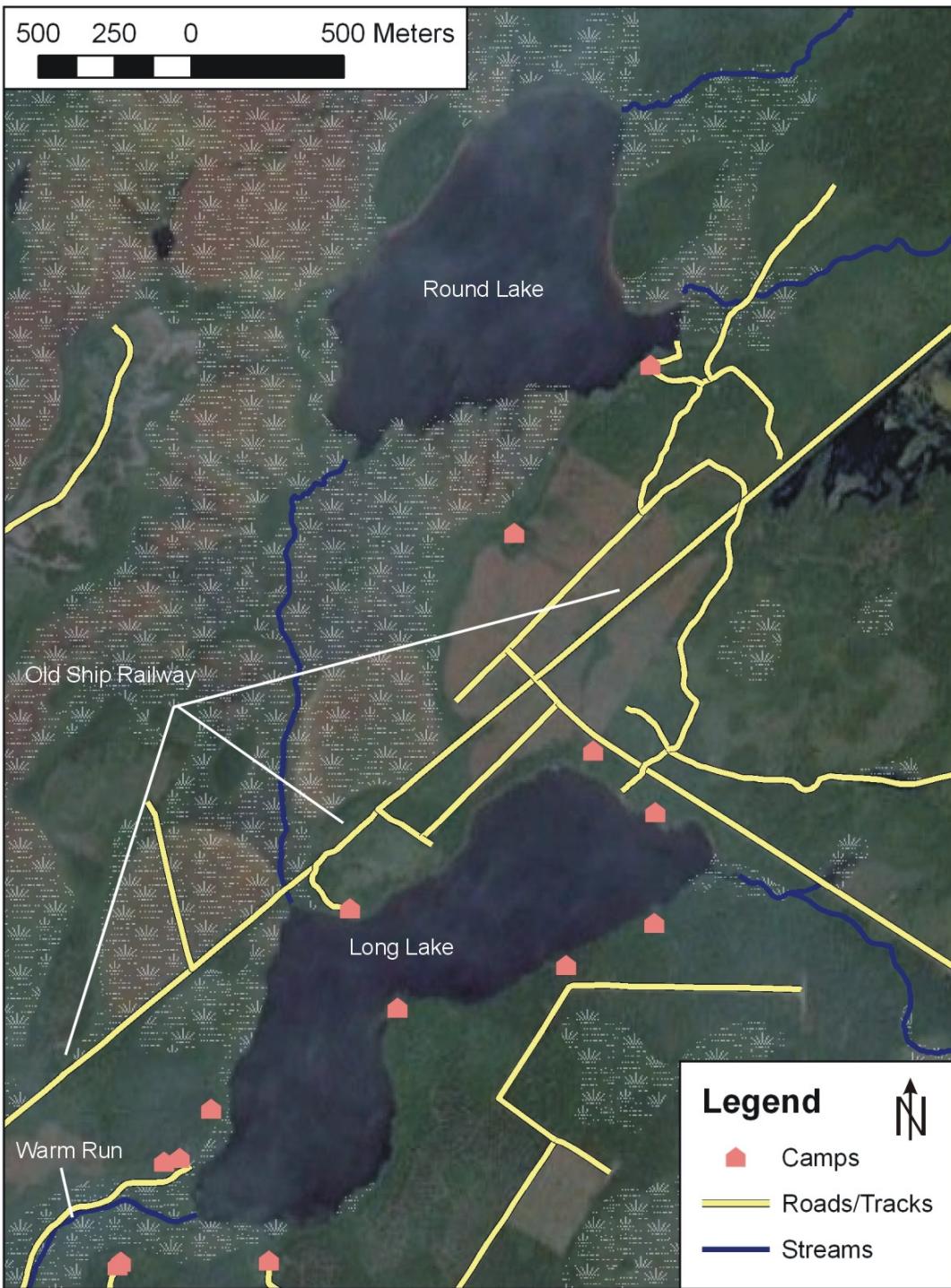


# Introduction to GIS Short Course

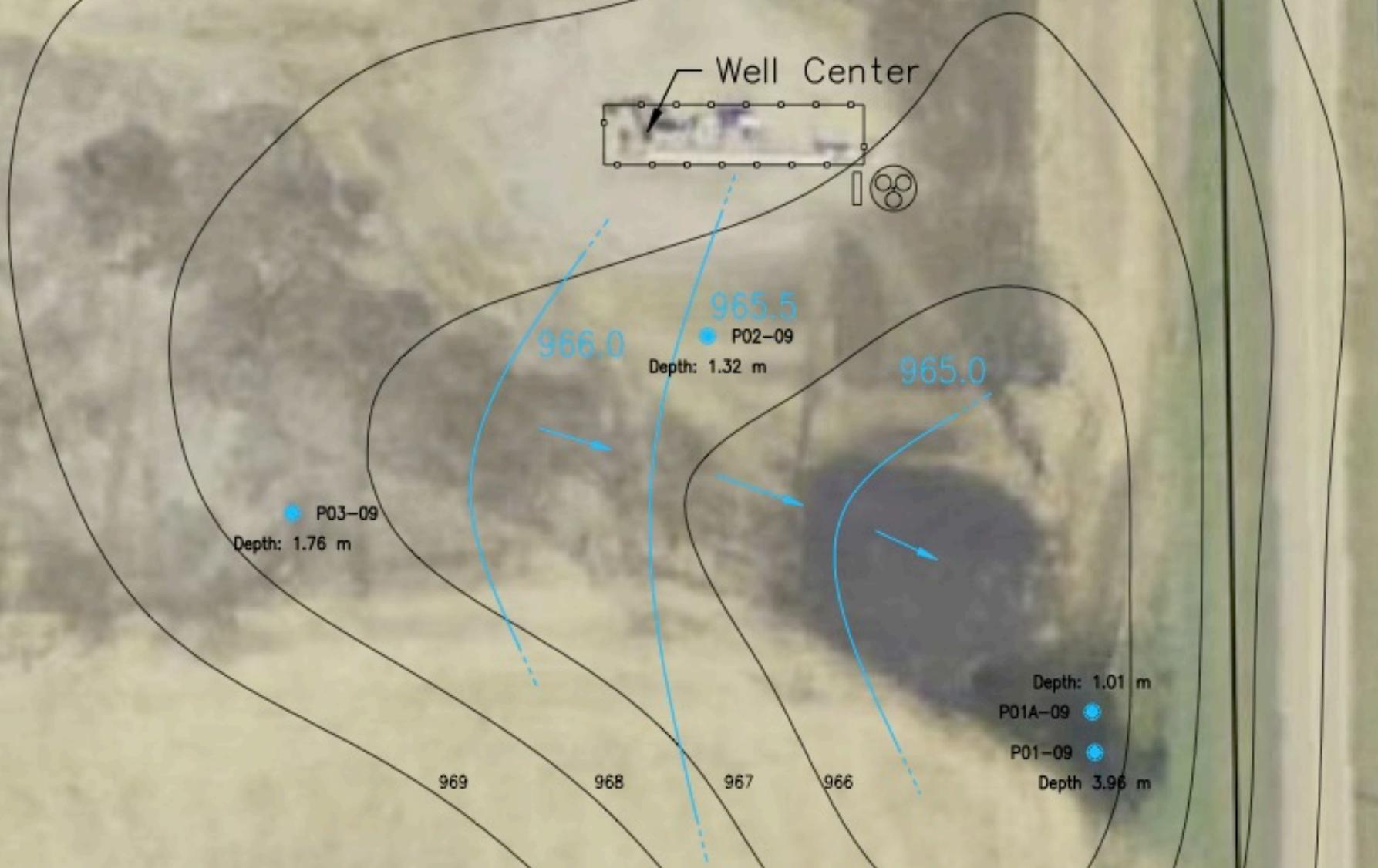
January 16<sup>th</sup> & 17<sup>th</sup>, 2015

