

Effective easy communication

Traffic Signs



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)

	Point	Line	Area
Shape			
Pattern			
Texture			
Orientation			
Size			
Tone			
<u>Colour:</u>			
Hue			
Chroma			
Value			

Weak variable

Very weak

Strongest variable

Visual Design Variables

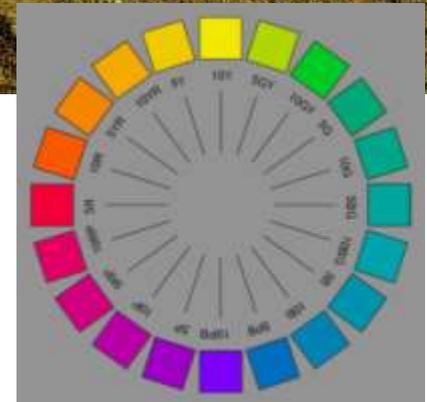
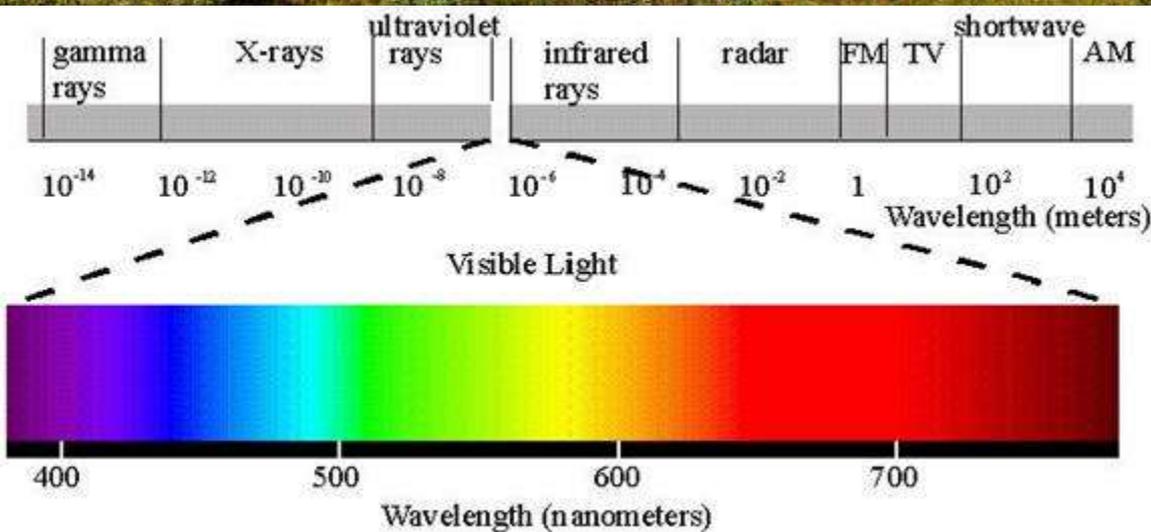
Colour: Has three 'dimensions'

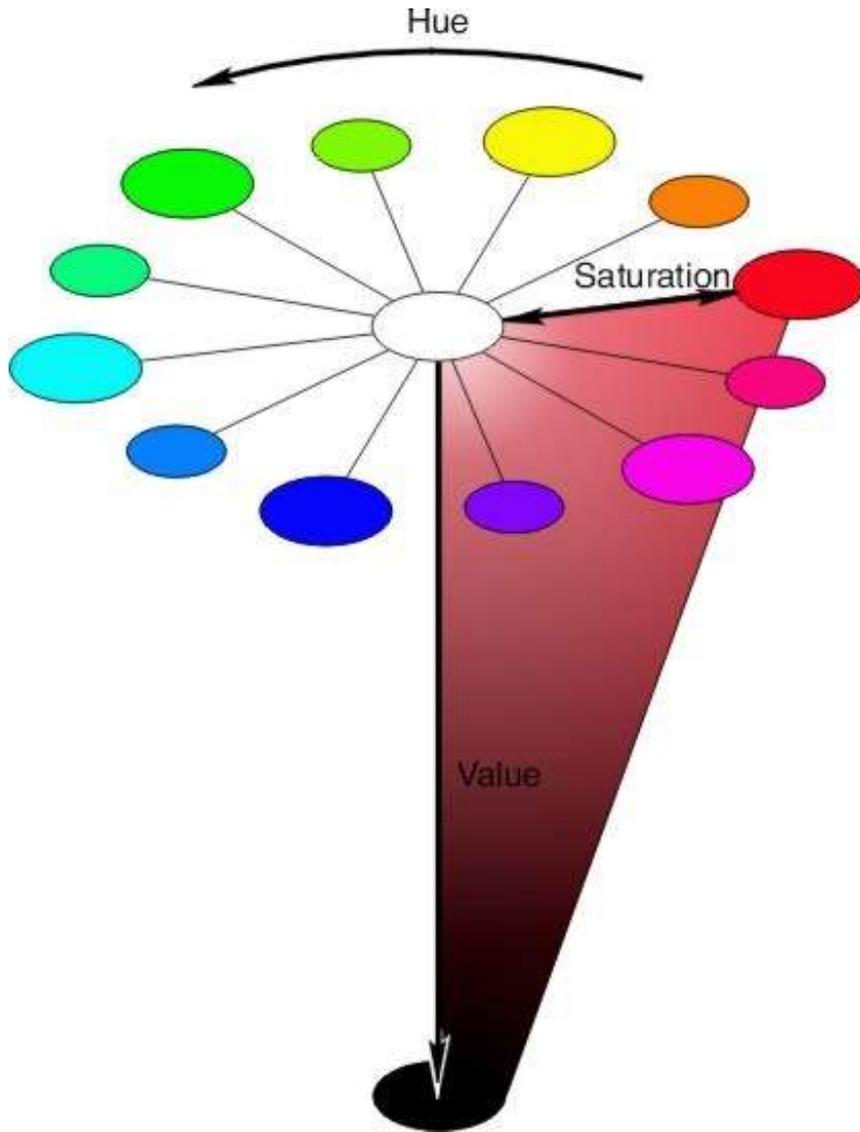
hue (wavelength): "the visual sensations from different wavelengths of light " e.g. red, blue

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

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

The 'electro-magnetic' colour spectrum the longest wavelengths of light (red) are the least refracted





hue - basic colour we see, eg 12 step wheel

value - relative lightness or darkness. Can be hard to perceive variations in value

Chroma - the quality of a color's purity, intensity or saturation.

<http://www.colorspire.com/rgb-color-wheel>

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



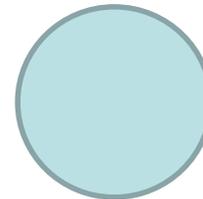
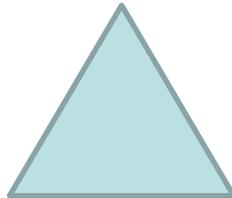
Shape: Iconic and abstract point symbols

choice may depend on map purpose and space available



www.shutterstock.com · 129186821

‘Iconic’ (pictorial)



‘Abstract’

Letters are not normally used except for:

H Hospital

P Parking

i Information (why the 'lower case' 'i' ?)

Association - Lines

The image displays a software interface for defining line styles, organized into a grid of options and a right-hand control panel.

