Geography 360
Principles of Cartography

May 1, 2006

Map elements

Reading: Slocum 11.2

Map elements

- What are common map elements?
- Rank intellectual level of map elements
- Principles of map layout

Map elements
- Frame line & Neat line -

- See Figure 11.2 B
  - Frame line encloses all map elements
  - Neat line crops the mapped area
- What is the role of frame/neat line?
  - Organize the map's contents, and define its extent
  - Focus the map users' attention on everything within it
- Avoid thick or ornate line - why? (see Figure 11.2 D)
  - because it would detract attention from more important map elements

Map elements
- Mapped area -

- See Figure 11.3
  - The region of Earth being represented
- Consist of thematic symbol and base information
  - Good base information provide a geographic frame of reference (Figure 11.3)
- Floating (Figure 11.3) vs. cropped (Figure 11.7)
  - Advantage and disadvantage of each?
    - Floating: create more space, but remove from geographic context
    - Cropped: placed in context, but lack of empty space
- Size: should be large enough (importance)
- Position: should be visually centered (balance)

Map elements

- Inset -

- A smaller map included within the context of a larger map
- When do you use inset?
  - To accommodate areas in multiple scales
    - Zoom out: Figure 11.5 A (to help orient the map user)
    - Zoom in: Figure 11.5 B (to focus attention)
  - To show related information
    - Figure 11.5 C (to communicate info. in parallel)
  - To show geographically isolated areas
    - Figure 11.14 (e.g. Alaska)

Map elements
- Title and Subtitle -

- See Figure 11.3 and 11.7 for typical example
- Content
  - make it succinct, use subtitle if necessary (to complement info.)
- Style
  - Should be large and plain (importance)
- Placement
  - Top of the map; horizontally centered
  - Upper left corner of the map
  - See Figure 11.8 above the legend

Map elements
- Legend -

- Map element that defines all of the thematic symbols on a map
- What should be included in legend heading?
  - Legend heading includes the unit of measurement and the enumeration unit
- How would you indicate “no data” in the legend symbol?
  - Use neutral color or a subtle pattern; not to be confused with present data
- How would you group legend symbol? (Figure 11.11)
  - Legend symbol can be grouped by (1) natural/cultural feature (2) geometric form of the symbols (3) theme vs. base information
- Where to place legend?
  - It depends on available space

Map element

- Scale -

- Three ways of expressing scale in maps
  - Representative fraction: e.g. 1:24,000
  - Verbal scale: one inch to the mile
  - Bar scale: resembles a ruler that shows distance measurement in maps
- Among three ways of expressing scale in maps, what is preferred method given that the map can be enlarged or reduced?
- Should I include scale bar or not?
  - Compare Figure 11.12 and Figure 11.14
  - Should be included if it is needed and useful
- With a scale bar, can you make a correct measurement at all locations in a small-scale map?
  - Relationship between map projection and scale change
- Where to place scale bar?
  - Below the mapped are (as expected)

Map element
- Orientation -

- When must I include the indicator of orientation (north arrow or graticule)? See Figure 11.16
  - When the map is not oriented with geographic north (see Figure 11.16 A)
  - When the determination of direction is crucial (e.g. navigation, surveying, orienteering)

- Does north arrow always tell you the correct direction at all locations in the map?
  - Not always (see Figure 11.16 B) e.g. Stereographic map

Rank intellectual level of map elements

1. Thematic symbols
2. Title, legend, labeling
3. Base map – land areas
4. Explanatory materials: source, credit
5. Base map – water features
6. Other base map elements – frame line, neat line, scale, graticule, orientation

All else being equal

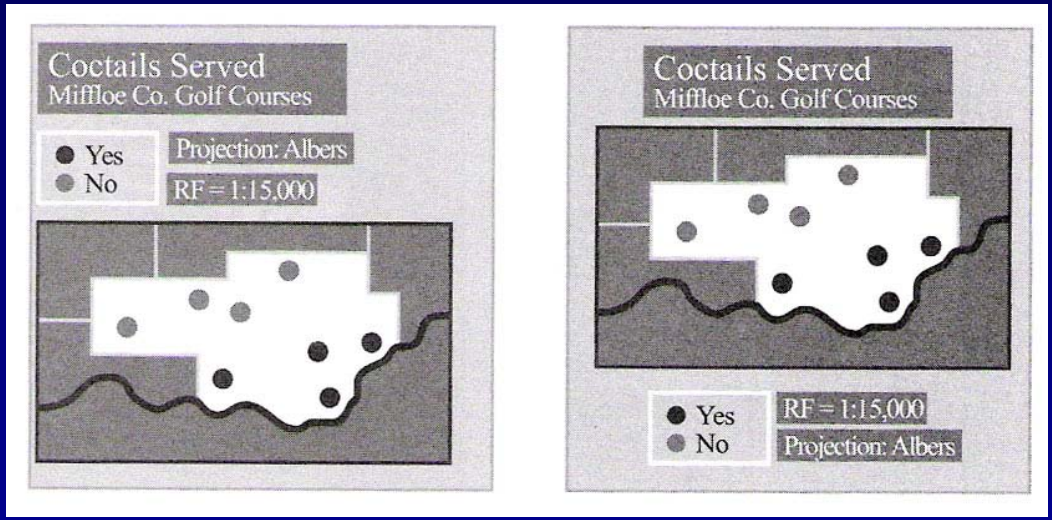
From Dent 1999

Principles of map layout

- Visual hierarchy
  - Map elements with higher intellectual hierarchy should be seen more dominant
    - e.g. Small title and large credit?
- Balance
  - Map elements should be aligned so that map layout has little empty available space
- Focus of attention
  - Map elements should be aligned so that important elements are put into focus