# 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



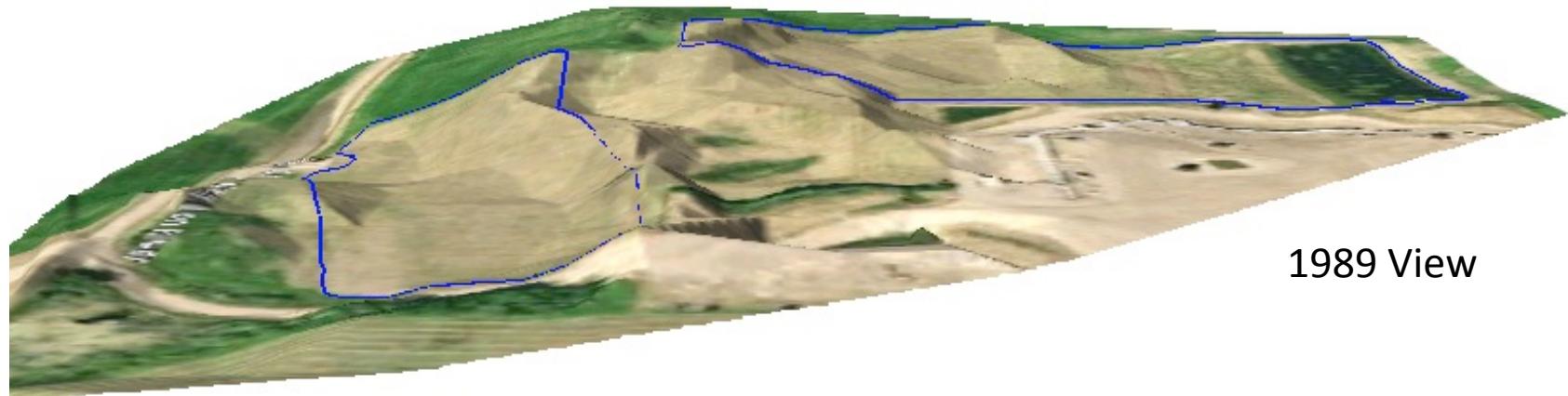
Elevation contours and water table contours of a spill site in Wimborne, Alberta



