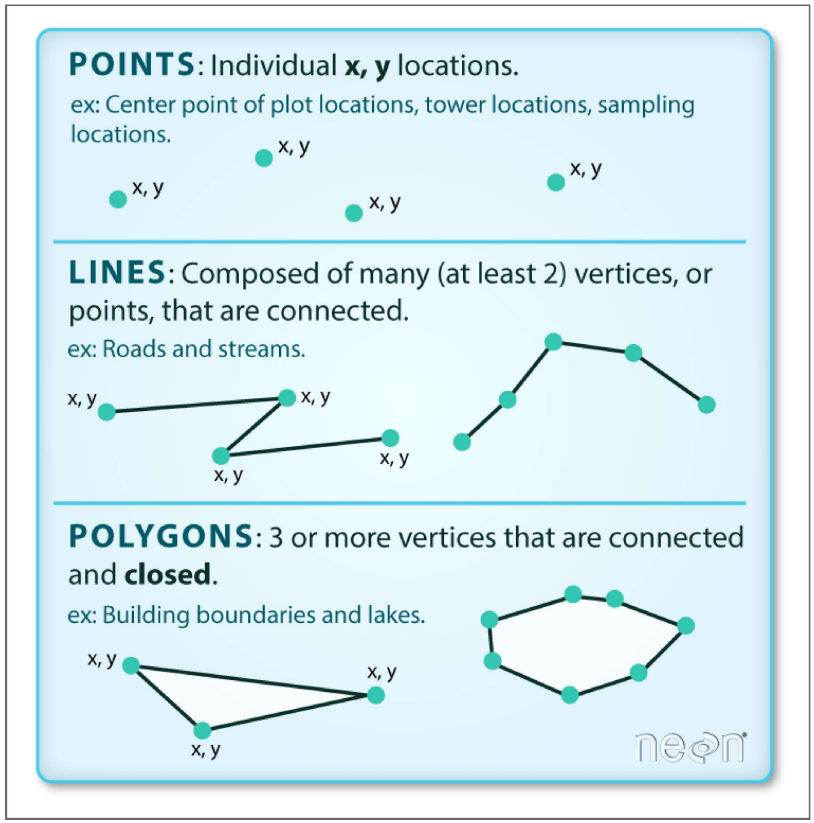
VECTOR DATA

A more complex, but light weight format best suited for **discrete objects**.

VECTOR DATA MODEL

Represents objects as sets of coordinate pairs.

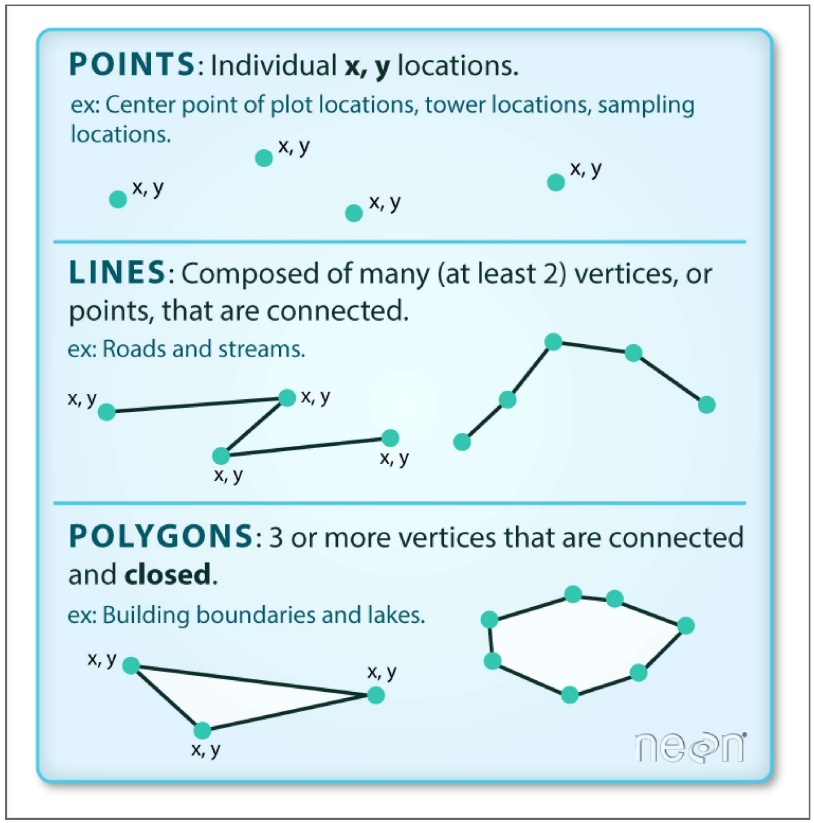
- Linked to descriptive attributes.
- Many attributes per object.



