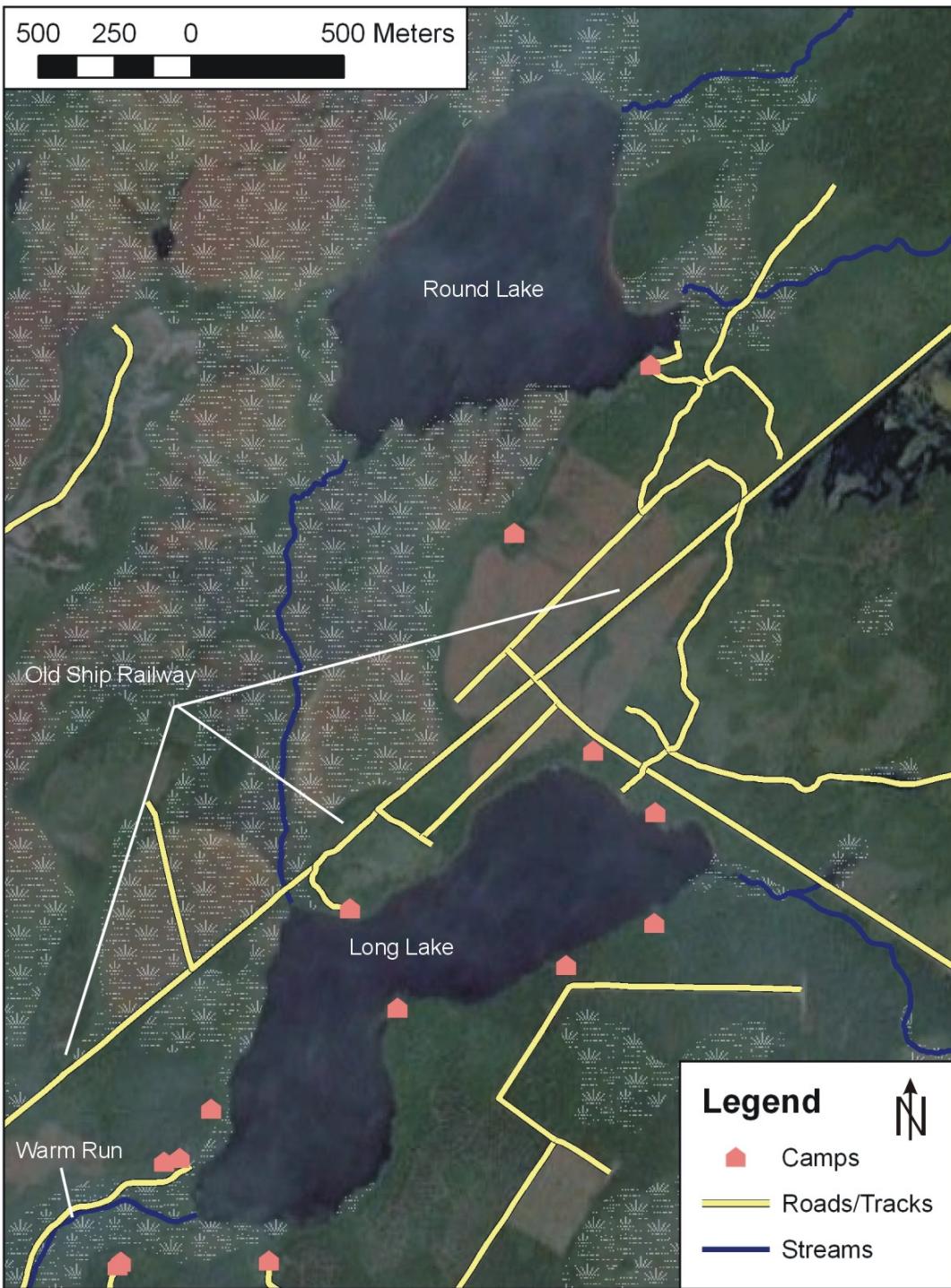


Introduction to GIS Short Course

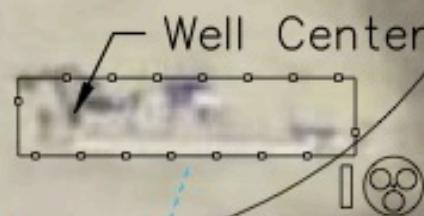
January 16th & 17th, 2015

My Background

- Not in GIS!
- Environmental Science at Acadia
- Environmental Scientist/Project Coordinator
at GeoGrid Environmental
- M.Sc. Geology at Acadia
- Use Geographic Information Systems in all 3
- Applied, Pragmatic approach to GIS