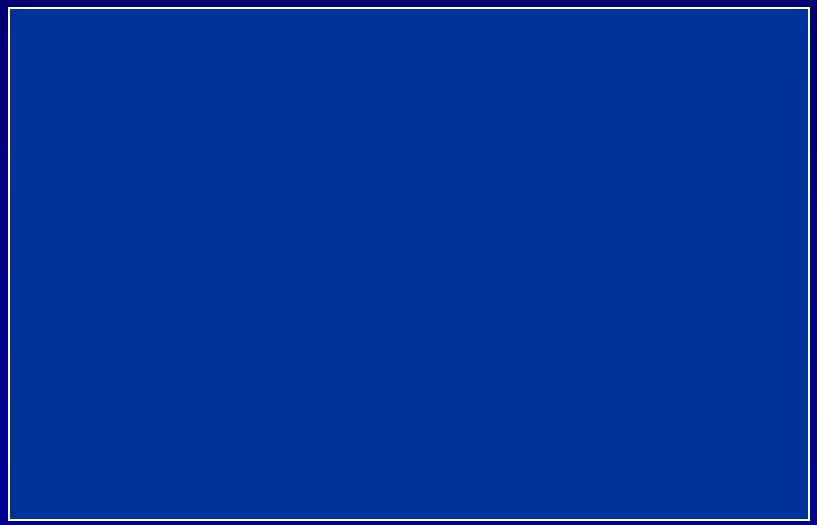
Balance

- Which is better?



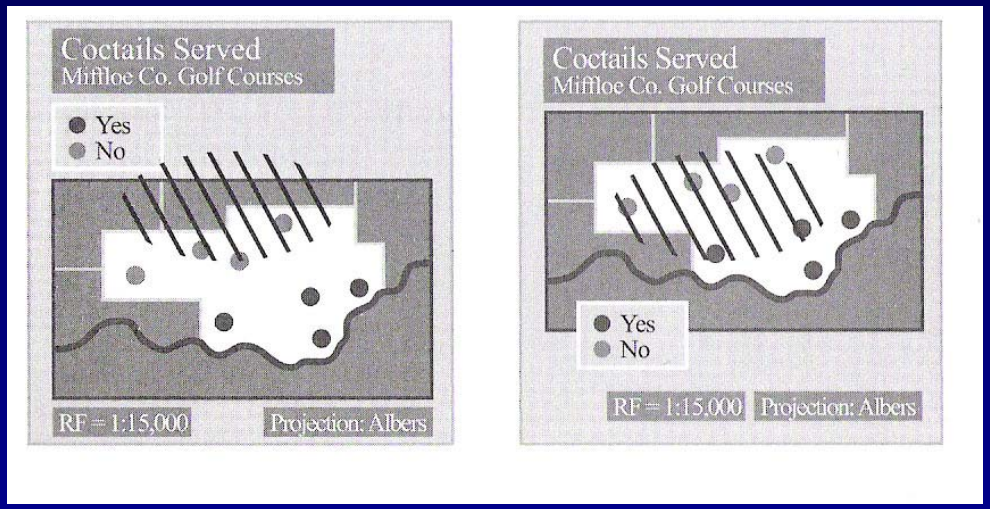
- Too much empty available space makes map less balanced

- Where is the optical center in the image space below?



Focus of attention

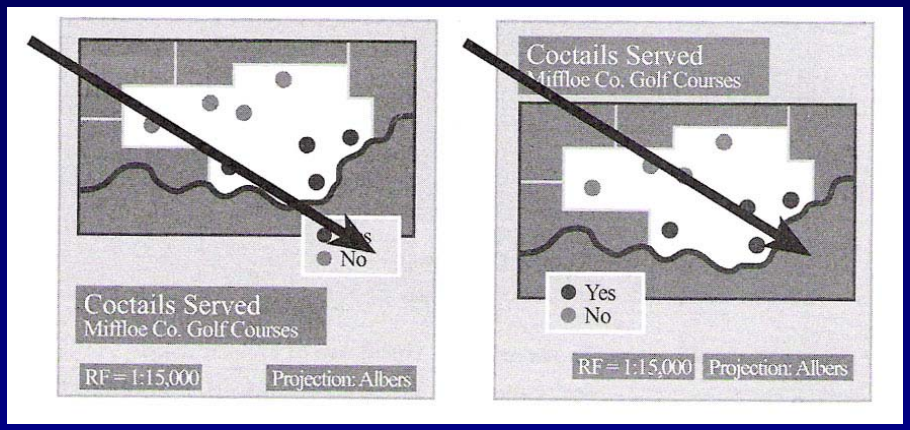
- Which is better?



- The optical center of a map layout is slightly above the actual center. Position map elements so that the most important are near the optical center of the map

Eye movement

- Which is better?



- Reading a map is like reading a page in a book: you start in the upper left and end in the lower right. Position map elements so that those that should be seen first are in the upper left part of the map

Steps to cartographic design

- Selecting themes and base information
  - Purpose, intended audience
- Choosing map type
  - Consider the nature of geographic phenomenon and data (see Dent table 12.1), and match it to mapping technique whenever possible
- Choosing map symbol
  - Match visual variable type to the level of measurement
- Organizing map elements
  - Goal is to achieve visual hierarchy in hierarchical visual organization: visual contrast, detail, surroundness, proximity,…
  - Goal is to achieve balance in planar visual organization: visually center objects in available space