POINTS

A point feature is an individual x, y coordinate pair representing a precise location.

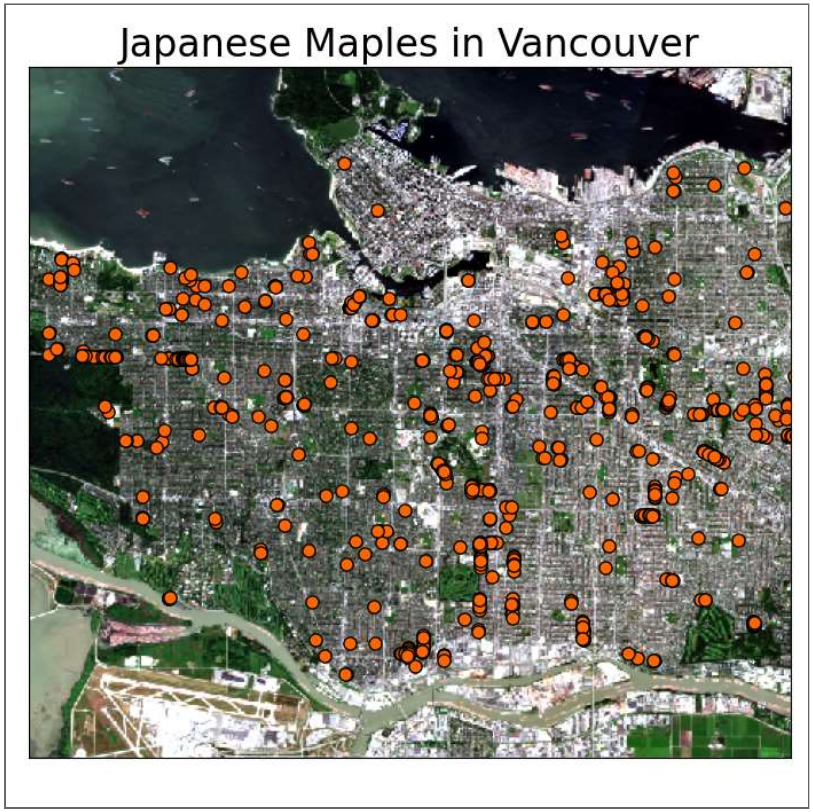
- "Zero-dimensional"
- No length, width, or area



POINTS

Points are great for representing a variety of objects, depending on the scale:

