2nd exam (10%): April 8th Moodle: 35 minutes <> 8.30-11am

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

- Remote sensing /Satellite images
- Map Projections: history and digital – mostly covered in quiz 3
- Mountain Cartography; Projects
- History of Cartography; Digital mapping
- Global Positioning Systems; Summary – this lecture

Projects due by April 10, 12 noon – sooner is better for us and you ☺
upload the map and report, to Moodle
Use this format: **surname-map.pdf** and **surname-report.pdf**

student survey of learning is on Moodle – your input is welcome

Emily project tips - Base Maps: - Removing reference layers:

No background layers with lettering and vectors: '10' placenames = your own

- The following are base maps without text or with separate reference layers that can be turned off:
    - "Imagery"
    - "Topographic"
    - "Light Gray Canvas" (turn off reference)
    - "Dark Gray Canvas" (turn off reference)
    - "Oceans" (turn off reference)
    - "National Geographic Style" (turn off "National Geographic Style" layer)
    - "Human Geography Map" (turn off "Human Geography Label")
    - "Human Geography Dark Map" (turn off "Human Geography Label")
    - "Firefly Imagery Hybrid" (turn off "Hybrid Reference Layer")

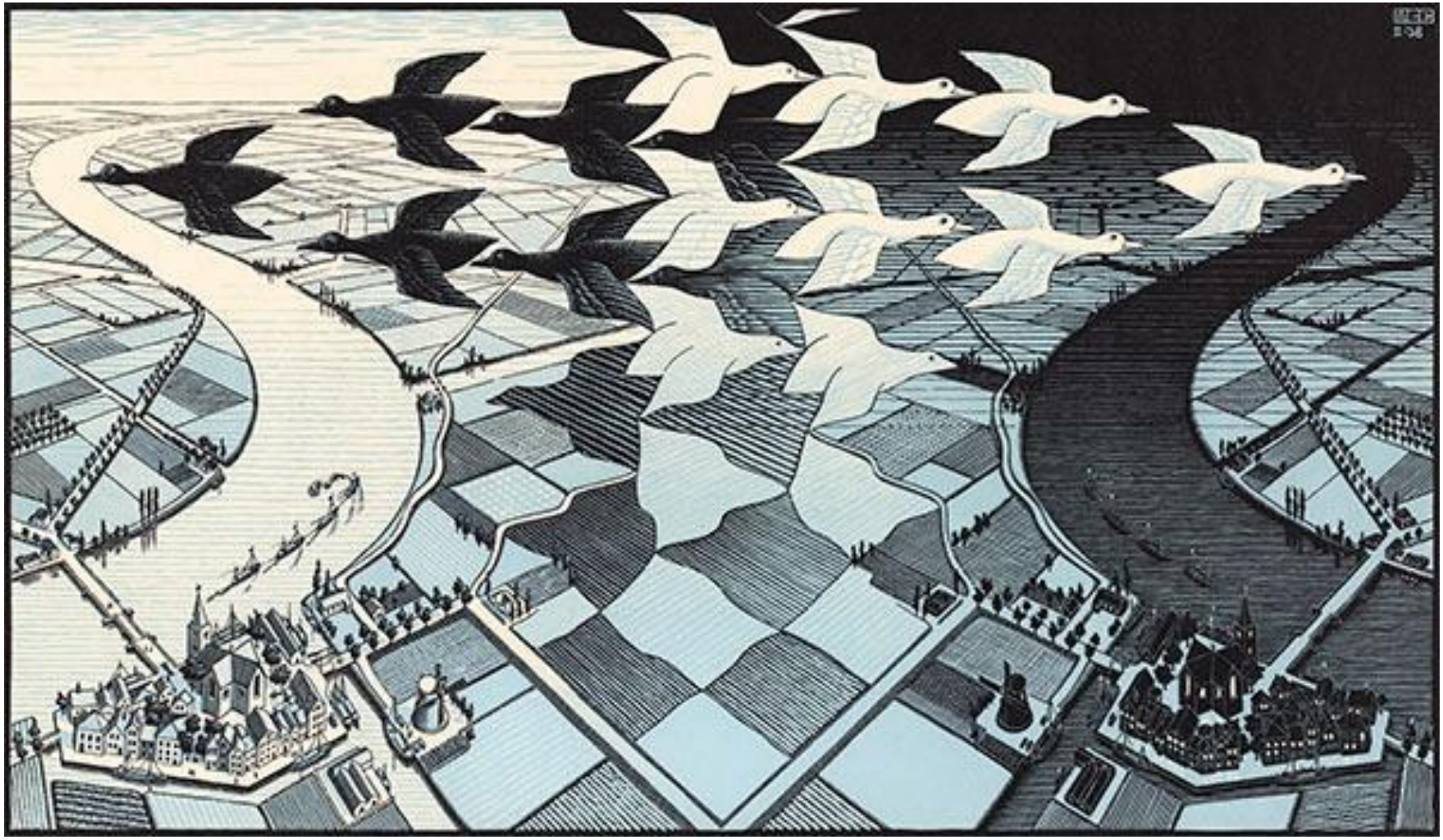
Making a meaningful map (Esri)

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' ? -> contrast / clarity
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)

http://www.esri.com/news/arcuser/0911/files/mapchecklist.pdf

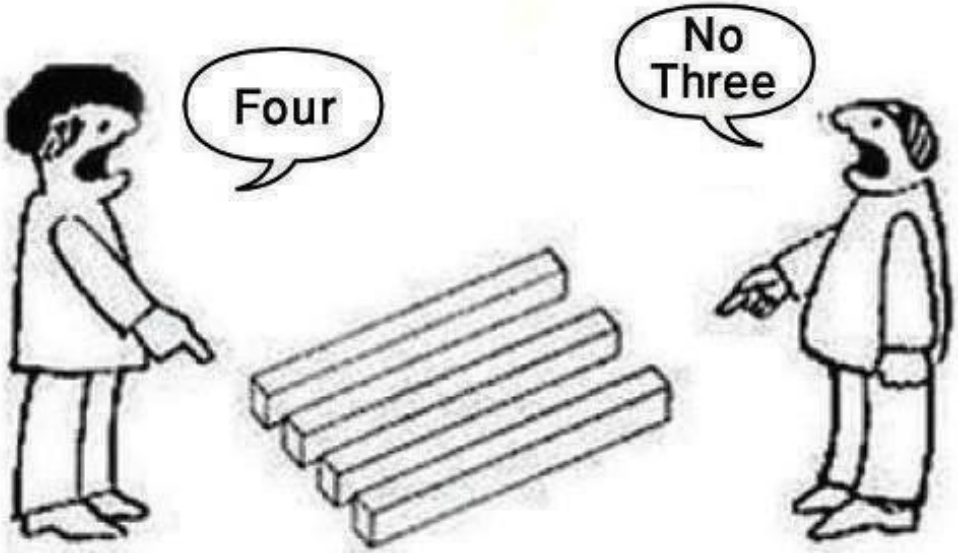
Figure-ground and Cartography (map design)

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

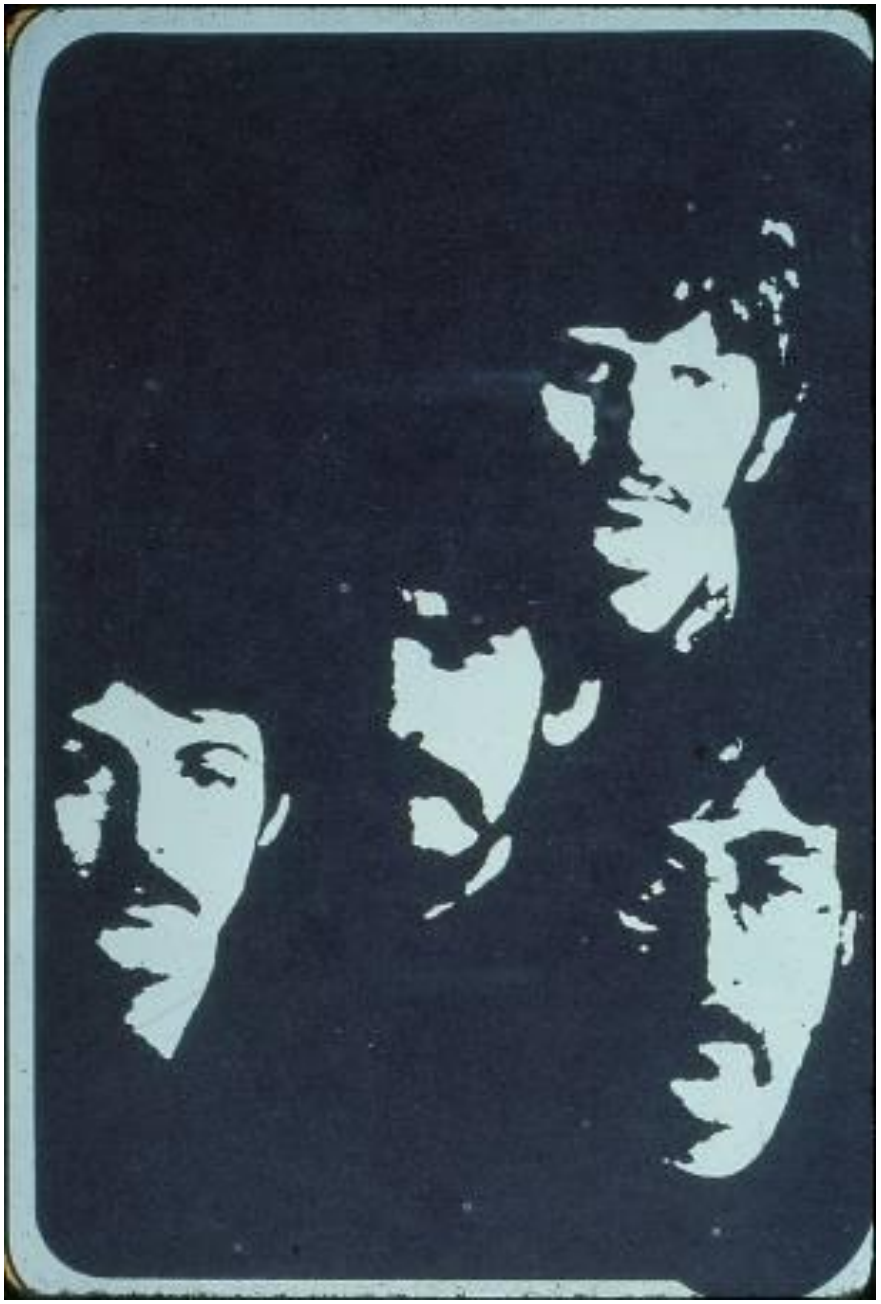


Escher: Day and Night (example of figure-background transfer)