Elevation contours and water table contours of a spill site in Wimborne, Alberta



966.0

Depth: 1.32 m

965.5

P02-09

P03-09
Depth: 1.76 m

965.0

Depth: 1.01 m

P01A-09

P01-09
Depth 3.96 m

969

968

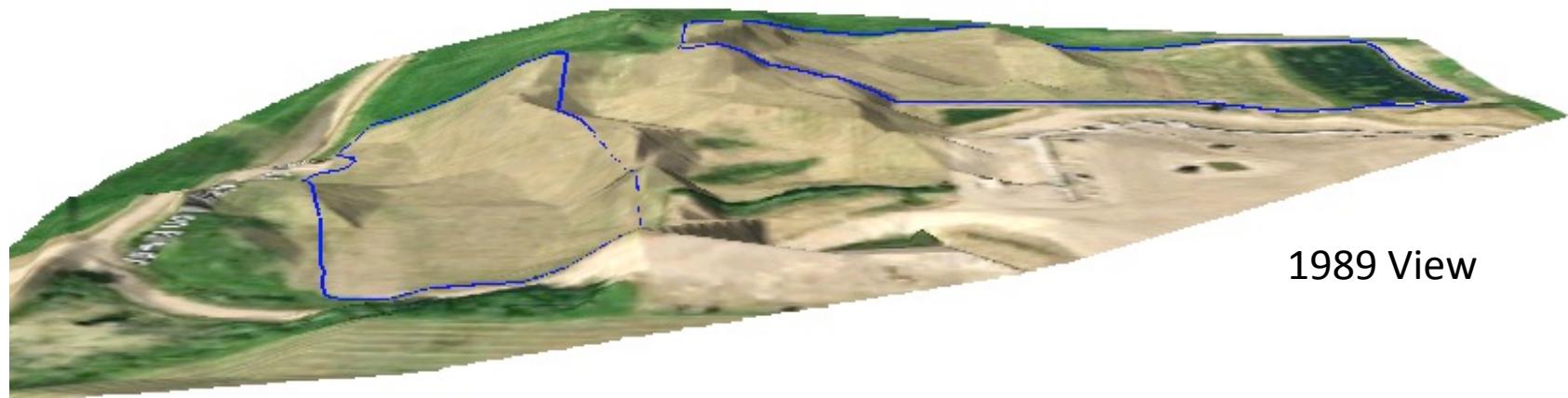
967

966

Cut and fill diagram of a site in
Elk Point, Alberta



Excavated View



1989 View



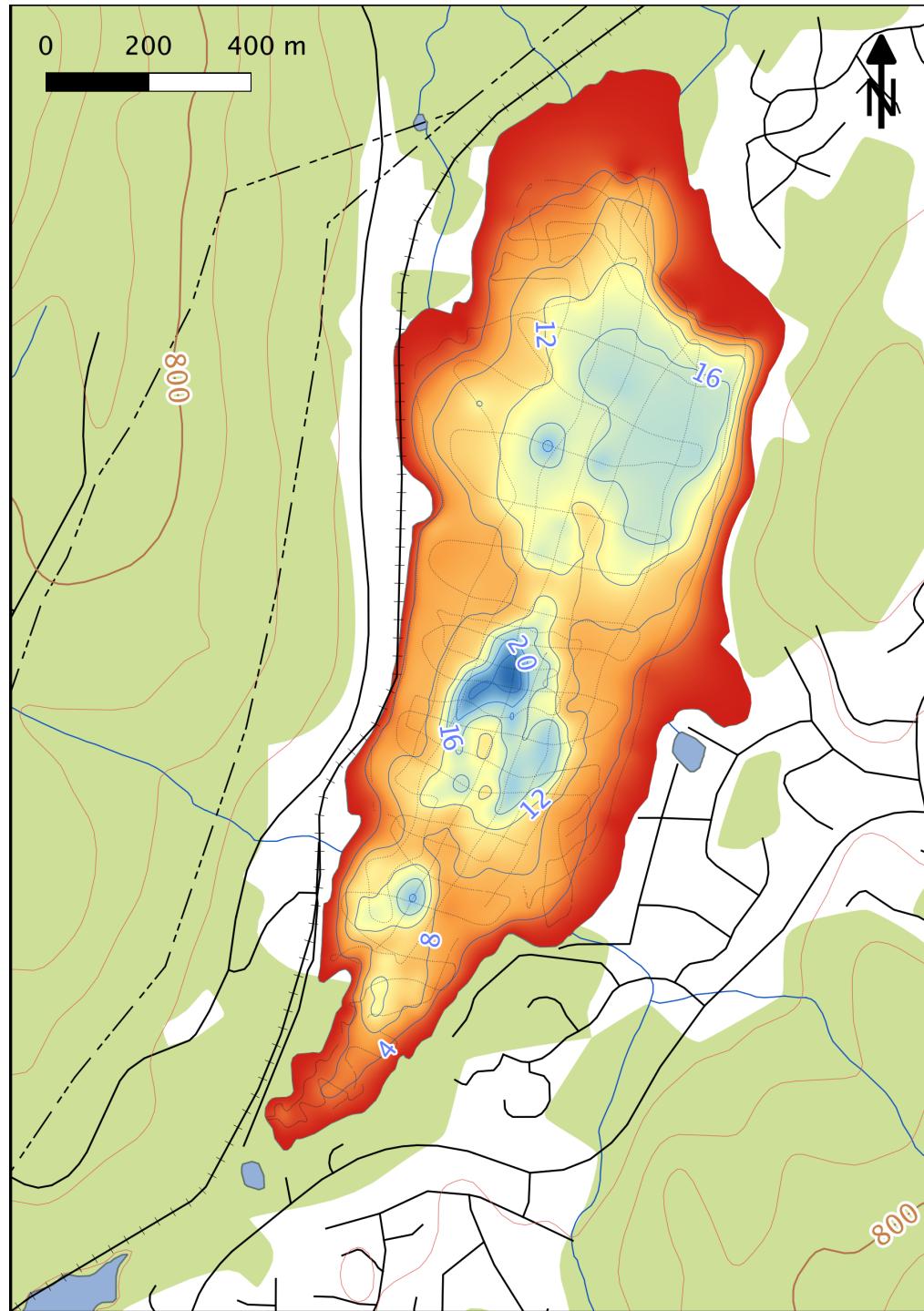
Final Contour



Cut and fill diagram of a site in
Elk Point, Alberta

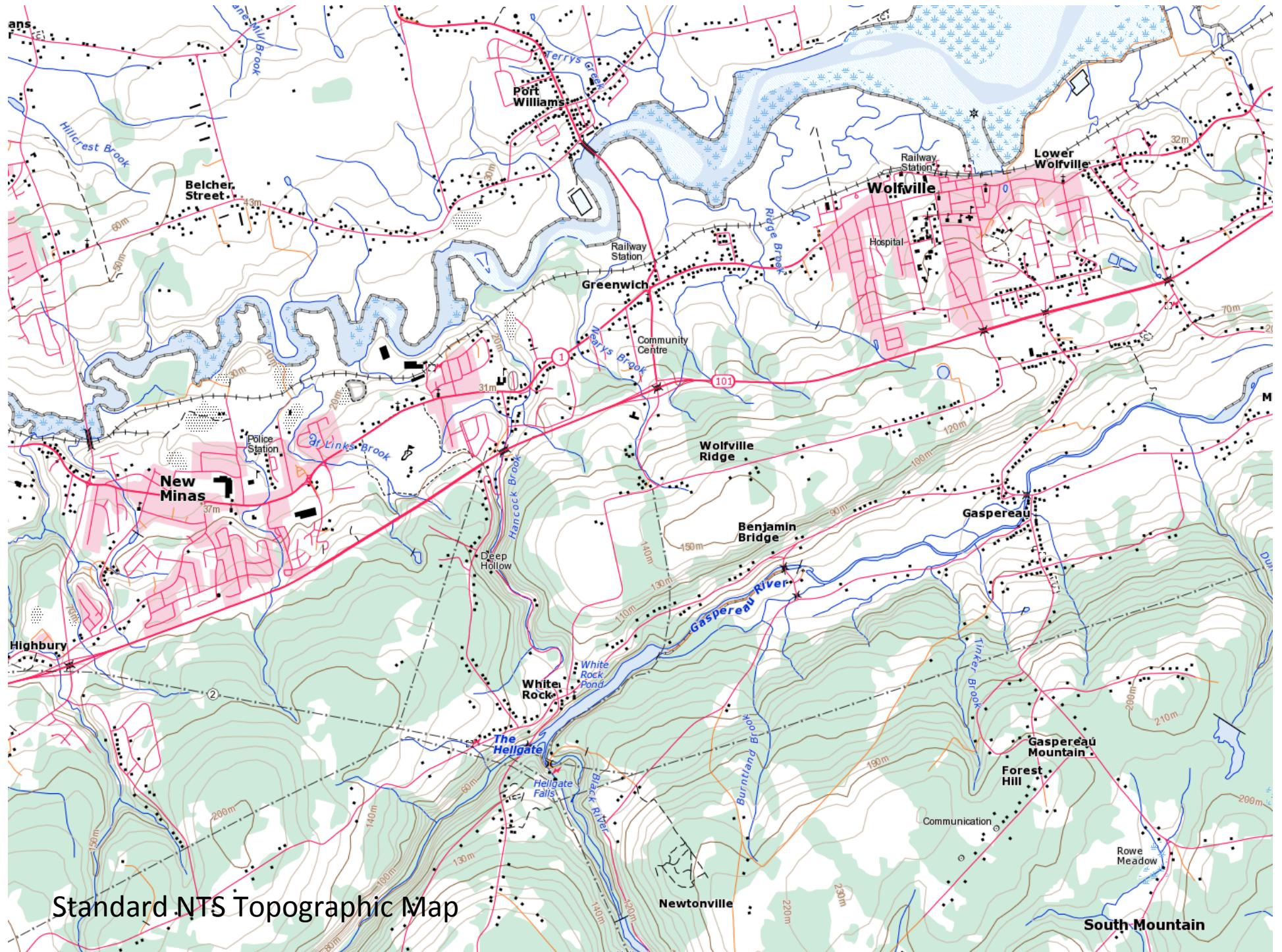






What is Geographic Information?

- GIS = Geographic Information System(s)
- Geographic Information is any information with a location associated with it (so, everything)
