SYMBOLISATION (symbolization)

Generalisation: ***which / how many features we display..***
Symbolisation: ***how to display them?***

General Goal: "easy and effective communication" (without ambiguity)

– based on design principles and common sense as much as rules

Similar principles in traffic signs:
Effective easy communication

www.doodlesandjots.com

Symbolisation (shapes)

Road sign in Belorussia **(next to historic church)**

Symbols: Visual Design Variables

Shape: the detail or outline of a point symbol

Pattern: regular repetition of shapes

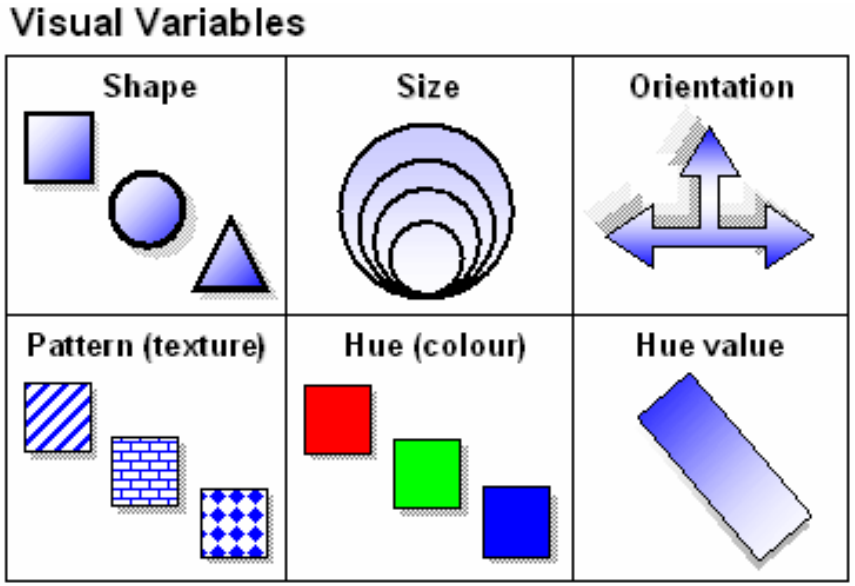
Texture: variation of tones or lines

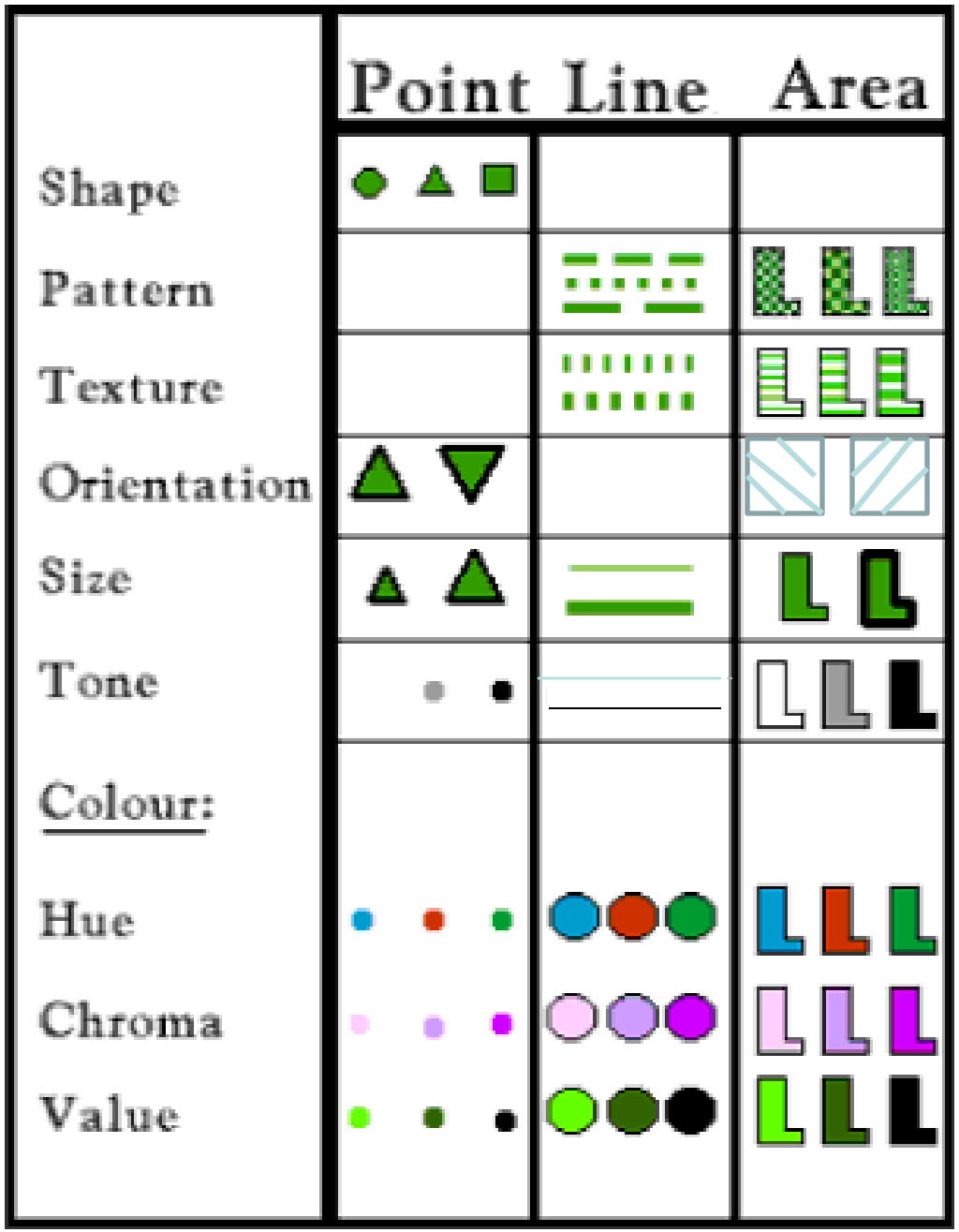
Orientation: direction of symbol element

Size: size of a point, width of a line

Tone: shades of gray (% black)

Colour: hue, chroma and value





Weak variable

Very weak

Strongest variable

Visual Design Variables

Colour: has three 'dimensions'

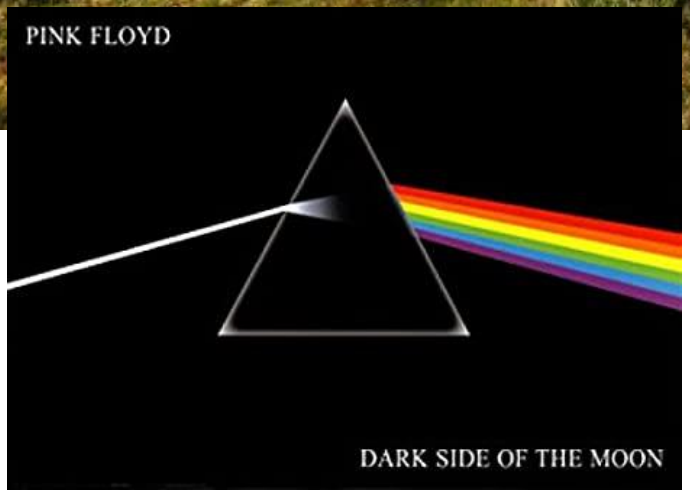
hue (wavelength): "the visual sensations from different wavelengths of light " e.g. red, blue

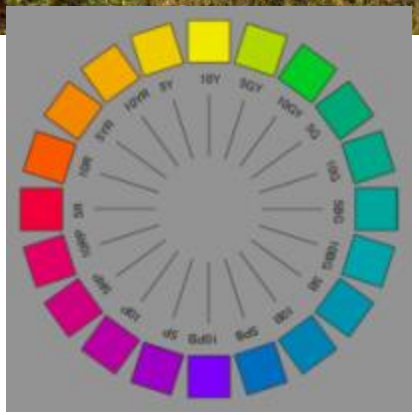
chroma (saturation): saturation = tints,
e.g. pale v solid blue

