

Practice Exam for Intro GIS

Data and questions for you to use to practice for the midterm practical exam.

Selection Tools

Scenario: Roads and streams in Washington

Culverts are commonly used to allow water to flow under or through developed areas, particularly under roads. This exercise will ask you for information about culverts in a small section of Pierce County, Washington.



In the folder part2_data, you will find data corresponding to the following:

- Culverts
- Streams
- Roads
- Soils

In addition, there is a table (in `.dbf` format) of percent rock fragments in each soil name.

Questions:

How many culverts are there in this area and how do you know?

135

number of features listed in attribute table

How many culverts are made of metal and how do you know?

108

select by attribute: material = metal

How many *metal* culverts are 24" wide and how do you know?

5

select by attributes: material = metal AND diameter = 24"

How many culverts are located within 100 ft of a stream, and what steps did you take to find the answer?

40

select by location:

- **culverts that intersect with streams**
- **search distance of 100ft**

Of the culverts within 100 ft of a stream, how many are metal, and what steps did you take to find the answer?

29

Combine selection processes from above using 'select from current selection'

What material is the culvert with the maximum diameter located on Barneston soil?

- What diameter is that culvert?
- What steps did you take to find the answer?

Metal, 48"

- 1. Select by attribute – Barneston Soil,**
- 2. then select by location – select features from culverts which intersect selected features in soil.**
- 3. Sort the attribute table**

What are the names of the soils under the 1200 Road? What percentage of rock fragments do each of the soil names contain? What steps did you use to get your answer?

Wilkeson – 25%

Bellingham – 0%

Barneston – 58%

- 1. Select by attribute: road name 1200 road**
- 2. Select by location: features from soils which intersect the road.**
- 3. Read the attribute table.**

What is the total distance (in km) of gravel, light-duty roads in the study area and how did you find out?

24.21km.

1. Select by attributes – surface = gravel and use = light-duty,

2. Add field to attribute table

a. calculate geometry, right click – statistics

b. Read sum.

Geoprocessing:

Scenario: Illegal logging in the Adirondacks

The Adirondack Park Agency is concerned about some cases of small-scale illegal logging within the park. Park managers think that local land owners have been cutting down trees for fire wood. The Adirondack Park Agency has asked for your help to identify locations within the town of Newcomb likely to be targeted this summer so that they can position law enforcement to prevent loss of trees. Here are the criteria that the park managers believe create elevated risk for illegal logging:

1. Locations must contain 'hardwood' land cover.
2. Locations must be inside the park boundaries and within the boundaries of the town of Newcomb.
3. Locations within 0-100 m of a road are **highest** concern.
1. Locations between 100-200 m of a road are **medium** concern.

The park has provided you with the following data:

- **landcover.shp** (a polygon shapefile of land cover classes)
- **landcover_descriptions.xls** (a table of land cover descriptions)
- **NY_towns.shp** (a polygon shapefile with NY state town borders)
- **roads.shp** (a line file of roads surrounding and within the park)
- **park_boundaries.shp** (a polygon shapefile of the park boundaries)

Questions

For each of the data files make sure you know:

- the data format: raster, vector, point, lines, polygons, other?
- The spatial reference info: GCS, PCS, datum, projection, etc.

File types, data formats are:

- **landcover.shp: vector, polygon**
- **landcover_descriptions.xls: spreadsheet**

- **roads_in_park.shp: vector, line (polyline)**
- **NY_towns.shp: vector, polygon**

The shapefiles are in a Projected Coordinate System (PCS):

NAD_1983_UTM_Zone_18N (also known as cylindrical or Universal Transverse Mercator)

What is the land area (in square km) at highest concern for illegal logging?

1.39 km²

What is the land area (in square km) at medium concern for illegal logging?

1.30 km²

Describe the steps you took to answer the two above questions.