- Trees
- Stop signs
- Fire hydrants



POINTS

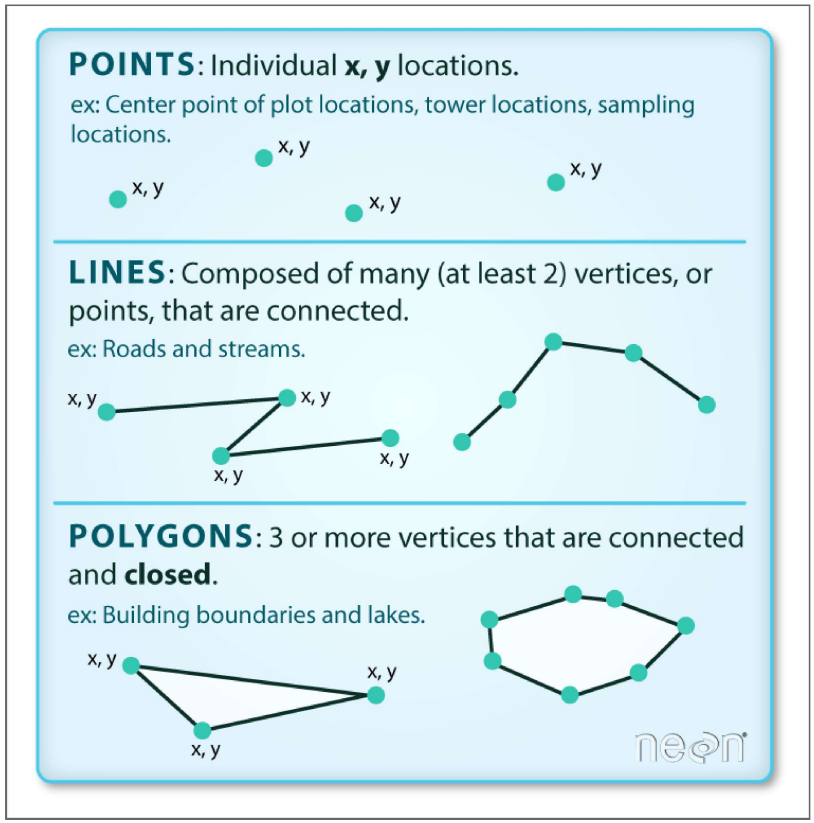
Points are great for representing a variety of objects, depending on the scale:

- Trees
- Stop signs
- Fire hydrants
- Cities
- Wild fires
- Airports

LINES

A line feature is a set of connected points. **Must** have a start and end point. *May* have middle points (vertices).

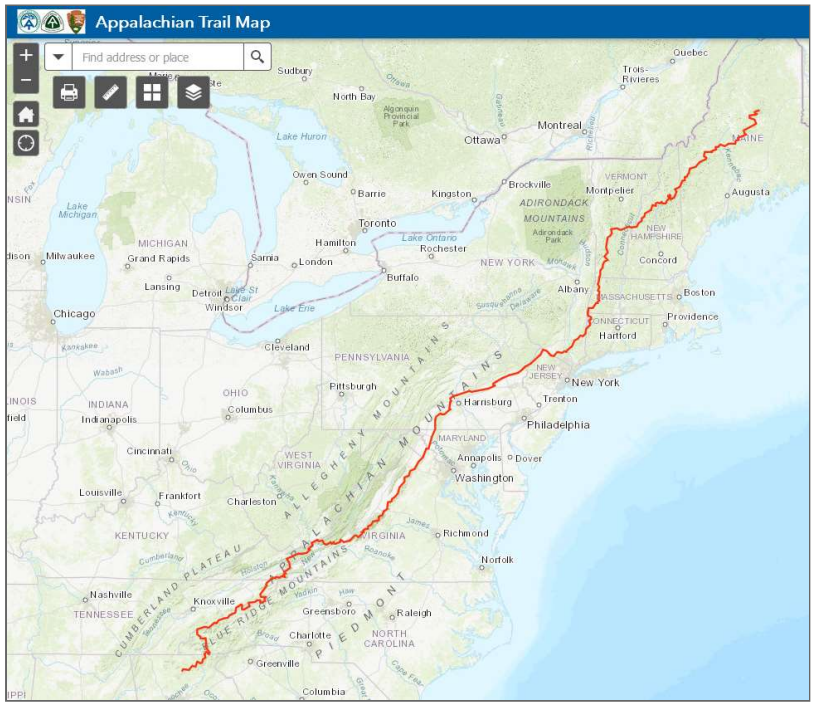
- One-dimensional
- Length
- No width or area



LINES

Lines are also great, depending on the scale:

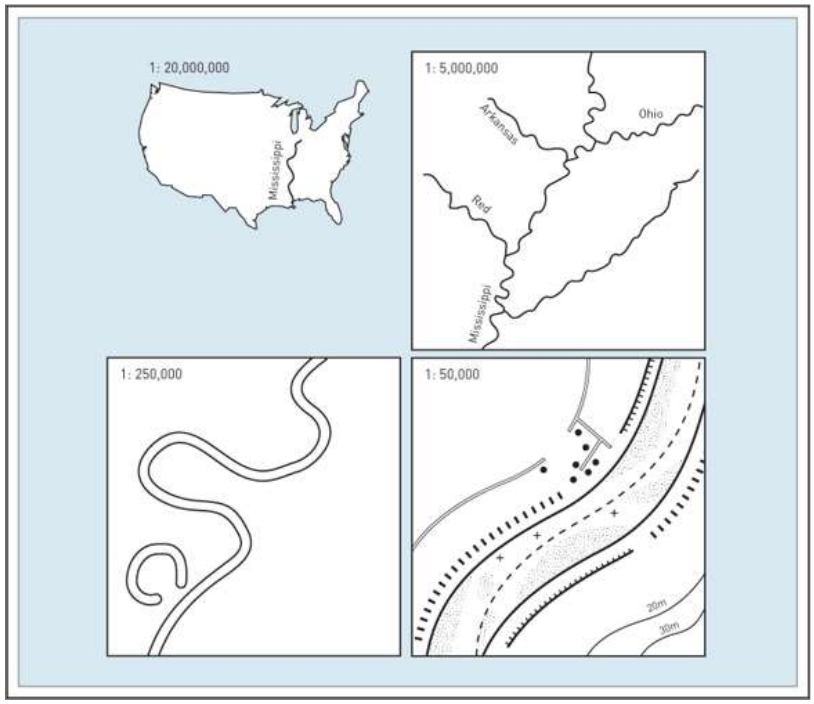
- Hiking trails
- Power lines
- Water pipes



LINES

Lines are also great, depending on the scale:

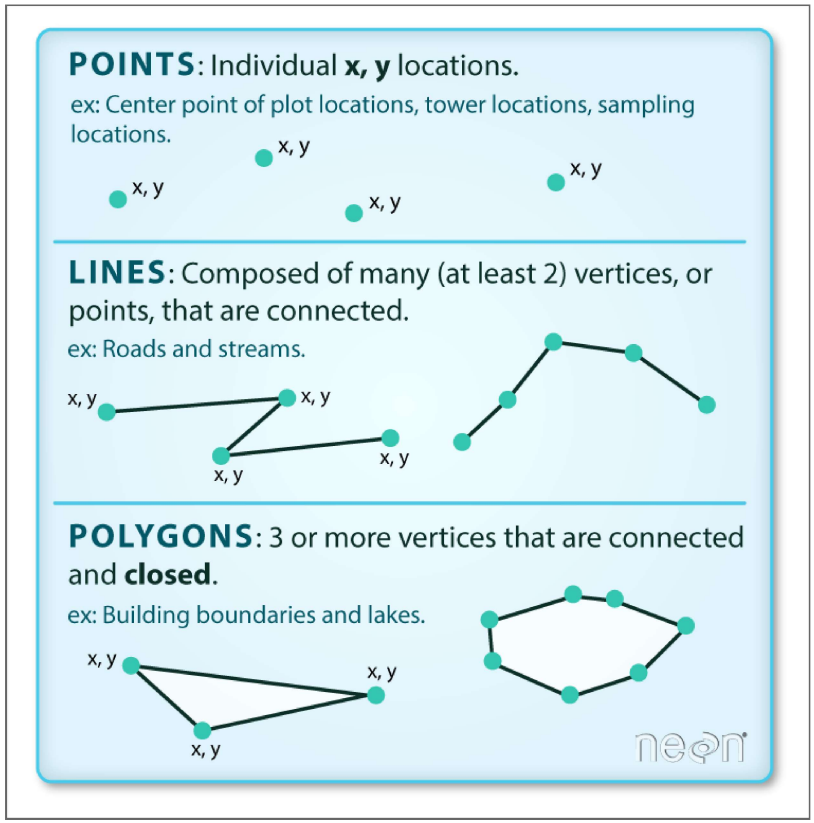
- Hiking trails
- Power lines
- Water pipes
- Roads
- Rivers
- Storm tracks



POLYGONS

A polygon feature consist of a set of **three** or more vertices connected by line segments (edges) that form an enclosed shape.