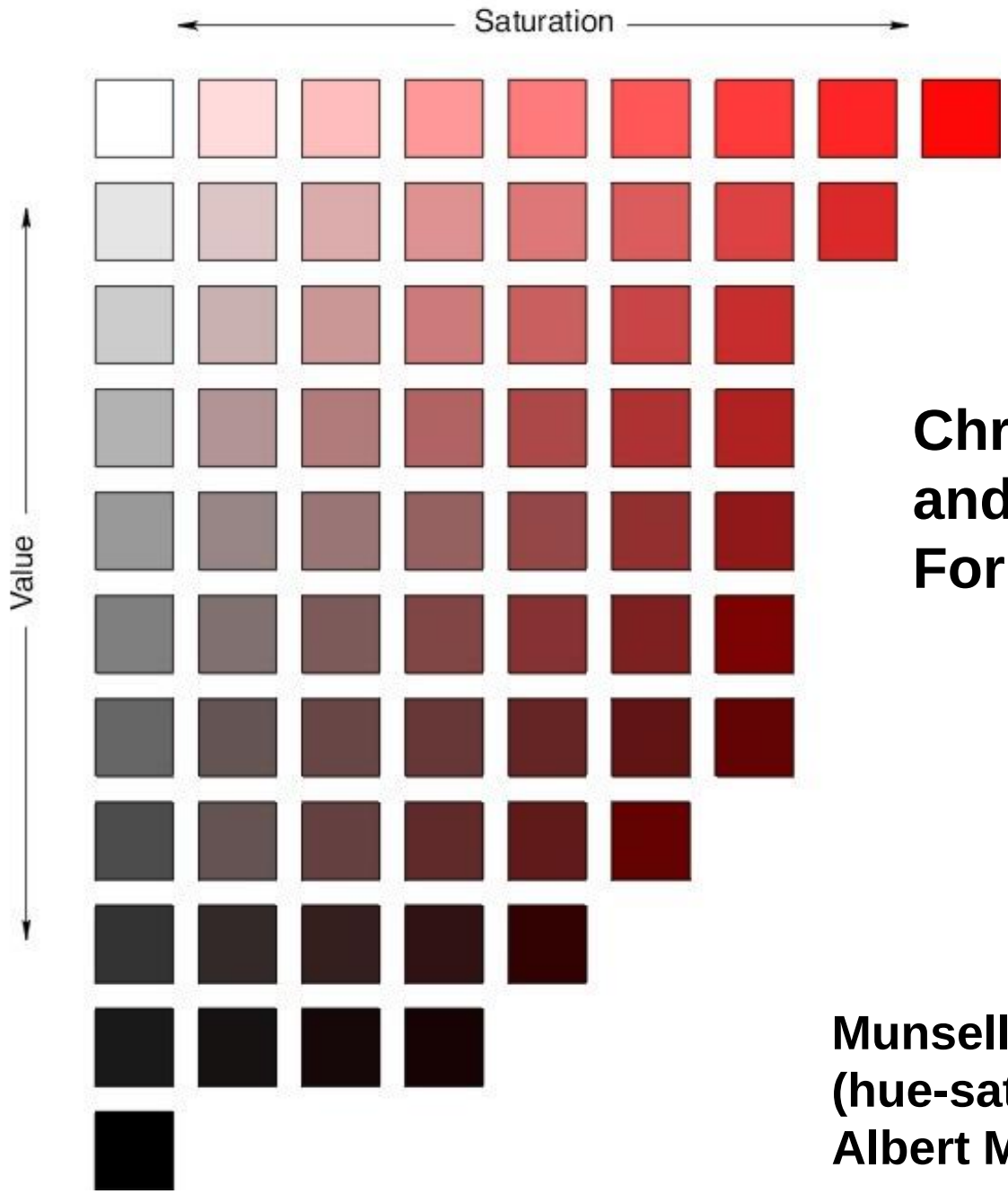
value (intensity): purity- lightness or darkness = shades,
e.g. blue v blue/black

The 'electro-magnetic' colour spectrum

the longer wavelengths of light (red) are the least refracted







Chroma / saturation and value / intensity For one hue (red)

Munsell soils color chart (hue-saturation-intensity) Albert Munsell, 1858 - 1918

Design criteria: 1. 'Association'

Symbols should be 'associated' with their features, physically or by function

Vegetation		green
Contours		brown *(except on ice …)*
Battlefield		
Winter sports		
Camping		
Railway line		

Taking association too far ?

One man’s campaign to make football (soccer) signs more realistic :

… missing the point of generalization/symbolisation

Association taken too far - ensure good contrast
Theses are too similar for the human eye

Example: unsuccessful forest classification (primary species)

colours: too many similar tints/shades of the same hue

Point symbols

Are mostly based on Shape
… and also colour

Solid or open ?

Letters are not used much

- can be confused with place names except:

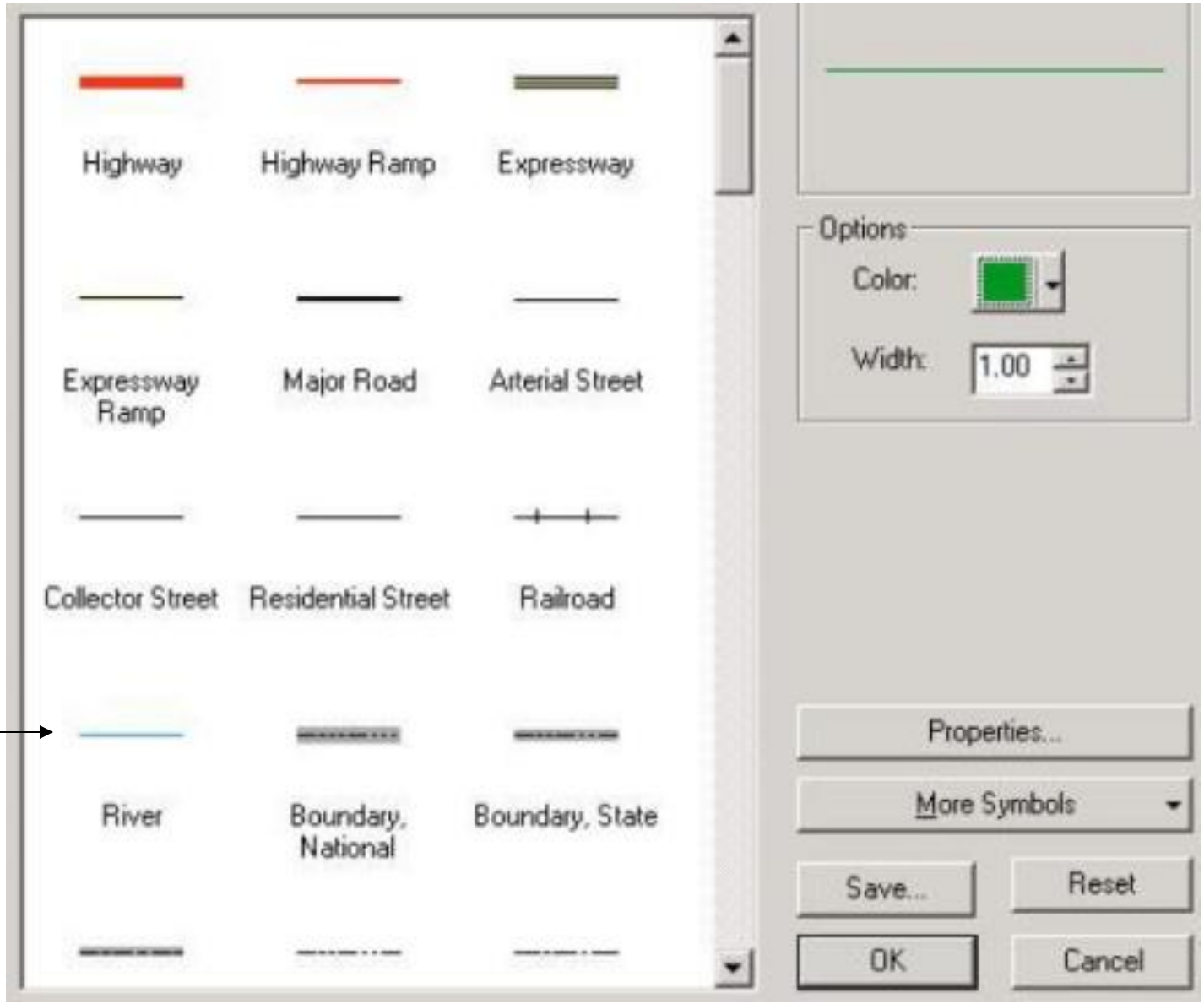
H Hospital

P Parking

i Information (or I ?)

'Abstract': if space is limited

Lines symbols



Too big for most streams

Beware of defaults !