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



Excavated View



1989 View



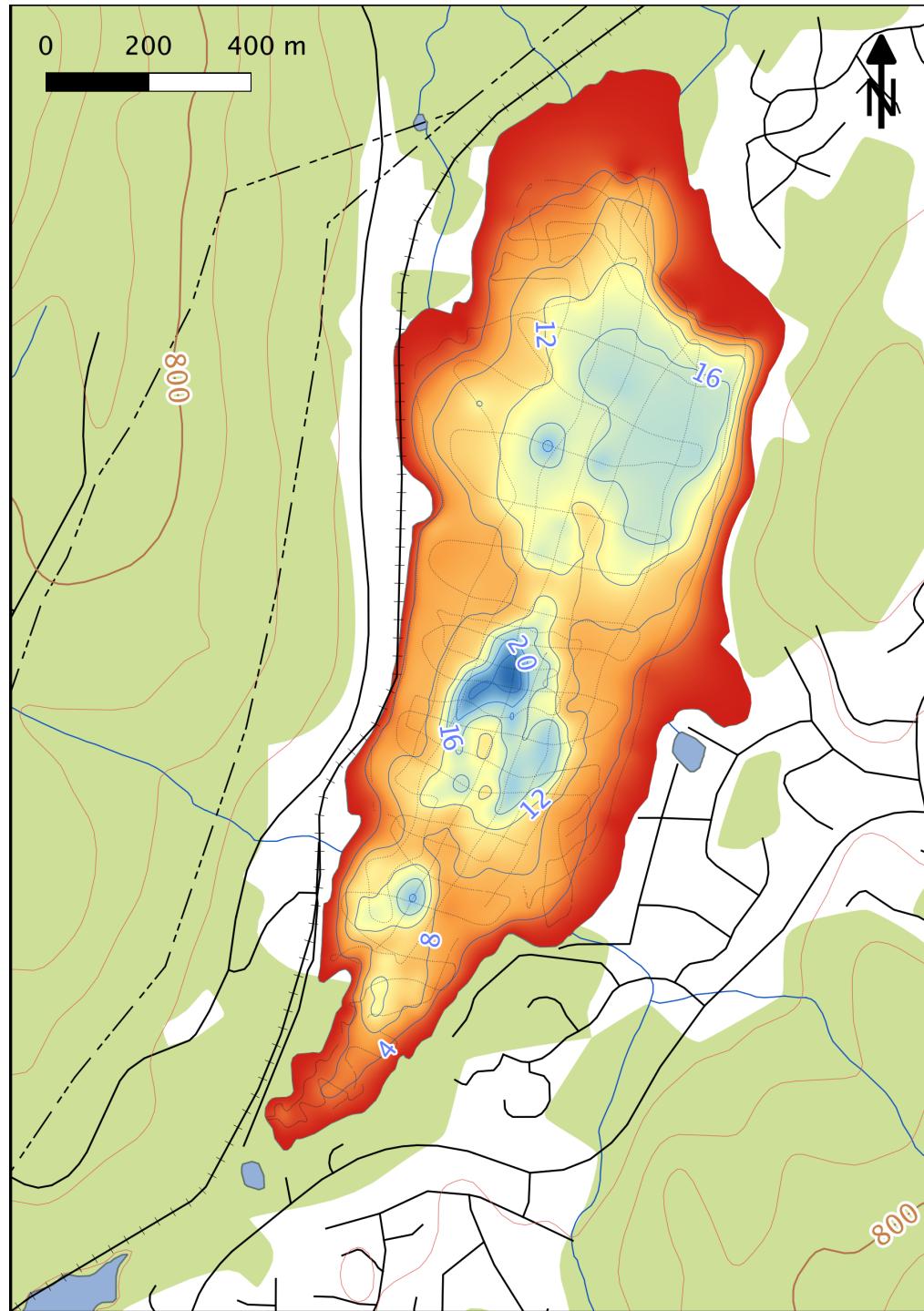
Final Contour



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

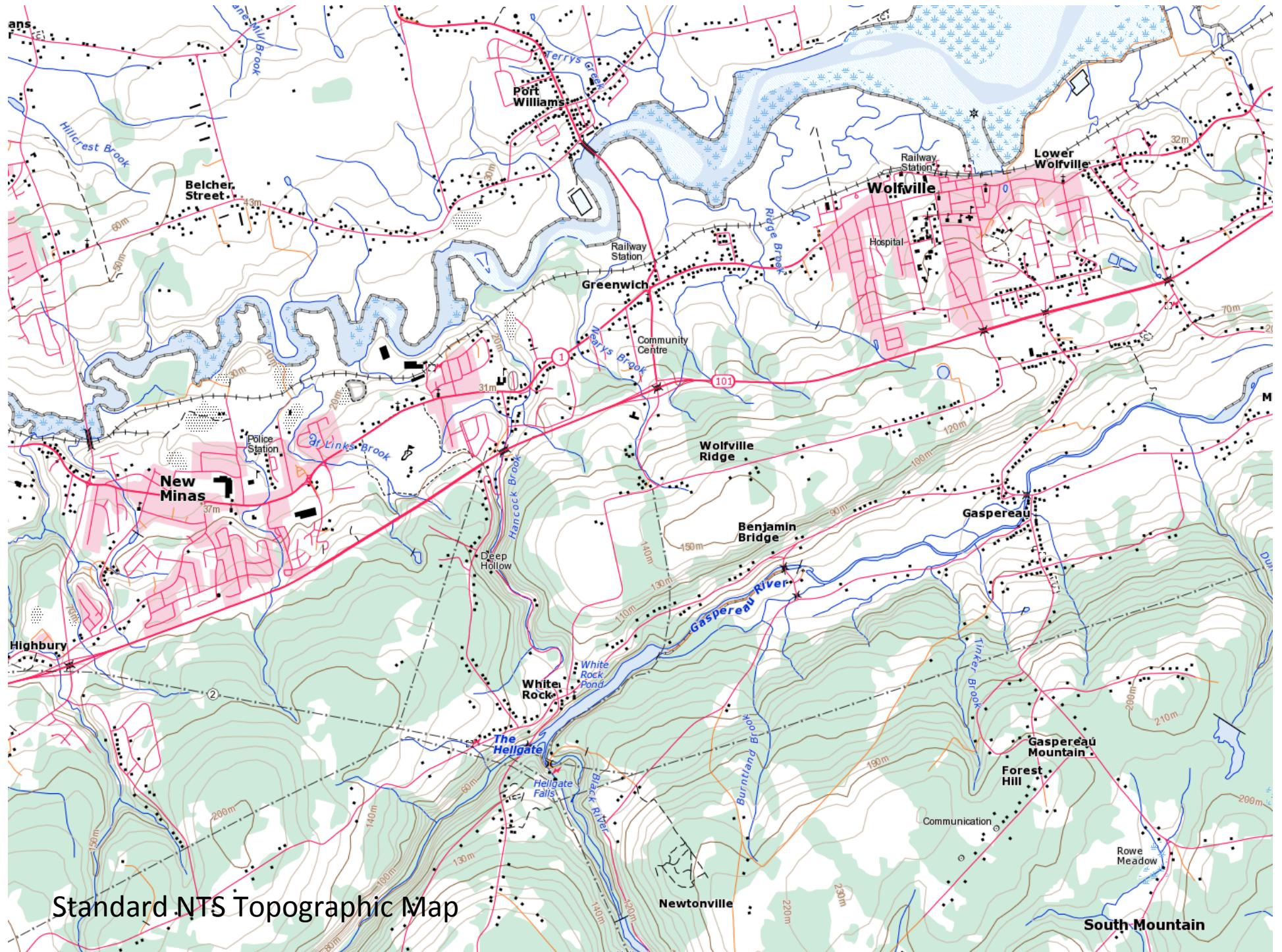






# What is Geographic Information?

- 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

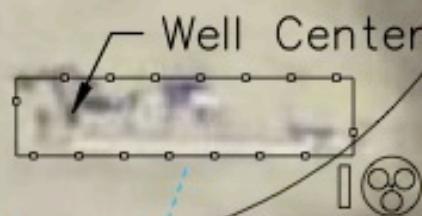
# Introduction to GIS Short Course

- 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

# Assignments

- During each module you will:
  - Create a QGIS Project
  - Create a PDF of the map you made in that module
  - Save the QGIS Project (and any data you generate during that module) in the correct folder.
- You “must” complete these tasks!