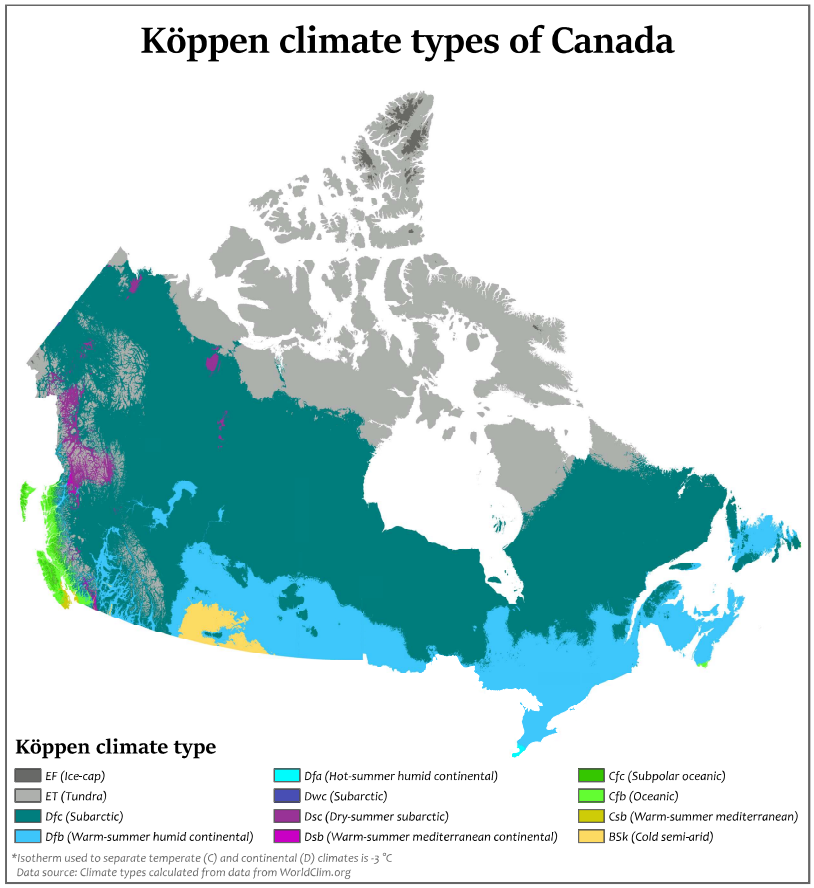
- One-dimensional
- Length **&** width
- **Area**



POLYGONS

Preferred for many objects depending on scale:

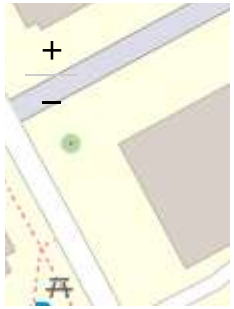
- Climate units
- Lakes
- Political boundaries



POLYGONS

Preferred for many objects depending on scale:

- Climate units
- Lakes
- Political boundaries
- Buildings
- Roads
- Cities



INTERIOR RINGS

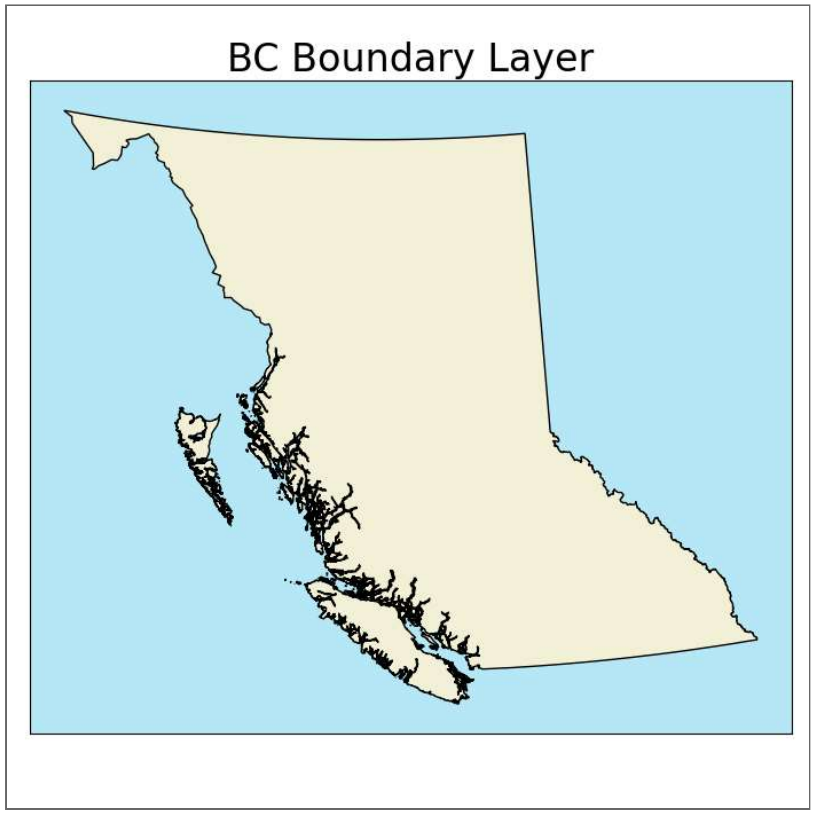
All polygons are an enclosed shape. Some can also have interior rings (holes).