Association - Lines

- **'permanent' physical** features are shown as solid.

  e.g. rivers, roads

- Less certain features are shown in **broken** lines.

  e.g. intermittent streams, trails

- Administrative boundaries use a **dot-dash** pattern

Areas / polygons

Fill – colour, pattern

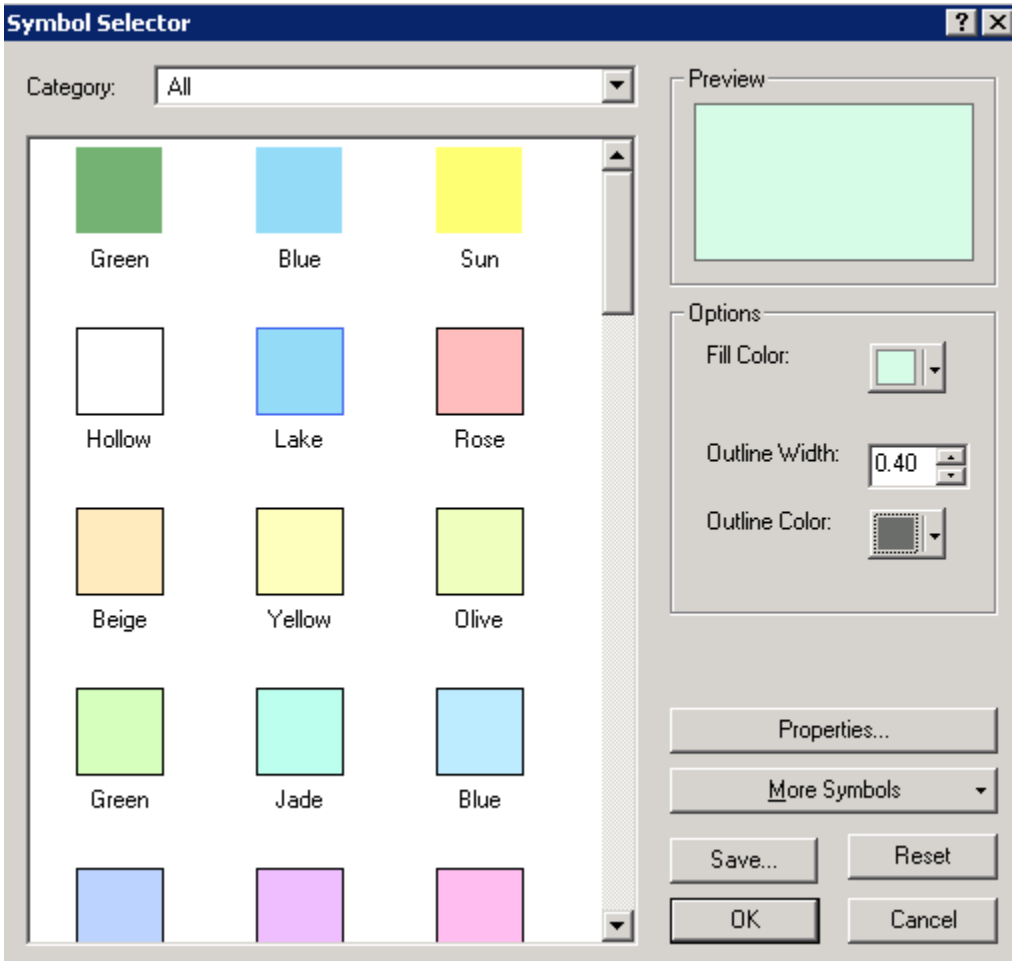
Colours should be associative

Avoid really solid colours

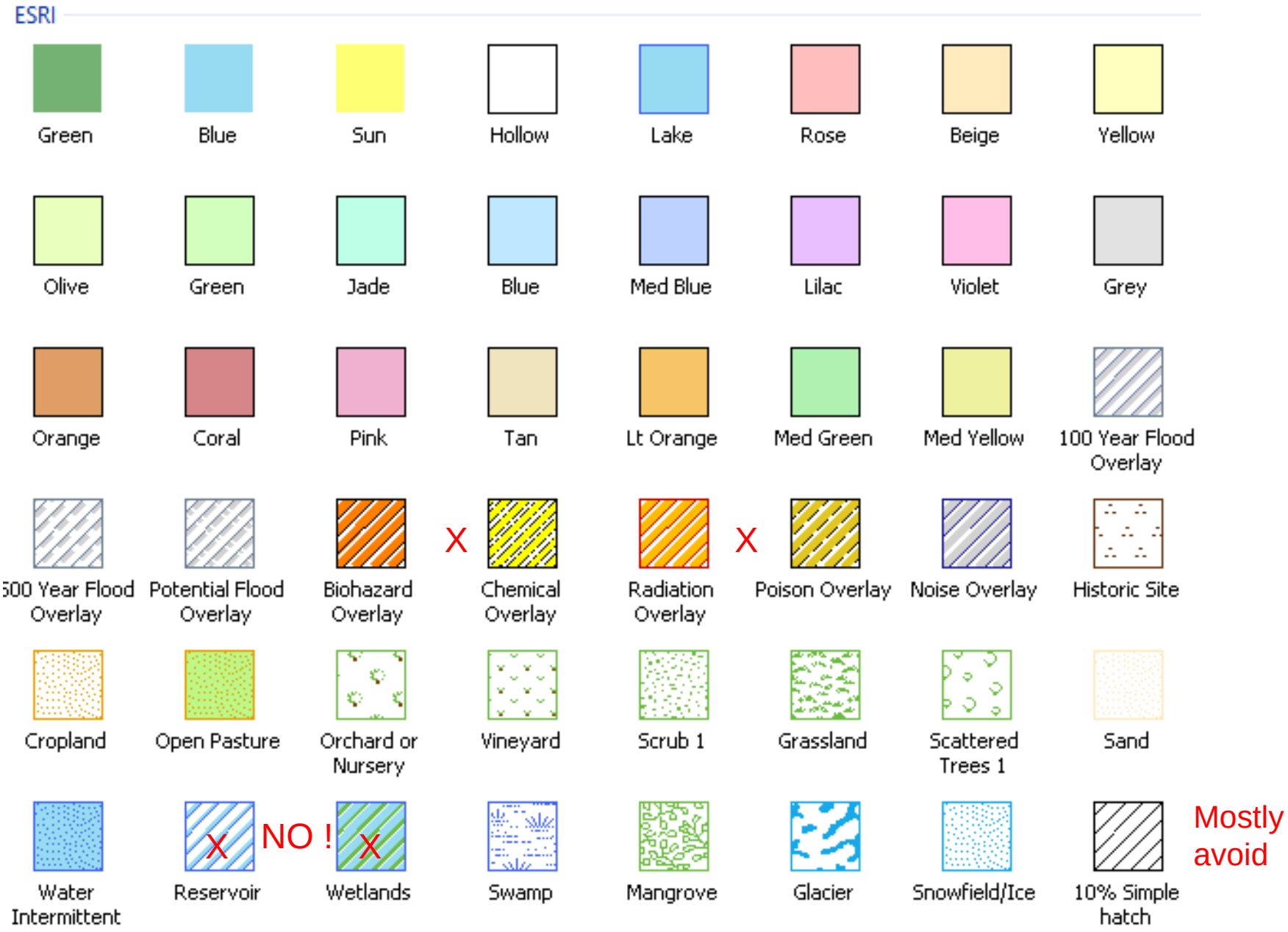
(except for small areas)