Line Style	Label
	Highway
	Highway Ramp
	Expressway
	Expressway Ramp
	Major Road
	Arterial Street
	Collector Street
	Residential Street
	Railroad
	River
	Boundary, National
	Boundary, State

Options:

- Color:
- Width:

Buttons: Properties..., More Symbols ▾, Save..., Reset, OK, Cancel

Association - Lines

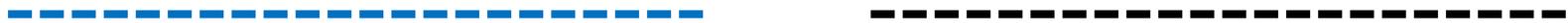
- 'permanent' physical features are shown as solid.

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) - output design

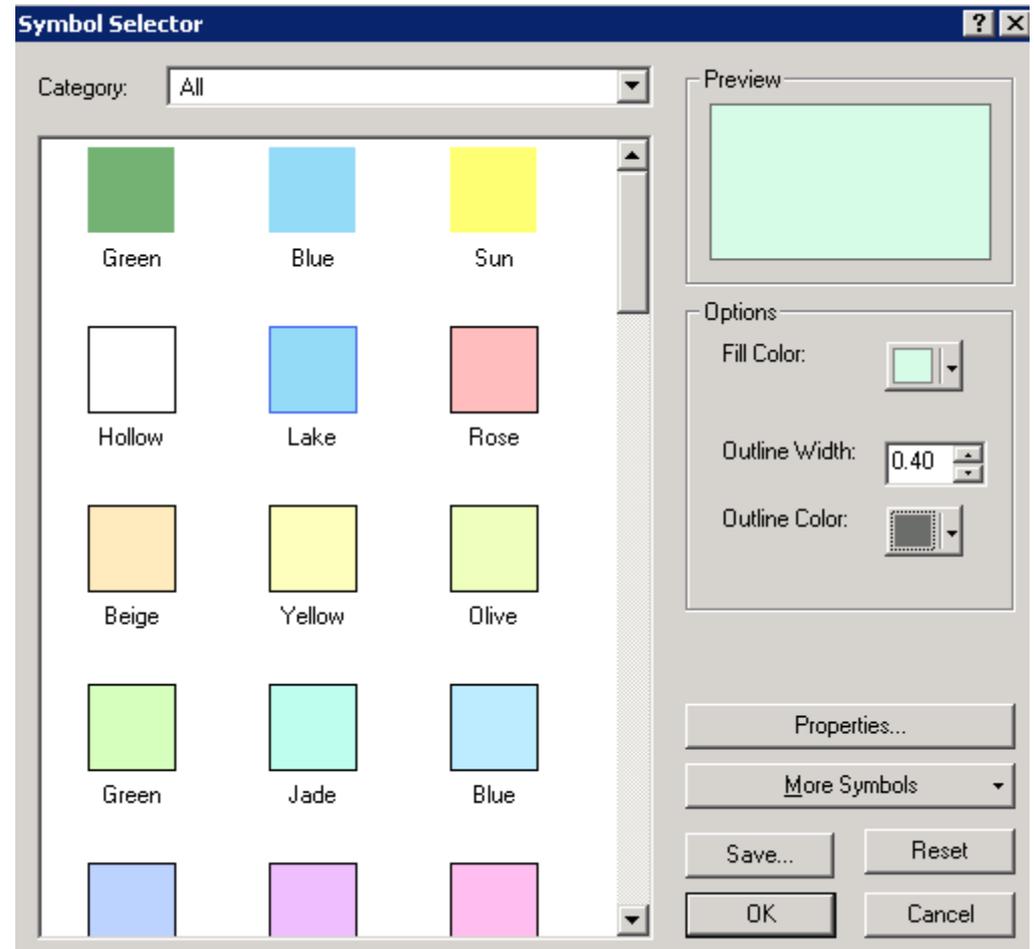
Fill - colour, pattern

Colours should be associative

Avoid really solid colours
(except for small areas)

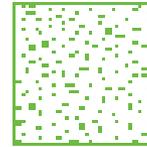
Outline ? - colour, width

- No polygon outline for
uncertain boundaries

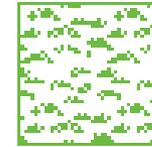


Areas - patterns (not so much)

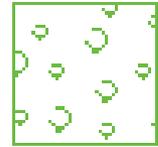
- Visual contrast



Scrub 1



Grassland

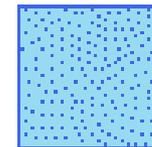


Scattered Trees 1

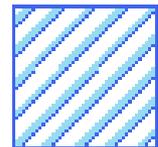
- Simple patterns if used



Sand



Water Intermittent

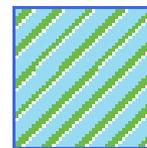


Reservoir

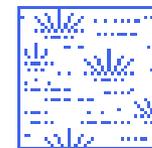


- Patterns may conflict with points

- for small polygons - use colours



Wetlands



Swamp



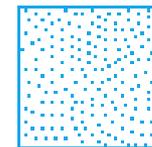
Mangrove

Avoid ugly tie stripes !

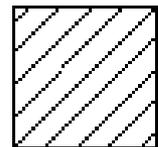
Don't buy into defaults



Glacier



Snowfield/Ice



10% Simple hatch

Polygons / areas

Use of fill v outline v both depends on:
meaning / significance of area edge

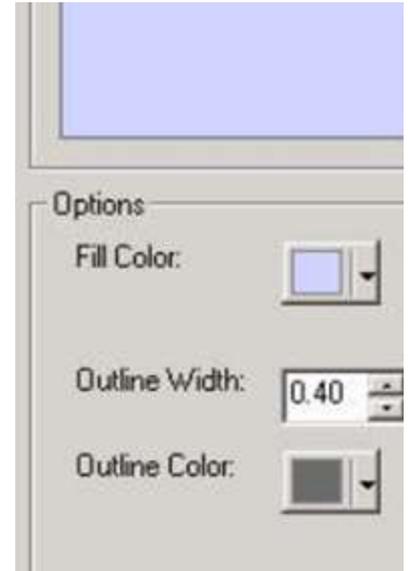
Rivers and lakes: outline (+ colour fill)

Park boundary: outline / no fill ?

