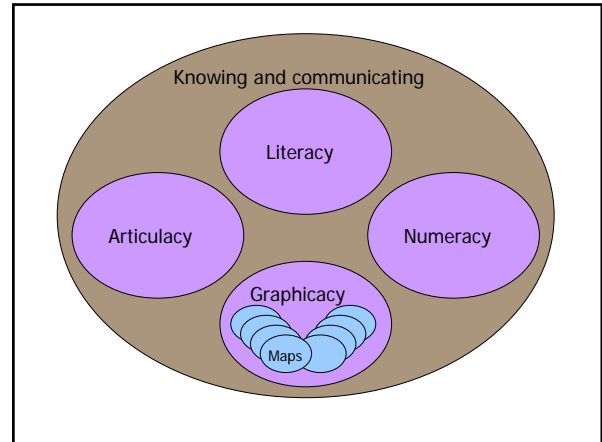


## GEOG 462: Cartographic Design

### Communicating Geographic Information

"Geographers think in and through maps, and changes in mapping capabilities will affect the way we think about the world."

Ron Abler (1987), *Annals of the Association of American Geographers*



### Basic characteristics of maps

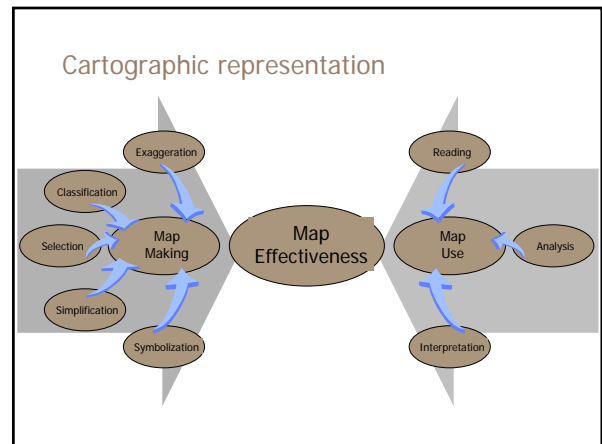
- all maps are concerned with two primary elements
  - locations and attributes
- all maps are reductions of reality
  - scale
- all maps are transformations of space
  - map projections and coordinate systems
- all maps are abstractions of reality
  - generalization and its components
- all maps use signs and symbolism
  - cartographic symbolization

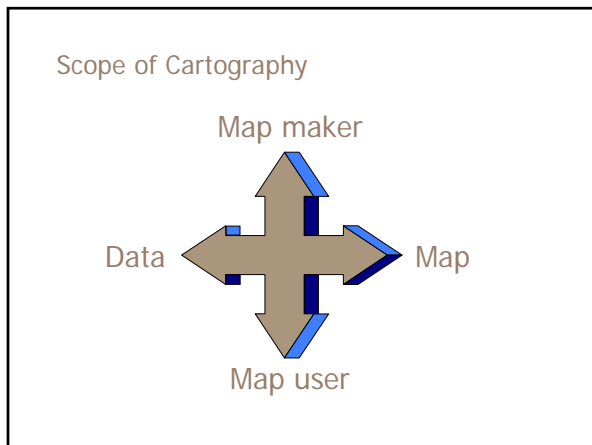
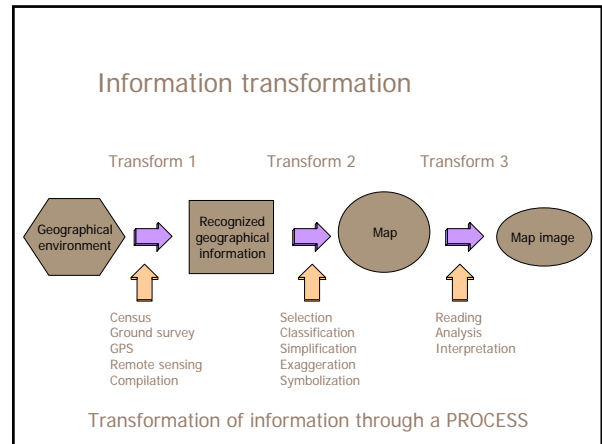
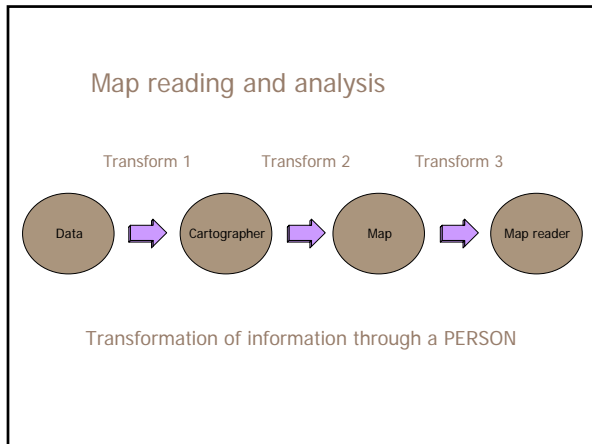
### Map purposes

