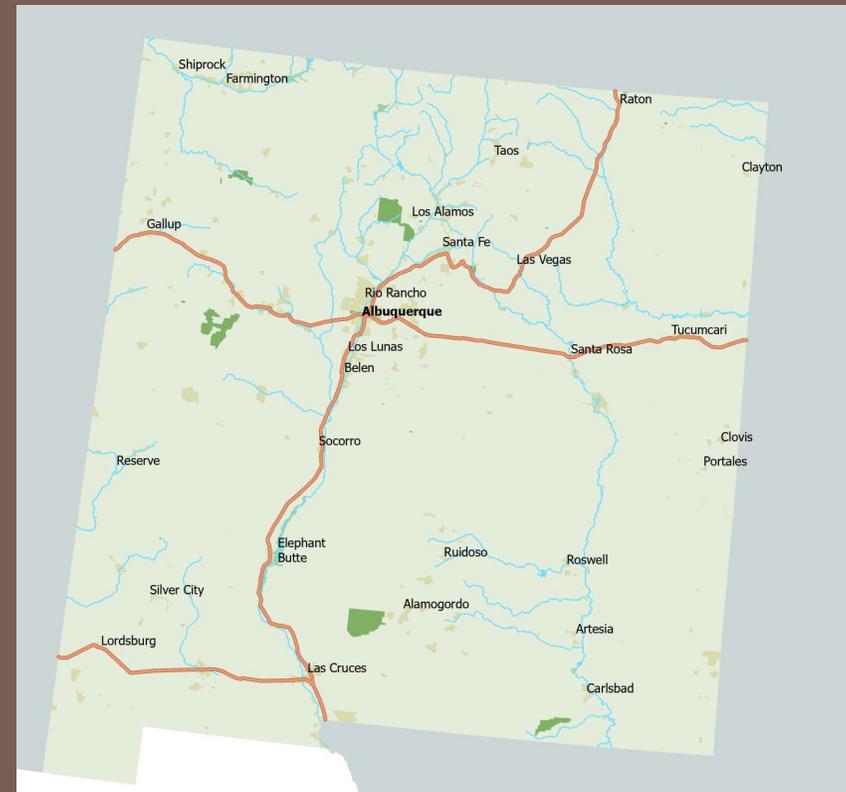
- Wildcard Searches
  - LIKE operator
    - `STATE_NAME LIKE 'Miss%'`
    - Percent symbol means anything is acceptable in it's place
  - Using 'Underscore'
    - Underscore(\_) represents one character
    - `OWNER_NAME LIKE '_atherine Smith'`
    - Finds Catherine Smith and Katherine Smith

<https://pro.arcgis.com/en/pro-app/latest/help/mapping/navigation/sql-reference-for-elements-used-in-query-expressions.htm#>

# DEFINITION QUERY



Example: From Exercise 1 road data, The definition query is only showing only the roads that has a road class defined as Interstate.

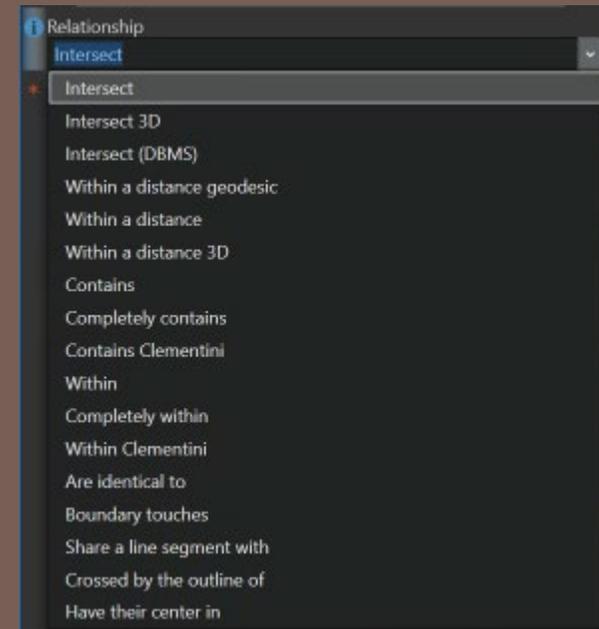
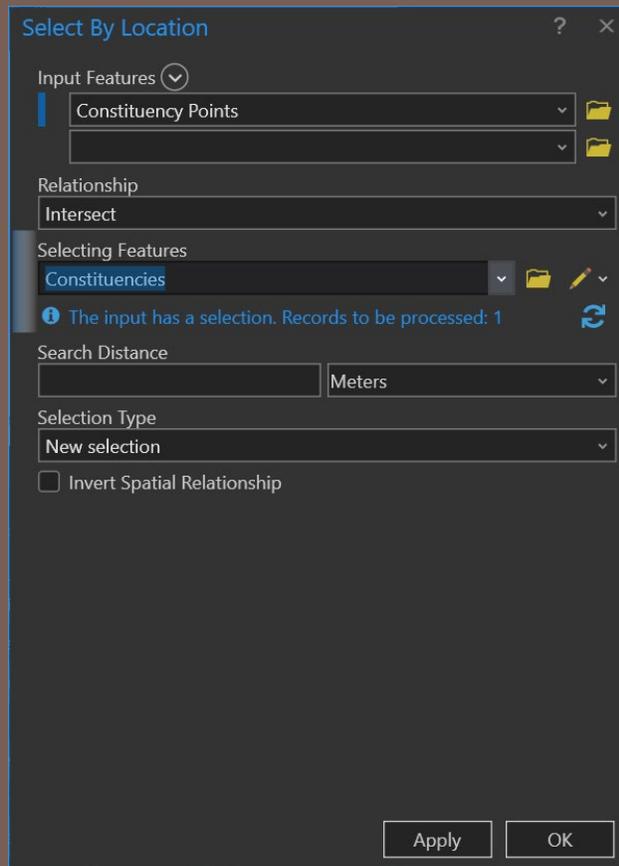


