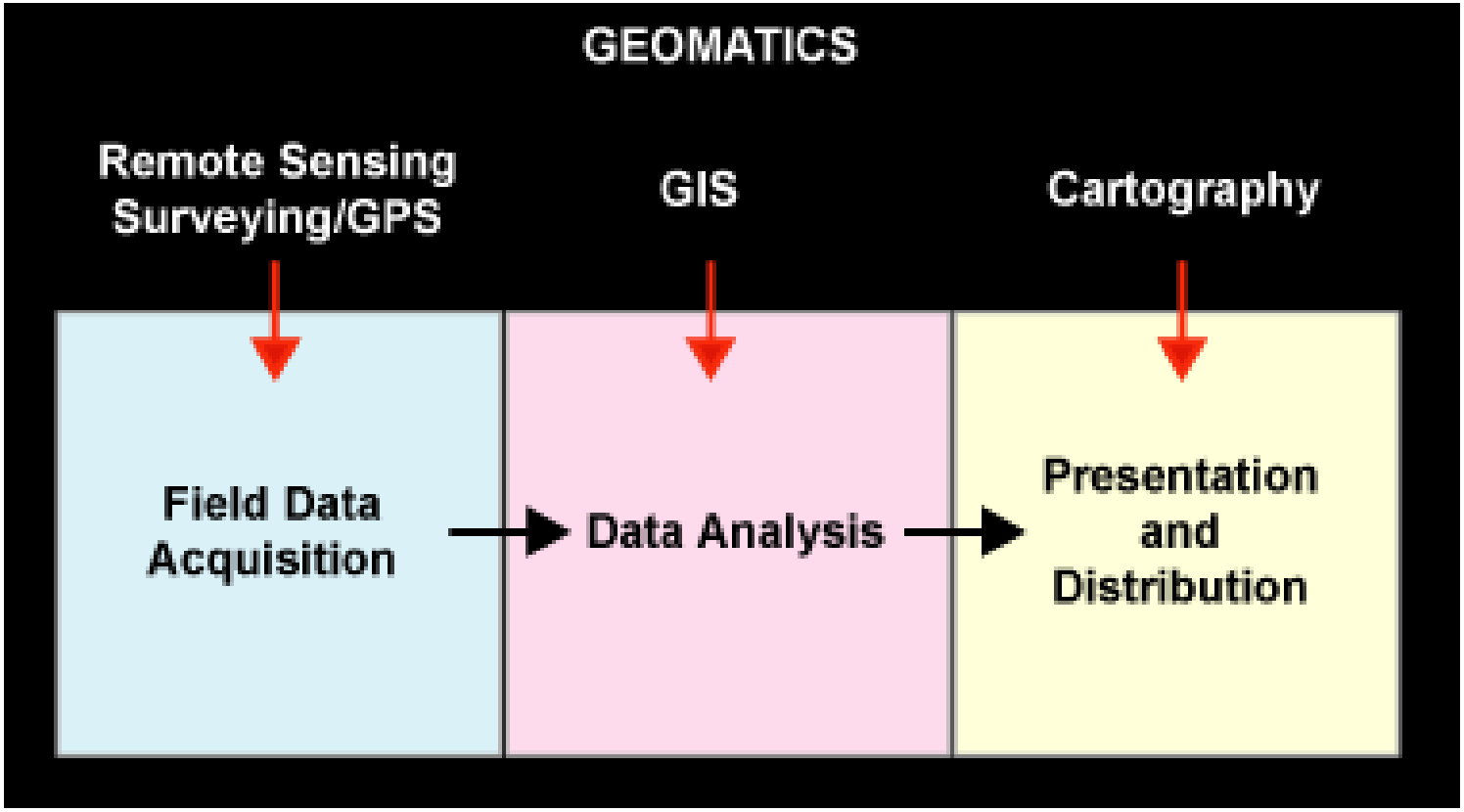
# GEOG205 summary / review
# In this course, you should have learned:

- General overview of mapping technologies (geomatics)
- Use of (complex) GIS software for map output
- How maps and images are used in projects and the media
- How to create a map for future projects and courses
- Appreciation of what makes a good display …. and bad !