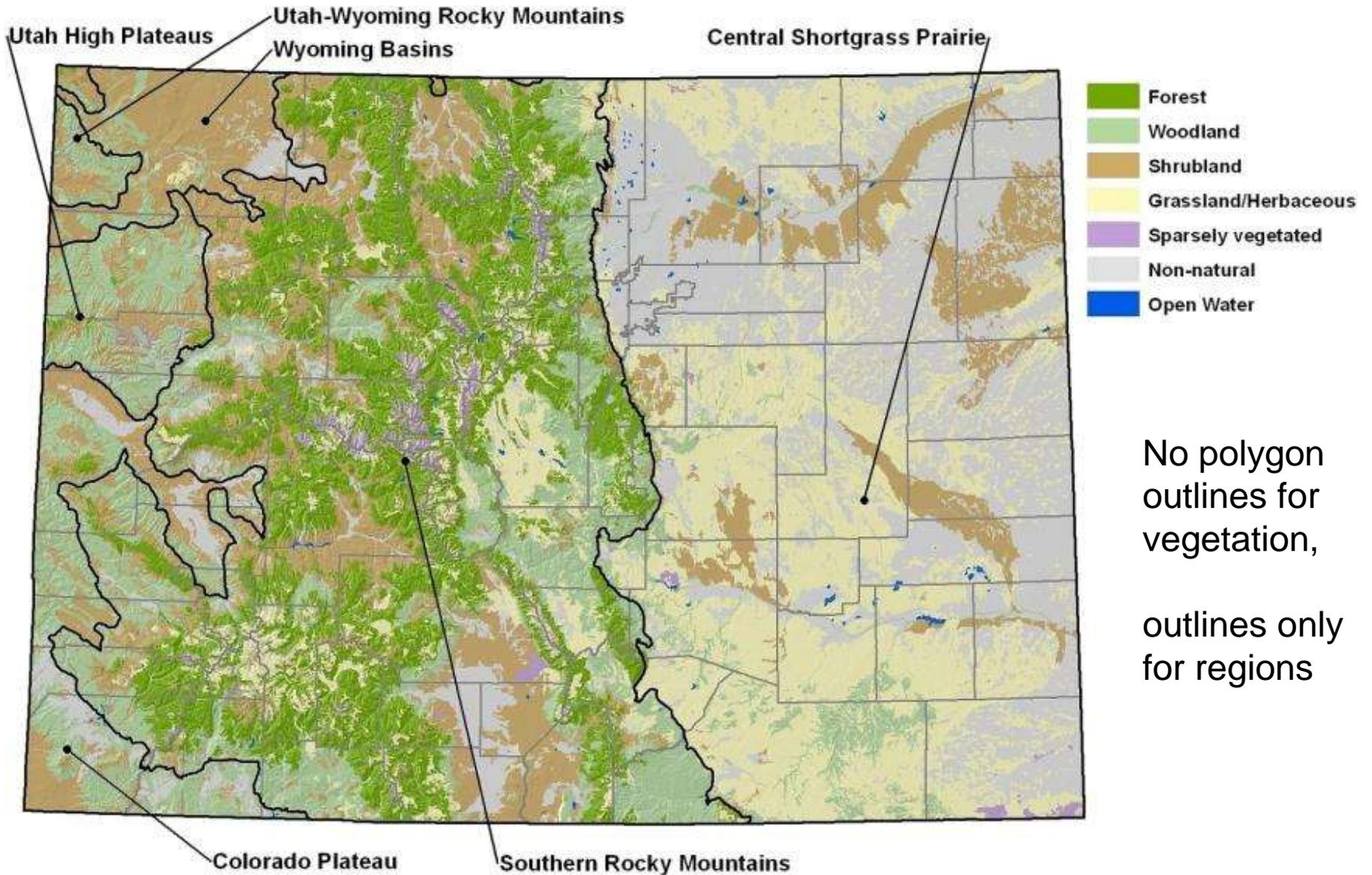
Forest /vegetation: fill only (no outline)

Size: small area - fill (+outline)