- Each ring is a separate set of vertices and edges within the polygon.
- Interior rings **cannot** overlap.

MULTI-PART VECTORS

When an object has multiple parts, the vector model allows for:

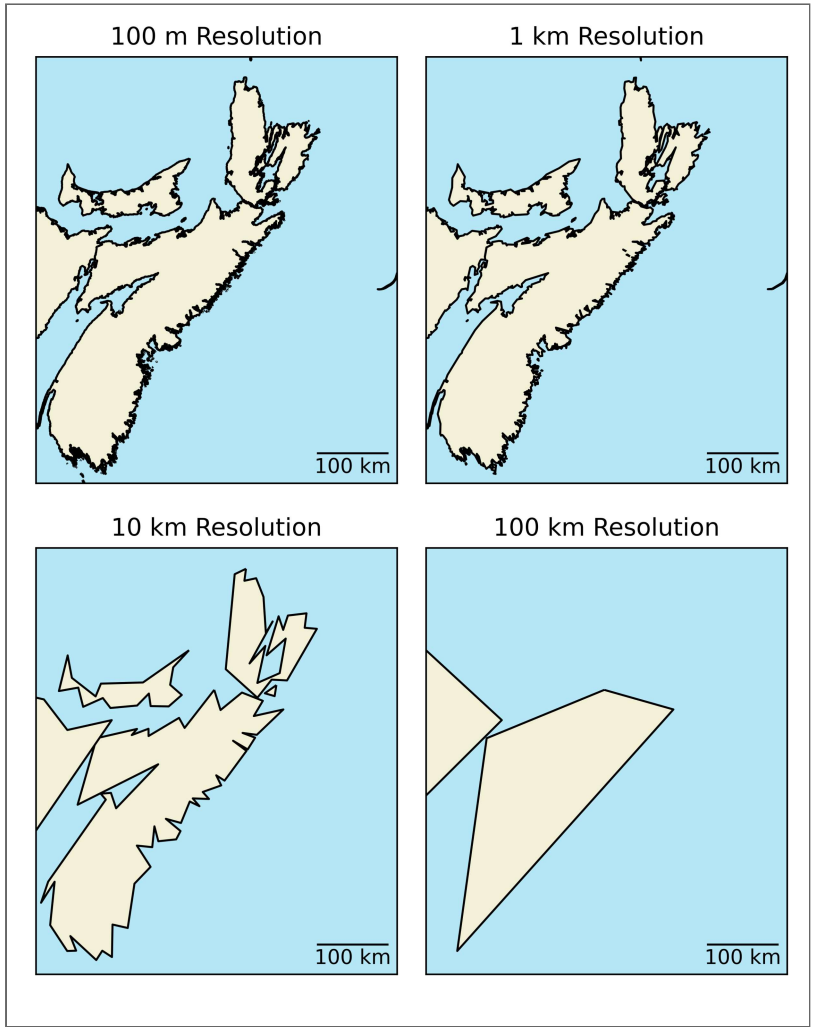
- Multi-polygons
- Multi-lines
- Multi-points



RESOLUTION

Data resolution also applies to the vector model:

- Less straightforward than for raster model
- Space between vertices
- Higher resolution = larger filed size



TABULAR DATA

Non-spatial data can be stored in an **Attribute Tabule** separate from the spatial data.

