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





To XY



Cursor displays specific attribute

| Layer Properties: Consti | tuency Points | | × |
|--|--|-----|------|
| General Metadata Source Elevation Selection Display Cache Definition Query Time Range Indexes Joins | Scale symbols Scale symbols when a reference scale is set Display field D Show MapTips | | |
| Relates Page Query | | | |
| | <u>_</u> K | Car | ncel |



CONFIGURE POP-UPS

• Allows to access documents or web pages related to features

| | | | | | Configure | Pop-ups - Constituency Point | s ?∨₽× | | |
|--------------|--------------|--------------|-------|----------|-----------|---------------------------------------|------------------|--|-------------|
| Configure Po | n-uns - Cons | tituency Poi | ints | 2 ~ I X | \odot | Fields Options | | | |
| | ,p ups cons | | - | | | | HTML mode 🔵 | | |
| A | | | | <u>n</u> | | | | | |
| Text | Fields | Image | Chart | Carousel | Field V | | | | |
| | | | | | Cor | nstituency | | | |
| | | | • | | Caption | UK Constituencie | s | | |
| Title: | | {ID} | | | Only use | visible fields and Arcade expressions | | | |
| | | | | | 🗹 Display | Field Alias {Field Name} | | | |
| | | Fields(22) | | | | OBJECTID {OBJECTID} | | | |
| | | | | | | ID {ID} | | | |
| | | | | | | Constituency (Constituency) | | | |
| | | | | | | Winning MP {Winning MP} | | | |
| | | | | | | First {First} | | | |
| | | | | | | First_Votes {First_Votes} | | | |
| | | | | | ✓ | First_Share {First_Share} | | | |
| | | | | | | Second {Second} | Configure Po | p-ups - Constituency Points | ? ~ Ŧ × |
| | | | | | | Second_Votes {Second_Votes} | | | |
| | | | | | | Second_Share {Second_Share} | (C) | Text Options | |
| | | | | | | Third {Third} | | | |
| | | | | | | Third_votes {Third_votes} | | | HTML mode 🔵 |
| | | | | | | Other votes (Other votes) | | | |
| | | | | | | Other Share {Other Share} | 🔍 Field 🗡 🛛 | $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | - |
| | | | | | | Turnout {Turnout} | | | |
| | | | | | | Electorate {Electorate} | | | |
| | | | | | | Shape_Length_1 {Shape_Length_1} | | | |
| | | | | | | Shape_Area_1 {Shape_Area_1} | | | |
| | | | | | | ORIG_FID {ORIG_FID} | | | |
| | | | | | | First_code {First_code} | | | |
| | | | | | | | | | |

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



https://pro.arcgis.com/en/pro-app/latest/help/mapping/navigation/configure-pop-ups.htm

LOCATE/FIND

- Search
- Layer Search
- Address Inspector





SELECTIONS

How to select features?

WHY DOYOU 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





pro.arcgis.com

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

Selection: 🍡 Select By Attributes 🛛 🕀 Zoom To 🛛 🖶 Switch 📃 Clear 💂 Delete 📑 Copy

Attribute Table Menu

| Project | Мар | Insert | Analysis | View | Edit | Imagery | Share | Help | T | able | Graphics | Featu | ure Laye | er l | Labeling | Data | |
|---------------|-------|---------|----------------|--|----------------|------------|----------|-----------|-----------|------------|-----------|--------------|----------|---------|----------|----------|--------|
| <none></none> | | • 🔳 | | 📃 All | | | | | | | | | | | | | |
| | | Attribu | ite Table From | Reference and the second secon | ch Laver Fr | rom Fields | Subtypes | | Attribute | Contingent | t Add | Ndd 🖸 | Joins | Relates | Related | Export | Export |
| | | Table | e Selection | Clea | r Selecti | on | | | Rules | Values | Archive | Spatial Join | | | Data 🗸 | Features | Table |
| Definition | Query | ы | Table | S | election | | | Data Desi | ign | | Archiving | | Relation | nship | | Exp | ort [|