- Any information you can put on a map
- (and *want* to)



Why do we bother?

- Often a map is the best way to present and analyze information with a geographic component.
- Maps allow us to view multiple types of information together (“layers”) to make connections.

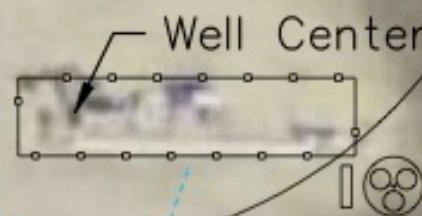
Introduction to GIS Short Course

- Day 1: How do you make a map in QGIS?
 - Add data to the map
 - Format the data to look pretty
 - Export/Print the map
 - Getting your data into QGIS

Introduction to GIS Short Course

- Day 2: Creating, importing, and manipulating GIS Data
 - Make a map of your study sites
 - Create and edit data in QGIS
 - Interpolation and contouring (Raster processing)
 - Vector data analysis
 - Going over participant projects

Elevation contours and water table contours of a spill site in Wimborne, Alberta



P03-09
Depth: 1.76 m

966.0

Depth: 1.32 m

P02-09

965.0

Depth: 1.01 m

P01A-09

Depth 3.96 m

P01-09

969

968

967

966

GIS Applications

- GIS = Programs that work with geographic data
- Google Earth (free to \$400/year)
- ESRI ArcGIS (\$1500 base license, \$4000 per extension; free basic versions available)
- GRASS, QGIS (“free” or by donation)
- MapInfo (\$1995)



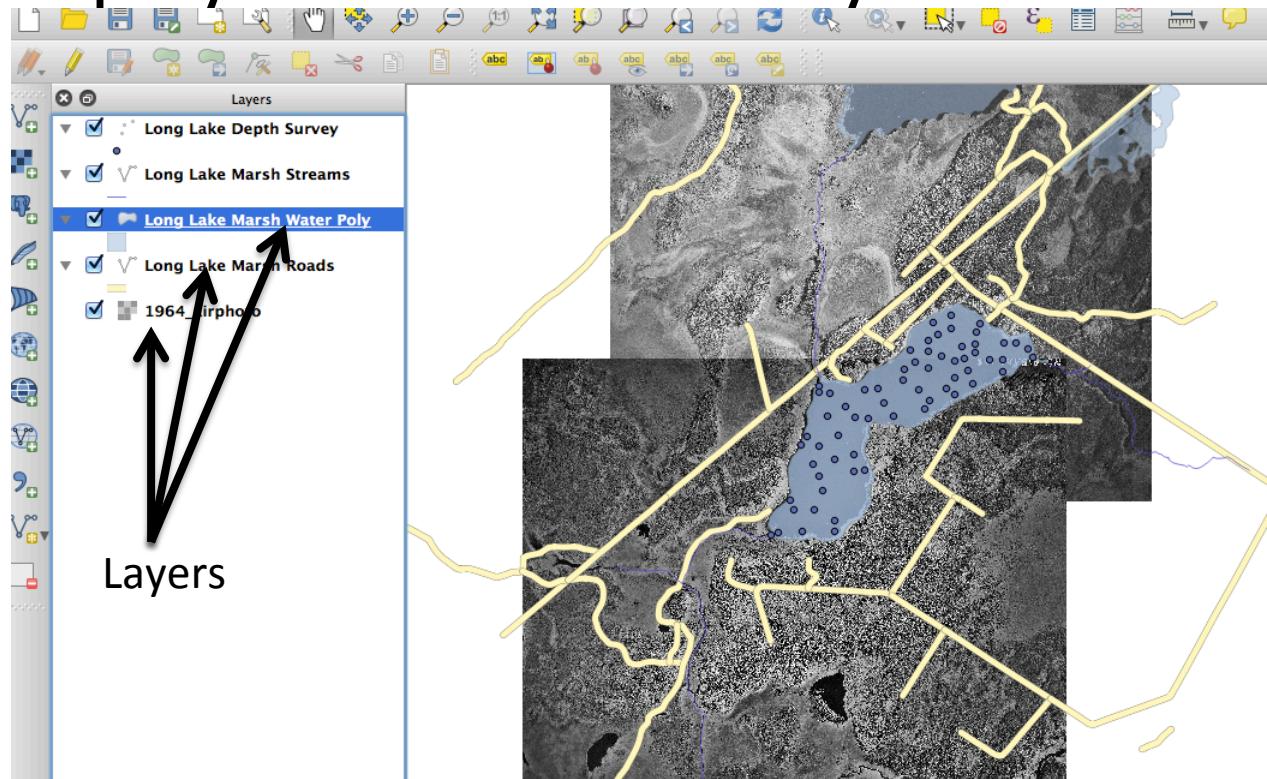
MapInfo.