Outline ? – colour, width

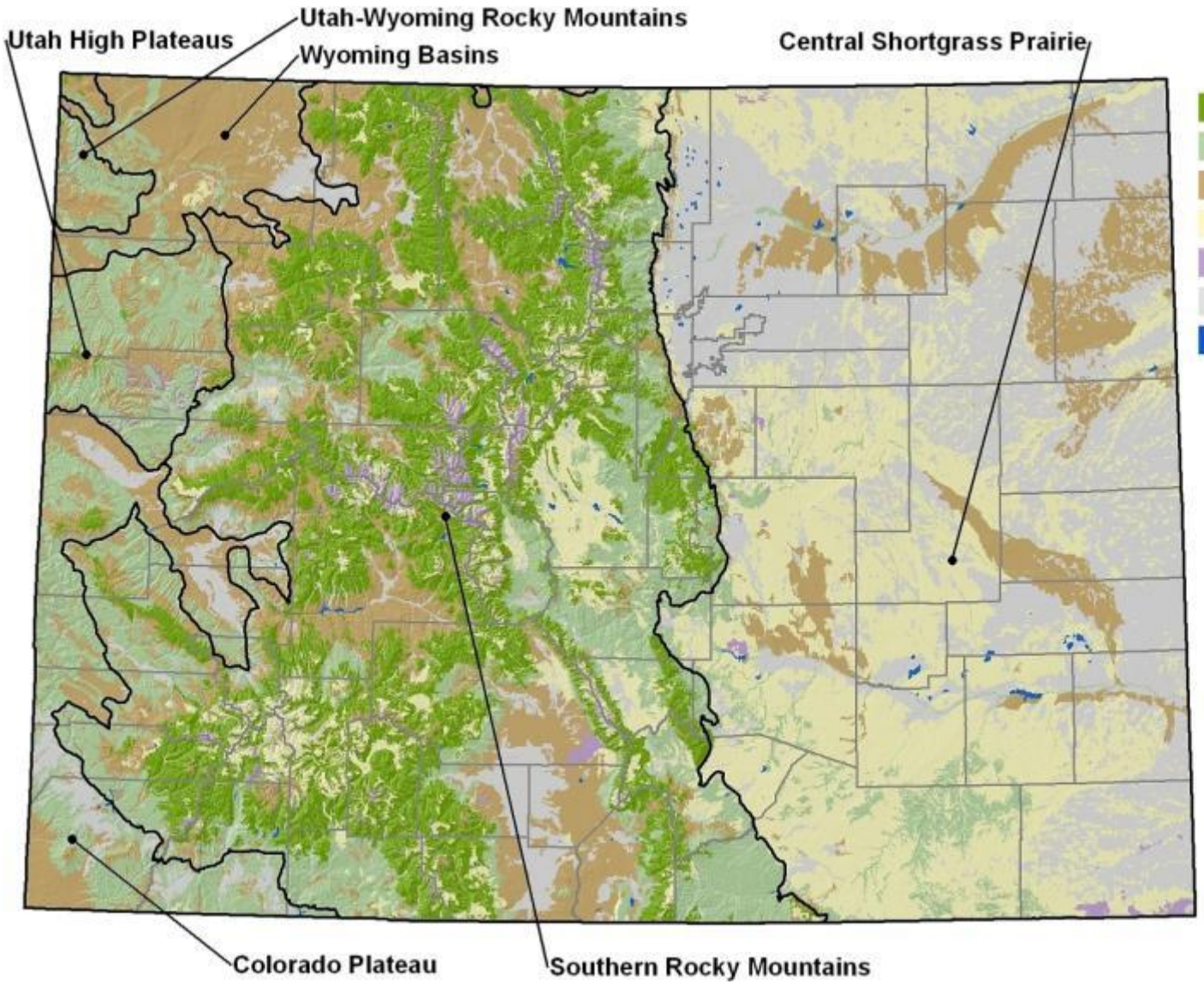
No polygon outline for 'uncertain' boundaries



Some OK and ugly Esri polygon patterns – don't copy defaults …

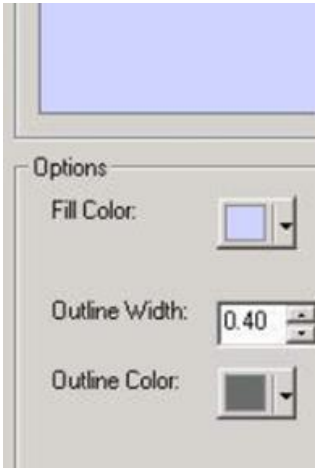


Example 1



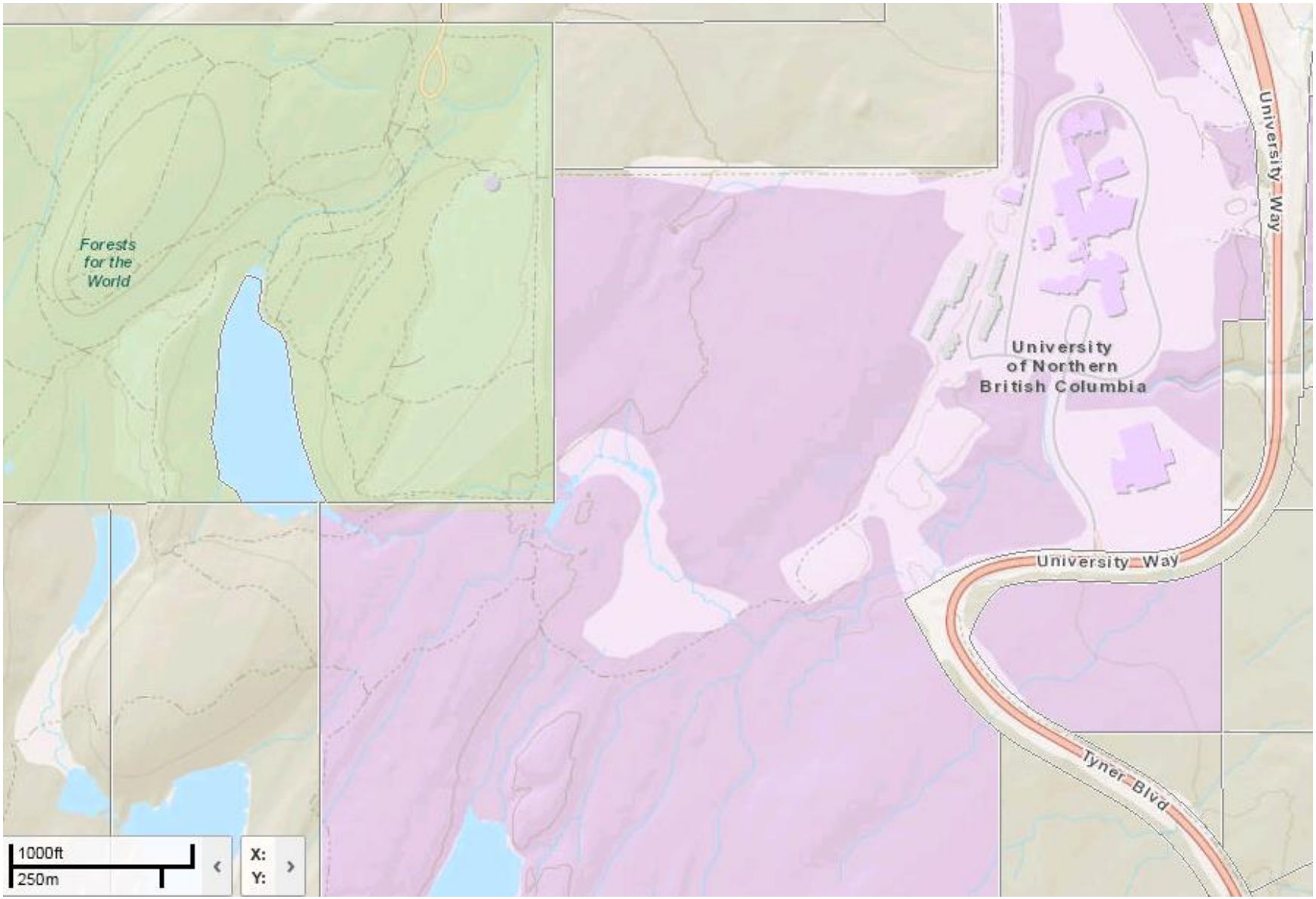
No polygon outlines for vegetation,

outlines only for regions



Use of fill vs outline vs both depends on: significance of area edge, scale
Lakes: outline (+ colour fill)
Forest /vegetation: fill only (no outline)

Example 2: PGMap – use of area transparency – but outline only might be better



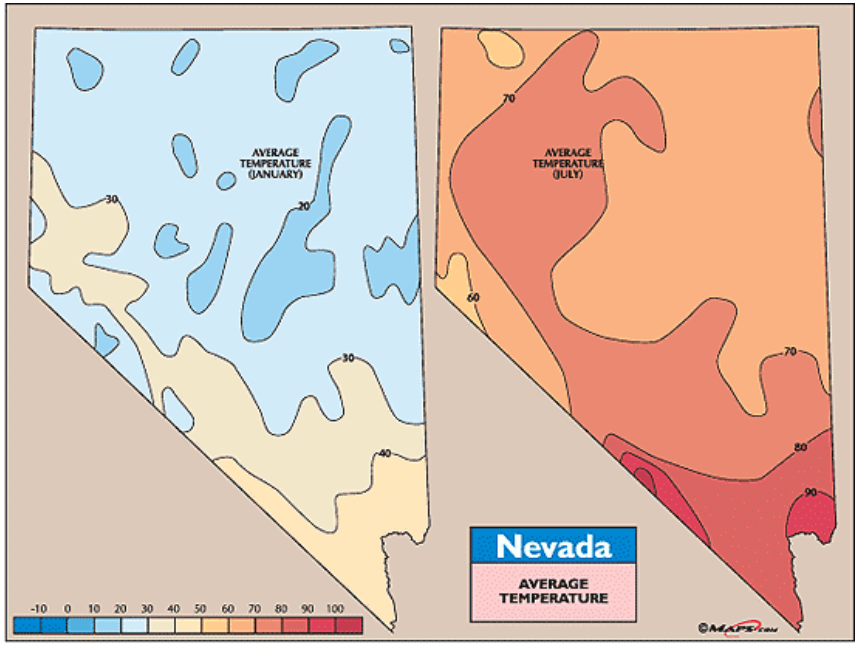
Colour associations: physical and psychological

Yellow – sun, bright (cheery..) ;

Blue – water, calm, cool etc..