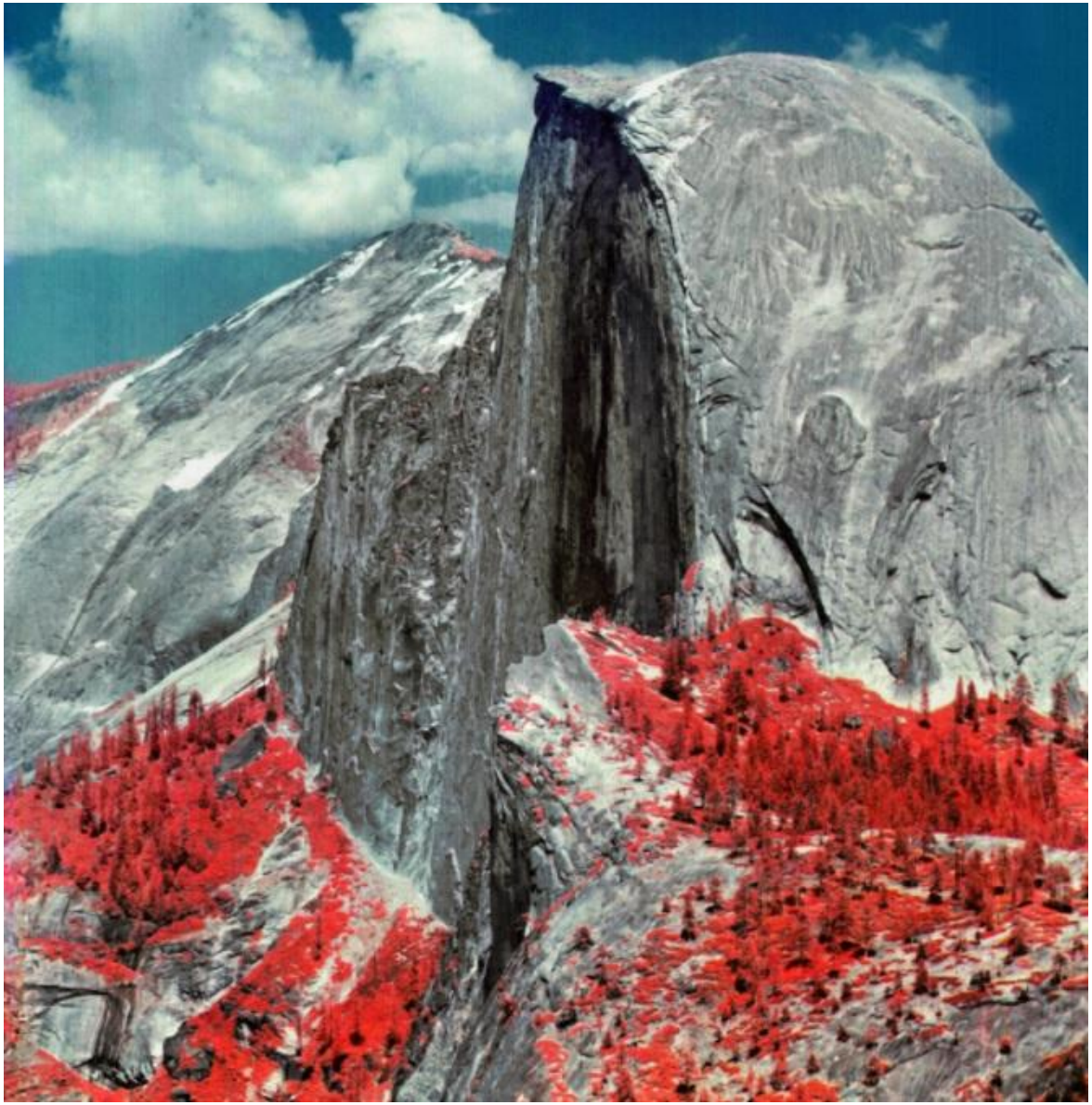
# Cartography and Geomatics



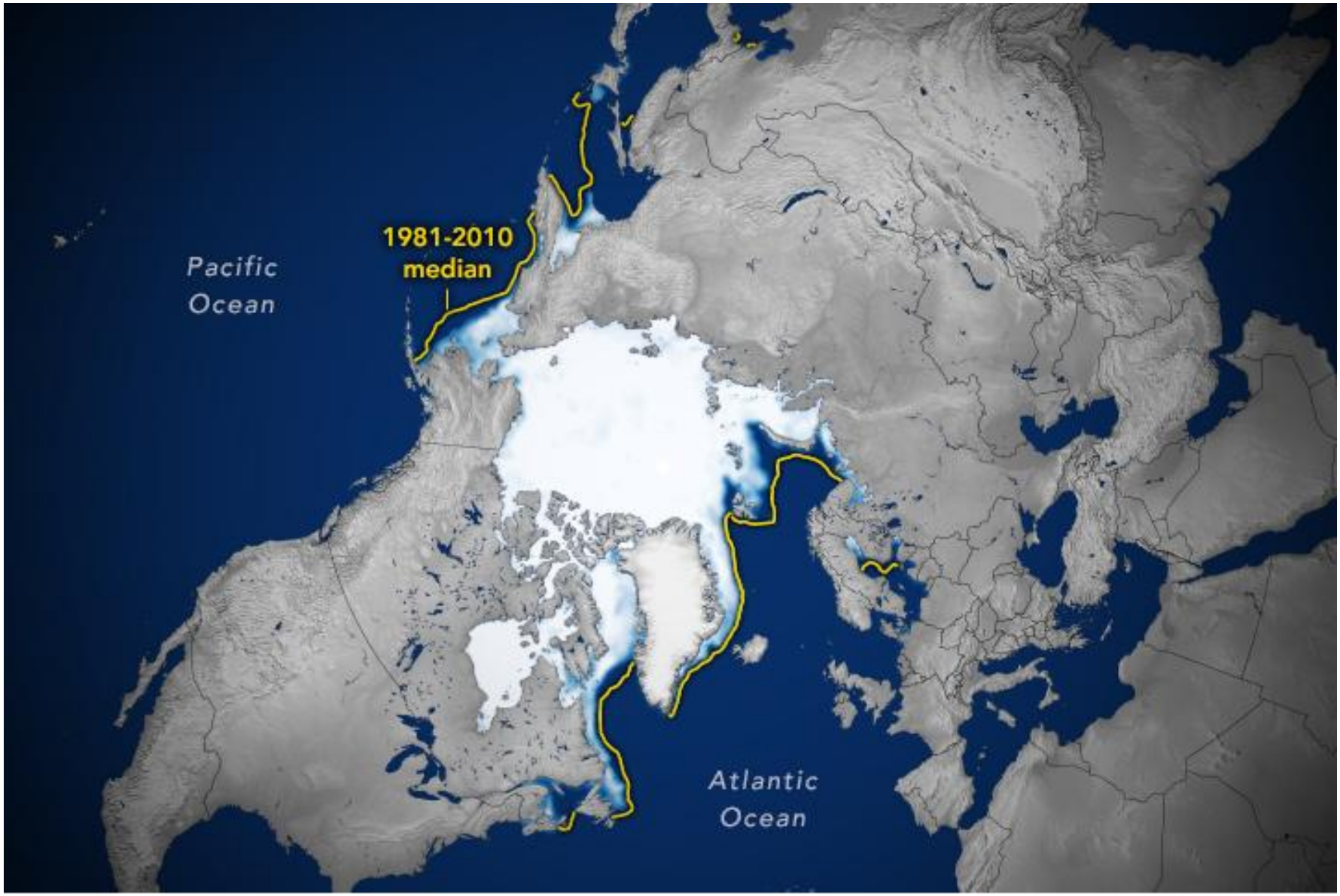

**"Cartography and Geovisualization"**
**Effective output, not just 'pretty maps'**

Map Output: the glue connecting geomatics
'proof of the pudding'

# Remote sensing



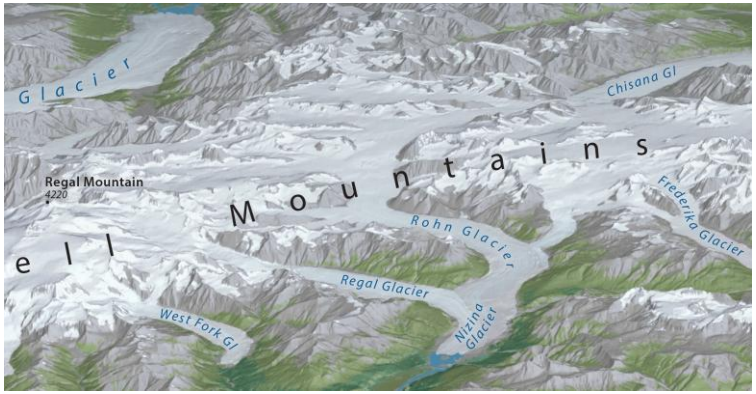
Yosemite (Infra-Red)

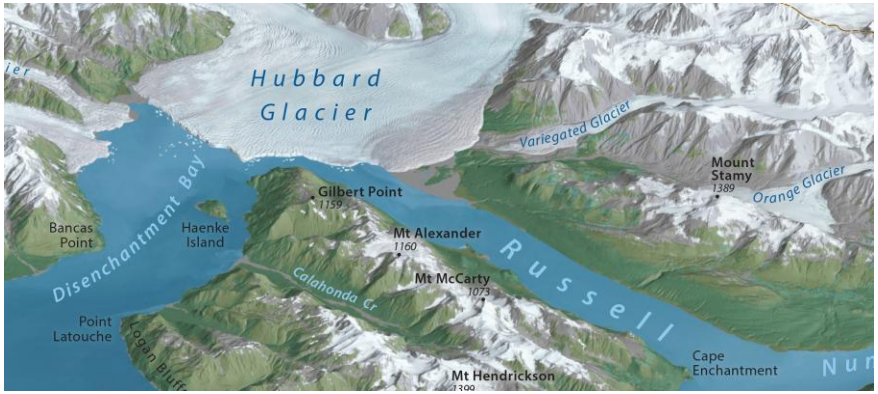



Satellite **image** (microwave)

Arctic sea ice – March 6, 2023 (maximum extent)

# DEMs and mountain cartography

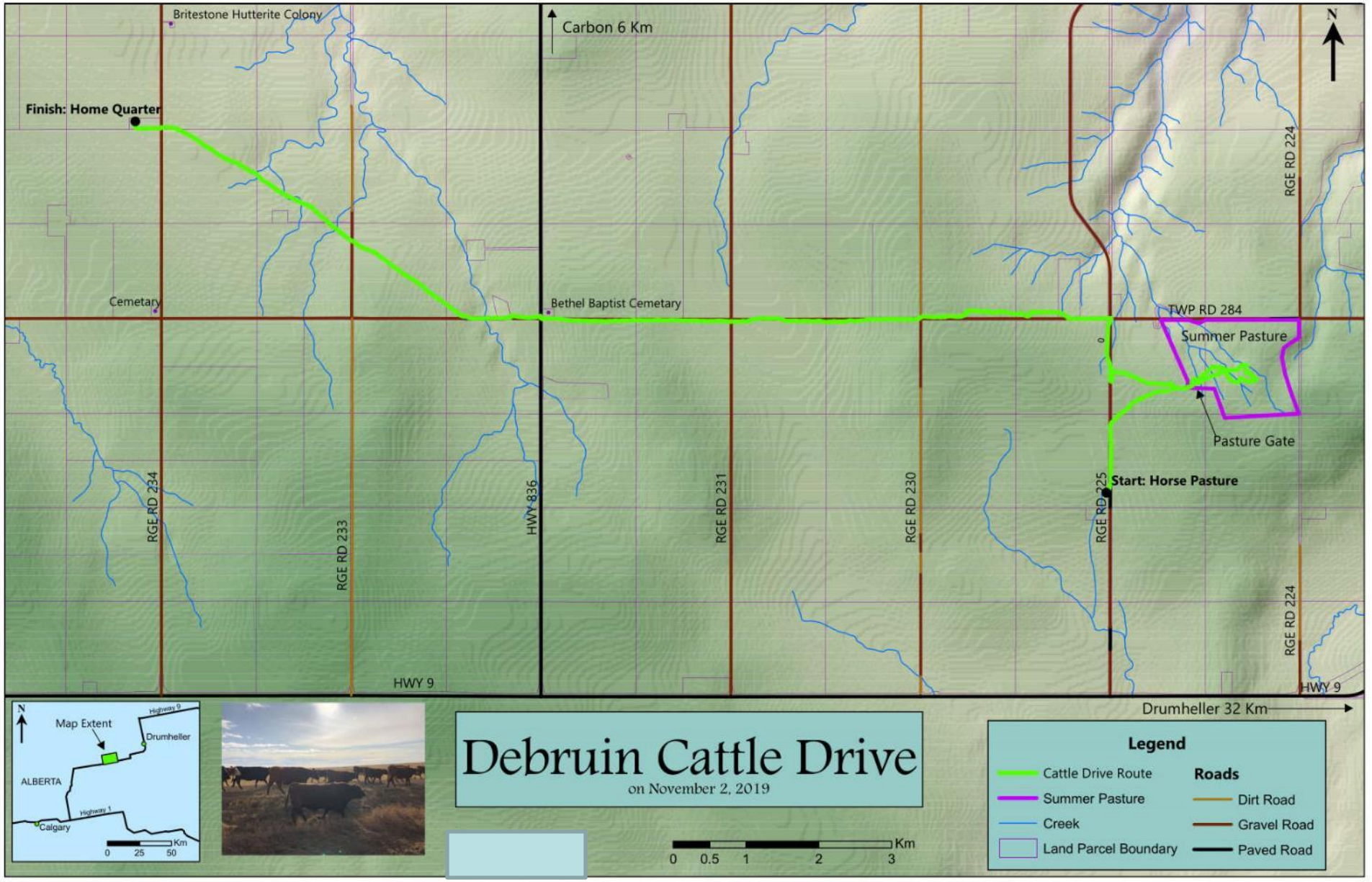



# History of Cartography, map printing and digital technologies

# GEOG205 Project map, 2020

(Cattle Drive by GPS)



# Current trends in mapping

- Increasing use of online tools e.g. google maps
- Animations –maps showing change and movement
- '3D' perspectives and software applications
- More and more data e.g. LiDAR, UAVs, satellites, GPS
- Increased use of scripting / coding
- Mapping and GPS for everyone
- Apps for mobile devices = 'Ubiquitous cartography