large area - outline only



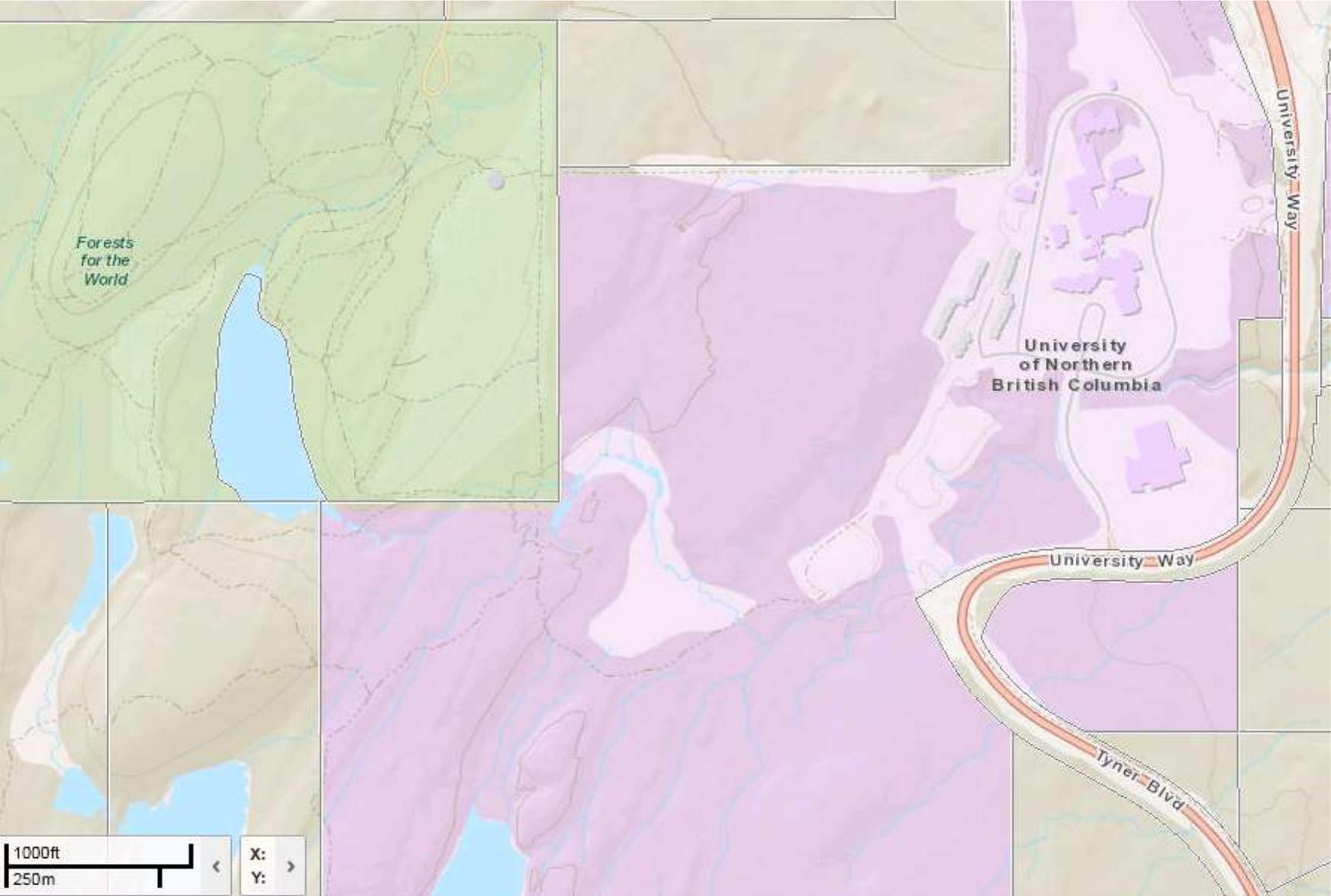
Example 1



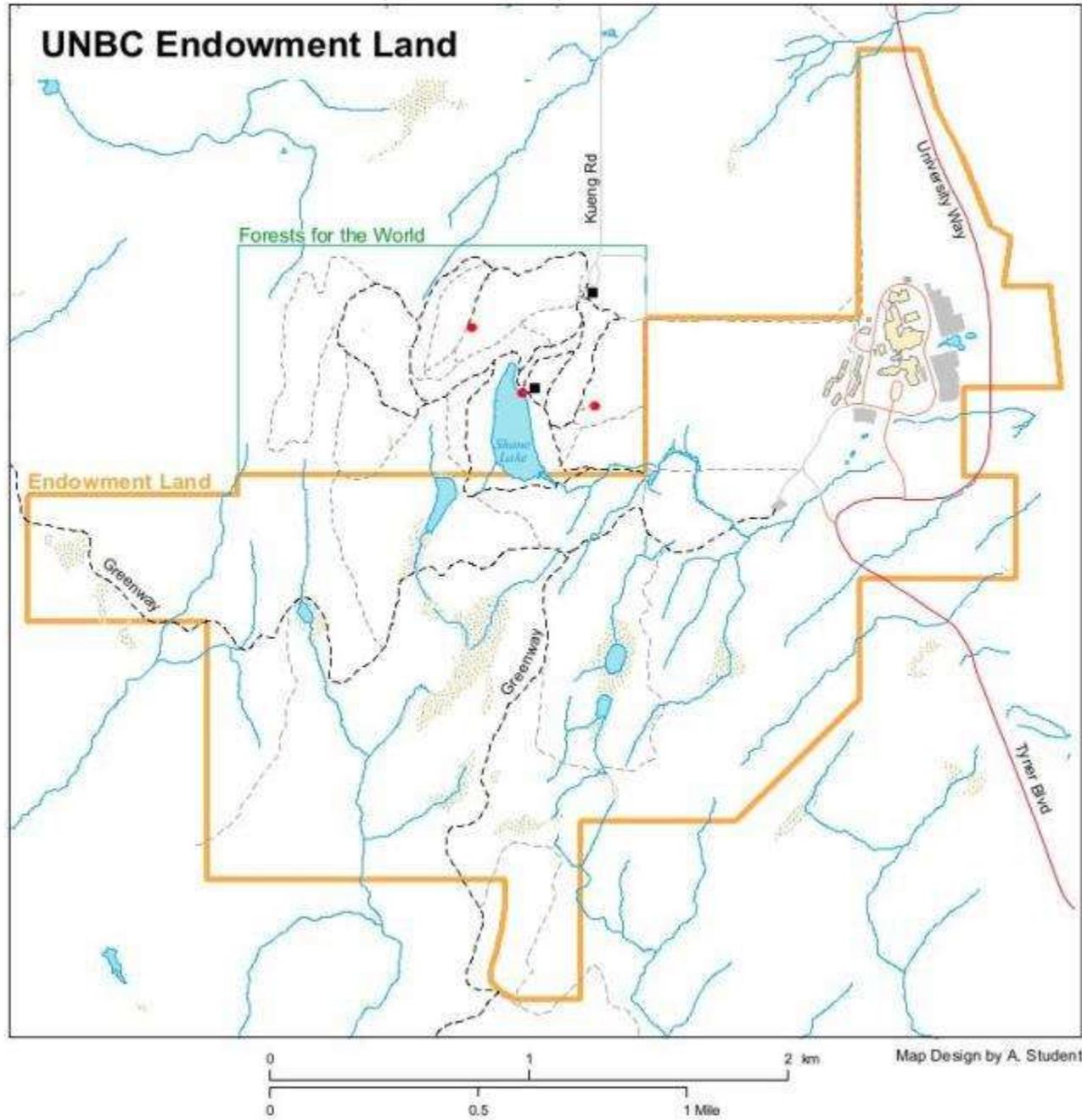
No polygon outlines for vegetation,

outlines only for regions

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



Example 3: Assignment 1- good line width contrast but streams still too thick



Legend

- Viewing Platform
- Picnic Shelter
- - - Pathway
- - - Trail
- Campus Road
- Gravel Road
- Paved Road
- ▭ Parking Lot
- ▭ Building
- Marsh



Magnetic Declination
at Map Centre
19° 47' East in 2007.

Locator Map



Colour associations: physical and psychological

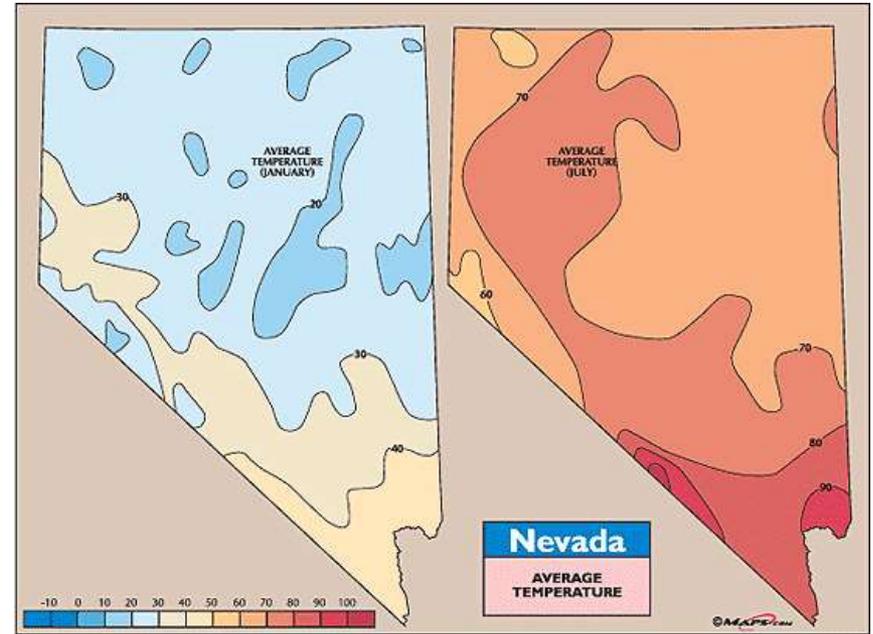
Yellow - sun, bright (cheery..) ;

Blue - water, calm, cool etc..

Red - heat, danger, blood ?