Red – heat, danger, blood ?

Green – vegetation, parks, recycling ?



http://visual.ly/meaning-colour-marketing

Association Conventional symbols –
e.g. topographic mapping

Canada NTS conventions

Green – forest vegetation

Red – main roads

Orange - minor roads

Black – buildings

Urban – pink

most conventions are based on association e.g. blue for water, while others are less obvious, e.g. pink / orange for urban.

Association – size

larger / more important features e.g. road width

2. Qualitative versus quantitative
a type of 'data association'

Qualitative: [nominal / categorical]

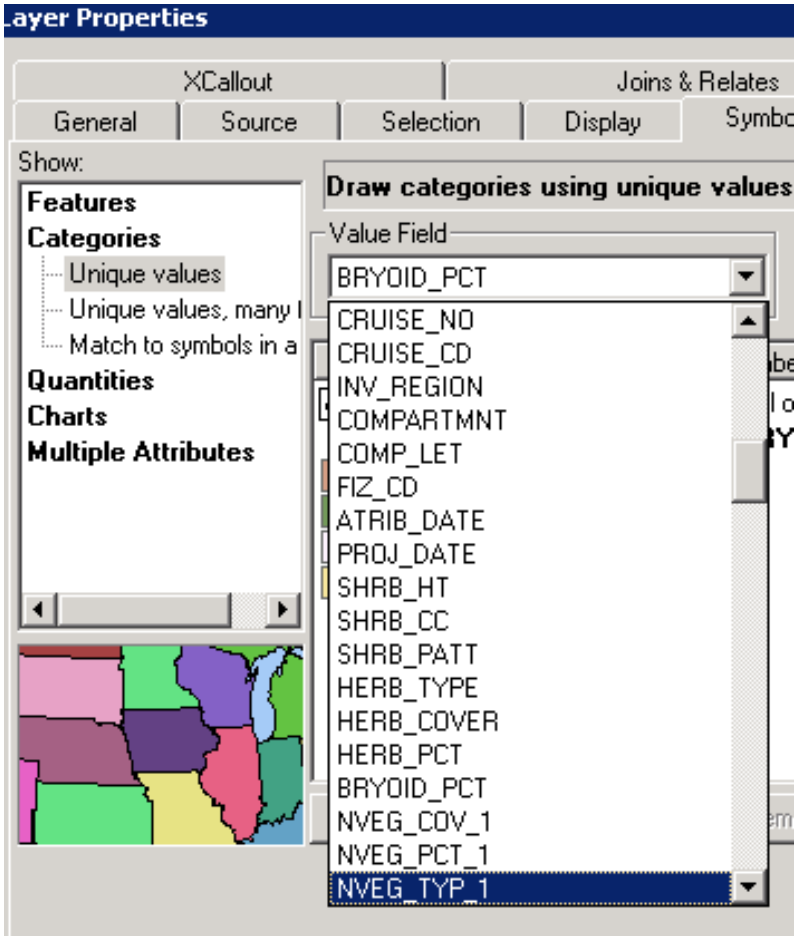
HUE *, shape, pattern e.g. soil types, schools versus churches

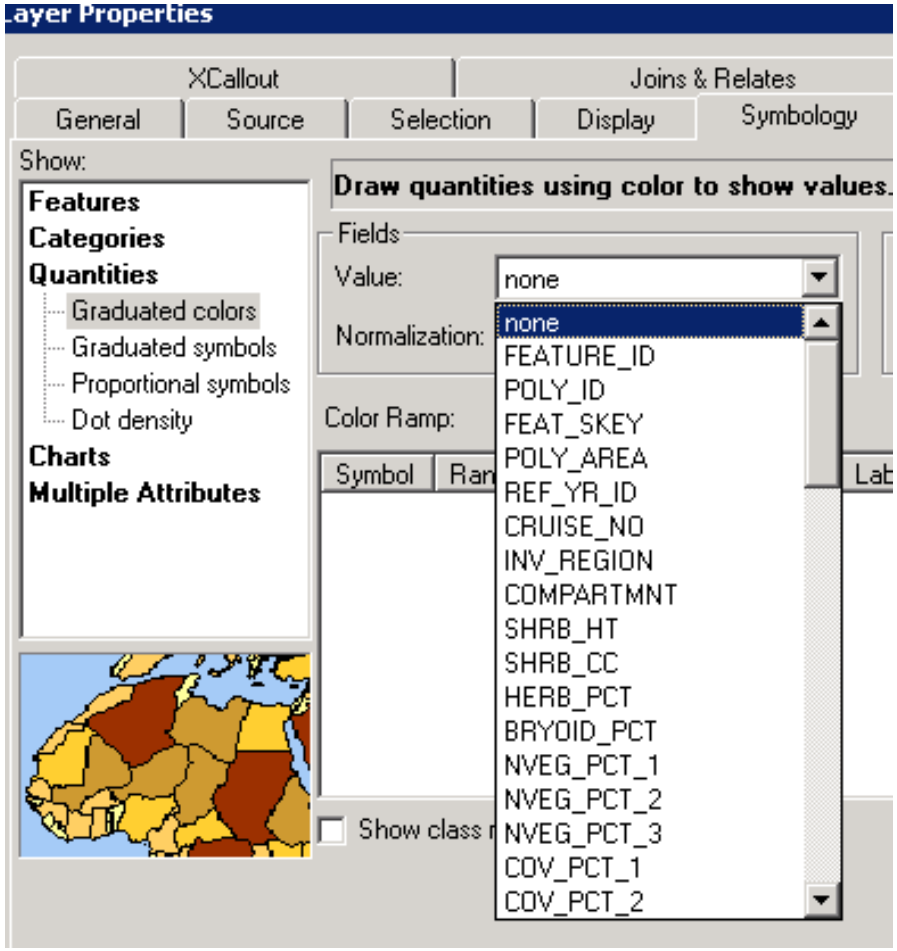
** see upcoming slides*

Quantitative: [interval / ordinal]