# SPATIAL QUERY

- A spatial query is a query expression used to select features based on their spatial relationships to other features (i.e., where they are located in relation to other features).
- Spatial Relationships
  - Distance (e.g. select points within a distance of a feature)
  - Containment (e.g. select points contained by a polygon)
  - Intersection (e.g. select lines that intersect a feature)
  - Adjacency (e.g. select polygons adjacent to a feature)

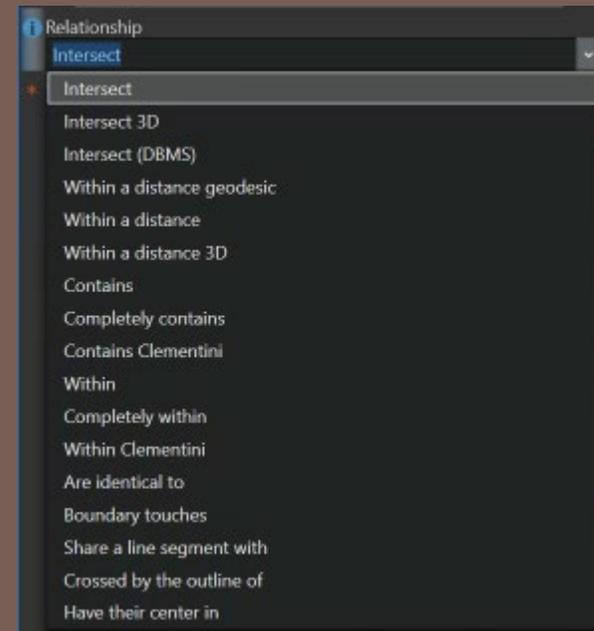