Also: https://www.bcafn.ca/first-nations-bc/interactive-map https://maps.fpcc.ca

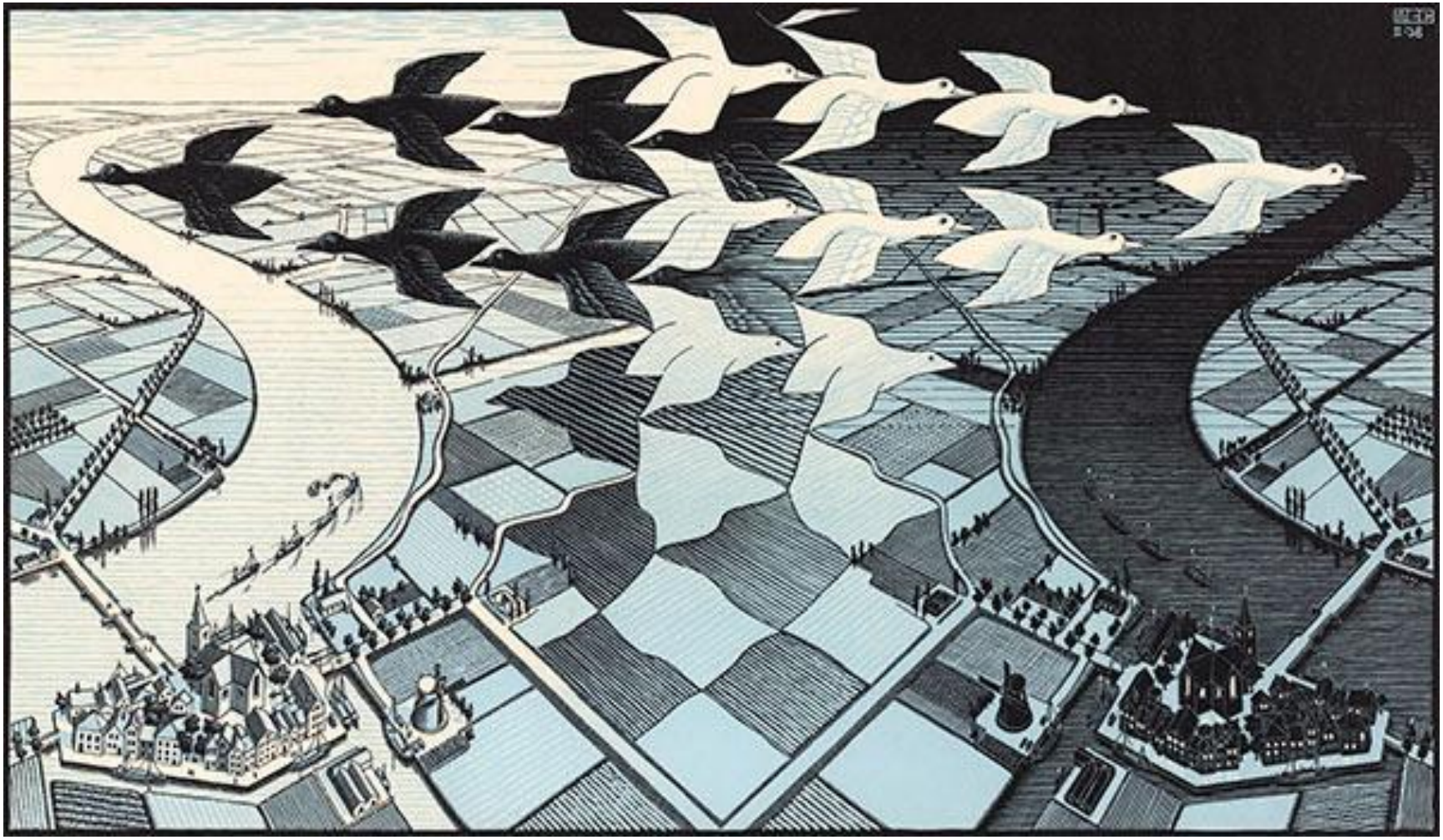
# Making a meaningful map (Esri)

1. Do I know what my map's story is ?
2. Am I using the right map projection ?  (not 'geographic')
3. Am I using data at the right level of generalization ?
4. Is my symbology clear ?
5. Do my symbols match my data ?
6. Have I used the right text symbols (lettering) ?
7. Does my map have 'figure-ground organization' ?
8. Does my map have good visual hierarchy ?
9. Do I need to add anything else to my map ?
10. Have I asked for a critique ? (e.g. in the lab)

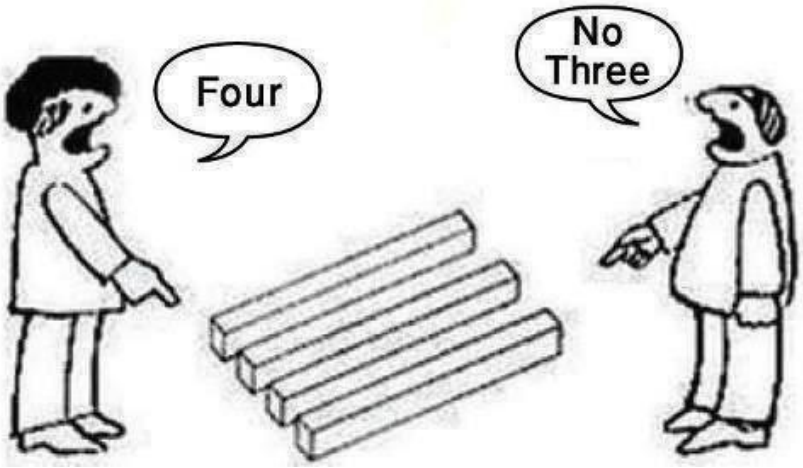
https://www.esri.com/news/arcuser/0911/making-a-map-meaningful.html

# One last mini-topic: **Figure-ground and Cartography**

Any image (e.g. art, map etc..) consists of a foreground figure and formless background

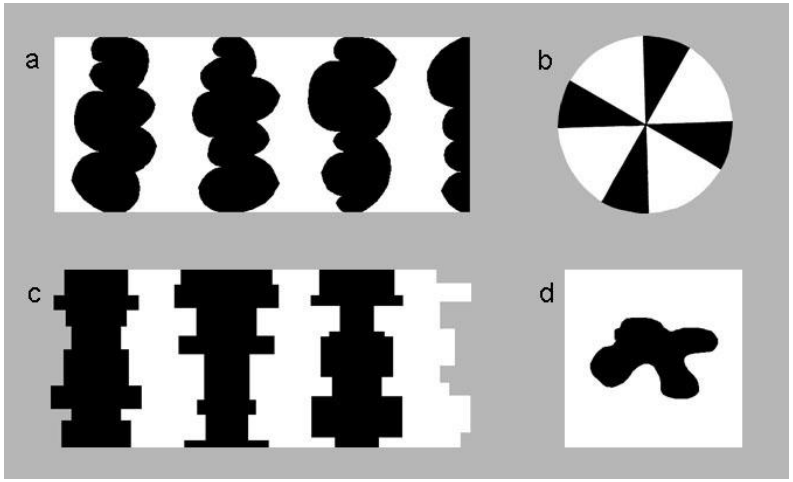


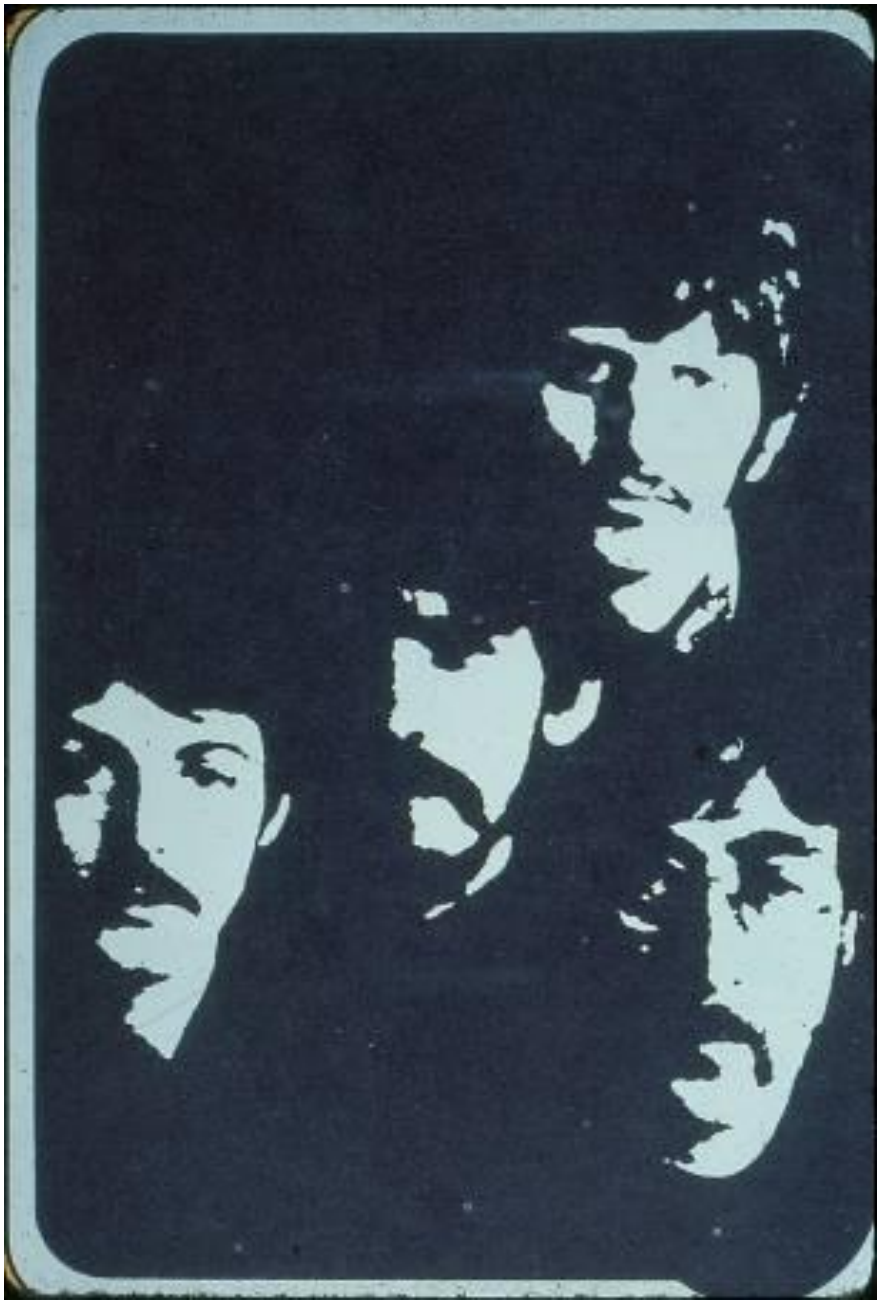
Escher: Day and Night (example of figure-background transfer)