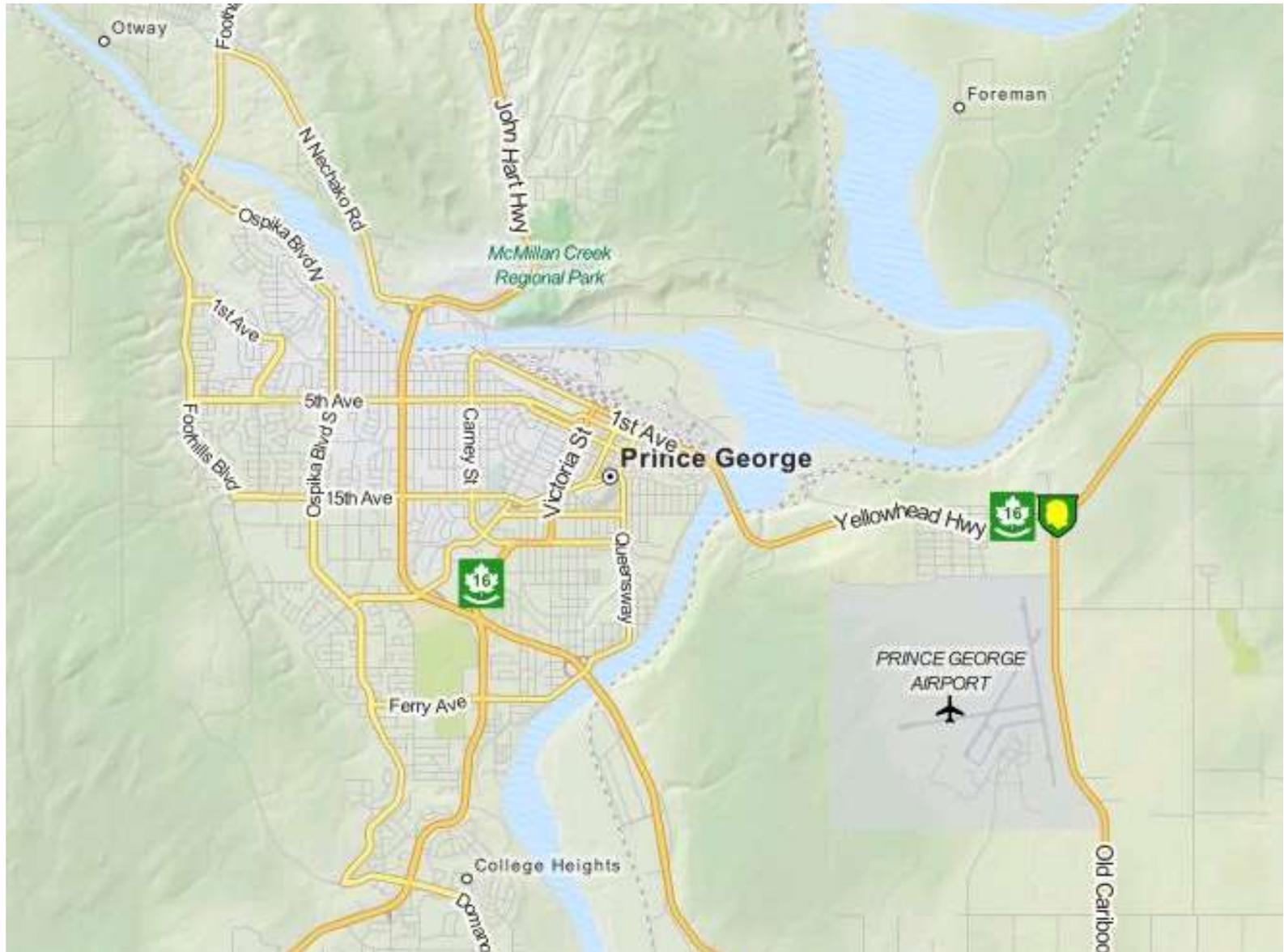
Green - vegetation, parks, recycling ?

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



Association - size

larger / more important features e.g. road width



Conventional symbols -
e.g. topographic mapping
based on association principles

Canada NTS conventions

Green - forest vegetation

Red - main roads

Orange - minor roads

Black - buildings

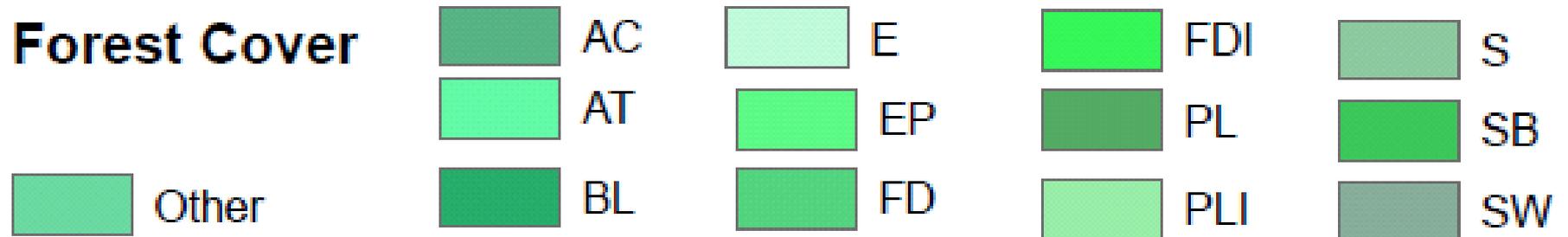
Urban - pink



Association taken too far - ensure good contrast

Example: Unsuccessful forest classification (primary species)

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



2. Qualitative versus quantitative - 'data association'

Qualitative: [nominal / categorical]

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

** see upcoming slides*

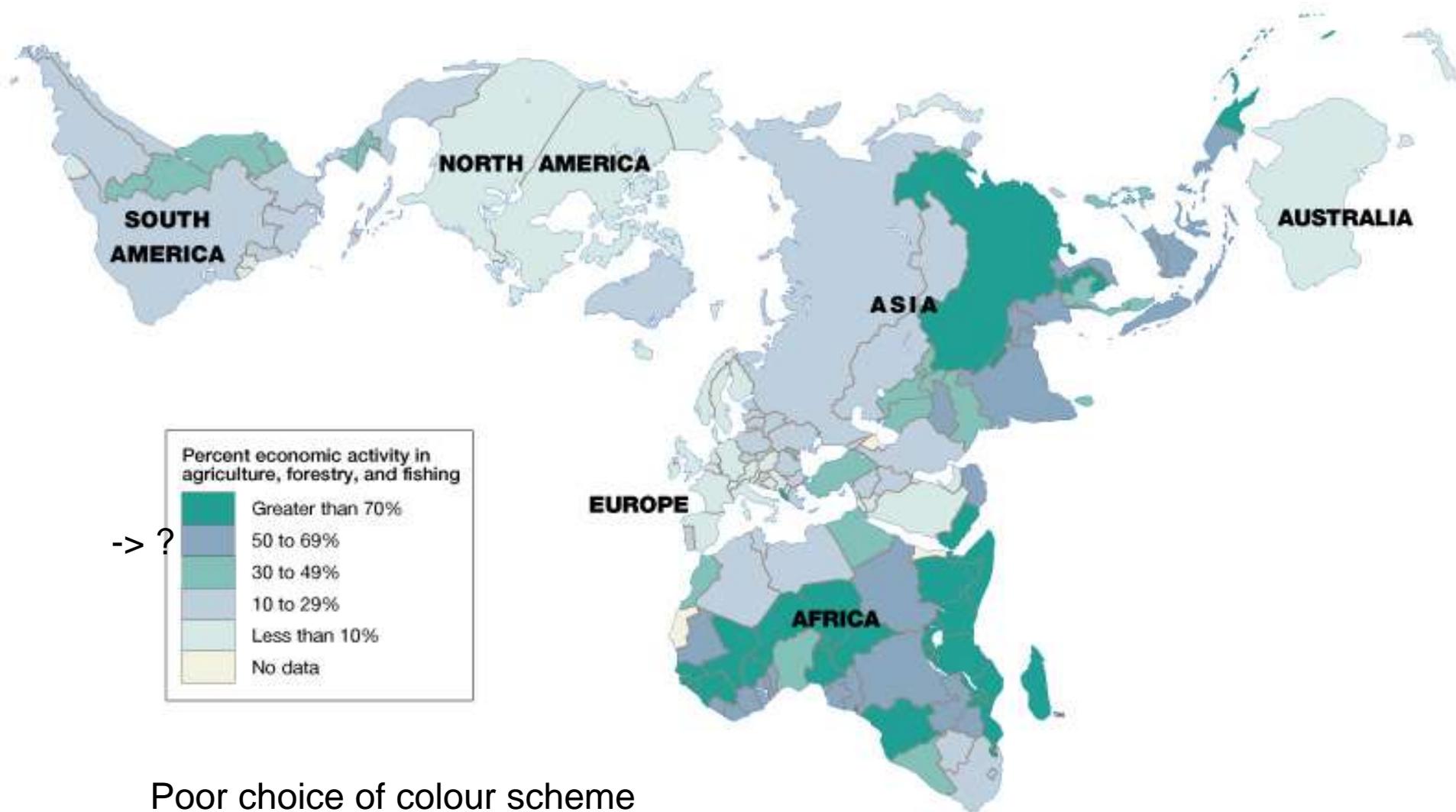
Quantitative: [interval / ordinal]