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

# 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)



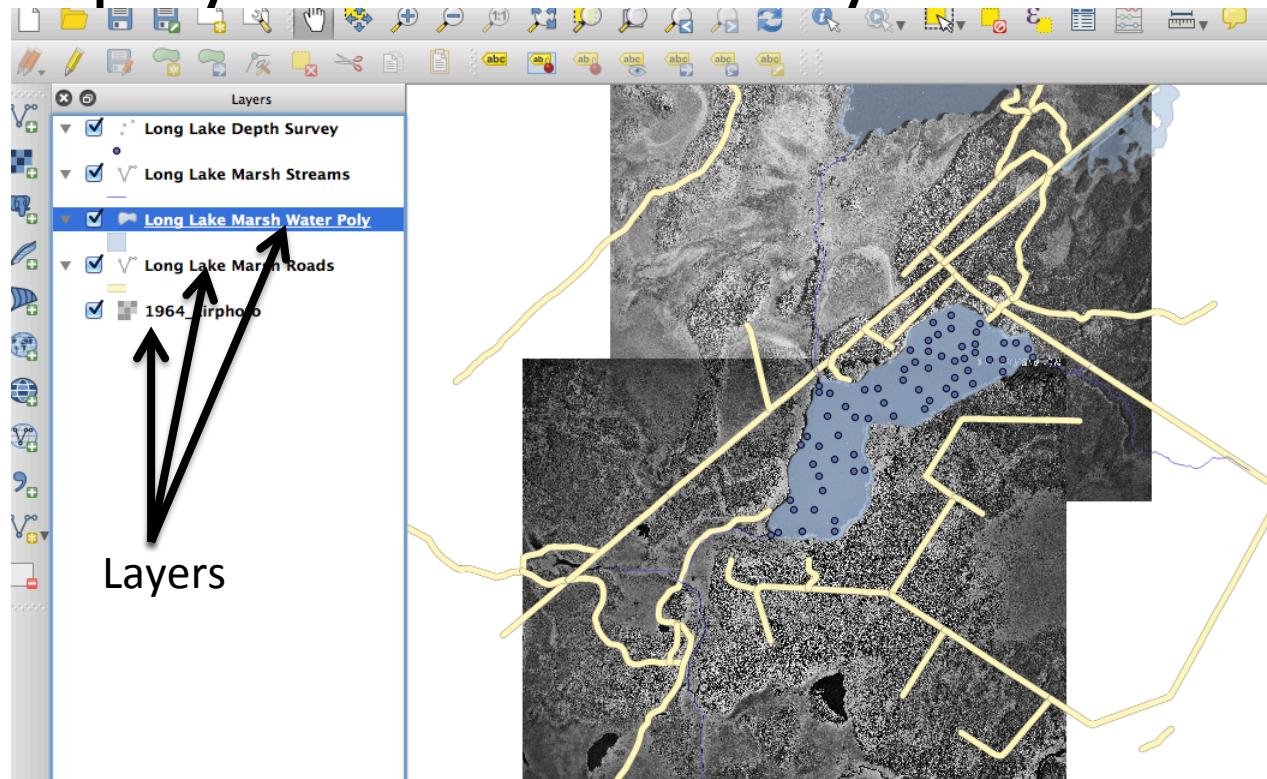
MapInfo.