| Fie | ld: | | Selection: 🌇 🕂 🗎 | i 🔲 💂 📑 Highlig | yhted: 🖹 🖹 🍕 🛱 | i 🗏 📮 🚍 | | = |
|-----|-----|---------|--------------------|-------------------|----------------|---------|----------|---|
| | FID | Shape | location | Agency | Project | Scale | Date | |
| | | Polygon | PWT-056_JemezWalsh | PWT | Jemez Walsh | 12000 | 19670615 | |
| | | Polygon | PWT-056_JemezWalsh | PWT | Jemez Walsh | 12000 | 19670615 | |
| | | Polygon | PWT-056_JemezWalsh | PWT | Jemez Walsh | 12000 | 19670615 | |
| | | Polygon | PWT-056_JemezWalsh | PWT | Jemez Walsh | 12000 | 19670615 | |
| | | Polygon | PWT-056_JemezWalsh | PWT | Jemez Walsh | 12000 | 19670615 | |
| | | Polygon | PWT-056_JemezWalsh | PWT | Jemez Walsh | 12000 | 19670615 | |
| | | Polygon | PWT-056_JemezWalsh | PWT | Jemez Walsh | 12000 | 19670615 | |
| | 12 | Polygon | PWT-056_JemezWalsh | PWT | Jemez Walsh | 12000 | 19670615 | |
| | | | | | | | | |

Filters:

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

| New select | tion | 0 | | |
|------------|----------------|------------|---------|-------|
| | G Save 🔺 | kernove | | SQL 🔘 |
| Where | Constituency | • is equal | • Angus | • • |
| And - | Select a field | • | | |
| And Or | | + Add Clau | ise | |
| Invert \ | Where Clause | | | |
| | | | | |
| | | | | |
| | | | | |



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 | Grouping | Annh |
|--|---------------------------------|--------------|
| Clause SQL Apply | | Арріу |
| Where Country is equal to China | Where Country is equal to China | а |
| And Population is greater than 100000 | And Population is greater than | n 100000 |
| Or Status is equal to Provincial capital | Or Status is equal to Province | cial capital |
| Add Clause | Add Clause | 2 |

Grouping

Cancel

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

| Layer Properties: High | way 🗆 🗆 🗙 |
|------------------------|--|
| General | Definition Queries + New definition query × |
| Metadata | |
| Source | 🔮 Query 1 |
| Elevation | road_class = 'INTERSTATE' Edit |
| Selection | |
| Display | |
| Cache | |
| Definition Query | |
| Time | |
| Range | |
| Indexes | |
| Joins | |
| Relates | |
| Page Query | |
| | |
| | |
| | |
| | 1 Queries Active definition query: Query 1 📃 |
| | |
| | <u>O</u> K Cancel Apply |

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

| Select By Location ? × |
|---|
| Input Features 📀 |
| Constituency Points 🔹 🏱 |
| • • • • • • • • • • • • • • • • • • • |
| Relationship |
| Intersect · |
| Selecting Features |
| Constituencies 🔹 🔽 🖉 🗸 🗸 |
| Image: |
| Search Distance |
| Meters ~ |
| Selection Type |
| New selection ~ |
| Invert Spatial Relationship |
| |
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| |

Apply

| Intersect | |
|----------------------------|--|
| Intersect | |
| Intersect 3D | |
| Intersect (DBMS) | |
| Within a distance geodesic | |
| Within a distance | |
| Within a distance 3D | |
| Contains | |
| Completely contains | |
| Contains Clementini | |
| Within | |
| Completely within | |
| Within Clementini | |
| Are identical to | |
| Boundary touches | |
| Share a line segment with | |
| Crossed by the outline of | |
| Have their center in | |

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



https://pro.arcgis.com/en/pro-app/latest/tool-reference/data-management/select-by-location-graphical-examples.htm

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

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

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.

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