Recentexamples



..best illustrated through reversible figure-ground examples



Familiarity, context v closure, pattern

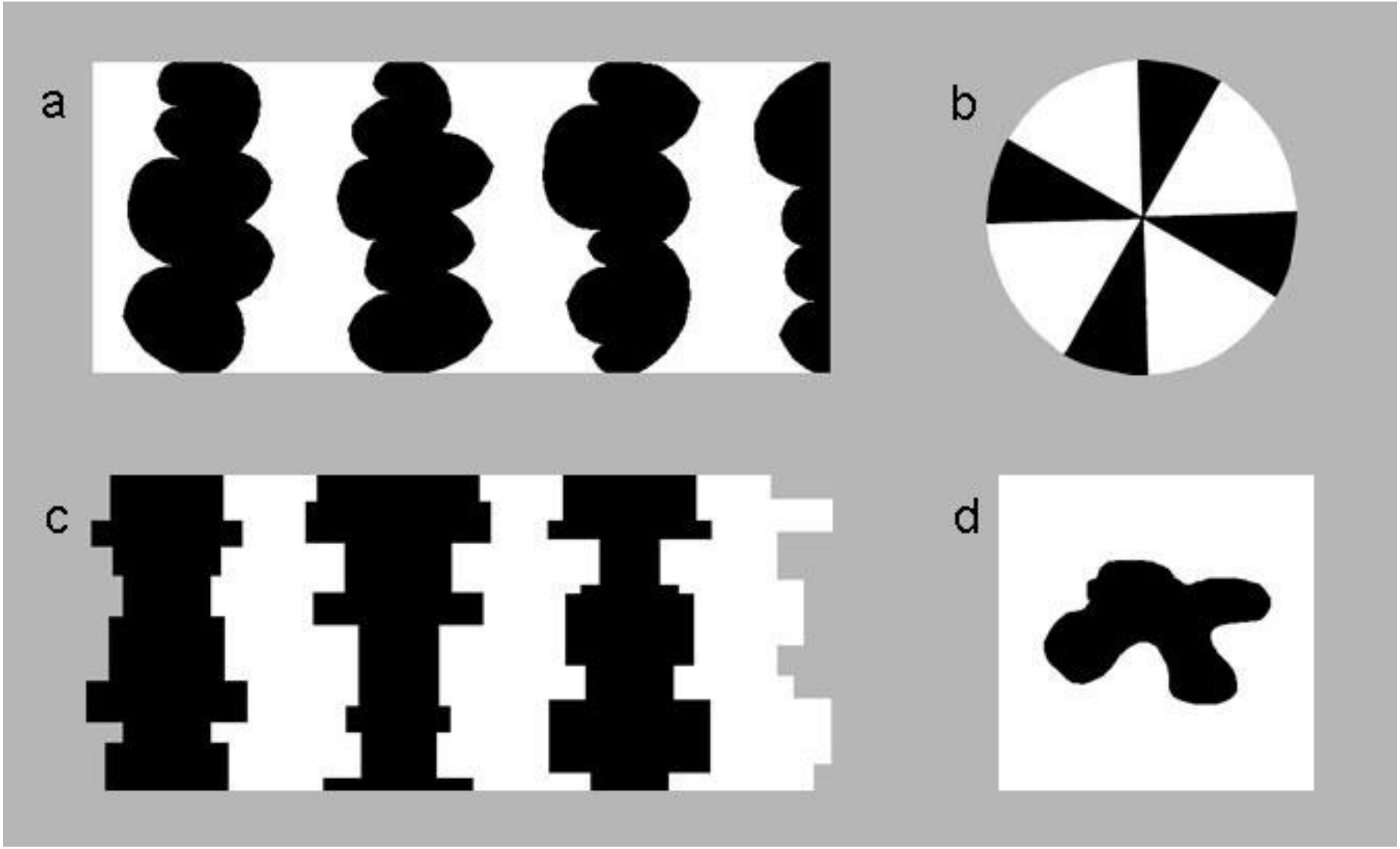


Figure-Ground and Rules of Visualisation

a. Convexity, b. Area, c. Similarity (pattern), d. Enclosure

Also: Continuity, Proximity, Texture, Meaning (context)

What does all this have to do with map design ?

What does all this have to do with map design ?

Good design involves:

Clear figure-ground -> no ambiguity

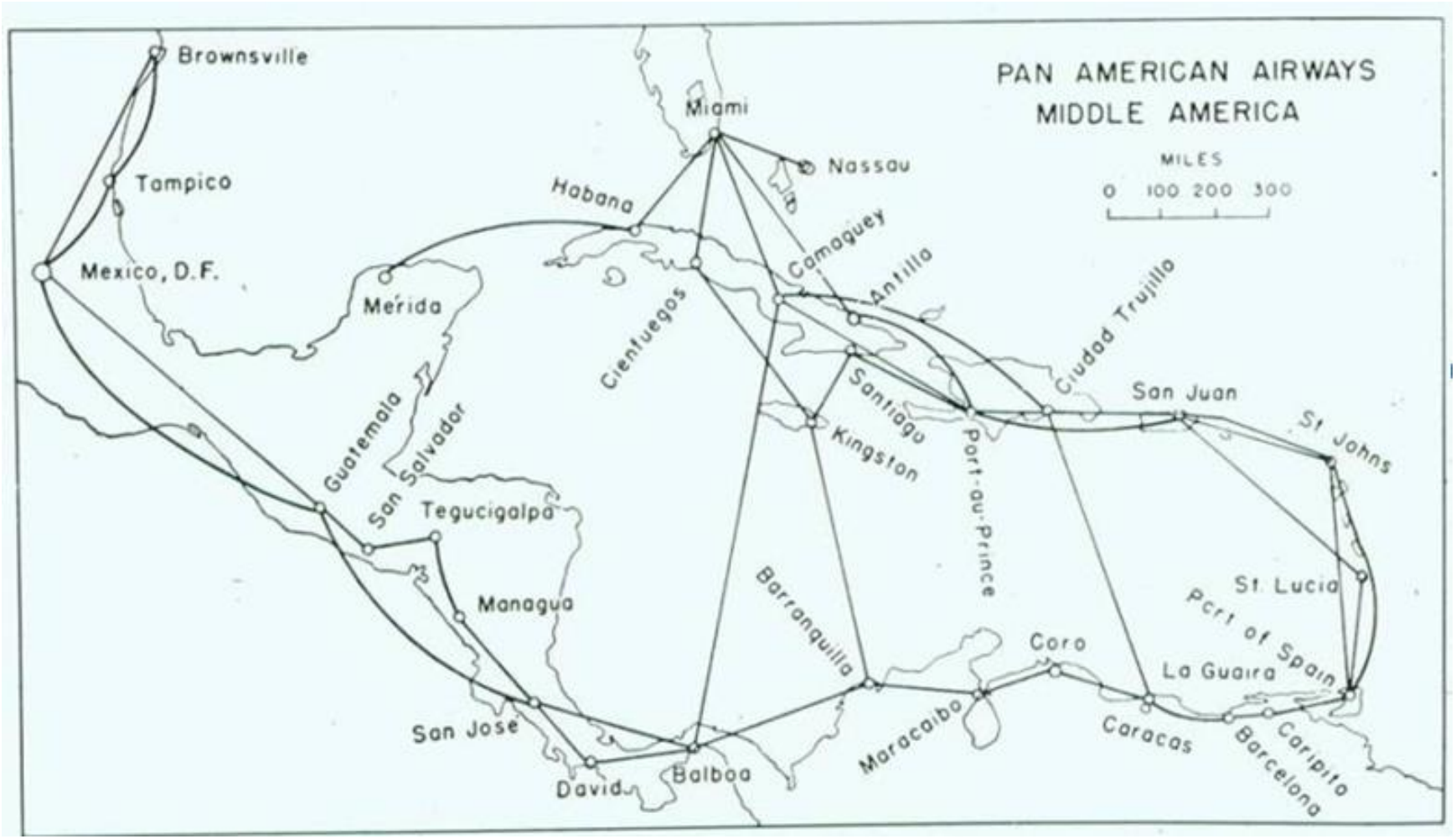
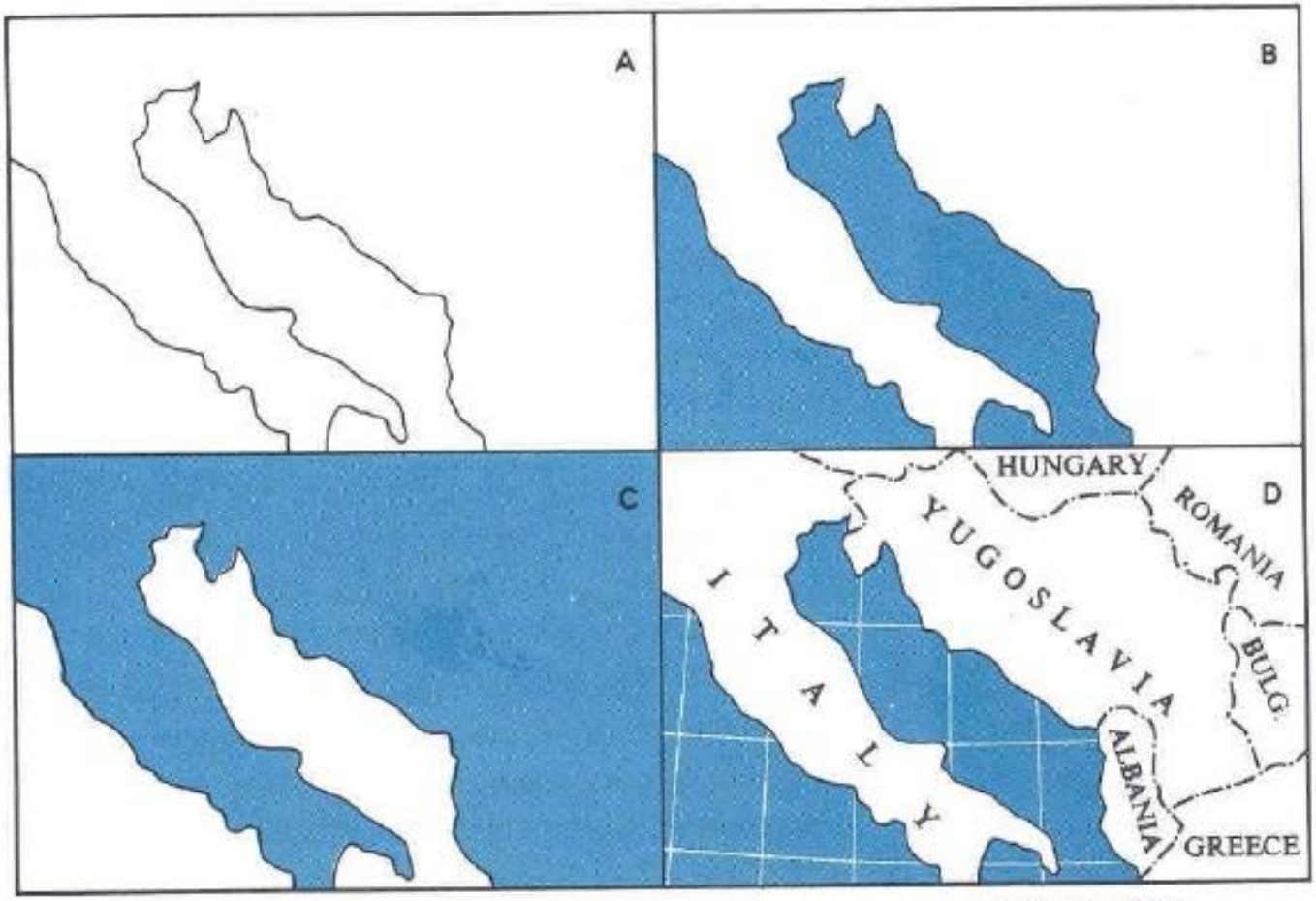