# 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)

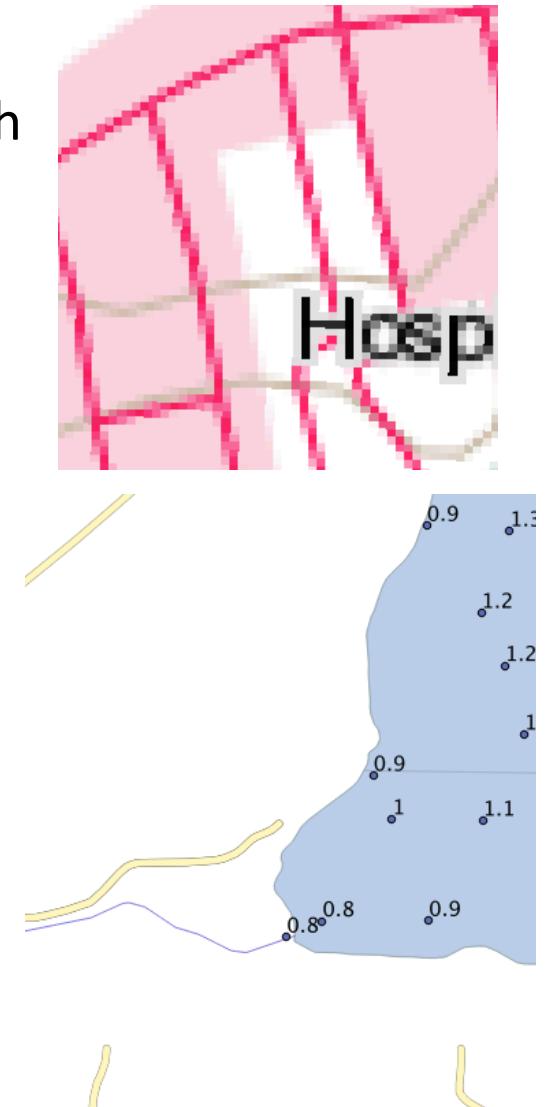
# How is GIS Data Organized?

- 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.



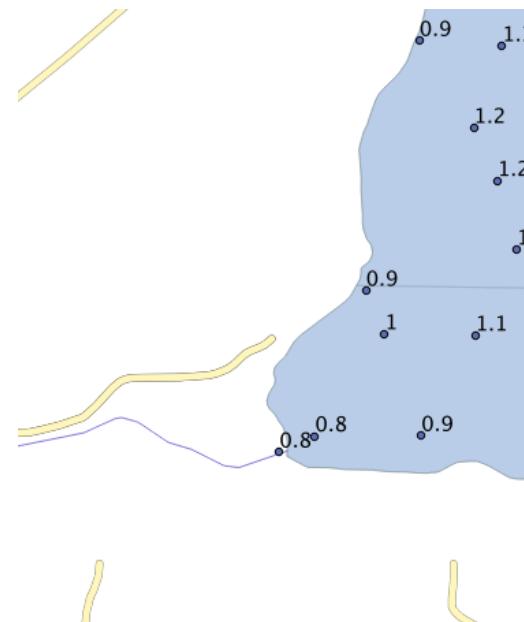
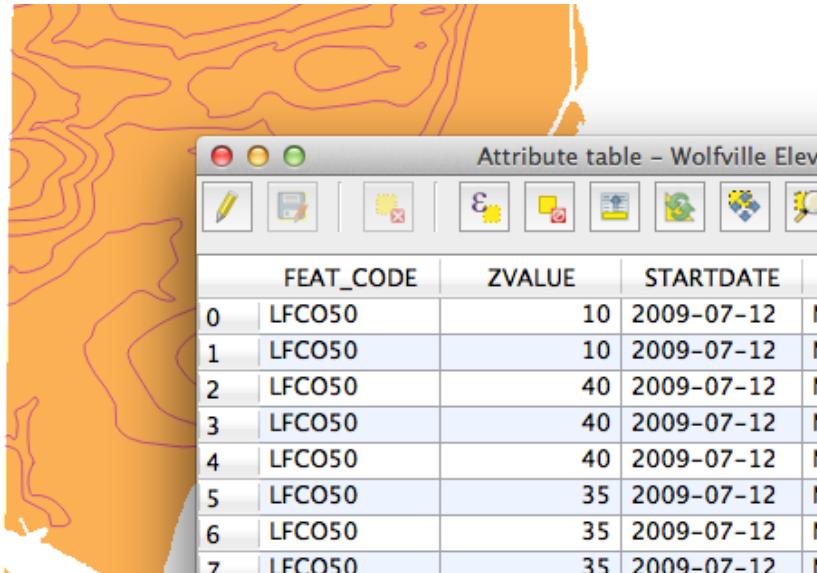
# Raster Layers

- 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”