# SELECT BY LOCATION

- Selects features based on their location relative to features in another layer



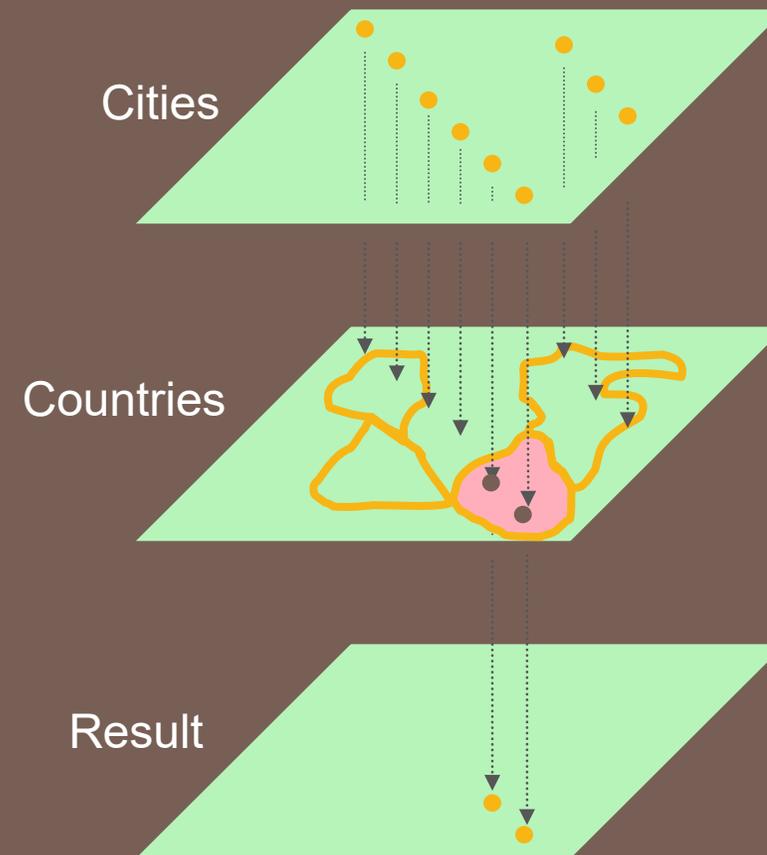
# SPATIAL QUERY TYPES

- Intersect
- Are within a distance of
- Are within
- Contains
- Have a boundary that touches
- Share a line segment with
- Are crossed by the outline of

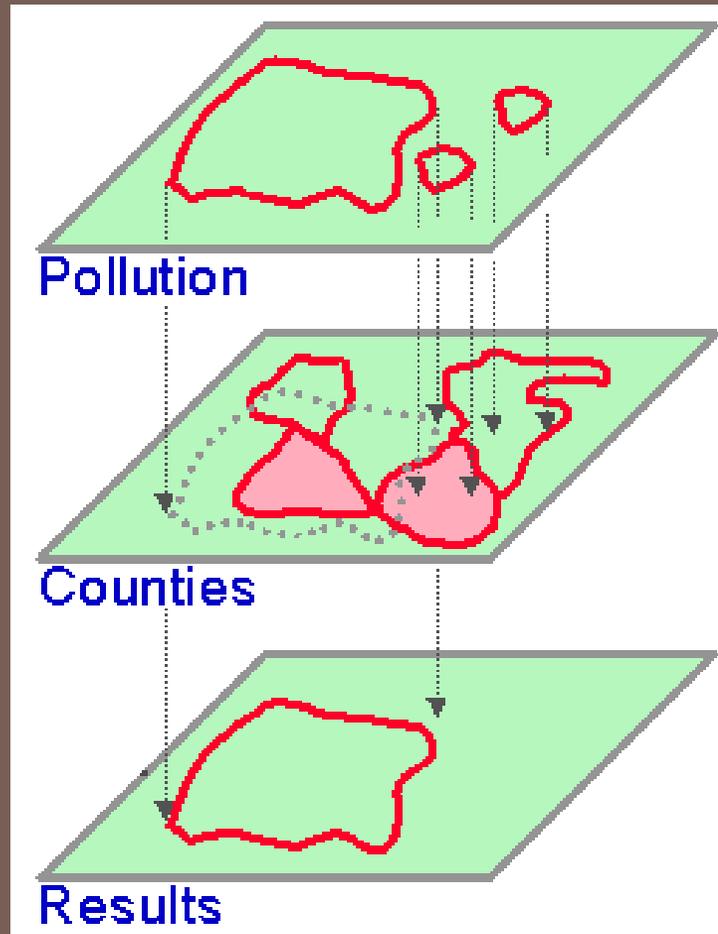


# SPATIAL QUERY EXAMPLE

- Select features from previous selection
- In this example, features in Cities layer were selected that lie within previously selected features from the Countries layer.