- the look of a map depends largely on its intended use and intended audience
- examples
  - store geographic information
  - aid navigation or mobility
  - aid analysis, such as measuring or computing
  - summarize large amounts of statistical data for forecasting or detecting trends
  - visualize what was otherwise invisible

### Principle task of cartography

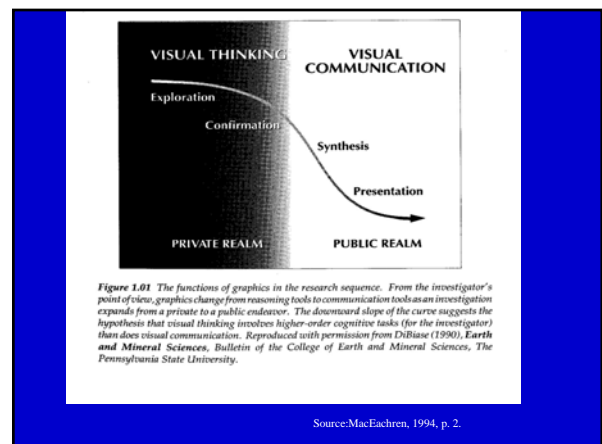
- communicate geographical information graphically
  - basic focus of graphic artist -- beauty
  - basic focus of surveyor -- accuracy
  - basic focus of cartographer -- communicate the information beautifully and accurately





- ### Qualities of a good map maker
- intellectual honesty
  - meticulous nature
  - patience
  - sense of proportion
  - cleanliness
  - comparatively inartistic
  - ability to correct errors

- ### The Roles of Maps – Alan McEachren “Some Truth with Maps”
- 1. Exploration
  - 2. Confirmation
  - 3. Synthesis
  - 4. Presentation
  - 5. OTHERS??



## 1. Exploration

- Visual Thinking
- Manipulation
  - Brain Storming
  - Induction
- Informal
  - Free from rules and protocol
  - Trial and Error
  - Ad Hoc, Pro Temp
- Individual or Sharing ideas with others

4 The Roles of Maps

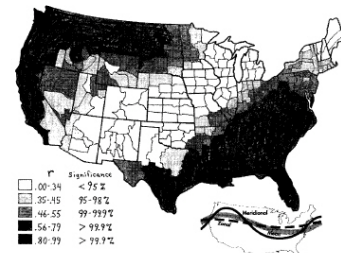


Figure 1.02 Correlation between the Pacific North American teleconnection index and mean winter U.S. temperature. This choropleth map (the original was hand drawn using colored pencils) represents values for each of the 344 climatic divisions of the conterminous U.S. The inset illustrates the mean position of the tropospheric flow in comparison to meridional and zonal flows (represented by positive and negative PNA indices, respectively).

Source: MacEachren, 1994, p. 4.

## 2. Confirmation

- Investigation Process
  - Assumptions made
  - Questions Posed
  - Hypotheses Generated
- Confirm initial ideas
  - Outcome of modeling
  - Map overlay / comparison
  - Analysis of residuals
- Rebuttal

## 3. Synthesis

- Visual Communication
- Coherent statement of ideas, patterns, relationships
- Abstraction process
  - Signal from noise
  - Lose detail / gain perspective
  - What to suppress, what to emphasize, which relationships are significant

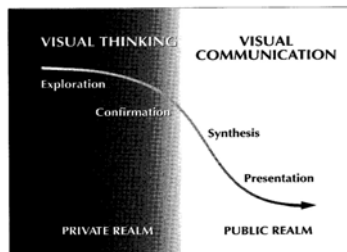
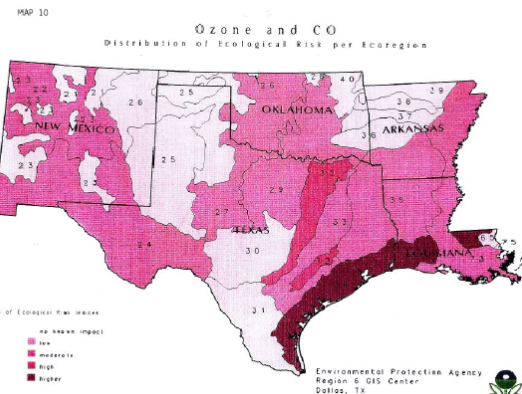


Figure 1.01 The functions of graphics in the research sequence. From the investigator's point of view, graphics change from reasoning tools to communication tools as an investigation expands from a private to a public endeavor. The downward slope of the curve suggests the hypothesis that visual thinking involves higher-order cognitive tasks (for the investigator) than does visual communication. Reproduced with permission from DiBiase (1990), *Earth and Mineral Sciences, Bulletin of the College of Earth and Mineral Sciences, The Pennsylvania State University*.