# Reversible examples

# Not islands !



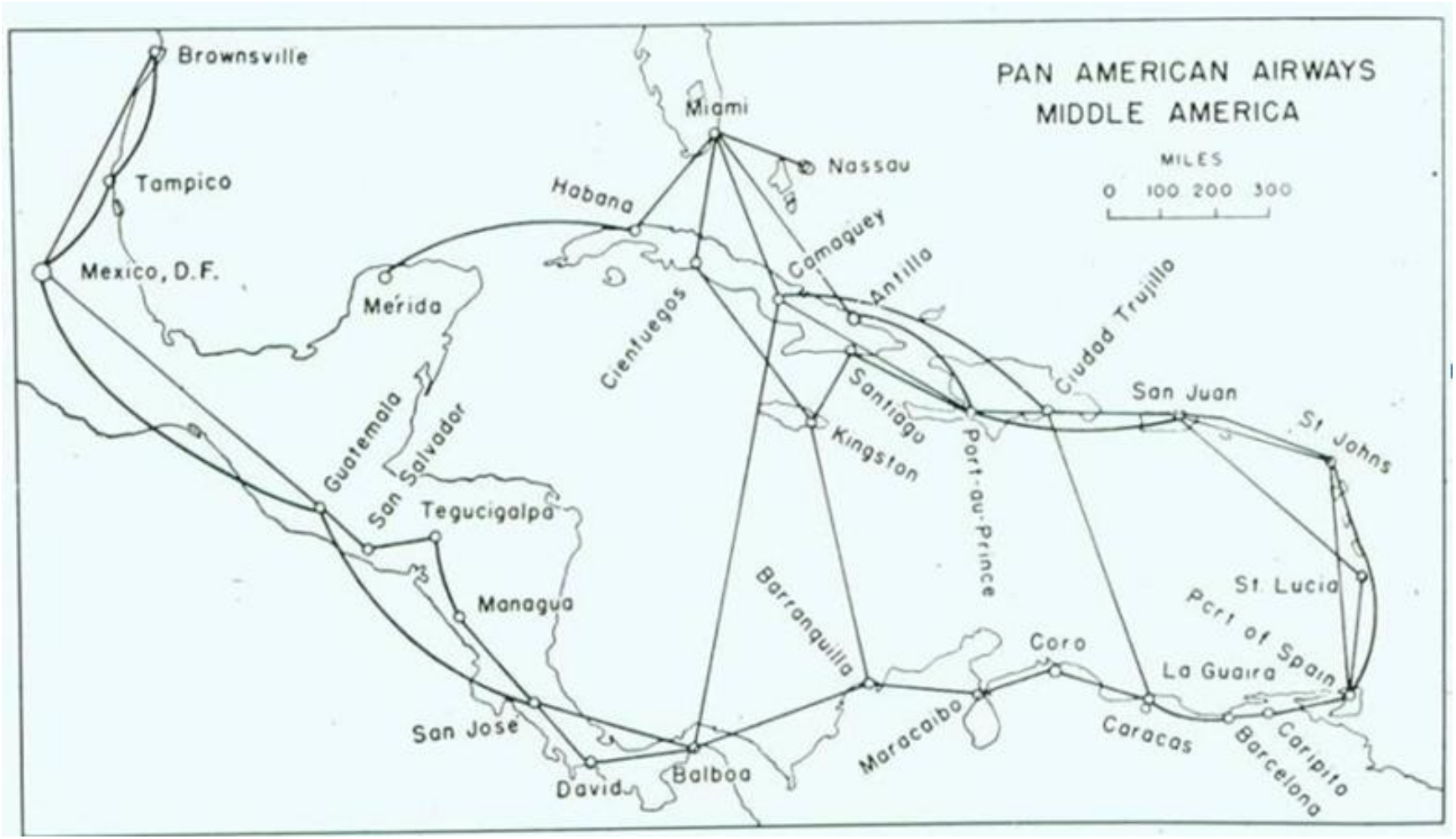



Recognition by context, closure, pattern, texture, area, similarity

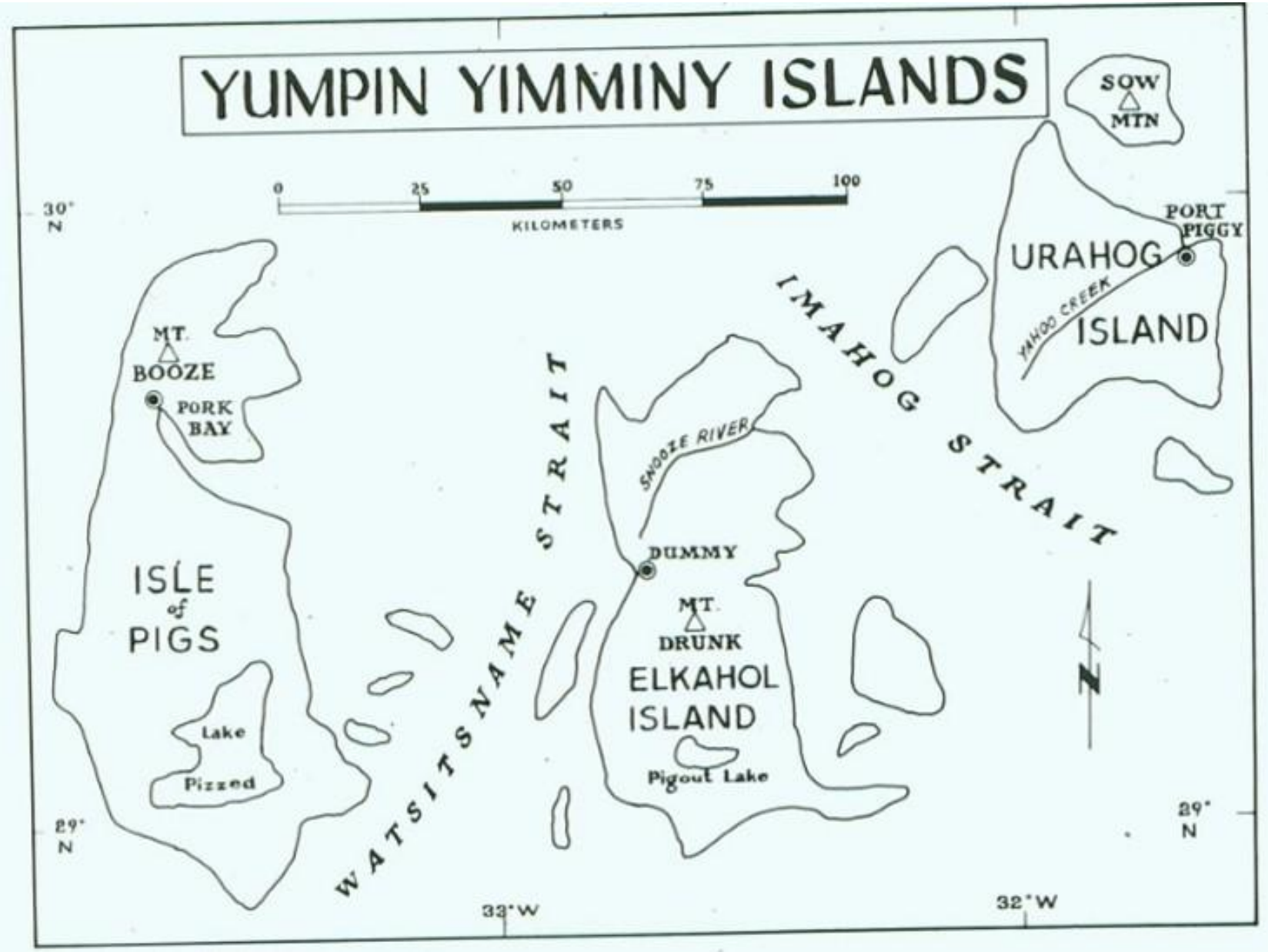
# How does figure-ground go with map design ?