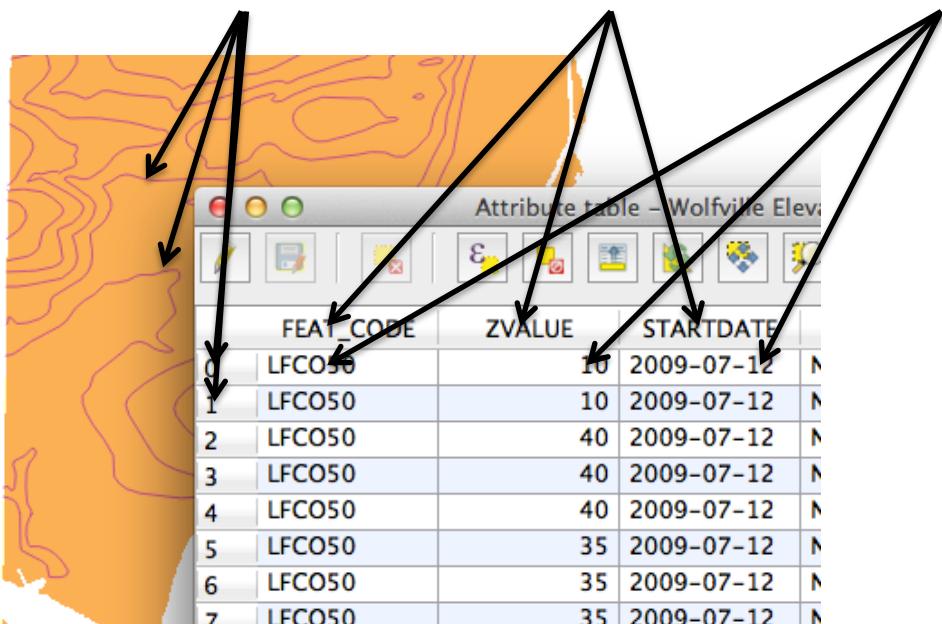
# Vector Layers

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



# Vector Data

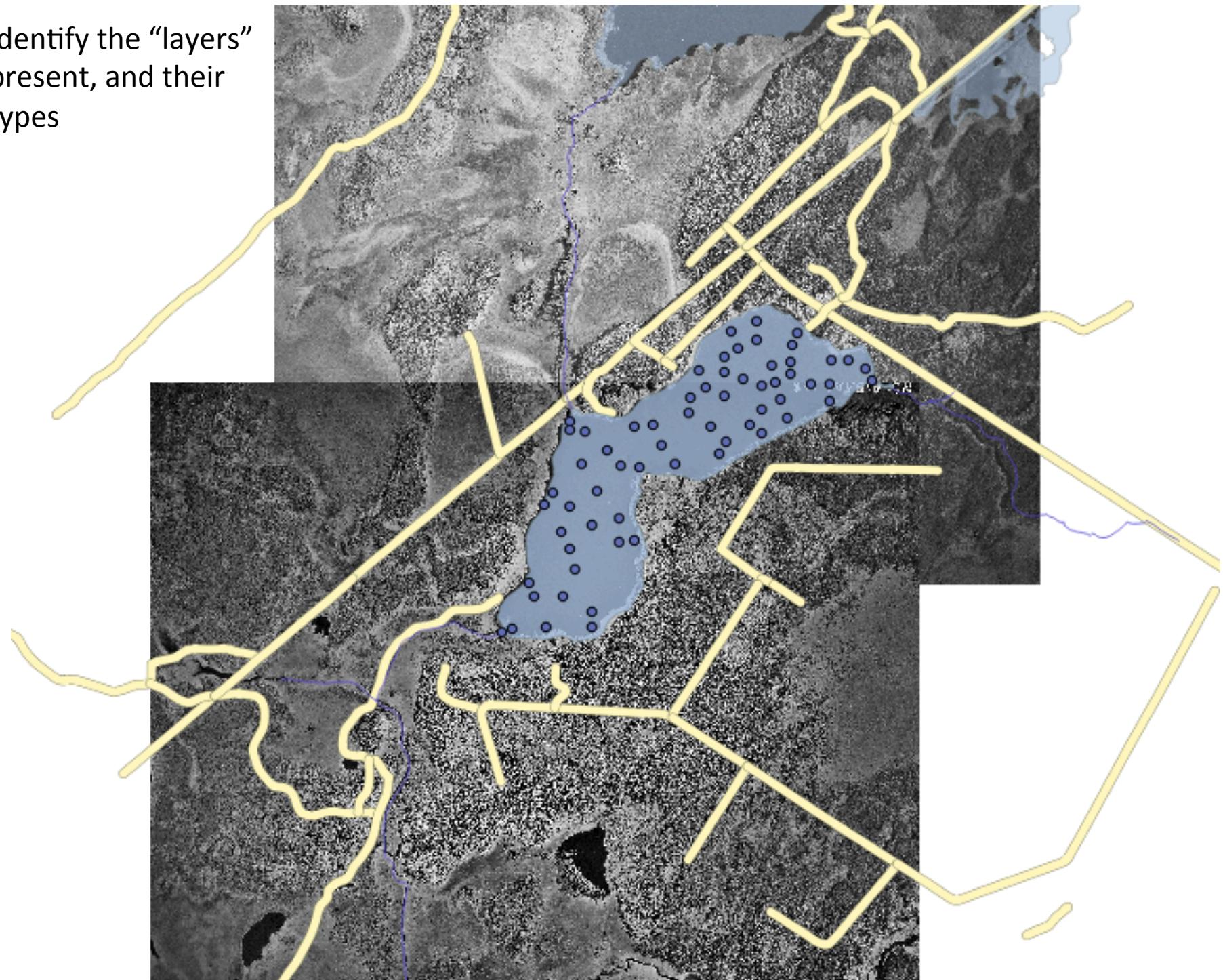
- Points •
- Lines —
- Polygons 
- Features, Fields, Attributes