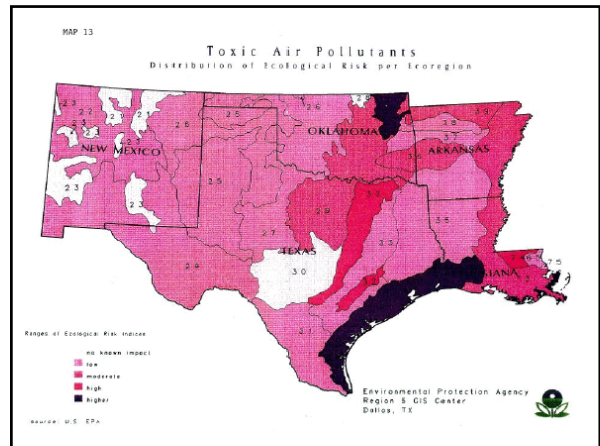
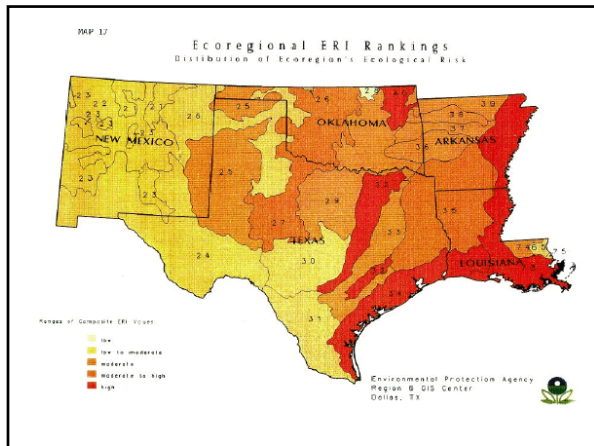
Source: MacEachren, 1994, p. 2.



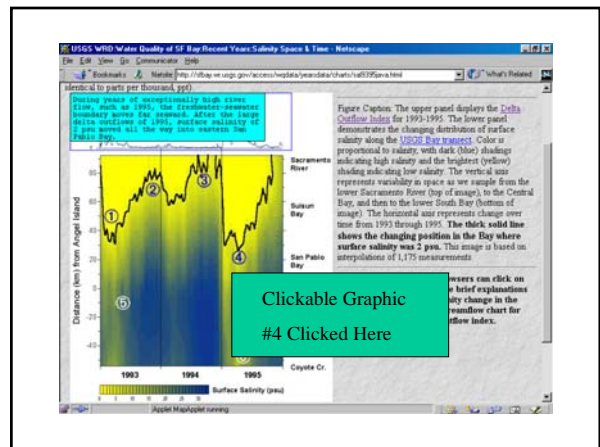
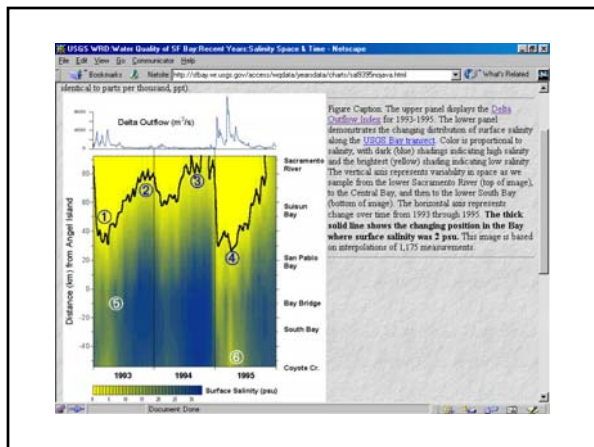
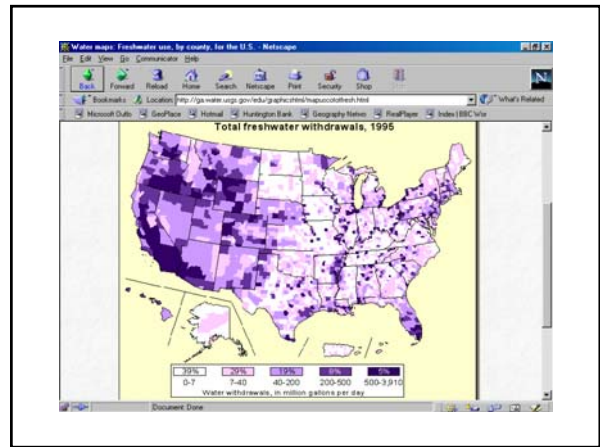
RANGES OF Ecological Risk INDEX  
 no known impact  
 low  
 moderate  
 high  
 higher

Environmental Protection Agency  
 Region 6 GIS Center  
 Dallas, TX

Source: U.S. EPA



- #### 4. Presentation
- Convincing others
  - Authenticity
    - "People believe maps"
    - (Suspicion of statistical analysis)
  - Combine measurement and 'expert' knowledge
  - GOALS



## 5. OTHERS??

- YOUR TURN
- HAS MACEACHREN THOUGHT OF ALL THE POSSIBILITIES?
- WHAT OTHER ROLES DO MAPS HAVE?

## SUMMARY I

- Cartographic Language
- Graphic Representation - Abstraction
- Visualization
- Displaying Data
- Communication
  - AUDIENCE
- Map Composition
- Presentation

## SUMMARY II

- Private and Public Domains
- Visual Thinking and Visual Communication
- Design and symbolization
  - GIS flexibility
  - Many possible renditions
- Different strategies (design/symbolization) for different goals