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

Qualitative (nominal/categorical) data



Quantitative (interval) data



Poor choice of colour scheme

ArcGIS - categories v quantities menus

Layer Properties

XCallout Joins & Relates

General Source Selection Display Symbology

Show:

Features

Categories

- Unique values
- Unique values, many to one
- Match to symbols in a layer

Quantities

Charts

Multiple Attributes

Draw categories using unique values

Value Field: BRYOID_PCT

- CRUISE_NO
- CRUISE_CD
- INV_REGION
- COMPARTMNT
- COMP_LET
- FIZ_CD
- ATRIE_DATE
- PROJ_DATE
- SHRB_HT
- SHRB_CC
- SHRB_PATT
- HERB_TYPE
- HERB_COVER
- HERB_PCT
- BRYOID_PCT
- NVEG_COV_1
- NVEG_PCT_1
- NVEG_TYP_1



Layer Properties

XCallout Joins & Relates

General Source Selection Display Symbology

Show:

Features

Categories

Quantities

- Graduated colors
- Graduated symbols
- Proportional symbols
- Dot density

Charts

Multiple Attributes

Draw quantities using color to show values.

Fields:

Value: none

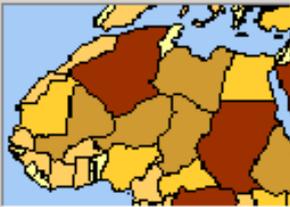
Normalization: none

Color Ramp:

Symbol Range

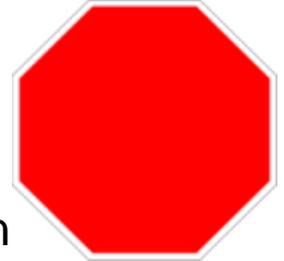
- FEATURE_ID
- POLY_ID
- FEAT_SKEY
- POLY_AREA
- REF_YR_ID
- CRUISE_NO
- INV_REGION
- COMPARTMNT
- SHRB_HT
- SHRB_CC
- HERB_PCT
- BRYOID_PCT
- NVEG_PCT_1
- NVEG_PCT_2
- NVEG_PCT_3
- COV_PCT_1
- COV_PCT_2

Show class names



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

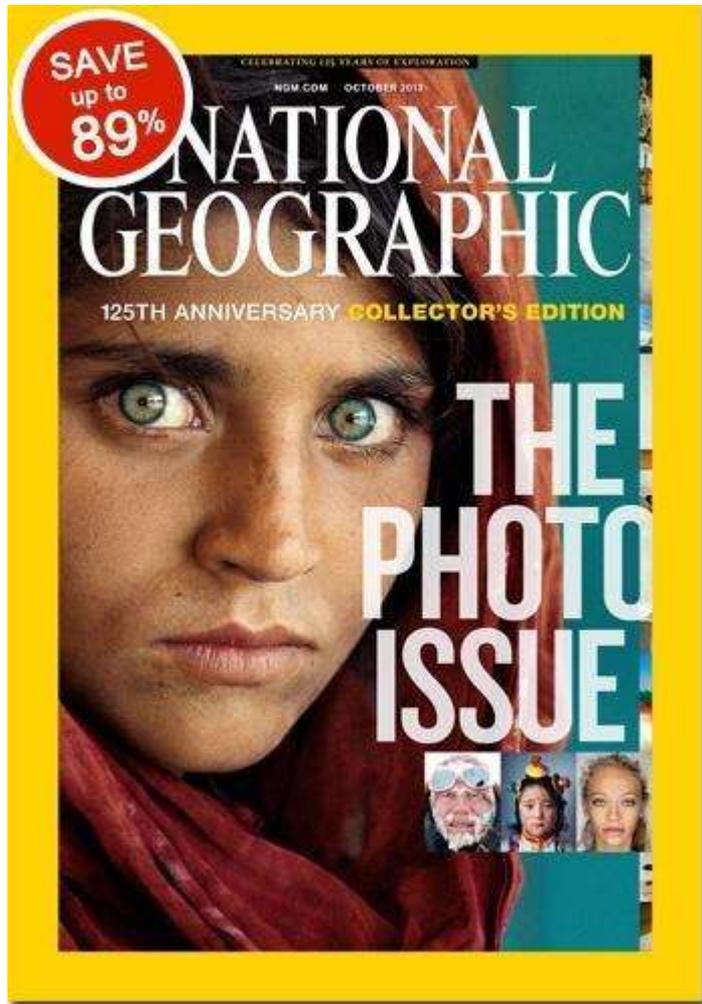
** Red - implies importance: / 'danger' (roads)