- 1. Join the landcover description to landcover based on gridcode (or just read the description and choose 'Gridcode' 1)**
- 2. Select by attributes the town of Newcomb (could export as new layer here or just leave selected)**
- 3. Select hardwood land cover and clip to the town of Newcomb**
- 4. Buffer roads 100 m with dissolve all (or dissolve in second step)**
- 5. Buffer roads 200 m with dissolve all (or dissolve in second step)**
- 6. Erase buffer roads 100 m from buffer roads 200 m to get 100-200 m**
- 7. Clip the hardwood within Newcomb by the buffer roads 100 m.**
- 8. Add area field and calculate geometry to get answer (1.39 km²)**
- 9. Clip the hardwood within Newcomb by the buffer roads 100-200 m.**
- 10. Add area field and calculate geometry to get answer (km²)**

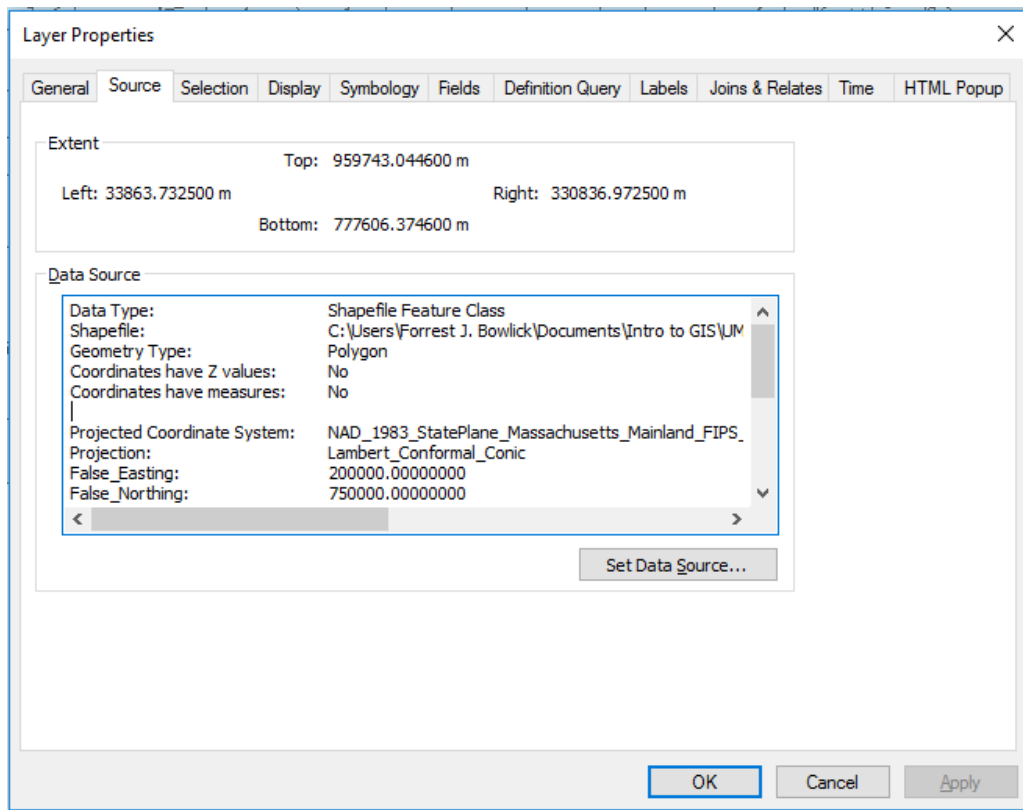
Projections

Look at the 'MA_2016_Towns' and MA_Outline files. Someone has deleted the projection information from the outline file!

Questions

What is the native projection of the towns file?

- **The native projection of this layer is: NAD_1983_StatePlane_Massachusetts_Mainland_FIPS_2001.**
- **Native projection means the projection used to encode the data in a file. You can usually find this info in the Layer Properties (see screenshot below).**



Is the outline file a PCS or a GCS? How do you know?

- **This layer is a GCS.**
- **I know it is a GCS because the units of the extent look like latitude and longitude coordinates.**

- They are far too small to be meters or feet, like most projected coordinates are stored in.
- See screenshot below.