SIZE, tone, chroma, value e.g. population densities, city sizes

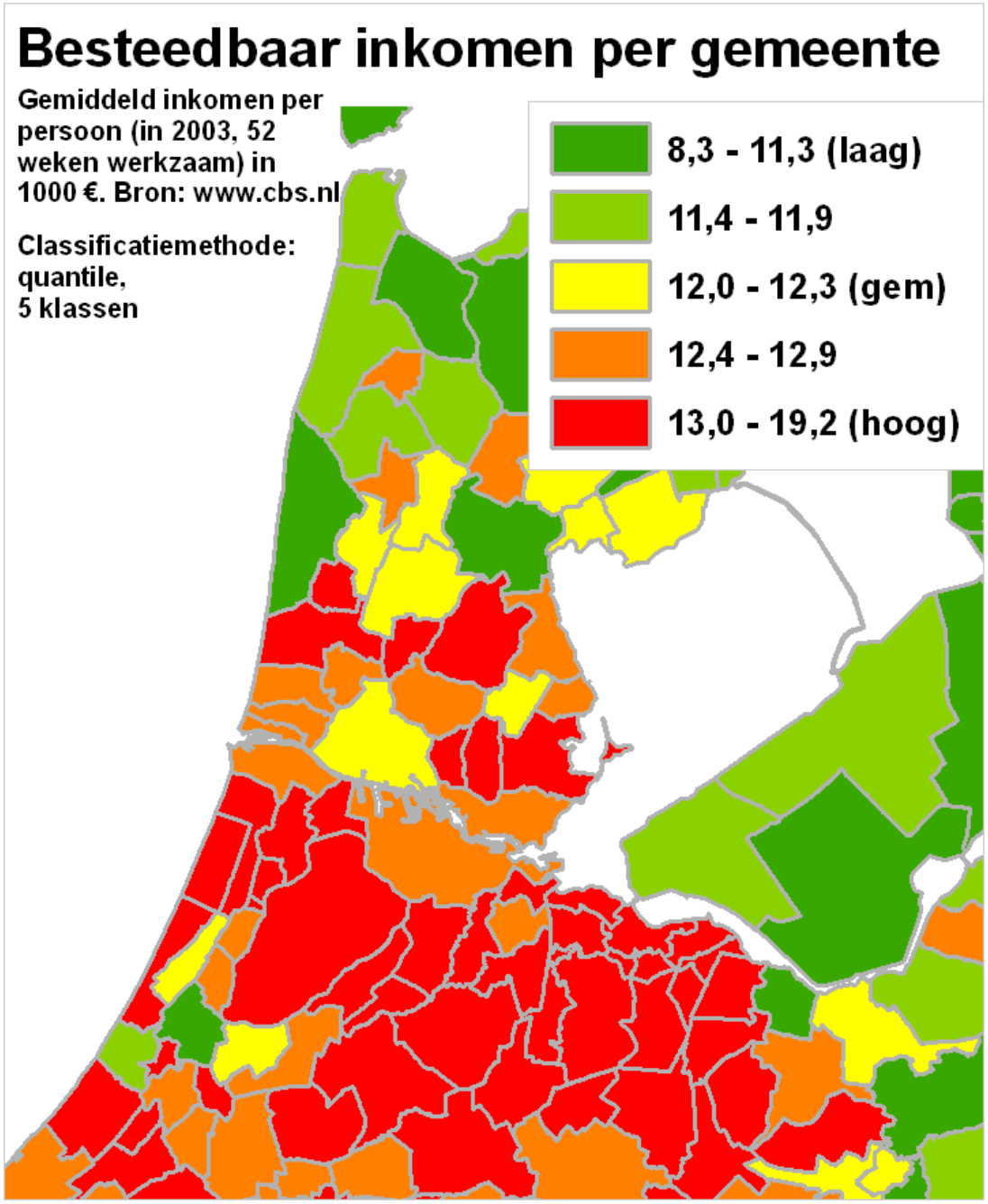
ArcGIS – categories v quantities menus





Qualitative (nominal/categorical) data

Categorical (nominal) classes



Colour ramp for quantitative data

(good example)

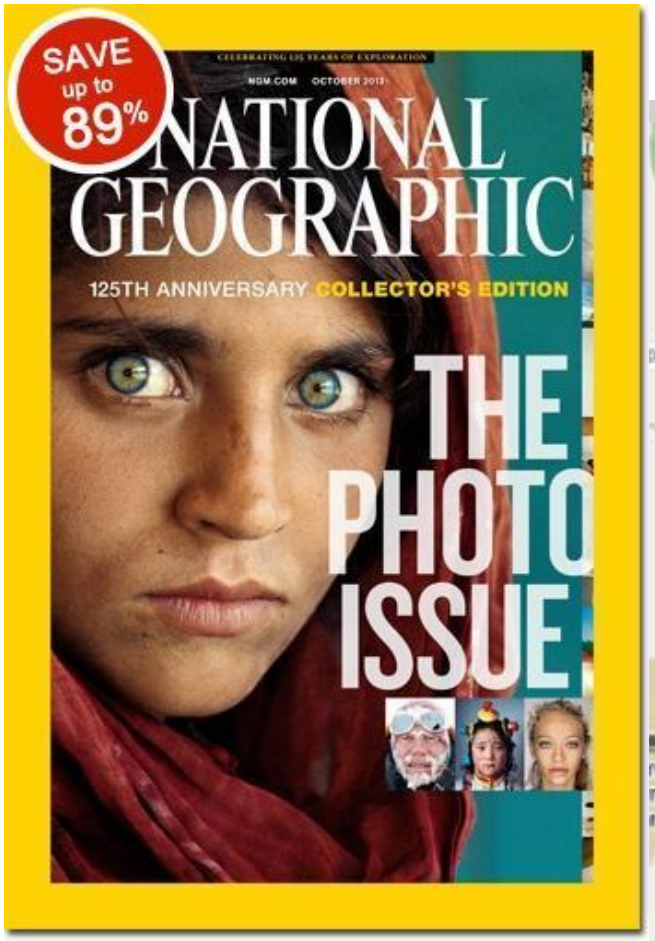
Red = highest values

•RED is reserved for importance due to its visual impact
- as it has the longest wavelength and 'advances' (blue retreats)