Universal STOP sign



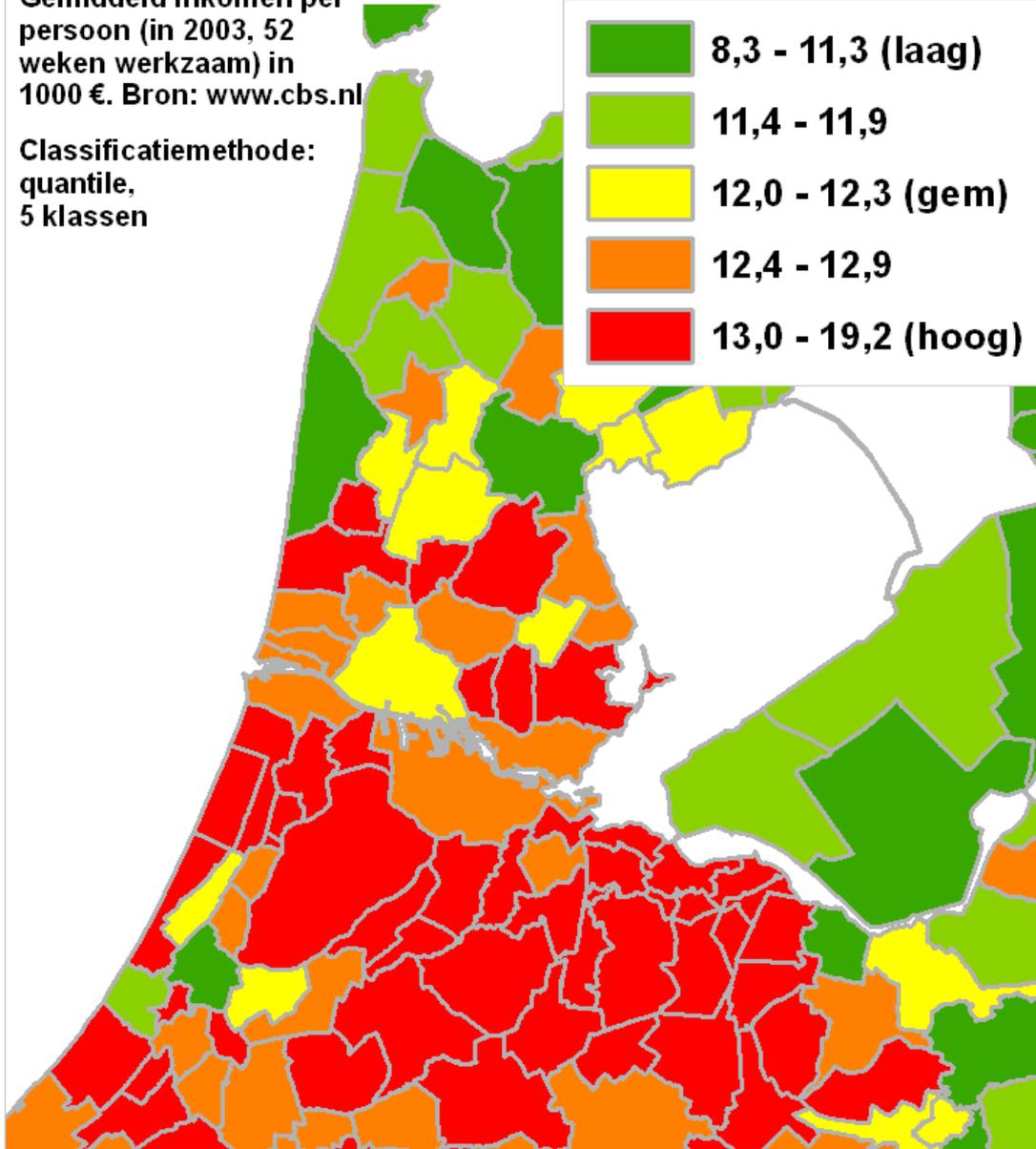
Yellow is next to red in the colour spectrum



Besteedbaar inkomen per gemeente

Gemiddeld inkomen per
persoon (in 2003, 52
weken werkzaam) in
1000 €. Bron: www.cbs.nl

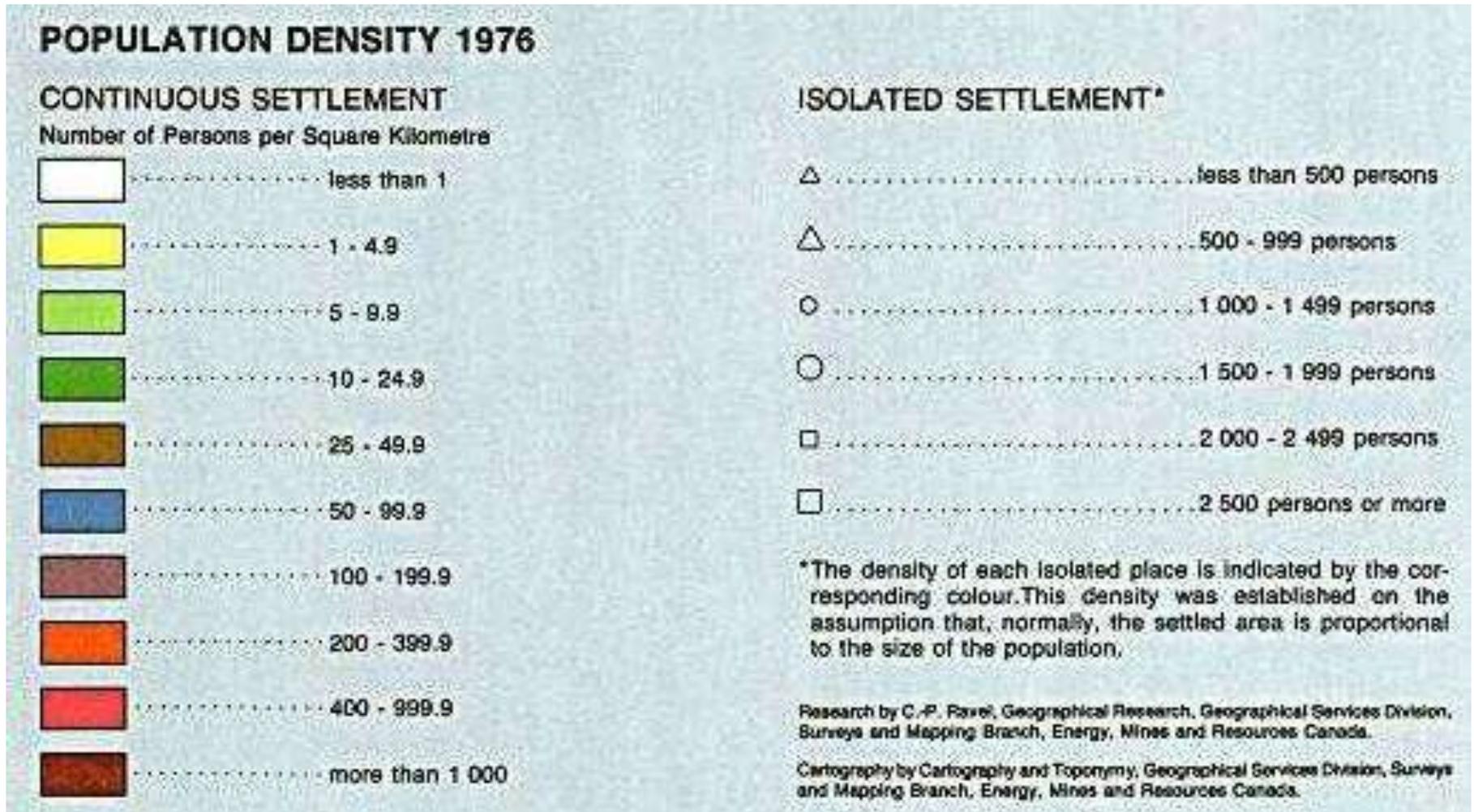
Classificatiemethode:
quantile,
5 klassen