GIS Applications

- All have same set of features:
 - Basemaps
 - Ability to add/edit/view geographic data (some free versions don't allow editing)
 - Analysis Tools
- We will be using QGIS because:
 - It doesn't cost money to install
 - It works (and works well) on multiple platforms
 - There is no license restriction (you can use it forever)

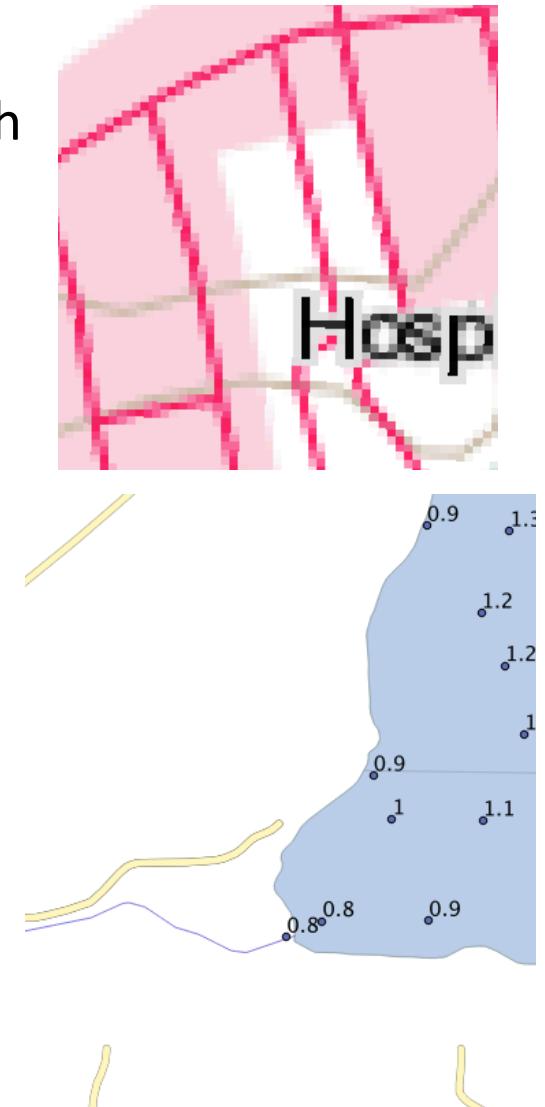
How is GIS Data Organized?

- GIS Data is organized in layers
- Each layer contains similar data that is usually displayed in a similar way.



Types of Layers

- Raster Layers
 - Contain a grid of data with a data value in each square
 - Can be color data (like a picture)
 - Can be other data (like elevation, concentration)
- Vector Layers
 - Contain a collection of points OR lines OR polygons (“features”)
 - Also contain data about these features (Sample number, elevation, depth, strike, dip; known as “attributes”).
- The power of GIS is often in comparing layers with each other and examining relationships.