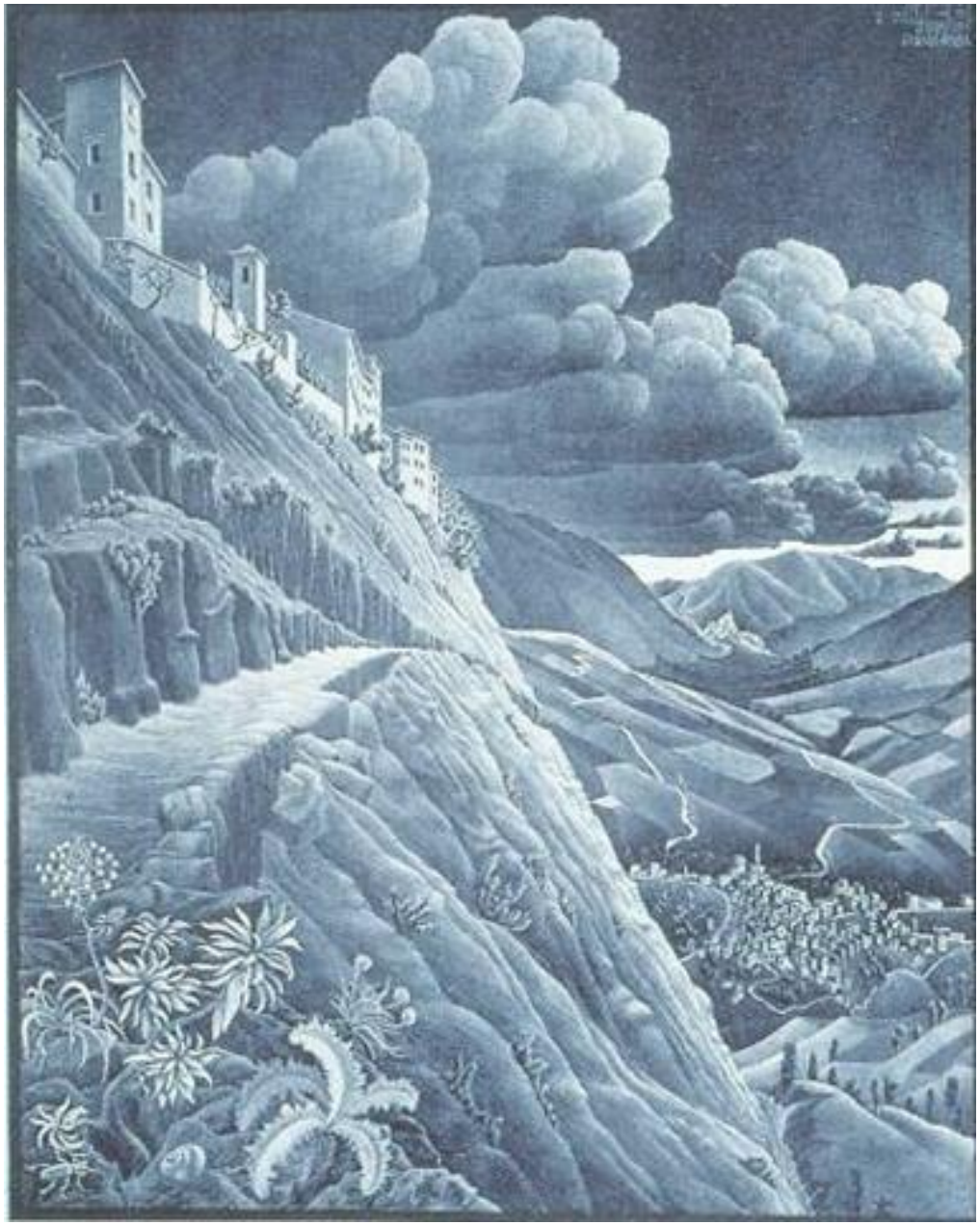
**Good design involves:** **Clear figure–ground -> no ambiguity**

Ambiguity, unclear figure-ground example below



Handlettering exercise (pre-ArcGIS) – consistent classes with contrast
Islands are the upside down Beatles (minus Paul)





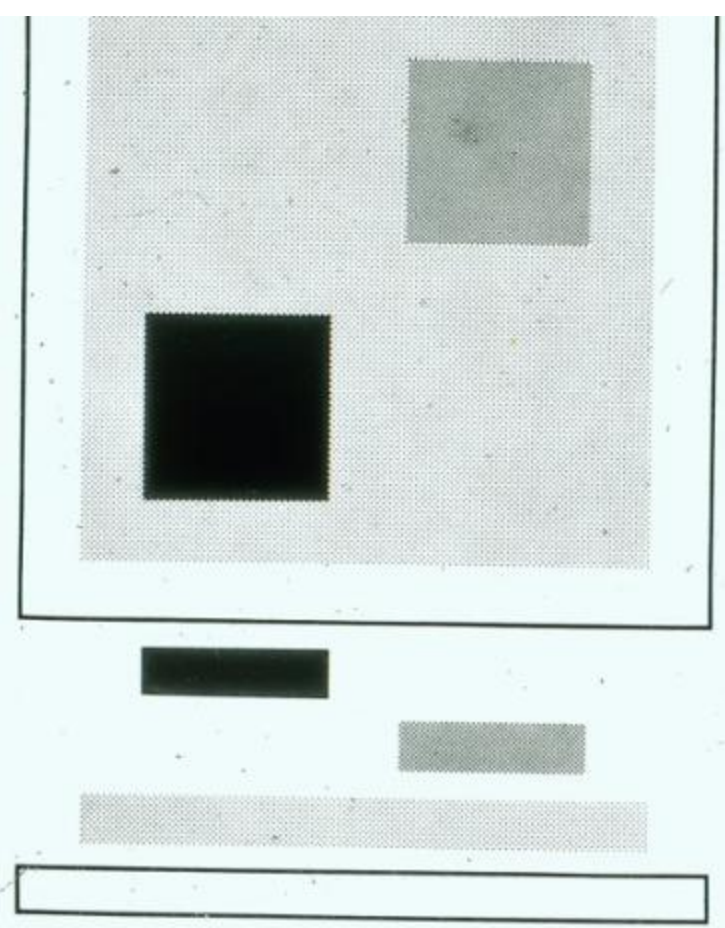
# 2. Figure ground - visual hierarchy

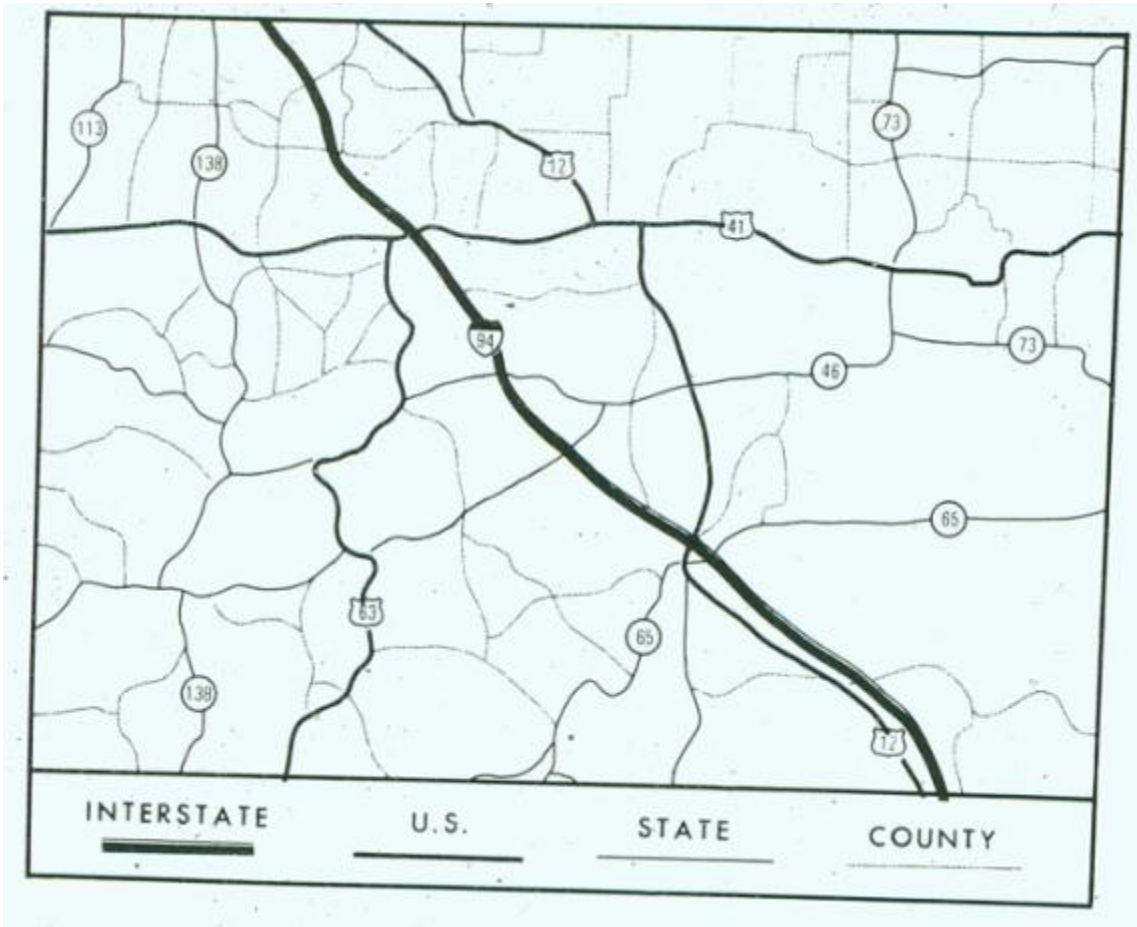
graphics such as maps need clear figure-ground ….. and visual levels – 5 here ?