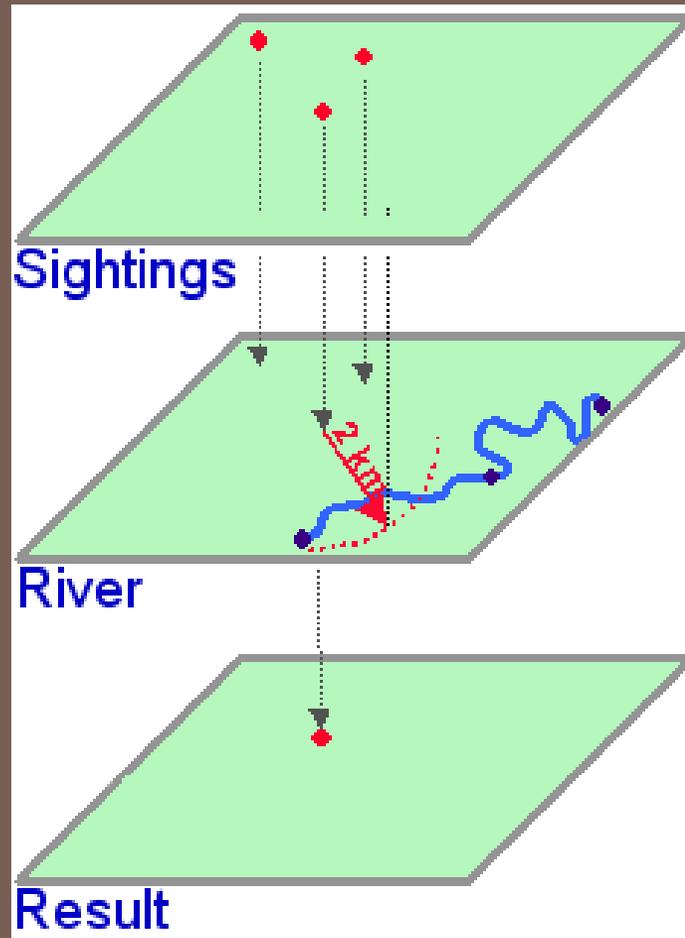


# SPATIAL QUERY EXAMPLE



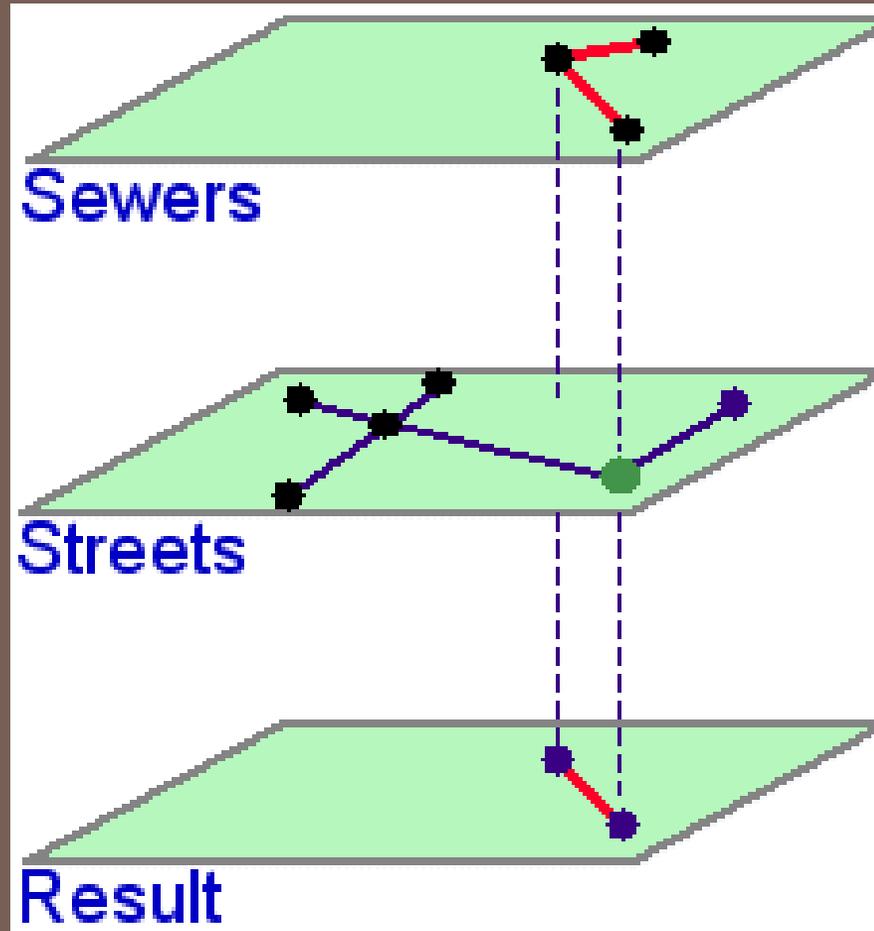
In this example, features in the Pollution dataset are selected if any selected features in the Counties dataset lie completely inside their boundaries.

# SPATIAL QUERY EXAMPLE



In this example, the locations where animals have been sighted are selected if they are within 2 kilometers of the features in the River dataset.

# SPATIAL QUERY EXAMPLE



In this example, features in the Sewers dataset are selected if they share a point with features in the Streets dataset.