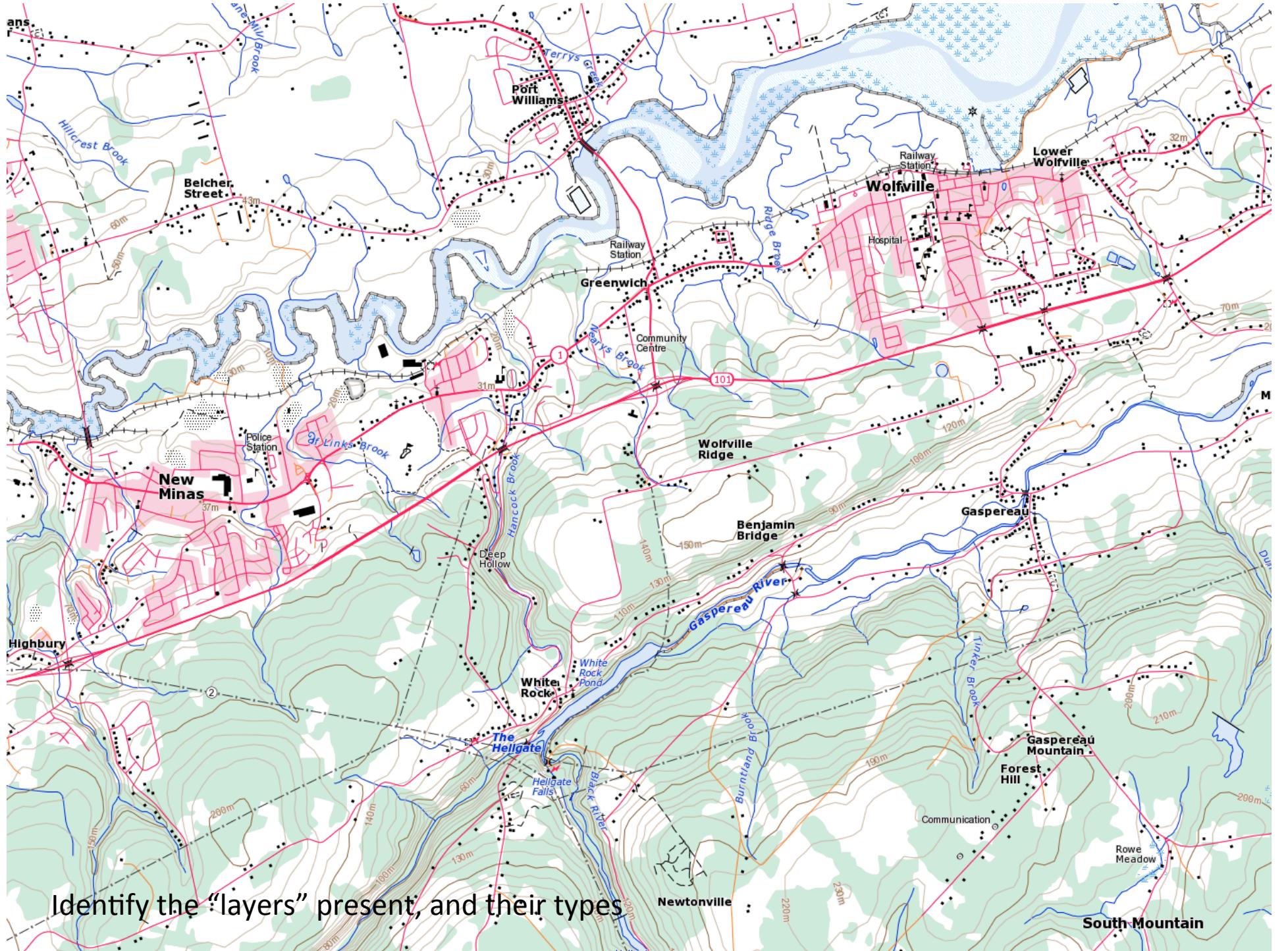


# How could the following data be represented?

- 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!