**VISUAL HIERARCHY**: a hierarchy of symbology should be used for the lettering, line weights and shading. More important features are typically larger and/or darker, less important/background information should be smaller and/or lighter. At the same time, do not "over weight" or "under weight" features.

http://www.wwu.edu/huxley/spatial/tut/what_all_maps_must_have.htm

# Maps and visual levels: tones and size





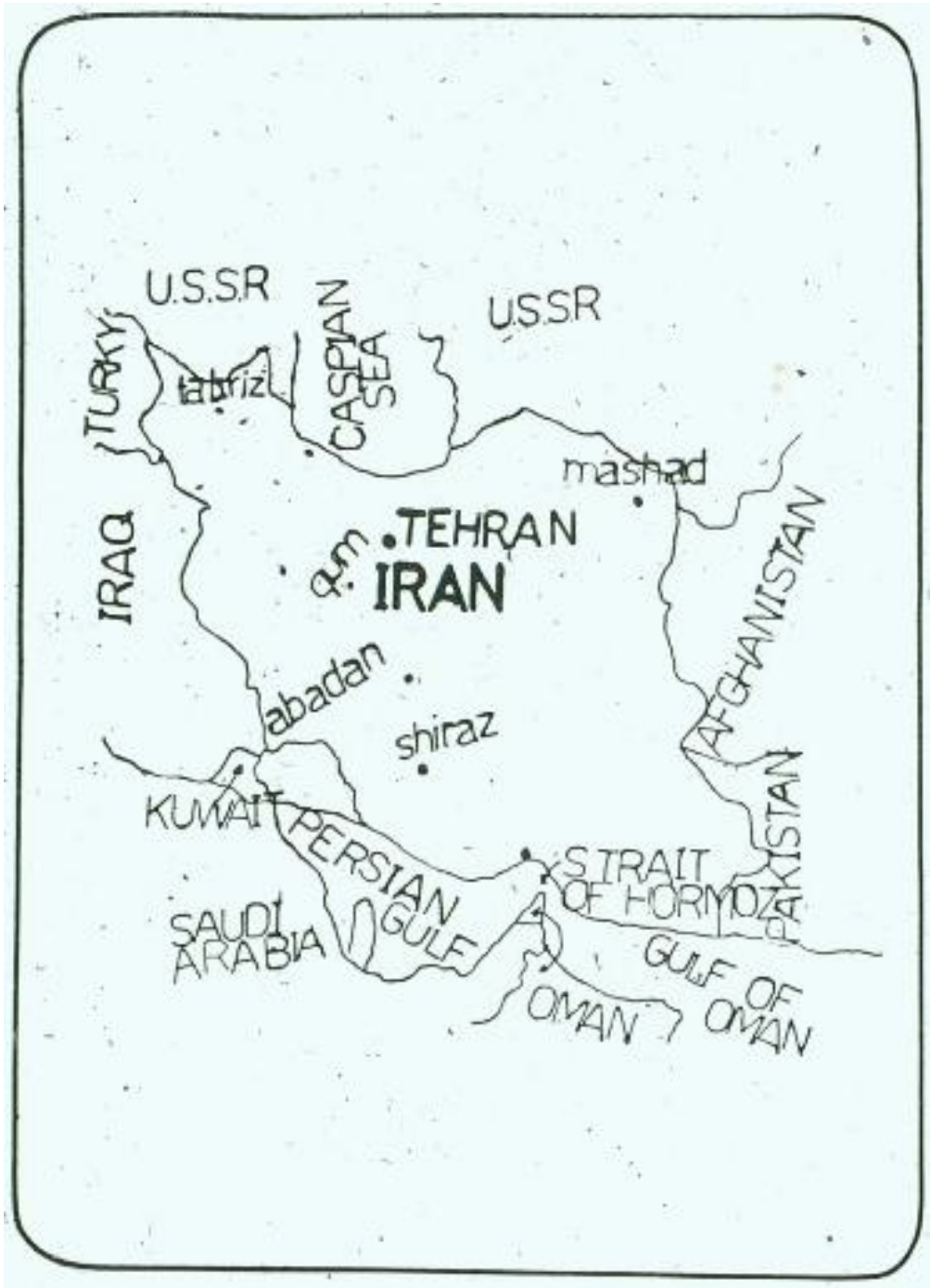

Darker / bigger stands higher = more important

# List the errors in this 1978 ‘masterpiece’...

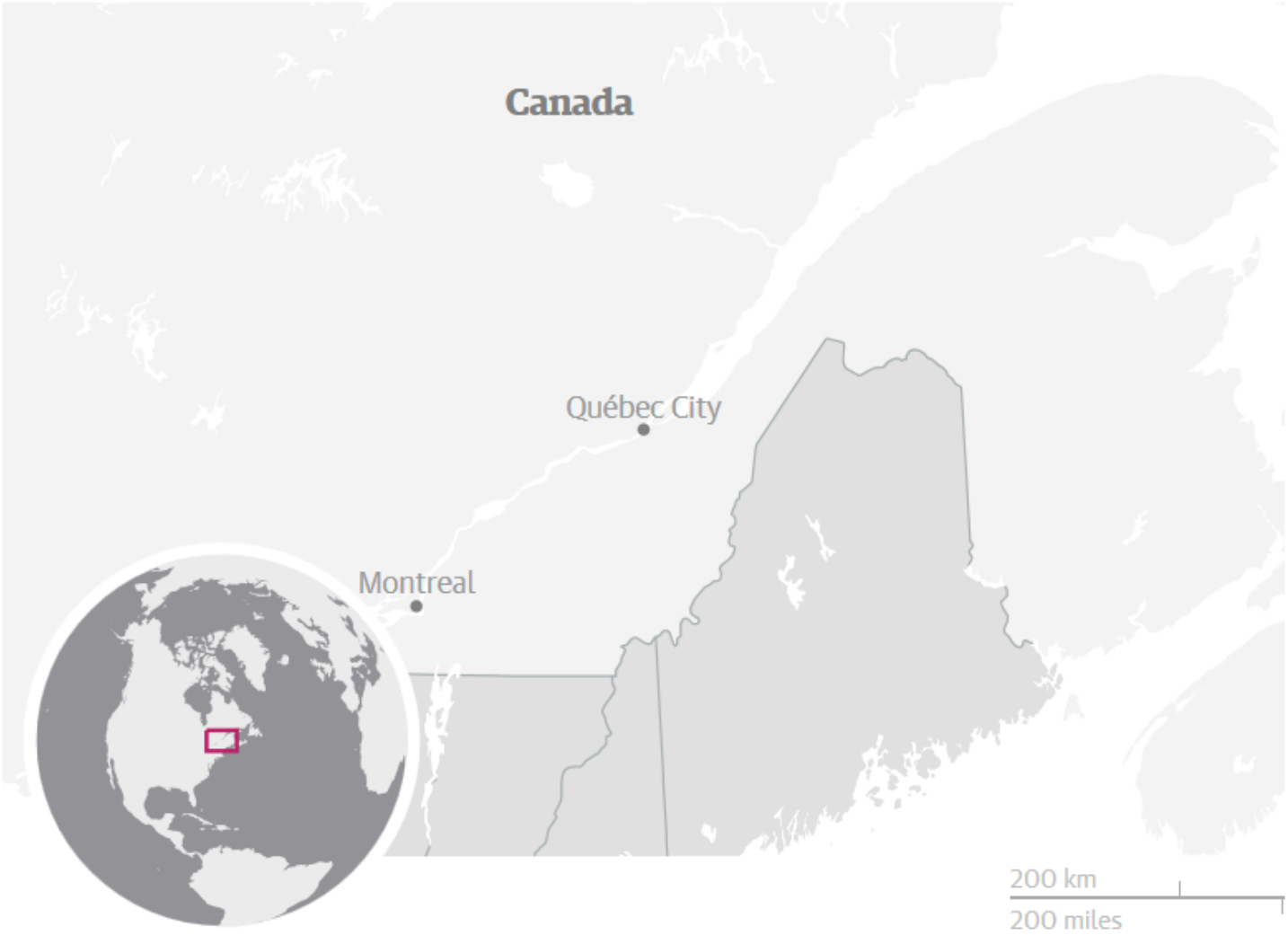
## 1. Lettering
**- Typography and positioning**