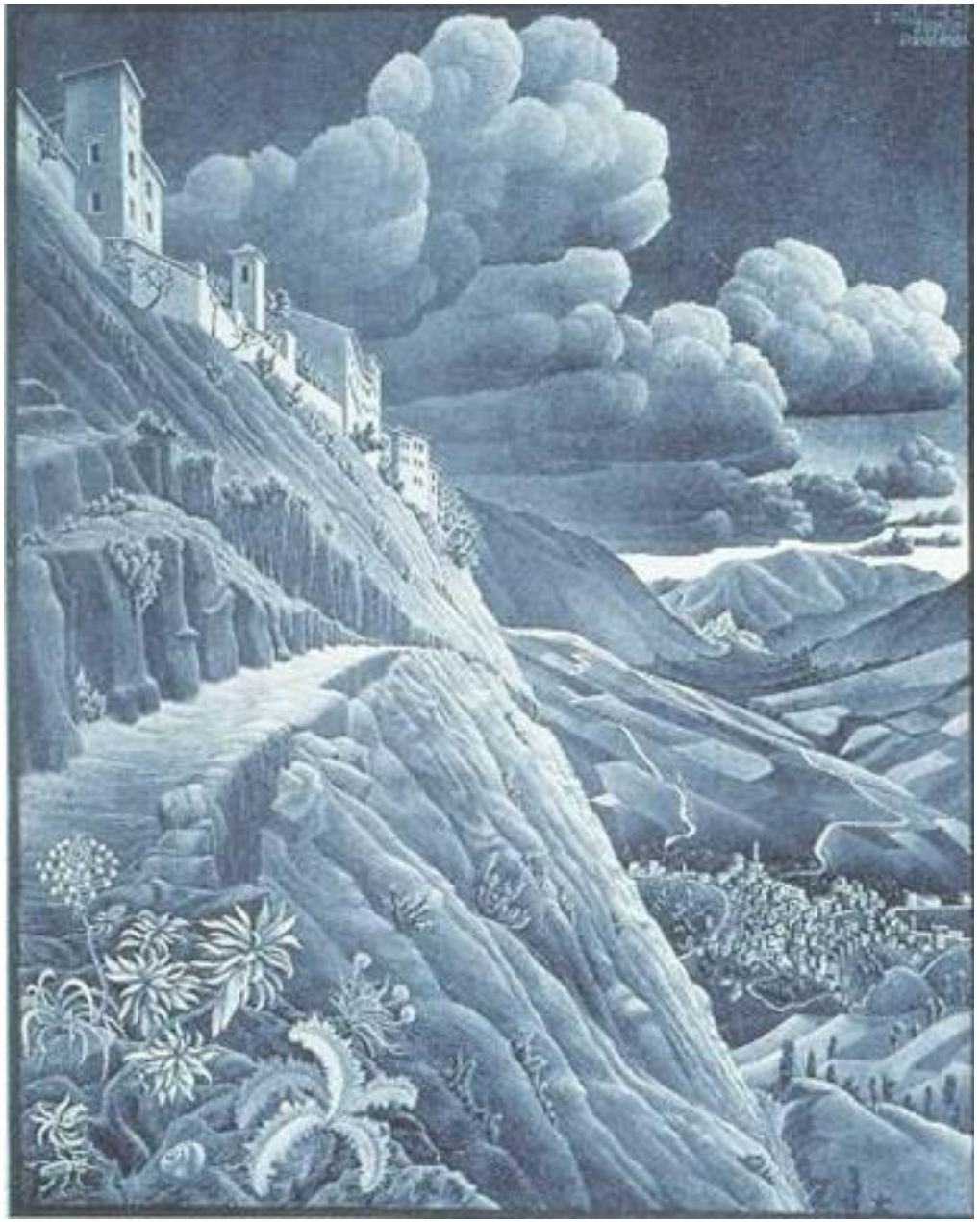
Figure-Ground and land-water

Figure-ground relationship



Robinson, 1995

State of the Map conference, 14 July 2007



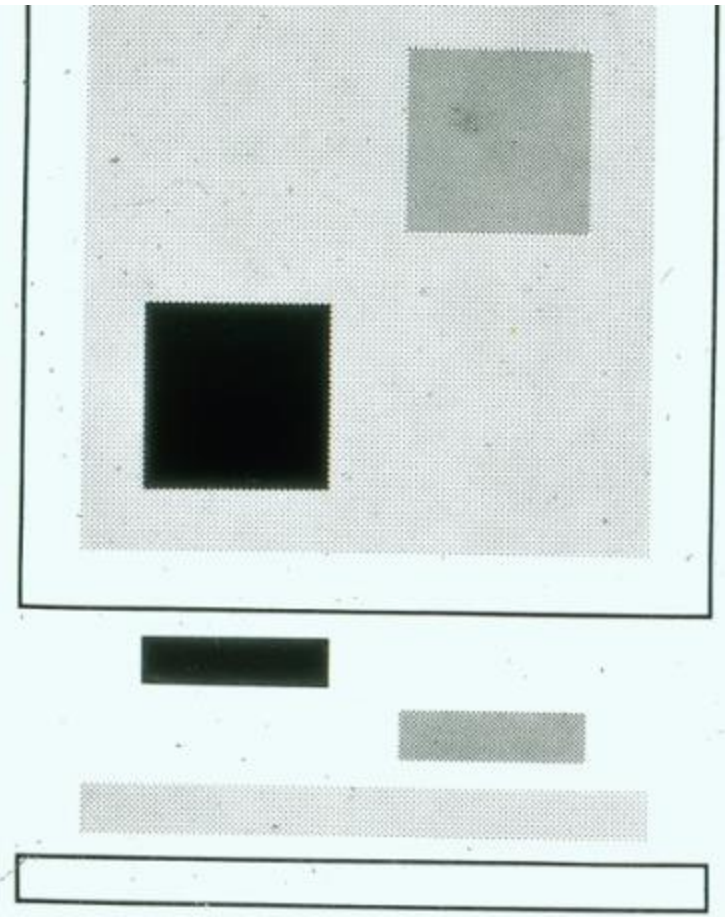
2. Figure ground - visual hierarchy

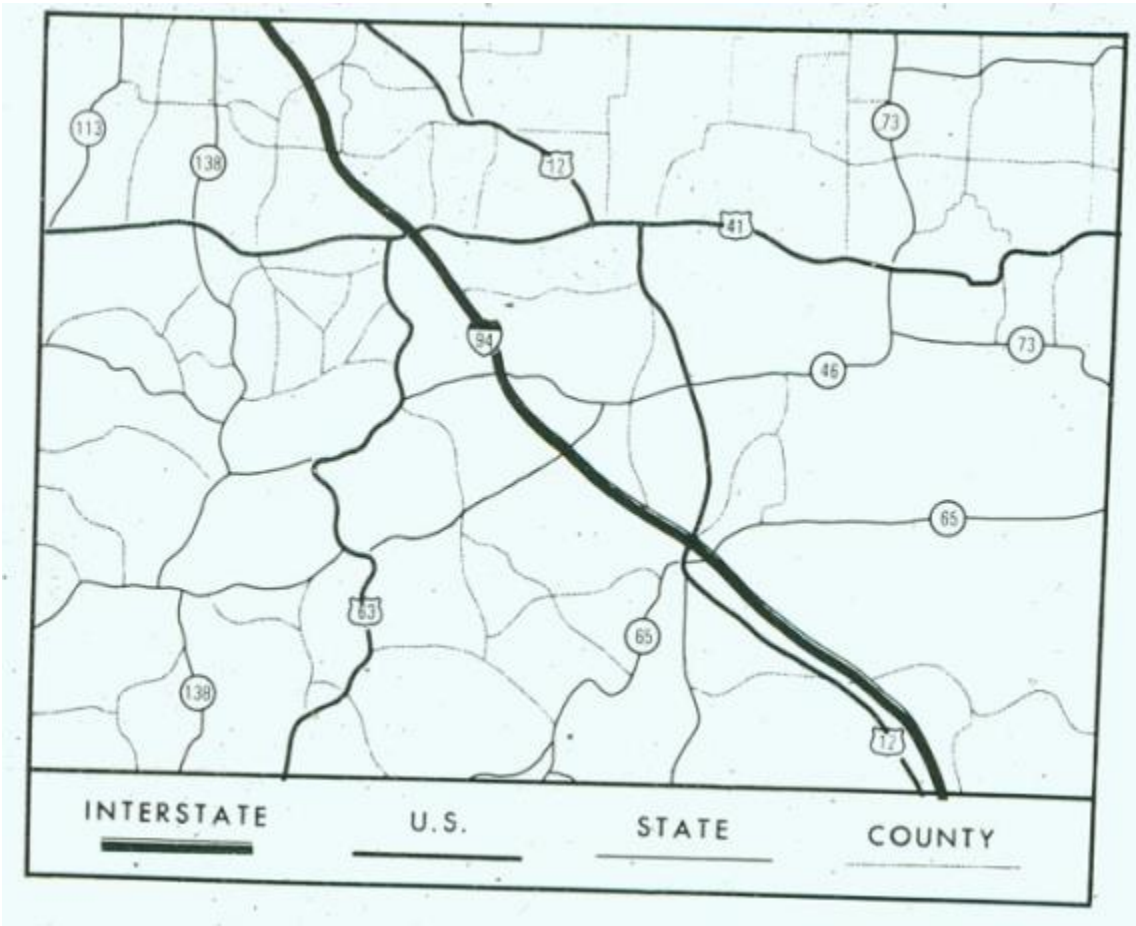
graphics – including maps

need clear figure-ground

….. and visual levels

Maps and visual levels: tones and size





Darker / bigger stands higher = more important

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

9. 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.

