Objectives

- Provide an overview of the basic tasks of data capture:
  - Conversion of graphic information that appears as points, lines, and areas on maps...
  - Into digital form to be stored and manipulated within the computer.

Overview

- Review of data needed to make a map
- Steps in data collection process
- Two fundamental approaches: raster & vector
- Vector mode data capture
- Raster mode data capture

Information needed to make a map

- **Base map** for extracting cartographic data:
  - Projection information
  - Location of control points
  - Location of all cartographic features to capture [points, lines, areas]
- **Attribute data** values for:
  - Points
  - Lines
  - Areas
  - Labels
Steps in procedure for automated capture of base map

- **Acquisition** of stable, geo-referenced base map materials drawn at a scale appropriate to the mapping project
- **Initial data capture**: a device is needed that enables conversion of the graphic image on the map into digital form [hardware dependent and intensive]
- **Editing** of captured data for generalization, simplification, and error correction
- **Manipulation and transformation** of the captured, corrected data

Two fundamental approaches automated map compilation

- **Vector**: basic element from which all cartographic elements are formed is the X,Y coordinate pair.
- **Raster**: basic element from which all cartographic structures are formed is the picture element or pixel.

Vector Mode Approaches

Digitizer
Hardware for Vector Mode

- Ruler
- Semi-automatic digitizing tablet & tablet technology:
  - Rail and beam
  - Tablet underlain with fine mesh of wires.
  - Sonic
- Automatic line following

Modes of Digitizer Operation

- Point
- Continuous interval
  - Stream
  - Switched stream
- Continuous incremental
  - Stream
  - Switched stream

Vector Mode Capture

- Advantages
  - Devices inexpensive
  - Need store only small part of image area
  - High resolution
- Disadvantage
  - Not good for highly complex images-photos.
**Raster Mode Capture**

- **Advantages**
  - Highly automated
  - Fast
- **Disadvantages**
  - Costly devices
  - Large data storage requirements, but can convert to vector mode
  - Next release of Arc Info will include Arc Scan at no extra cost.
Overview

- Review of typical error types.
- Error detection techniques.

Common error types

- Error in line shape.
- Pseudo polygons.
- Mislabeled polygons.
- Gaps and slivers.
Error Detection Techniques

- Plot map using fine line and compare to source.
- Display labels and plot to check for pseudo polygons.
- Display labels and plot to check for incorrect labels.
- In short…plot the map with a thin line weight and with labels displayed.

Digitizing features:

- Button 1: capture points

Simulation of process
Attach map to digitizer

Digitize first polygon: left button to capture; double click to end

Digitize second polygon: left button to capture; double click to end

Digitize third polygon: left to capture; double click to close
Overview

- Create new layers in Arc Catalog
- Run Arc Map and open the Editor Toolbar
  - Load new layers
  - Set Snapping
  - Start editing
  - Digitize
  - Correct
  - Save
- Add attributes
Digitize a Polygon

Polygon 1

Digitize a Common Border Polygon

Edit

Tool, Task, Target

Avoiding Gaps and Slivers

Polygon 2

Avoided Gaps and Slivers

Polygons with common border and no gaps or slivers
Polygon 1 is the existing feature. Polygon 2 is a new feature that shares a common border with polygon 1. To avoid gaps and slivers, select the autocomplete task and begin digitizing either within polygon 1 or at the location of a common vertex. Finish digitizing by double clicking within polygon 1. The program automatically stores the common vertices in polygon 2 so as to avoid gaps and slivers.

Click Edit and then select Undo Add Vertex or Delete a Vertex.

Modify a Feature: Delete
To save edits, click the Editor button to open the drop down menu and then click Save Edits.

To stop editing, click the Editor button to open the drop down menu and then click Stop Editing.

Modify a Feature: Insert Vertex

Modify a Feature: Move Vertex

Modify a Feature: Finish Sketch

Stop and Save
Overview of Rectification

- Add known & unknown layers
- Zoom to known
- Load georeferencing tool
- Fit unknown to display window
- Select control points [i.e., points in common]
- Check your work
- Rectify

Add County [Known]

Gloucester County New Jersey in NJ State Plane Coordinates

Add Unknown & Set Display

1. Double-click to open Layer Properties
2. Click Symbology Tab
3. Click Unique Values
   - Click to load Unique Values
Fit to Display

Select Fit to Display

Two Layers Fit in Same Window

Two Layers in same data view

Tying Unknown to Known Points

Select Control Points

Layers during Georeferencing

Magnifier ➔ click Window in Main Menu and select Magnifier
Tying Unknown to Known Points

Click here first

Click here Second

Unknown & Known Snapped

Check to See Fit Quality

Keep Your Work

Click here to make changes permanent
Specify Resampling Method & Save

- **Cell Size:** 197.912944
- **Resample Type:** Nearest Neighbor (for discrete data)
- **Output Raster:** C:\GIS\DATA\Chap_13\risk\Rectifyflood.png

Save Cancel

Your Result, A Thing of Beauty