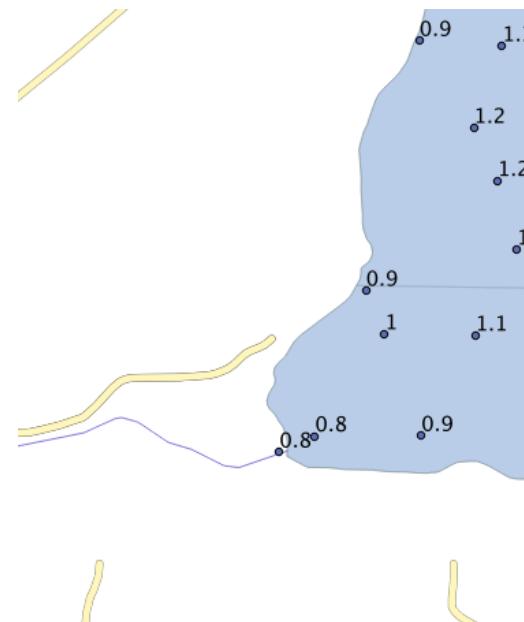
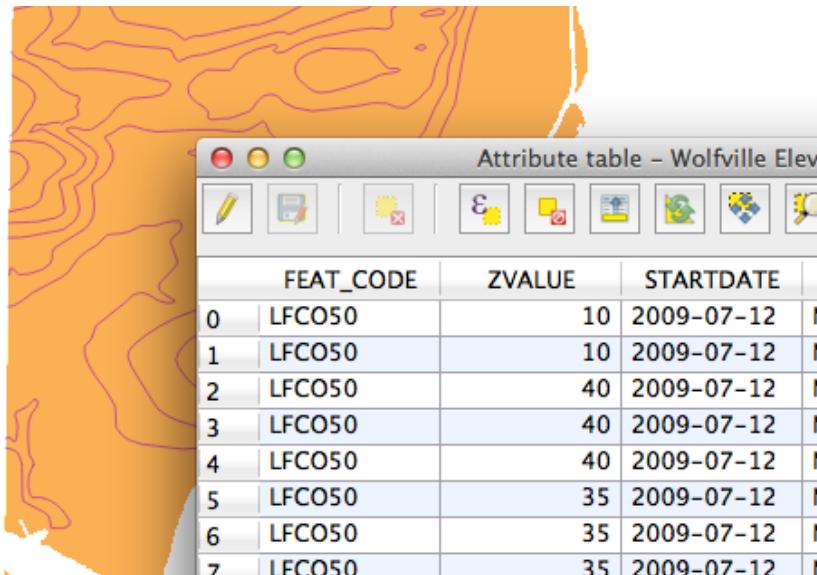
Raster Layers

- Can be displayed in a variety of ways – “color ramp” (shown below), grayscale, several discrete colors.
- For any point on the map, you can obtain a value from a raster.
- Also called a “surface”



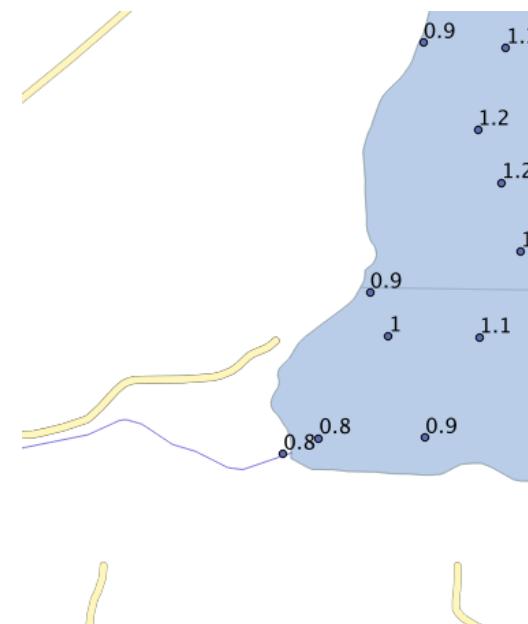
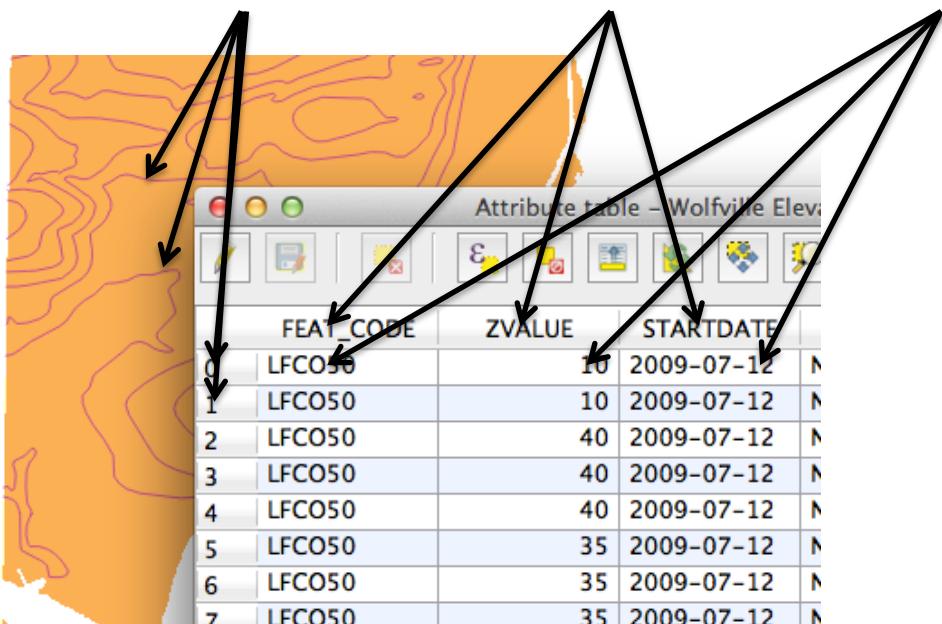
Vector Layers