** Red – implies importance: / 'danger' (roads)

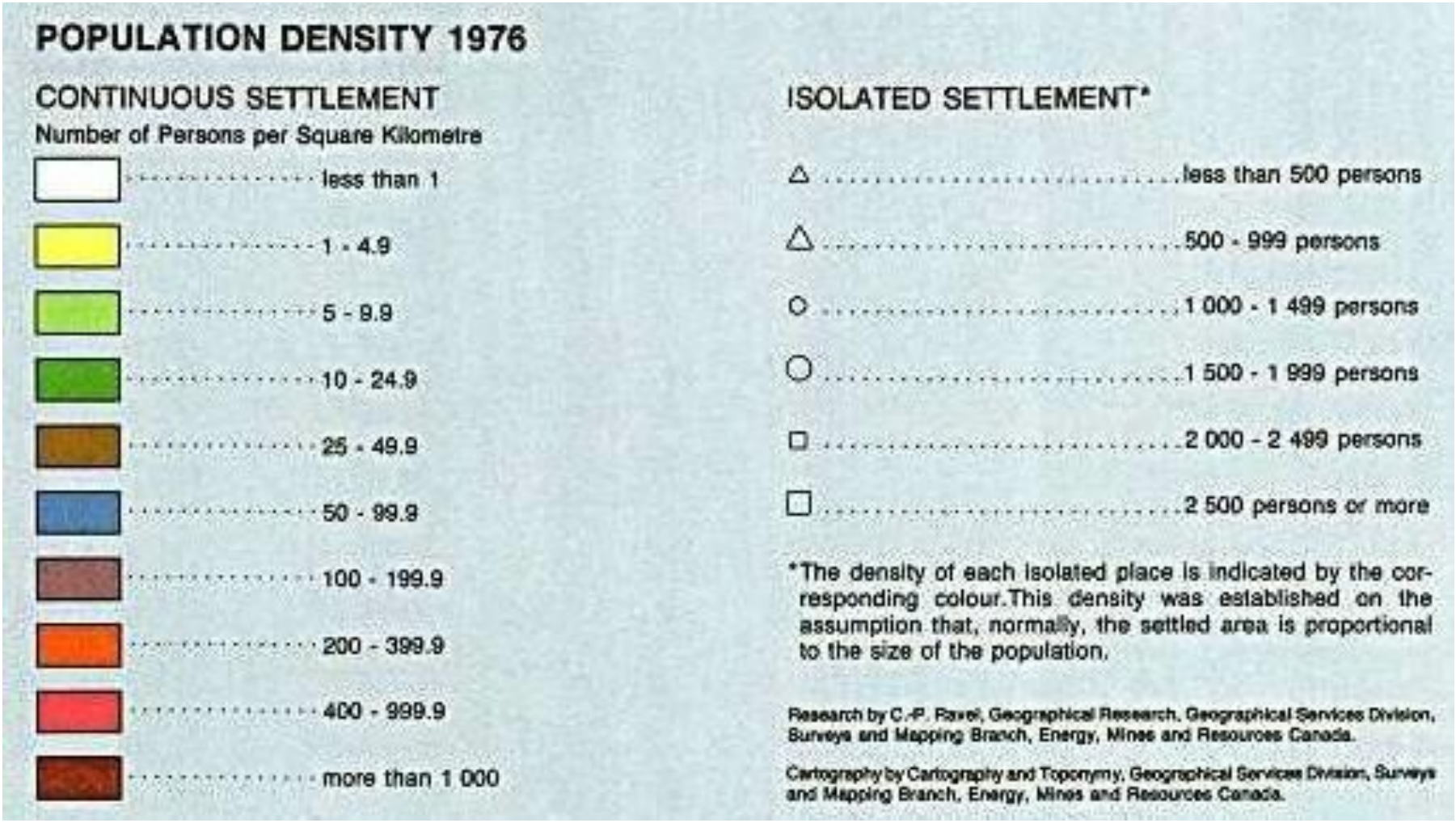
Universal STOP sign

Yellow is next to red in the colour spectrum



Poor use of colour ramp, size and shape

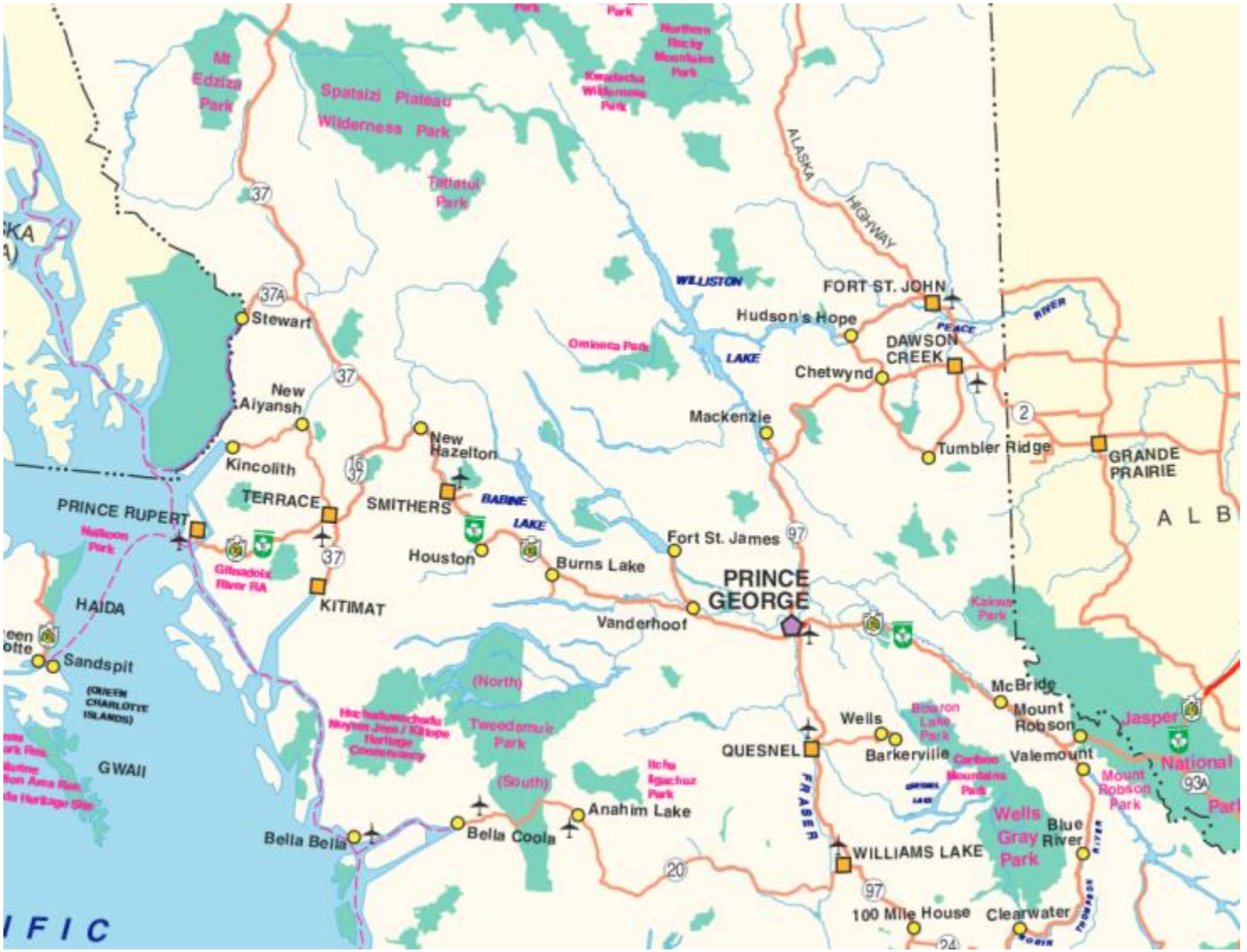
quantitative (interval) data but no clear sequence



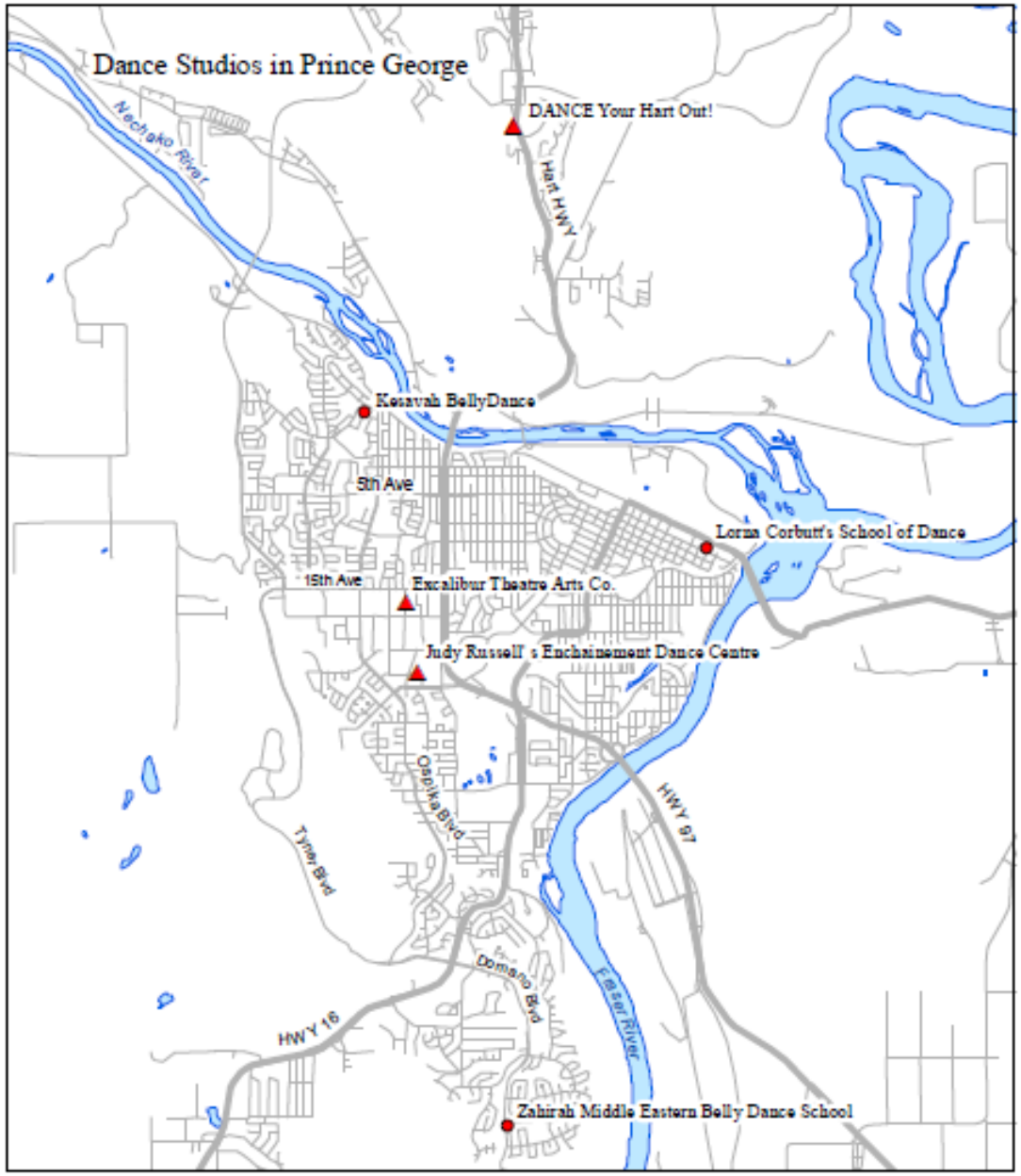
Atlas of Canada …. Shame !