## 2. No contrast between ‘layers’
(except Iran and Tehran are a bit darker)

## 3. No Figure-ground – no visual levels

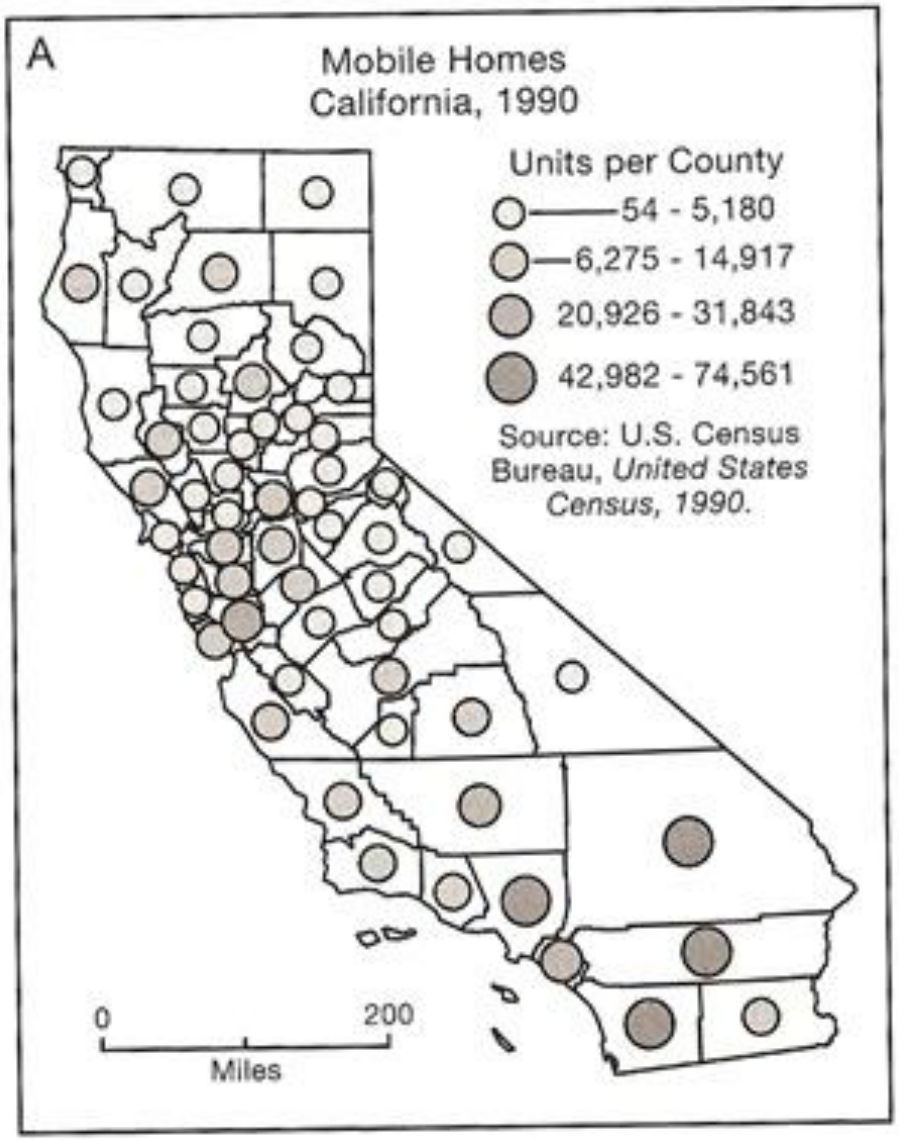


What stands out most here – highest in the hierarchy ?




(No title) – included within the article
Location of shooting – Quebec, January 29, 2017 (The Guardian newspaper)

# Contrast between **thematic** and **base** layers for visual levels



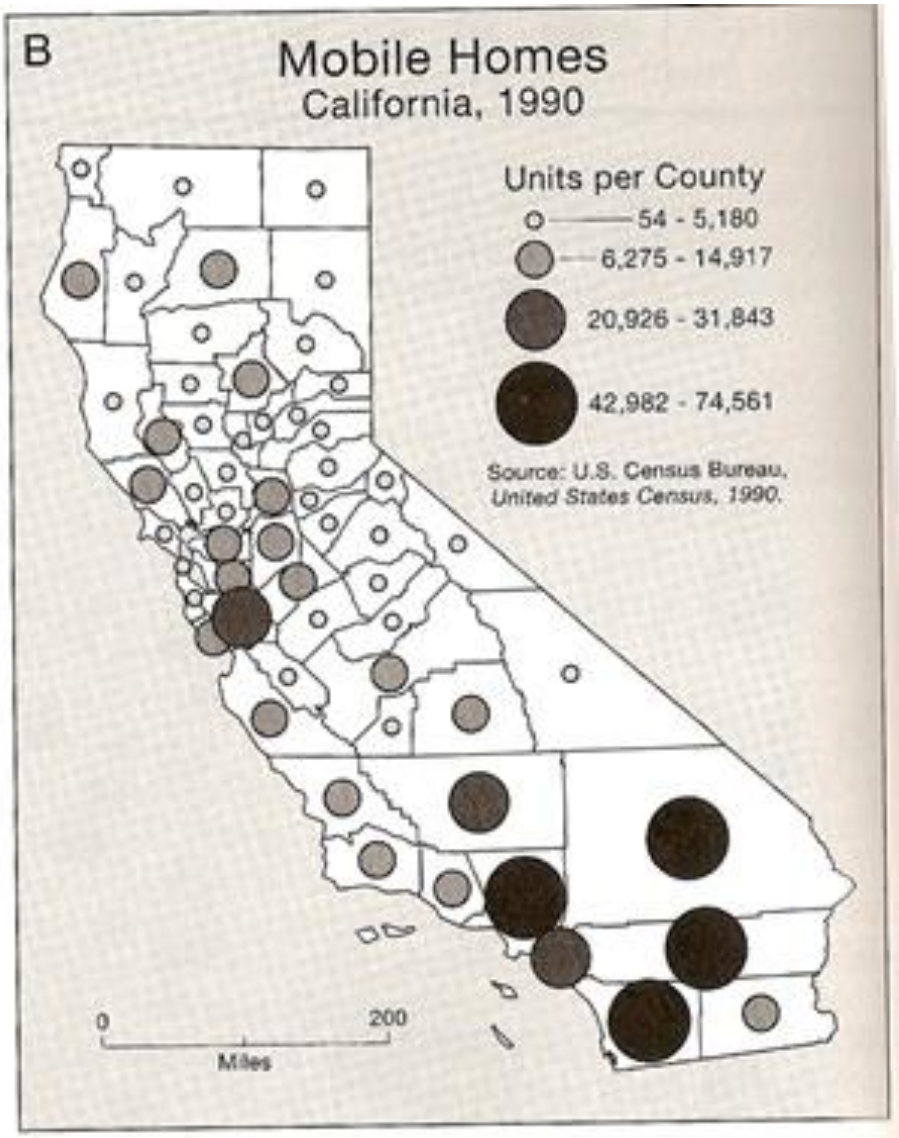




**FIGURE 11.31** (A) Insufficient contrast in type size, lightness and size of thematic symbols (circles), line width, and difference between the mapped area and the background. (B) Sufficient contrast in all respects.

# Summary use of visual variables
# Higher visual levels / = Figure

✓More shape / texture

✓Bigger size (points, line width)

✓Darker tone / values

✓Saturated chroma

✓Hue – colour spectrum Blue-> **Red**

https://blogs.esri.com/esri/arcgis/2011/02/15/graphic-design-principles-for-mapping-figure-ground-organization/

# Visual hierarchy of layers and elements:

1. **Contrast between map layers**

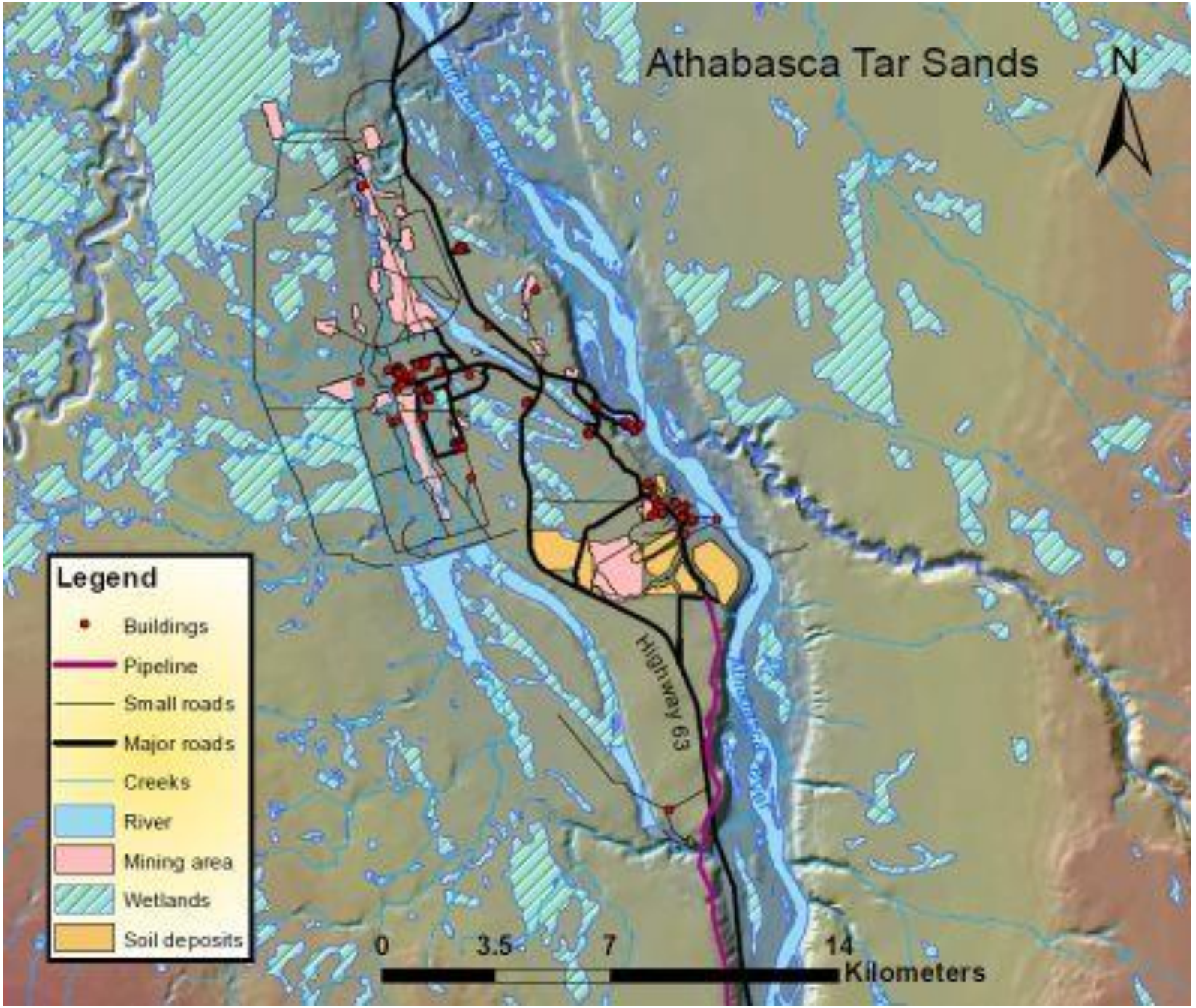
2. **Map features visually dominant over ancillary info**