Colour ramp for
quantitative data

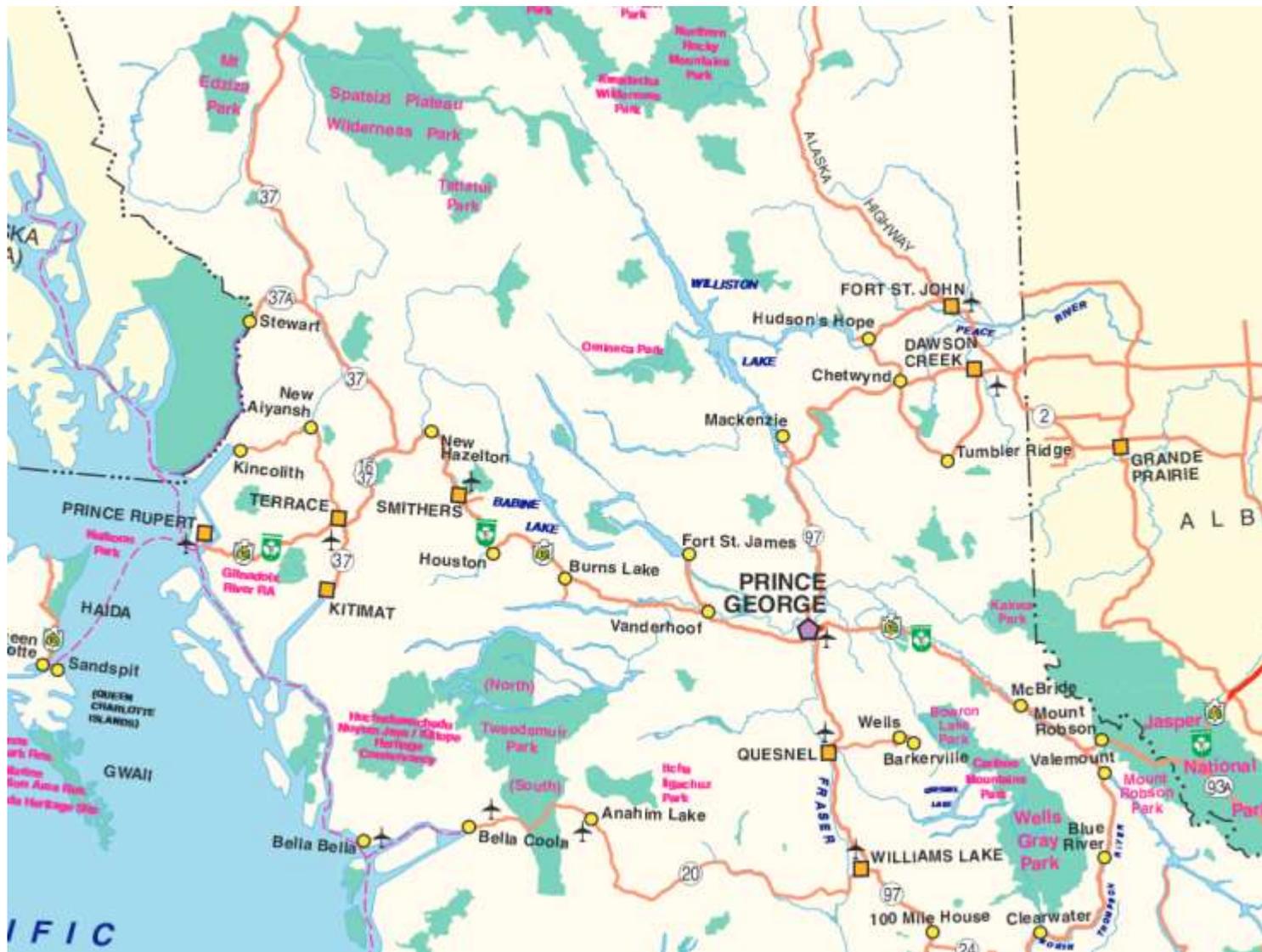
(good example)

Poor use of colours, size and shape



3a. Other factors: map purpose

e.g. parks / road map - what features are more important in each case ...



3b. Other factors: cost and media



Colour costs v Monochrome:

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

➤ online no cost

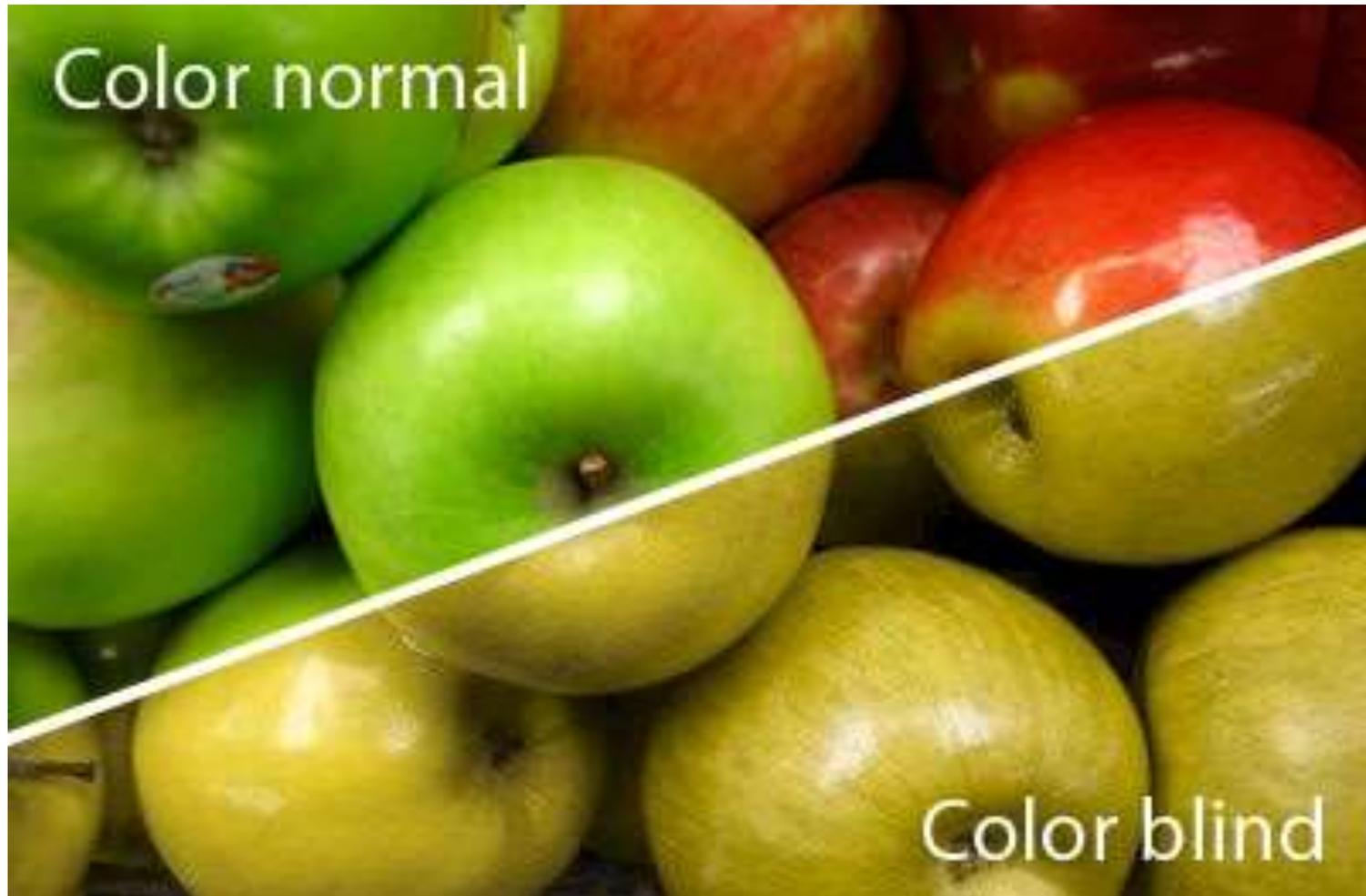
➤ photocopy 10x

➤ publication 1000x

➤ Don't always use colour, just because you can ...
but in 2021, you often can ...

More on colour

- colour blindness. 7% of men and 1% of women



Summary on symbol design

Symbols - design variables:

Qualitative

shape, pattern,

colour - hue (except red)

Quantitative

size, tone

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 communication