- Made up of one or more “features” that have “attributes”
- Point OR line OR polygon features in a single layer



Vector Data

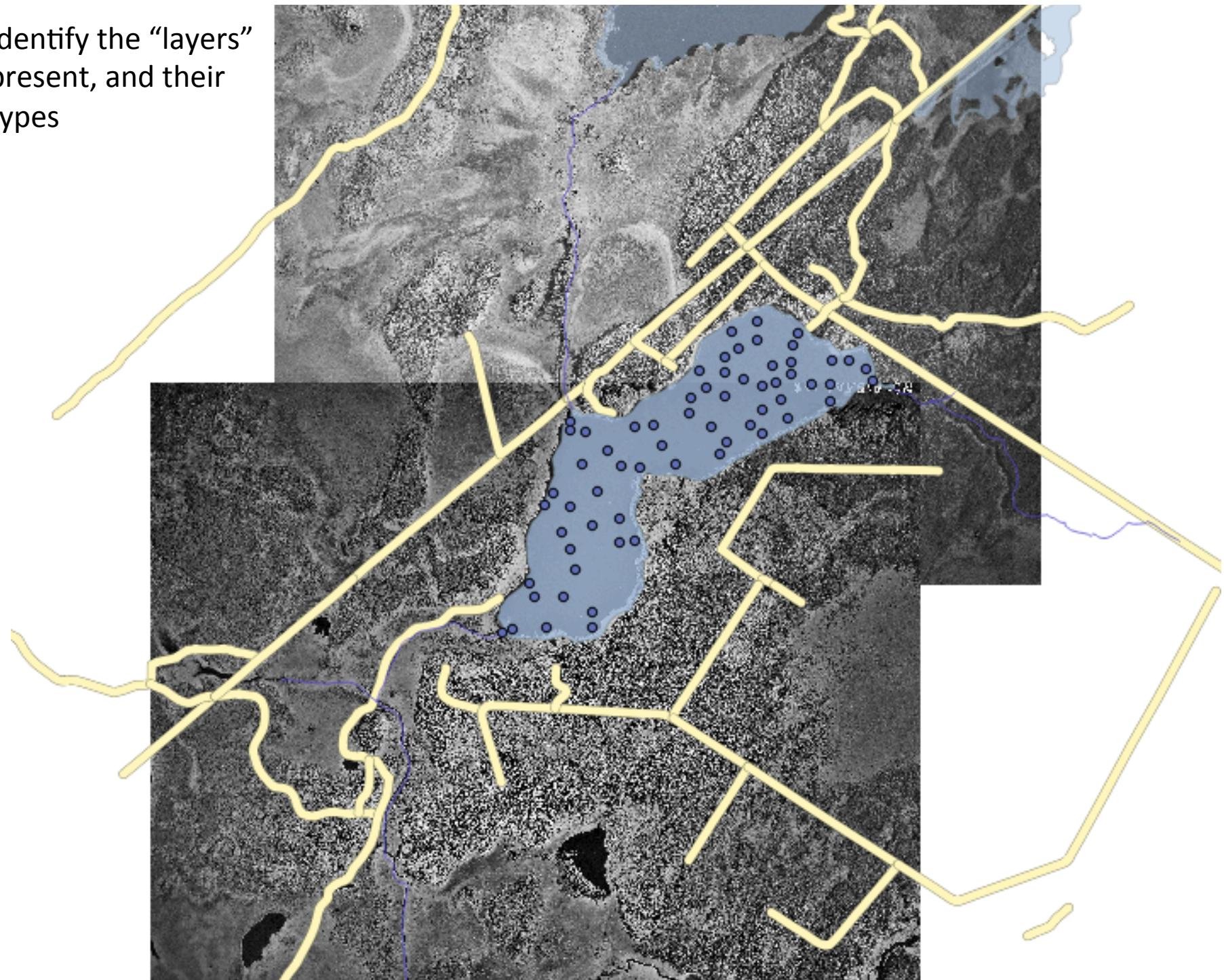
- Points •
- Lines —
- Polygons 
- Features, Fields, Attributes