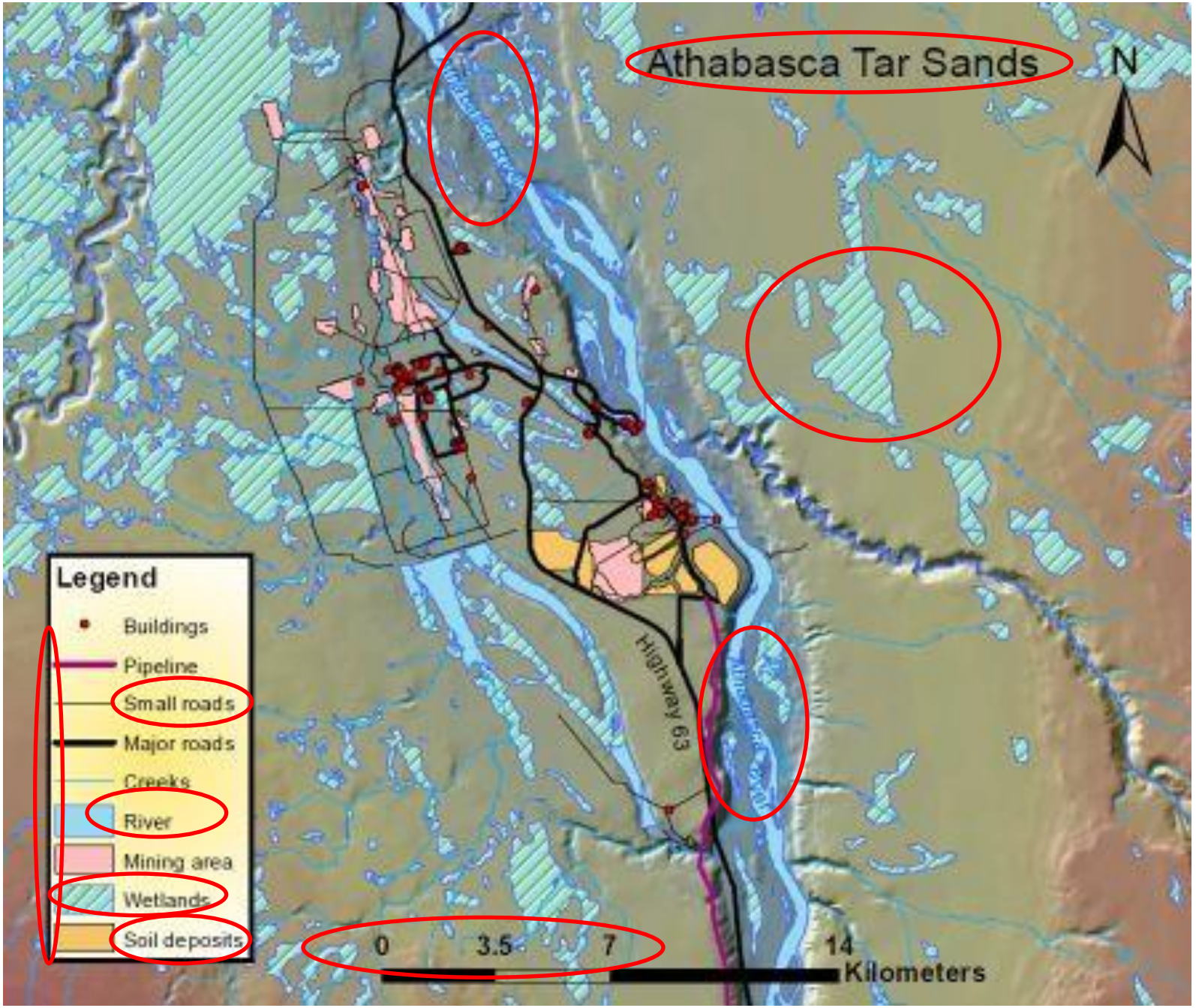
3. **Thematic layers over base layers**

4. **Important features dominant (based on map purpose)**

*Check for these in your project*

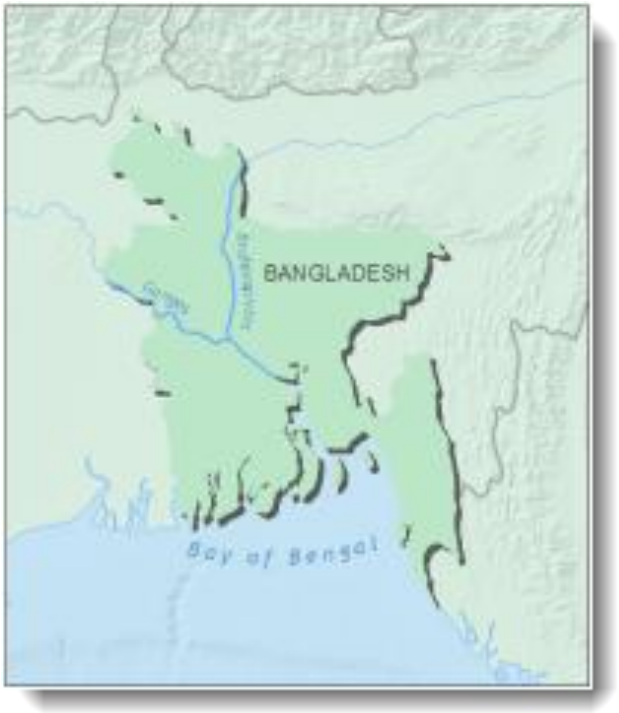
# AAGH NO ! Not the best project – can you count the errors ?



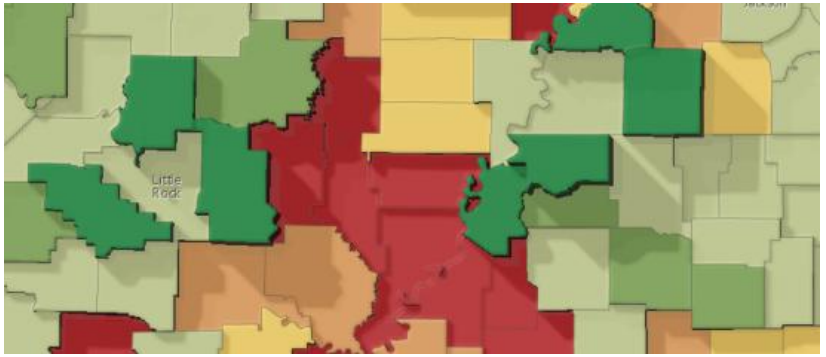

Athabasca Tar Sands
N
Legend
Buildings
Pipeline
Small roads
Major roads
Creeks
River
Mining area
Wetlands
Soil deposits
Highway 63
0
3.5
7
14
Kilometers

# Figure-ground: ArcGIS Drop shadow

http://blogs.esri.com/esri/arcgis/2011/11/04/figure-ground-drop-shadow




ArcGIS terrain tools
3D choropleth maps




https://www.esri.com/news/arcuser/0112/make-maps-people-want-to-look-at.html

# Further courses in Geomatics, 2025->

GEOG204: Introduction to GIS (fall)

GEOG250: Geospatial analysis (winter)

GEOG300: Intermediate GIS (winter)

GEOG357: Remote Sensing (fall)

GEOG413: Advanced GIS (fall)

GEOG450: Advanced Geospatial Analysis (fall)

GEOG457: Advanced RS (winter)

- *Mapping/GIS skills generally are in high demand*
- *Most desirable by employers: ability to code / script*

**UNBC GIS Minor:**

5 required geomatics courses + two options GEOG/CPSC

= GEOG 204, 205, 300, 357
+ GEOG/ENSC 250 or CPSC 110 or 101

+ two of GEOG 413, 450, 457 ….
CPSC 334, 444 or COMM 353

Can also specialise in GIS/mapping diploma e.g. BCIT, Selkirk
Email me for more info and/or possible summer jobs (no promises)

Projects due by April 7, 12 noon – sooner is better for us and you ☺
upload the map and report (surname-map; surname-report to Moodle).

*Course survey is out there - Feedback is appreciated*

**2nd exam (10%): April 4th Moodle: 35 minutes** <> 8.30-11am

*non-cumulative:* **lecture topics since the last midterm:**

- DEMs, Remote sensing /Satellite images
- Map Projections: history and digital – mostly covered in quiz
- Mountain Cartography, GPS (projects)
- History of Cartography, Digital mapping
- Summary review – this lecture

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*Q. Why do we NOT choose geographic(unprojected) for map data layers display ?*

a. Horizontal scale will be variable
b. Shape distorts away from the equator
c. East-west stretching changes some distances
d. All lines of longitude are parallel to each other
e. All of the above