PRUID	PRNAME	PREABBR	Area
10	Newfoundland and Labrador	N.L.	406998.00
11	Prince Edward Island	P.E.I.	5893.29
12	Nova Scotia	N.S.	55643.30
13	New Brunswic	N.B.	73050.60
24	Quebec	Que.	1509750.00
35	Ontario	Ont.	986723.00
46	Manitoba	Man.	649630.00
47	Saskatchewan	Sask.	652385.00
48	Alberta	Alta.	663251.00
59	British Columbia	B.C.	948292.00
60	Yukon	Y.T.	483867.00
61	Northwest Territories	N.W.T.	1350020.00
62	Nunavut	Nvt.	2094250.00

TABULAR DATA

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TABULAR DATA

Ability to store many attributes:

- Less redundancy than raster model
- Easy to add new attributes

PRUID	PRNAME	PREABBR	PRFNAME	PRFABBR	Area
10	Newfoundland and Labrador	N.L.	Terre-Neuve-et-Labrador	T.-N.-L.	406998.00
11	Prince Edward Island	P.E.I.	Île-du-Prince-Édouard	Î.-P.-É.	5893.29
12	Nova Scotia	N.S.	Nouvelle-Écosse	N.-É.	55643.30
13	New Brunswic	N.B.	Nouveau-Brunswick	N.-B.	73050.60
24	Quebec	Que.	Québec	Qc	1509750.00
35	Ontario	Ont.	Ontario	Ont.	986723.00
46	Manitoba	Man.	Manitoba	Man.	649630.00
47	Saskatchewan	Sask.	Saskatchewan	Sask.	652385.00
48	Alberta	Alta.	Alberta	Alb.	663251.00
59	British Columbia	B.C.	Colombie-Britannique	C.-B.	948292.00
60	Yukon	Y.T.	Yukon	Yn	483867.00
61	Northwest Territories	N.W.T.	Territoires du Nord-Ouest	T.N.-O.	1350020.00
62	Nunavut	Nvt.	Nunavut	Nt	2094250.00

KEY ADVANTAGES

- Compact data structure
  - Smaller file sizes
- Good for discrete objects
  - Graphic output is usually "cleaner"
- Easy to query and select by attributes
- Topology (connectivity) - Proximity & Network Analysis

MAIN DISADVANTAGES

- Complex data structures compared to rasters
- Topology (connectivity) - can be a huge head ache when creating a layer
- Some tasks (overlay of layers) can be computationally expensive
- No variability within polygons possible.
- Less suited for continuous variables (requires significant generalization)

SHAPEFILES (.SHP)

One of the most common file types you will encounter, stores the coordinates of vertices plus metadata:

- Object type: points/multi-points, lines/multi-lines, or polygons/multi-polygons.
  - **Only** one type per .shp!
- Coordinate reference system (CRS).
- Attribute table.

GEOJSON (.JSON)

A simple, lightweight format for most commonly encountered in web mapping.

- Unlike shapefiles, a GeoJSON can mix of geometries.
- Encoded stylistic choices in the file.
- Larger File Size
- **An Example**

TEXT FILES

Human readable formats like .txt, .csv, etc. They only work well for points and you must specify spatial data and CRS

Name	Province	Climate ID	Latitude (Decimal Degrees)	Longitude
ACTIVE PASS	BRITISH COLUMBIA	1010066	48.87	
ALBERT HEAD	BRITISH COLUMBIA	1010235	48.40	
BAMBERTON OCEAN CEMENT	BRITISH COLUMBIA	1010595	48.58	
BEAR CREEK	BRITISH COLUMBIA	1010720	48.50	
BEAVER LAKE	BRITISH COLUMBIA	1010774	48.50	
BECHER BAY	BRITISH COLUMBIA	1010780	48.33	
BRENTWOOD BAY 2	BRITISH COLUMBIA	1010960	48.60	
BRENTWOOD CLARKE ROAD	BRITISH COLUMBIA	1010961	48.57	
BRENTWOOD W SAANICH RD	BRITISH COLUMBIA	1010965	48.57	
CENTRAL SAANICH VEYANESS	BRITISH COLUMBIA	1011467	48.58	