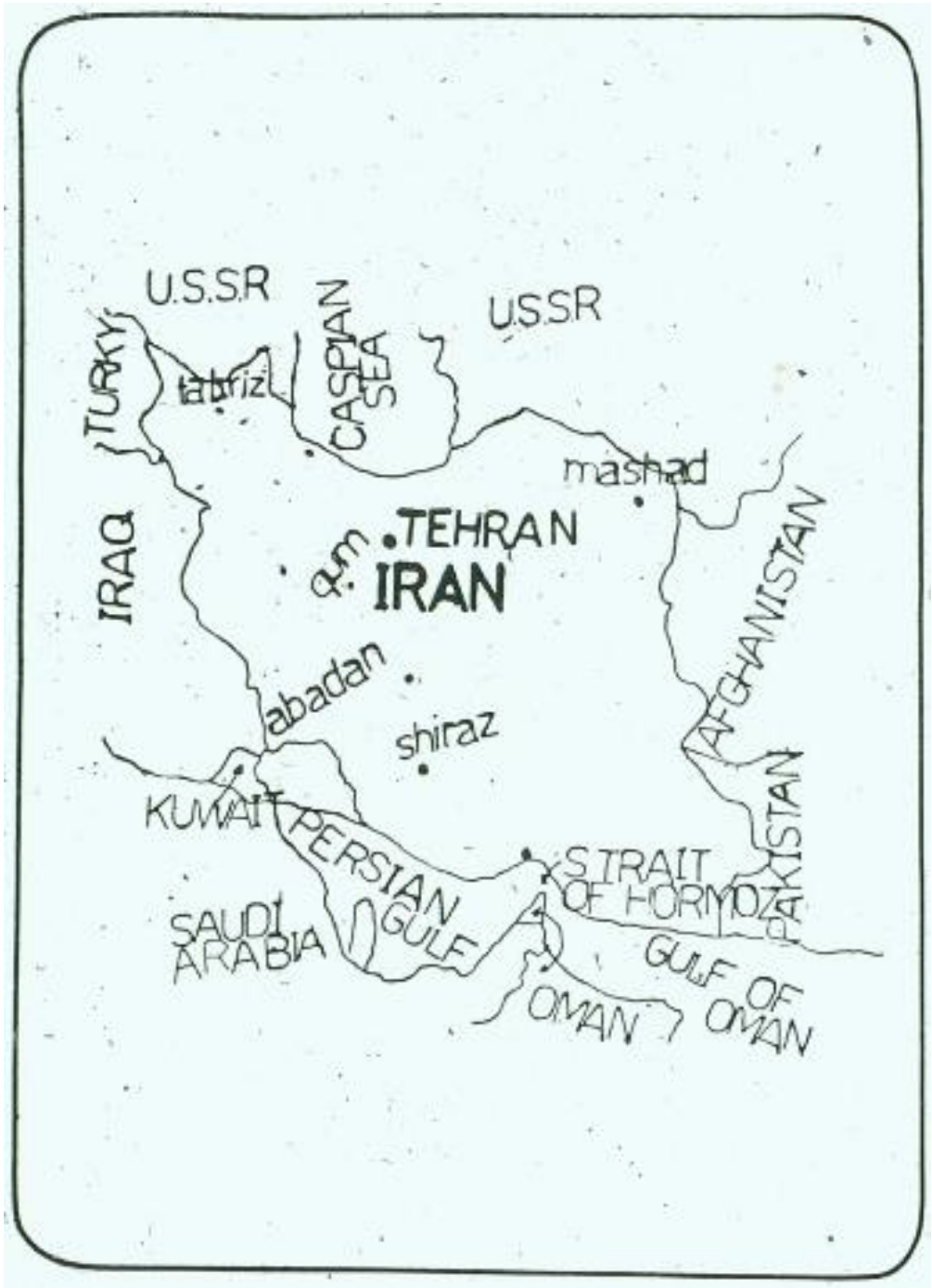
10. **PURPOSE:** All maps have a purpose which should influence every element of the map and the map layout.

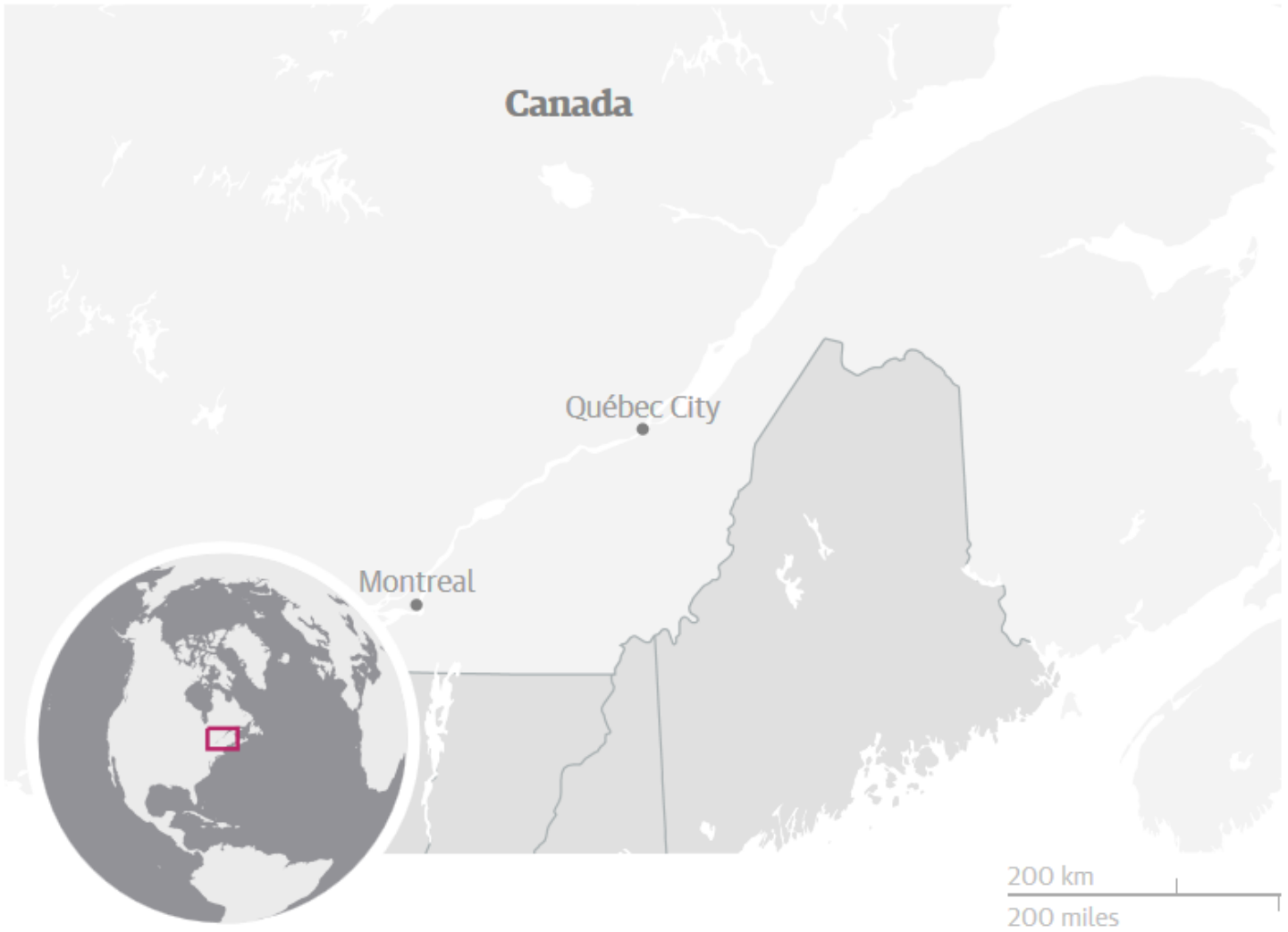
List the errors…

1. Lettering
- Typography and positioning

2. No contrast between ‘layers’

3. No Figure-ground – no visual levels





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

Good design involves:

Clear figure–ground -> no ambiguity

Visual hierarchy of layers and elements:

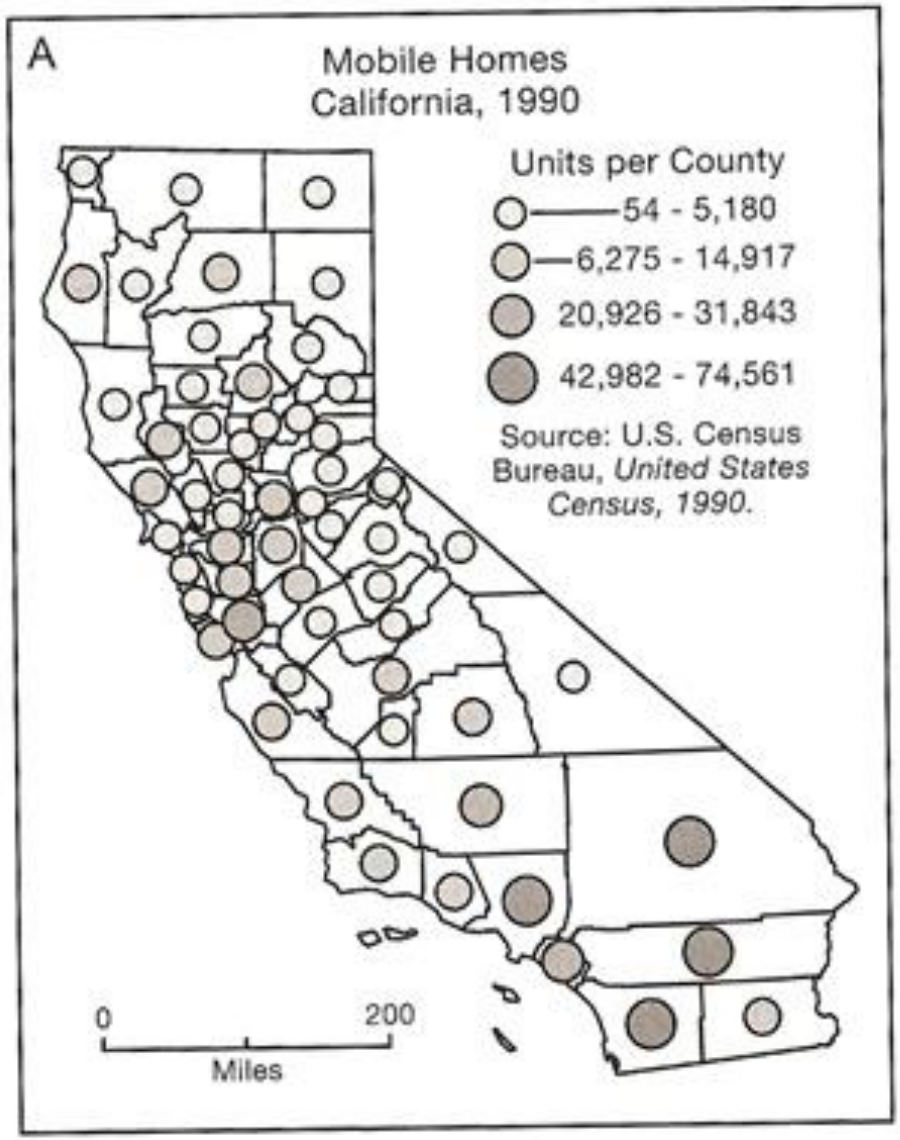
1. Contrast between map layers

2. Map features visually dominant over ancillary info

3. Thematic layers over base layers

4. Important features dominant (based on map purpose)

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



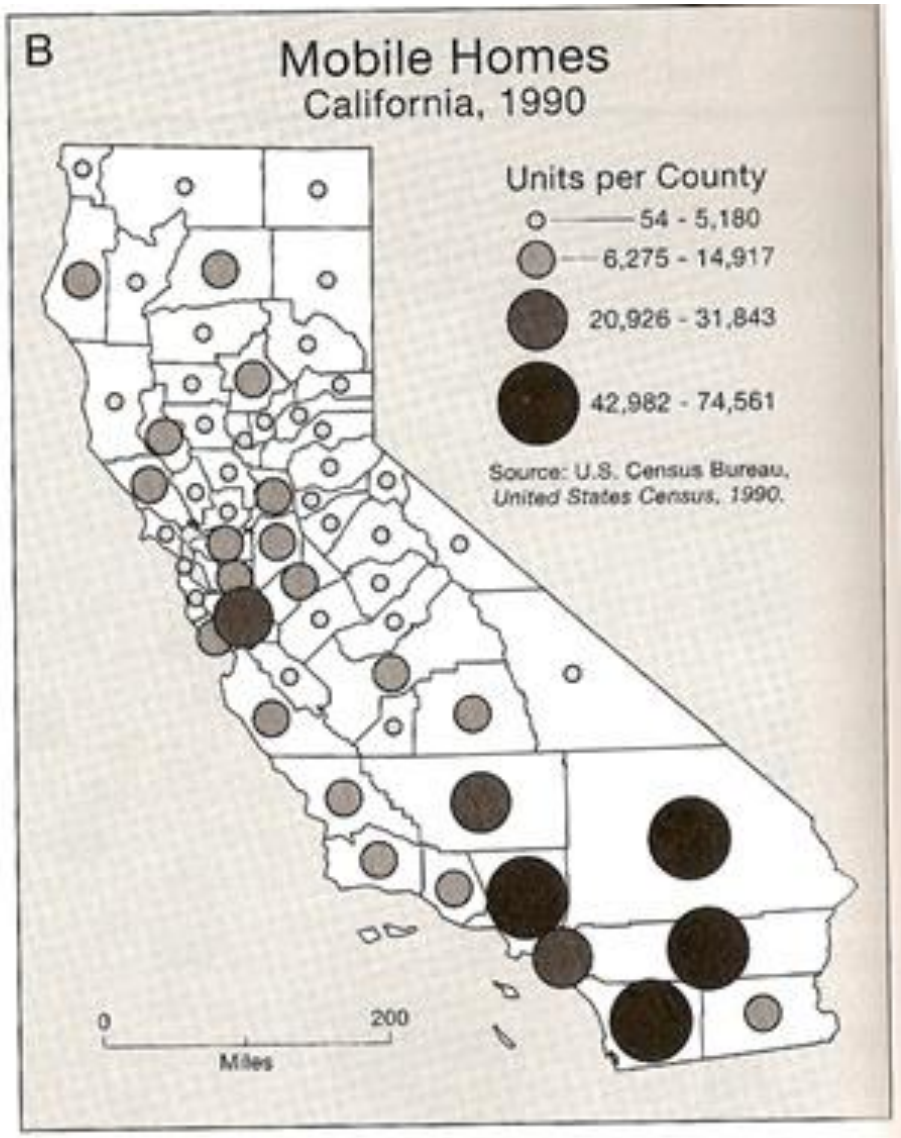


FIGURE 11.31 (A) Insufficient contrast in type size, lightness and size of thematic symbols (circles), line width, and difference between the mapped area and the background. (B) Sufficient contrast in all respects.

Summary use of visual variables
Higher visual levels / = Figure

✓More shape / texture

✓Bigger size (points, line width)