3a. Other factors: map purpose

e.g. parks / road map – what features are more important …



3b. Other factors: cost and media



Colour costs v Monochrome:

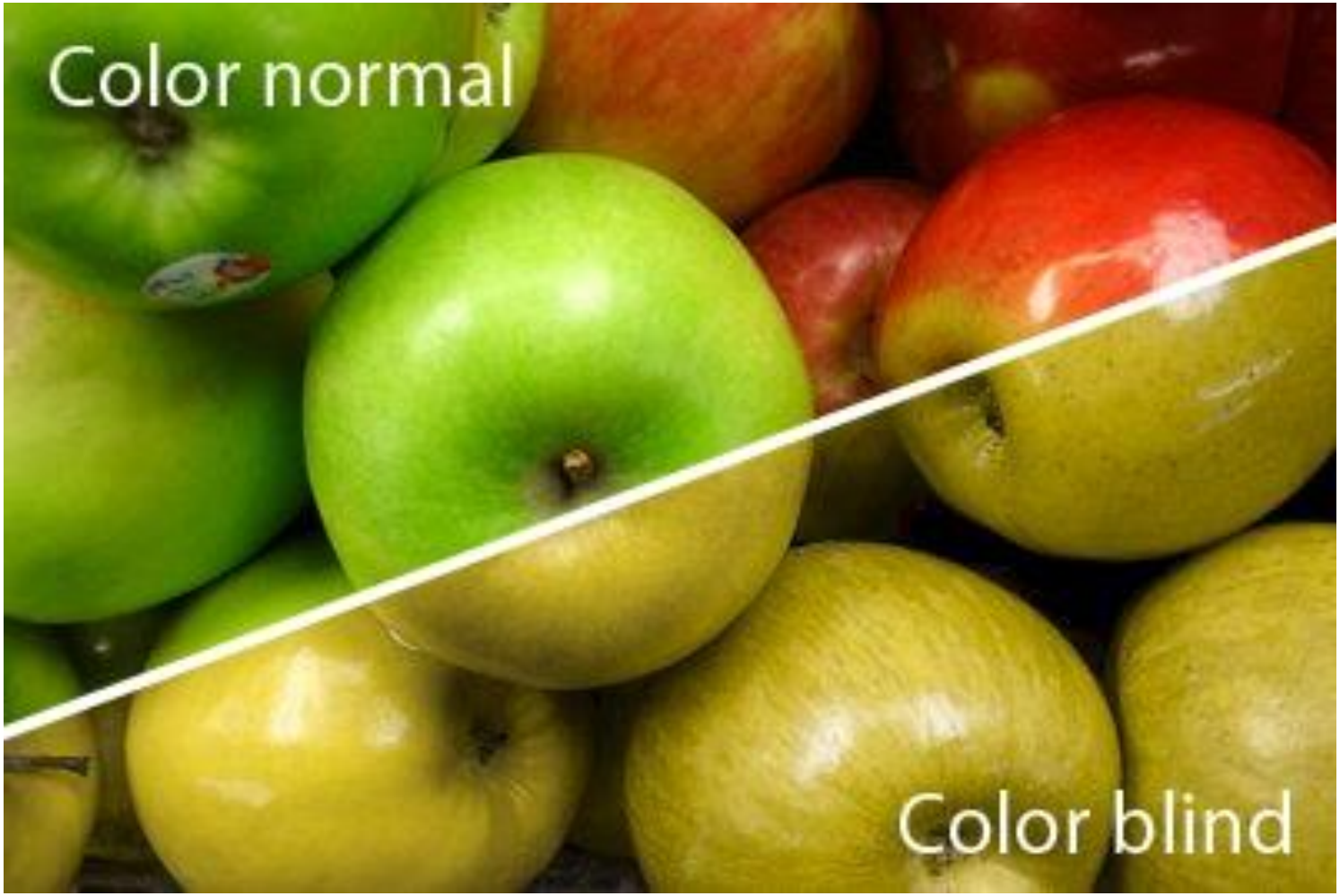
- In this case, colour could be avoided if not needed

- online — no cost
- monochrome — 1x
- colour photocopy — 10x
- publication — 1000x

- Don't always use colour, <u>just</u> because you can …
but in 2025, you often can …

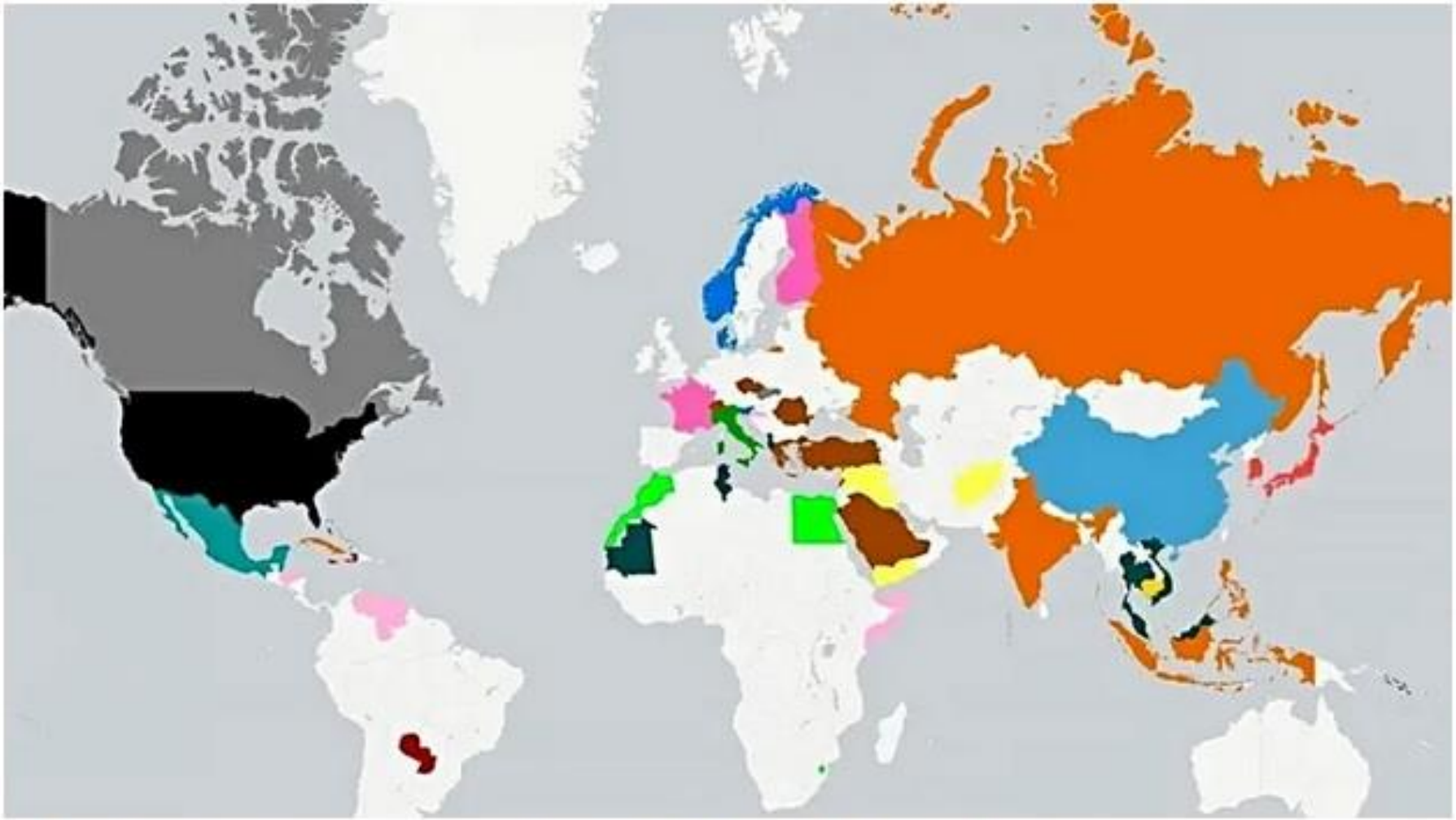
3c. More on colour ….

- colour blindness ~5% men and 1% of women



https://www.washingtonpost.com/travel/2023/01/12/color-blindness-glasses-museums
https://pro.arcgis.com/en/pro-app/latest/get-started/color-vision-deficiency-simulator.htm

3d. Deliberate misuse of colour : Can you tell which is #1 from the colours ?



The Rudest Countries In The World: Ranked

Internet bait: the goal is to lure you in, not to give you the picture at a glance

Summary on symbol design

Symbols – design variables:

Qualitative	*Quantitative*
shape, pattern,	size, tone
colour - hue (except red)	colour – chroma / value

Symbols – use of design variables:

1. *Association*: form, size, colour, convention
2. Qualitative or quantitative data
3. Output purpose, cost and media

Much of this is common sense – design enables good communication