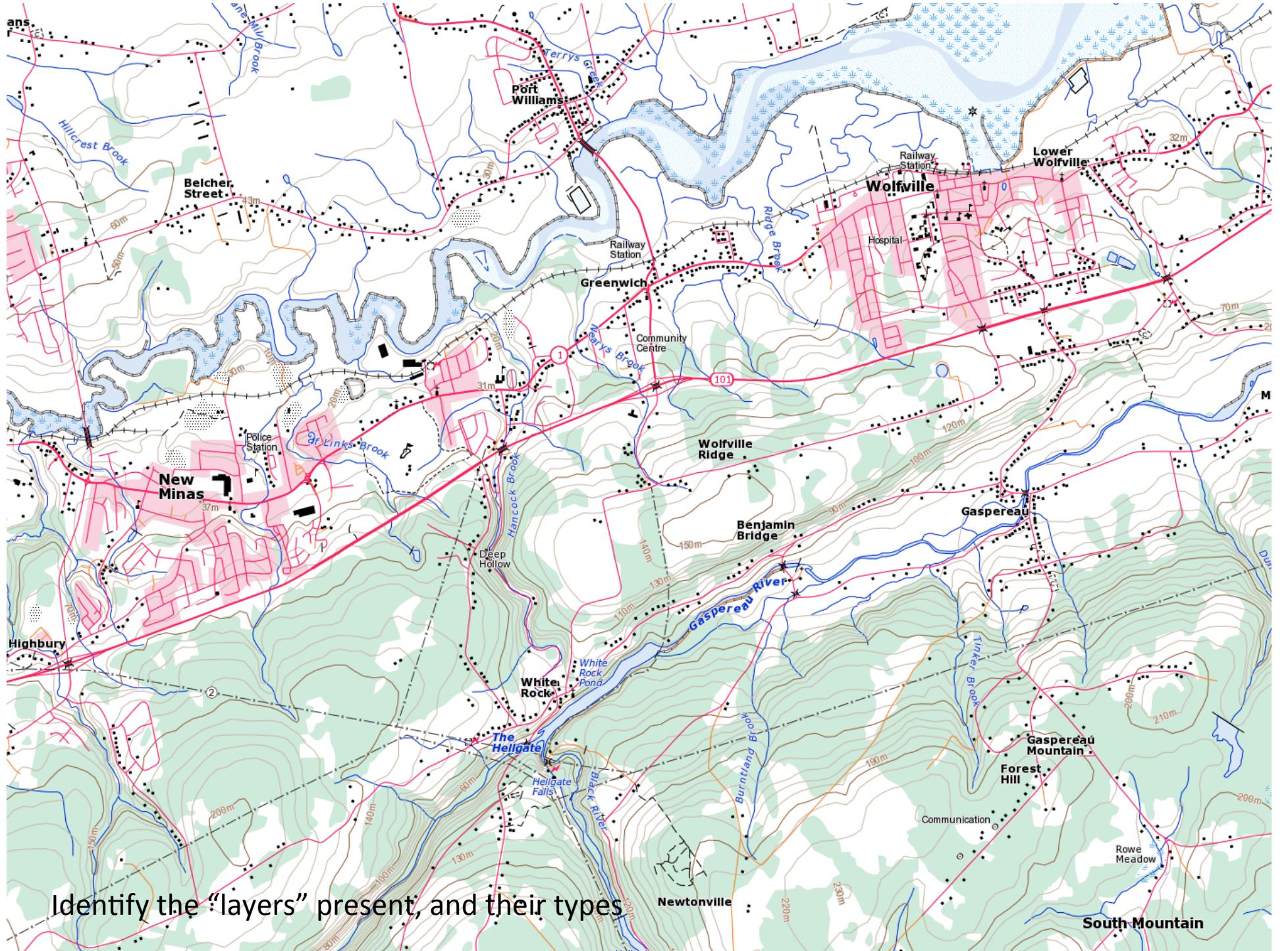


How could the following data be represented?

- Soil conductivity (Points, Contours, Raster)
- Water table depth (Points, Contours, Raster)
- Sample locations (Points, Raster)
- Strike & dip (Points, Contours, Raster)
- Slope steepness & direction of slope (Points, Contours, Raster)
- Roads (Lines, Polygons, Raster)
- Habitat suitability (Polygons, Raster)
- Bedrock type (Polygons, Raster)

Identify the “layers”
present, and their
types





Exercise!