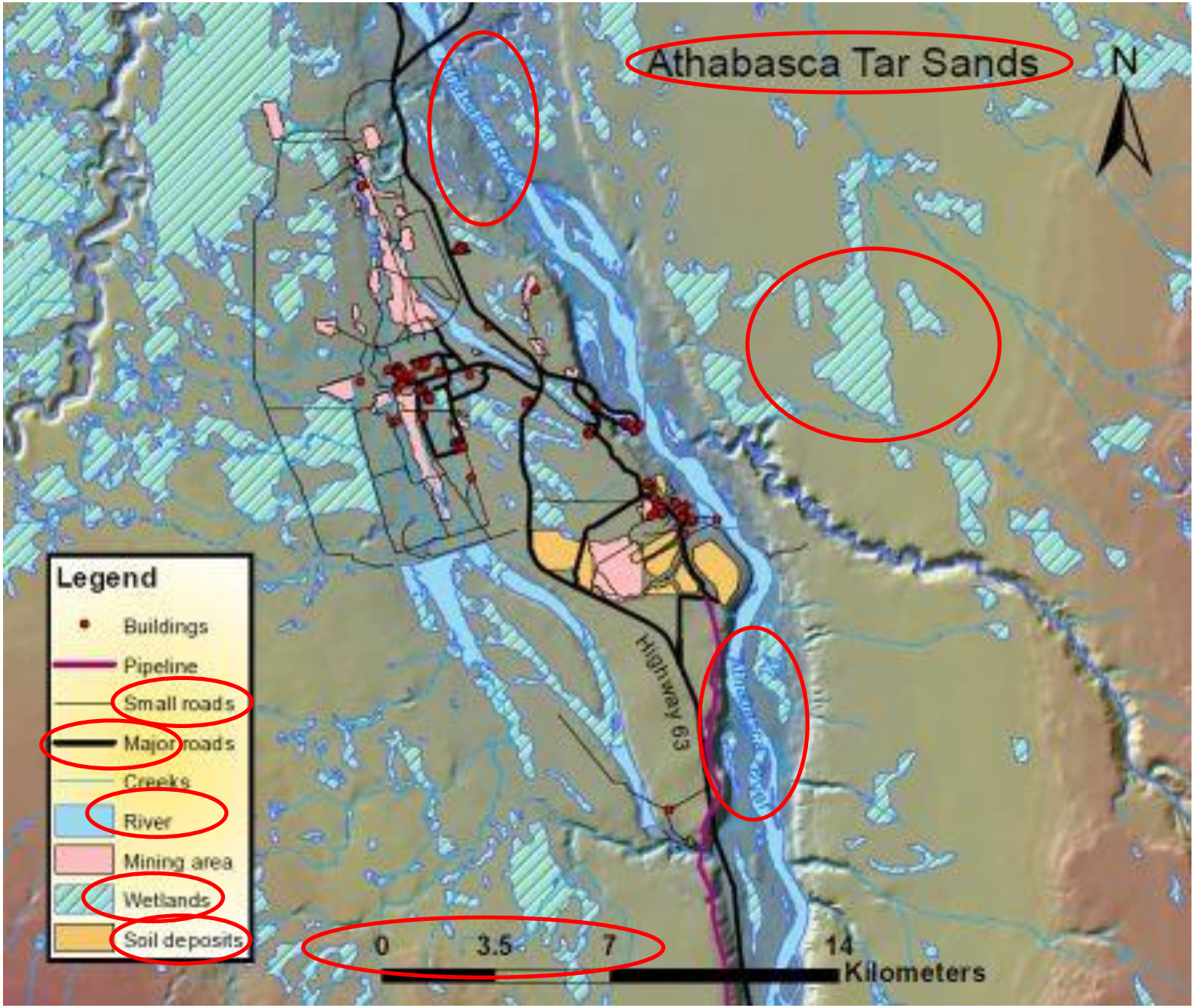
✓Darker tone / values

✓Saturated chroma

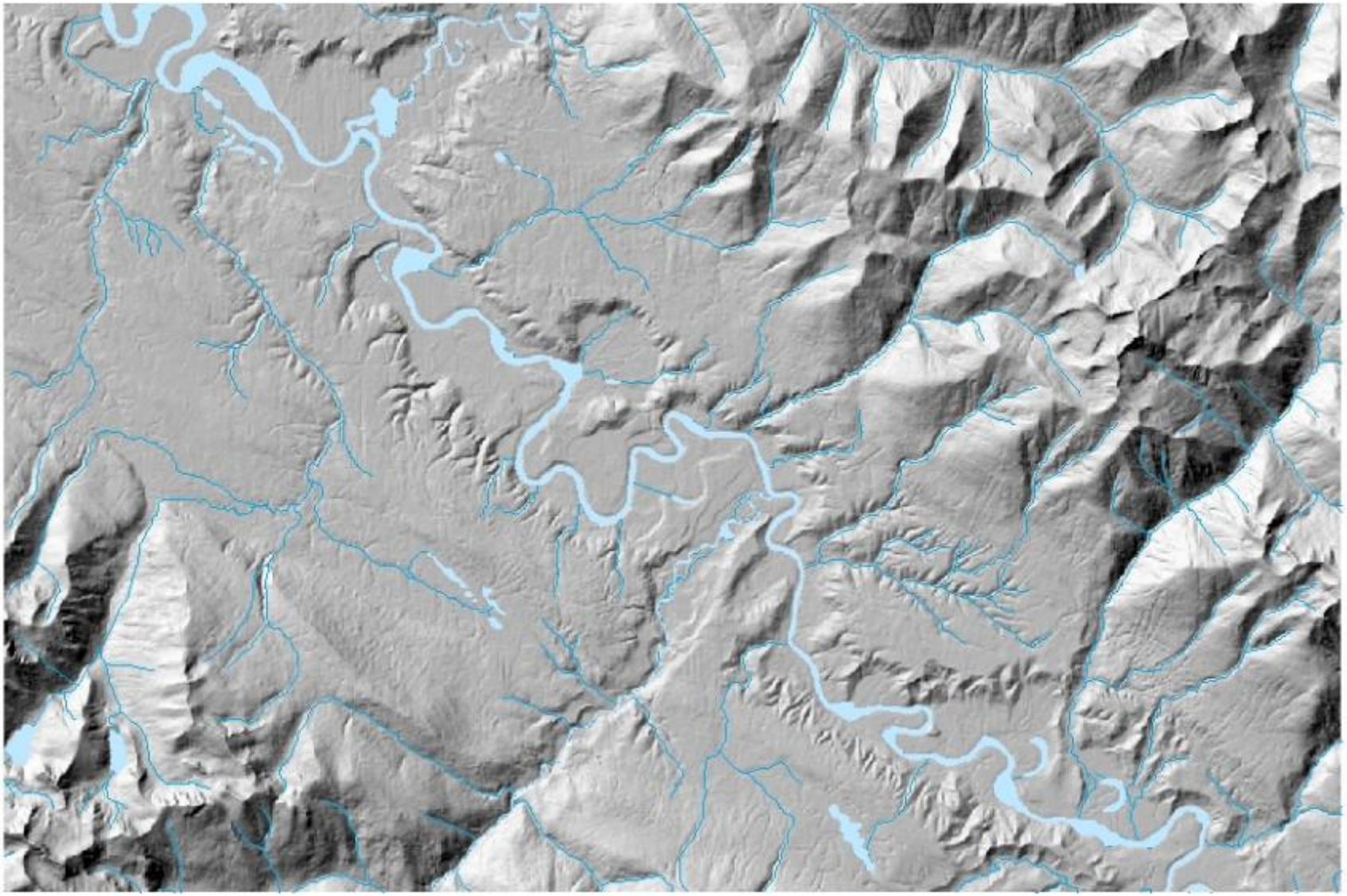
✓Hue – colour spectrum Blue-> **Red**

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

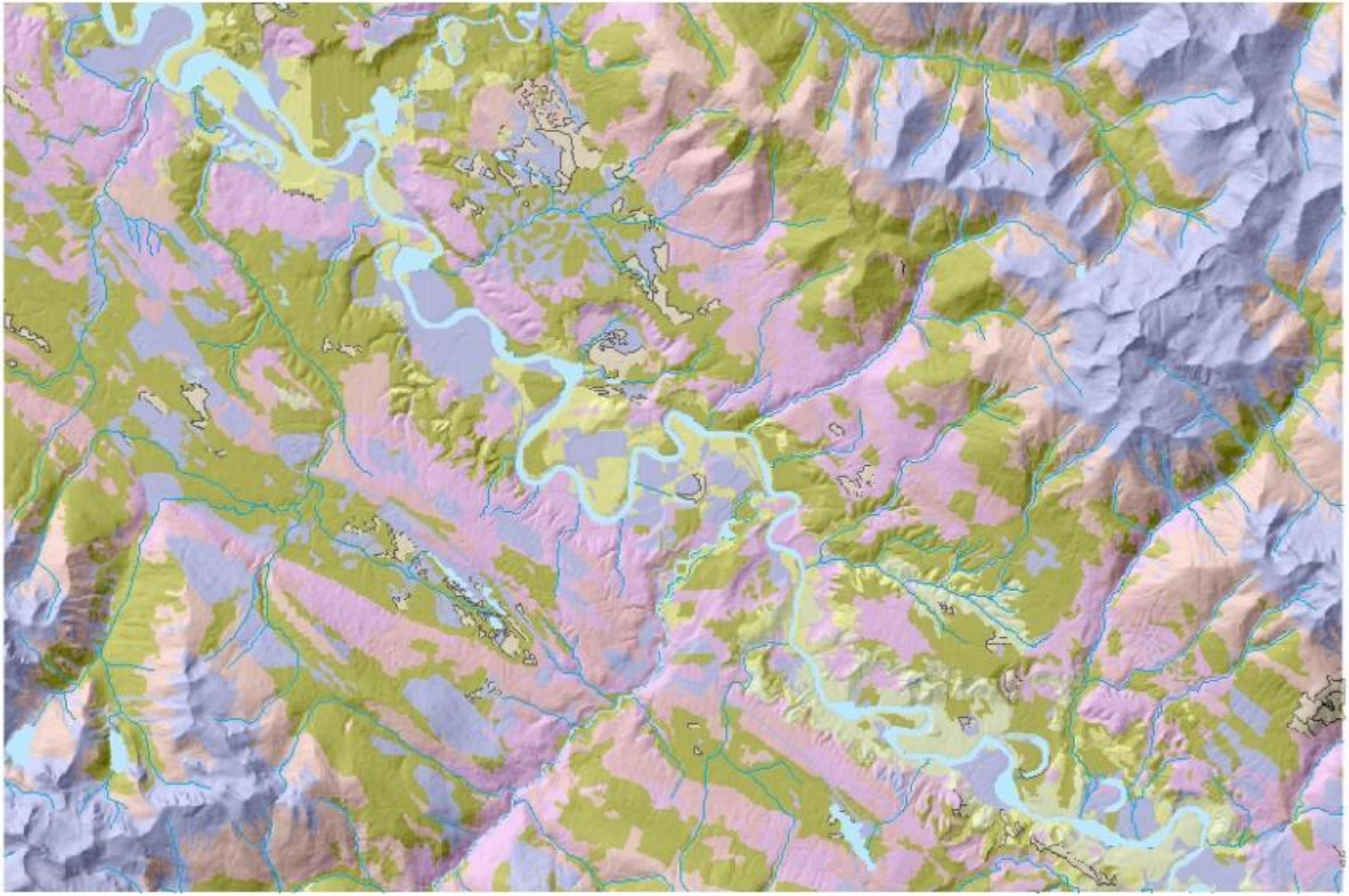
AAGH
NO !


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

Part of the BC raster hillshade layer - Goat River = ‘figure’ or ‘ground’ ?

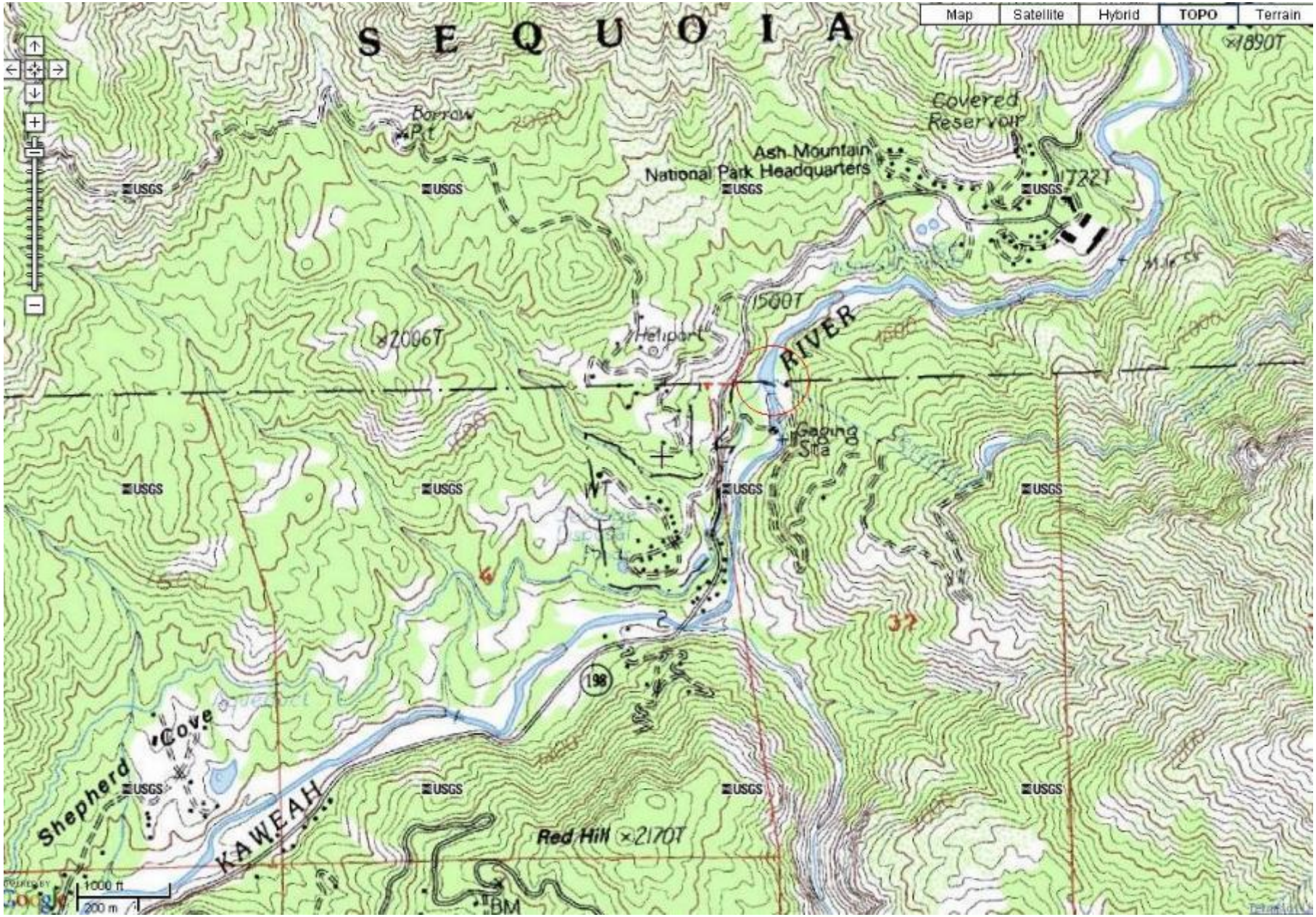


Using transparency to show terrain and forest cover



Shaded relief can form an effective ground layer to underlay other elements
Viewable via peripheral vision …. But it may modify polygon colours

Contour lines encode elevations but as vectors, require focal attention as ‘figure’

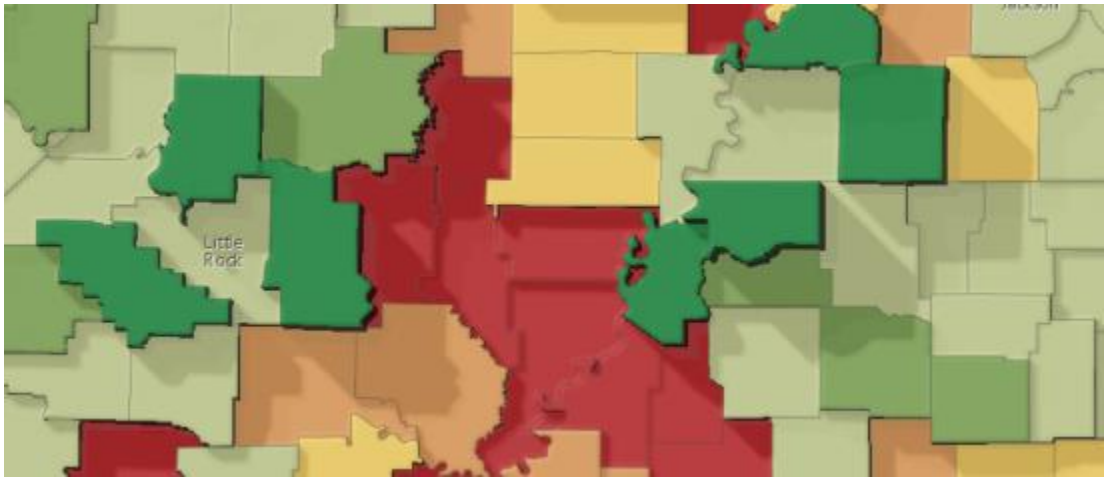


Use of contours versus shaded relief (or both) depends on map purpose (and scale)

Figure-ground: ArcGIS Drop shadow

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

ArcGIS terrain tools
3D choropleth maps



The Isle of Skye
Paper Cut Islands

Esri's paper-cut style
for ArcGIS Pro

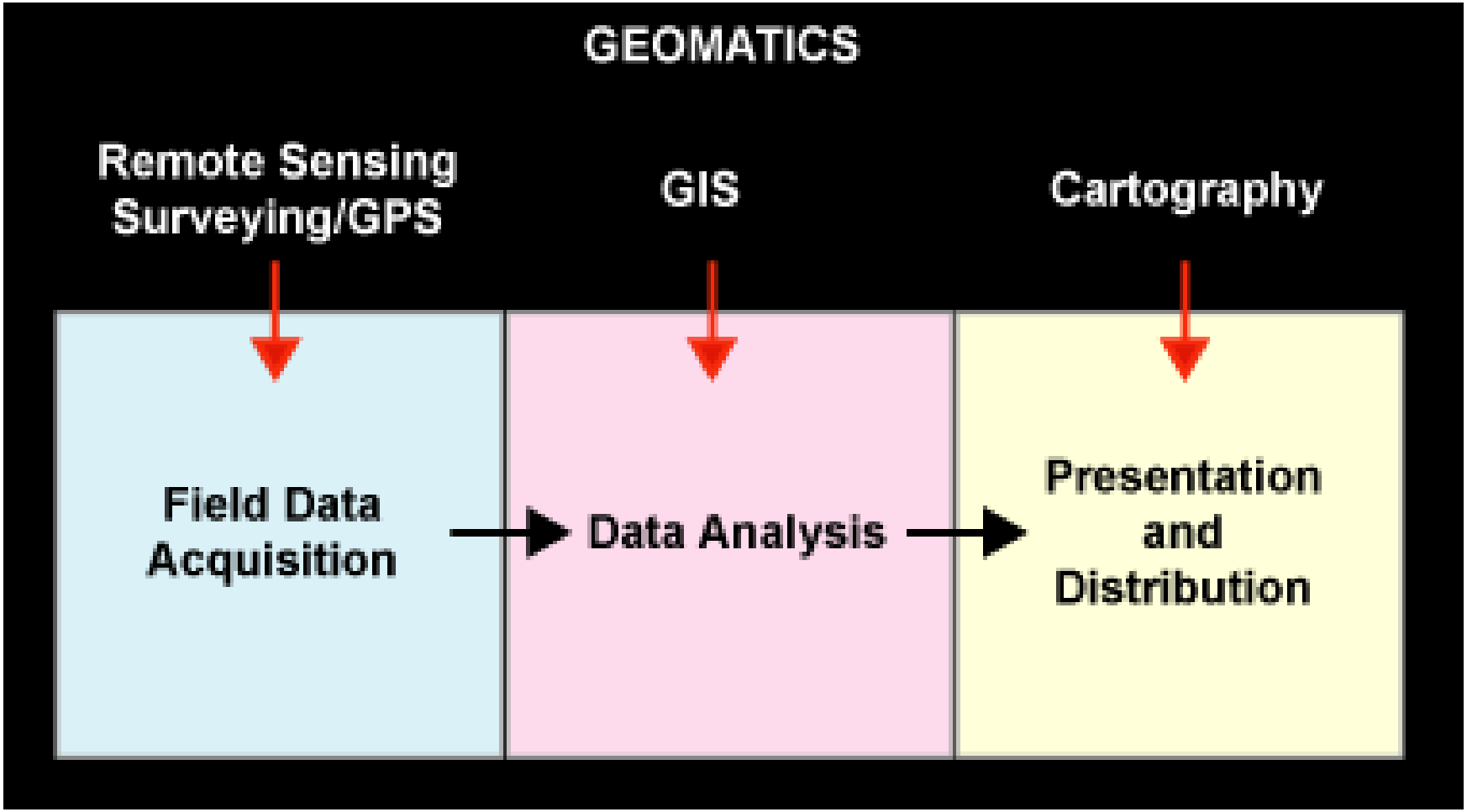
Fine Art print 1934
Hypsometric tints
= ' hierarchical levels'
(but not ideal as a 'ground')

..be wary of dark or saturated
Polygon layer colours

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 !

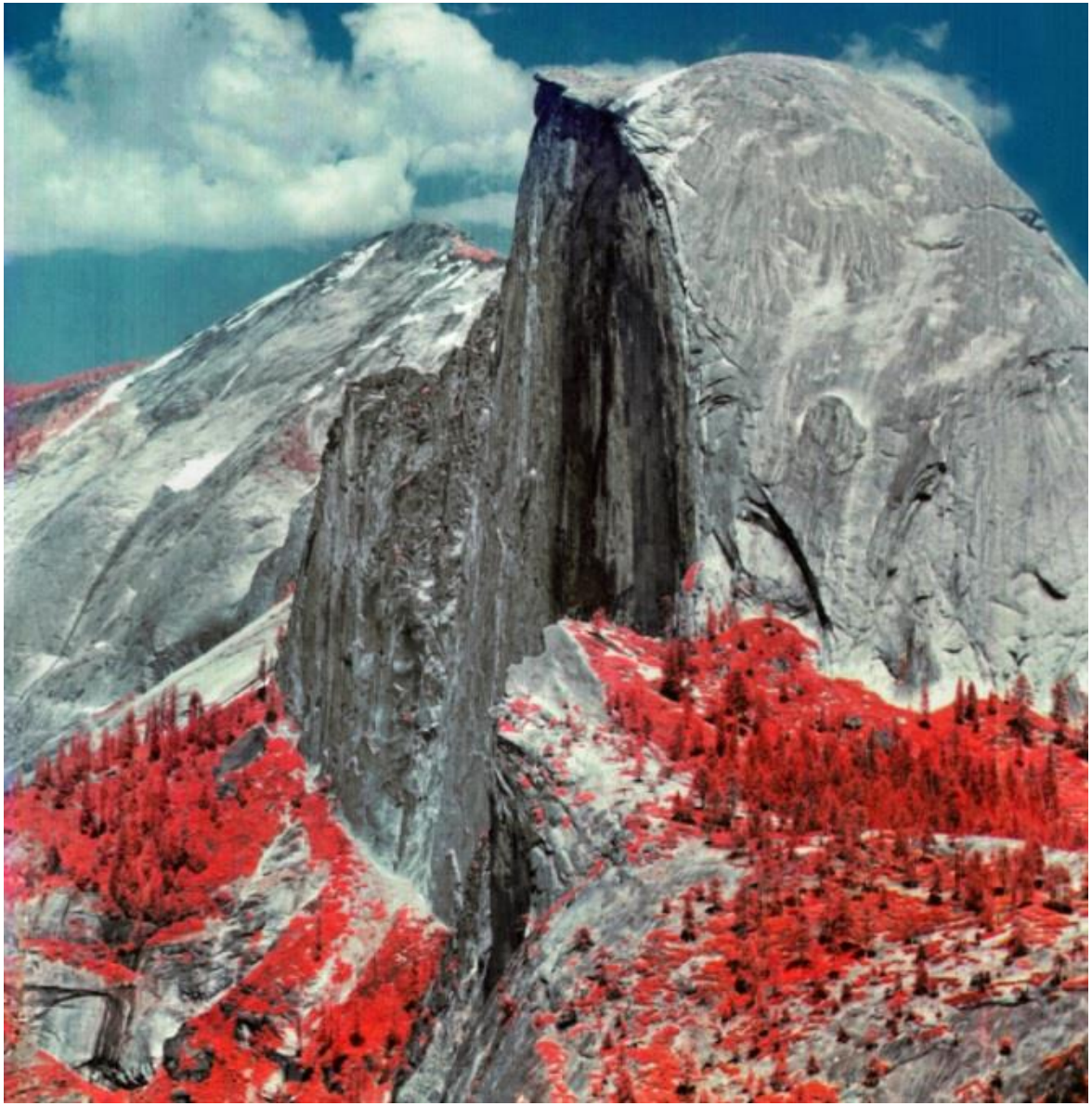
Cartography and Geomatics



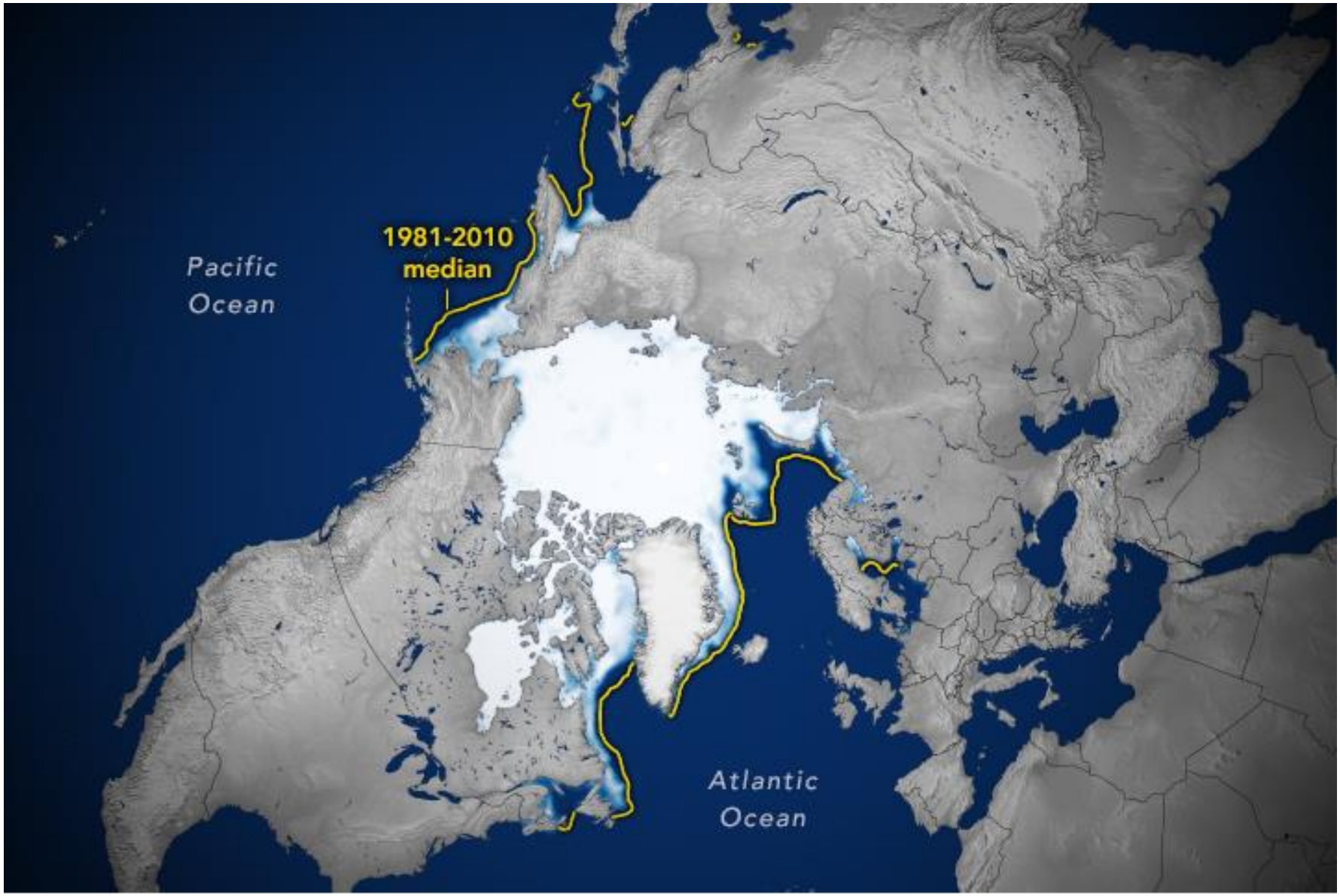
"Cartography and Geovisualization"
Effective output, not just 'pretty maps'

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

Remote sensing



Yosemite (Infra-Red)

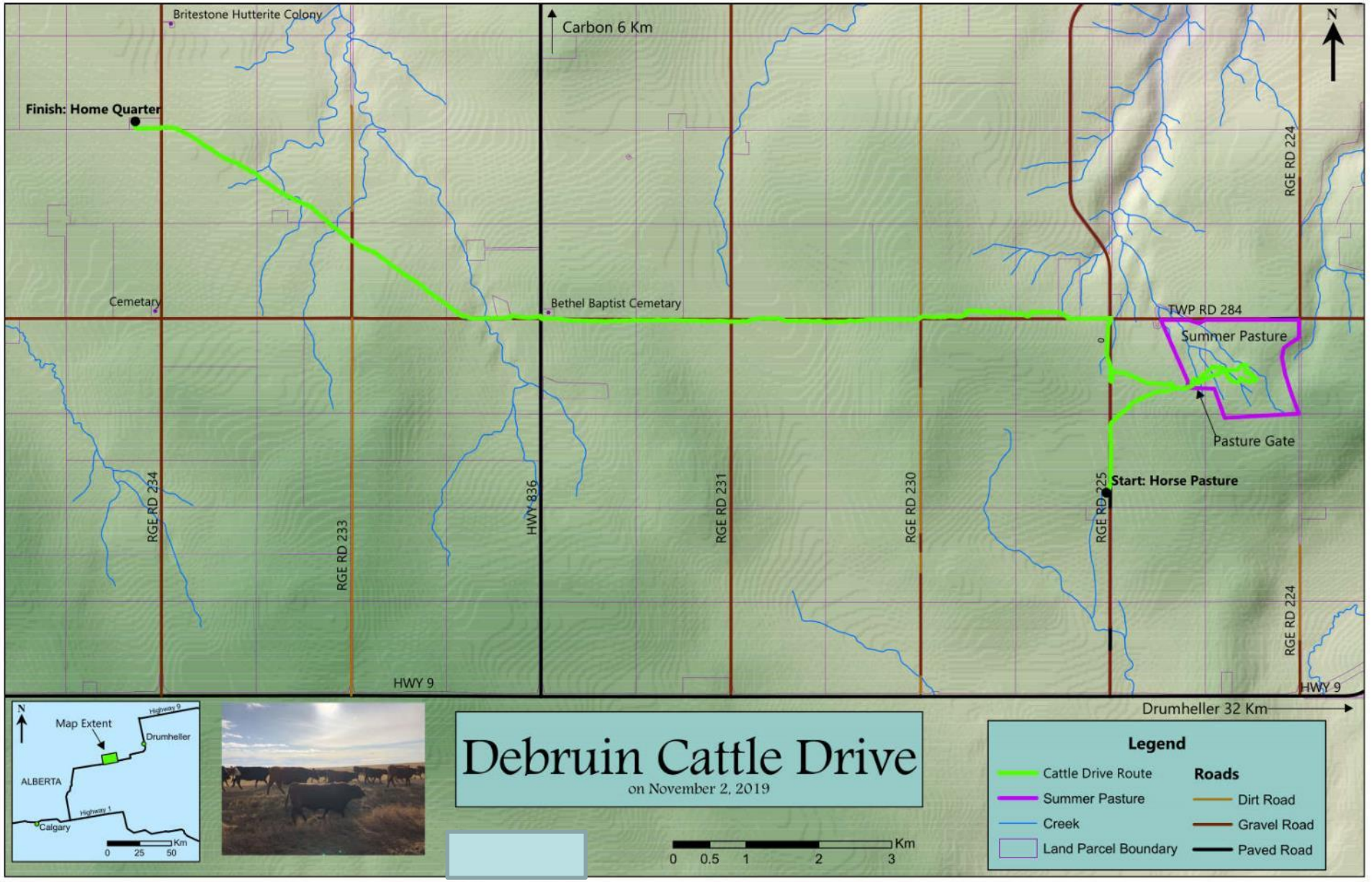


Satellite **image** (microwave)

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

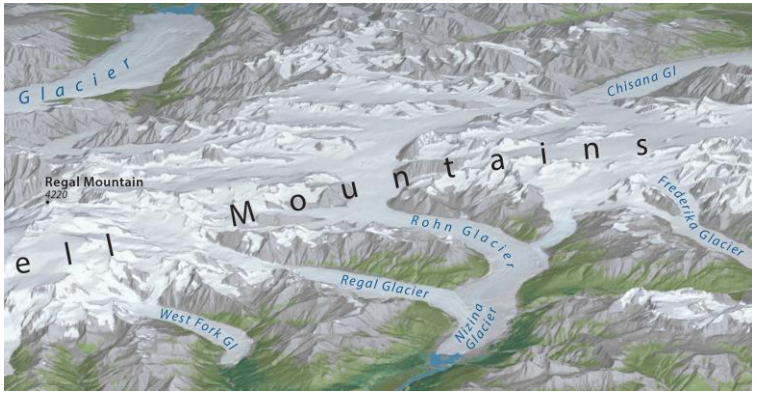
GEOG205 Project map, 2020

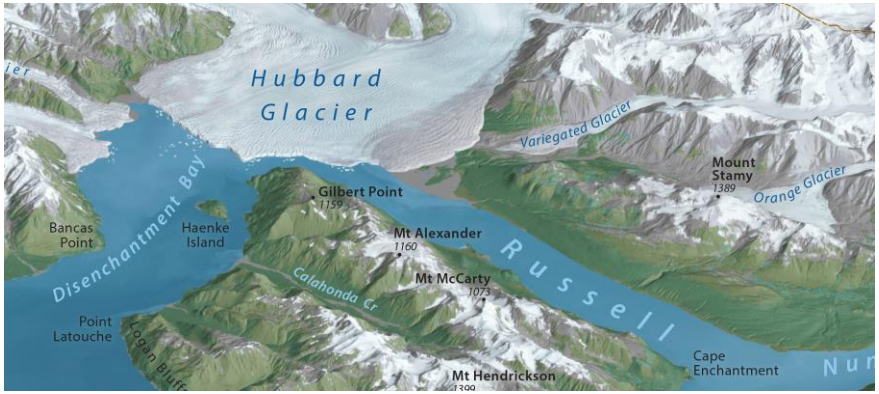
(Cattle Drive by GPS)



Malaspina Glacier and the Saint Elias Mountains

Alaska / Yukon / British Columbia






PART OF
Matouwesarini
Charioquet
The Grand River of Canada
PART OF NEW SCOTLAND.
Tadouſſac
Quebecq
NORTH
Canomakers
Armeomeeks
AMERICA
NEW YORK
NEW ENGLAND
Mahicans
Nawas
Sequins
Minnesinck or Land of Bachans
Sennecaas
Gachoos
Matanackouſes
Konekotay
Minquaas
Sasquahana
Sauwanoos
Long Iland
THE NORTH SEA
NEW JARSEY
MARYLAND
A Map of NEW ENGLAND AND NEW YORK
Sold by Tho. Bassett at Hartshorn and Richard Chiswell in St. Pauls Church Yard.
A Scale of English Miles

https://native-land.ca

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

Current trends in mapping

- Apps for mobile devices = 'Ubiquitous cartography'
- 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
- Increased use of scripting / coding
- Mapping and GPS for everyone

Further courses in Geomatics, 2024->

GEOG204: Introduction to GIS (fall)

GEOG250: Geospatial analysis (fall) (Python programming)

GEOG300: Intermediate GIS (winter)

GEOG357: Remote Sensing (fall)

GEOG413: Advanced GIS (fall 2024)

GEOG450: Advanced Geospatial Analysis (winter 2025)

GEOG457: Advanced RS (winter 2026)

GEOG499/440: Independent Study/Internship –anytime

- *Mapping/GIS skills generally 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 250 or CPSC 110 or 101

+ two of GEOG 450, 413, 457 ….
CPSC 324, 334, 444 or COMM 353

Can specialise in GIS/mapping diploma e.g. BCIT, VIU, Selkirk