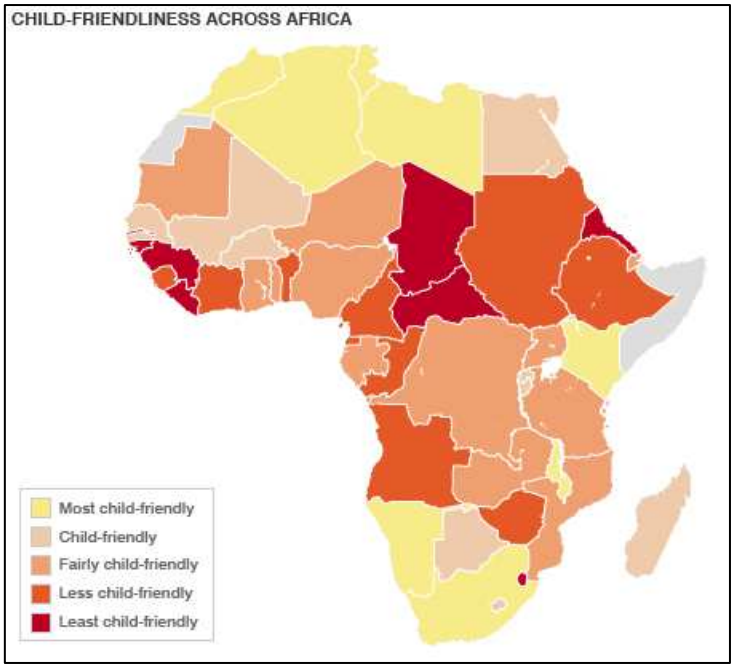
# EnvSci 360 Computer and Analytical Cartography

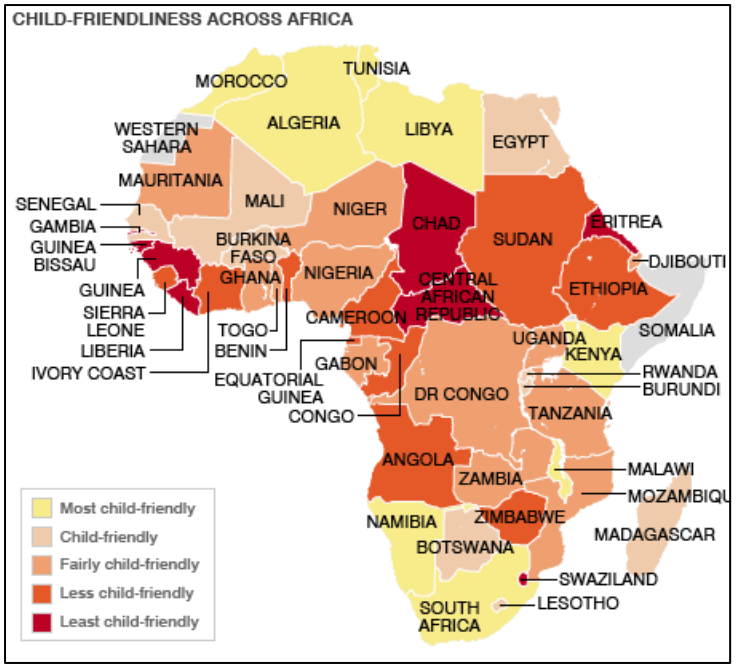
## Lecture 5

***Working with Type and Labels***

# Key Points

- **Labels are text that locate and identify features on a map**
  - Important for readability & communication



# Key Points

- **Two most important considerations:**
  - Must be **legible -** Size, style, etc.
  - Must be **unambiguous -** Placement
- Also must be:
  - **Functional**
    - Categorizes features and establishes a visual hierarchy
  - **Visually appealing**
    - Consistency
    - Good combination of typefaces and styles

# Key Points

- Labeling can demanding, time-consuming and tedious (in order to get it "just right")
  - You usually need to experiment a bit, especially when you are labeling many features and many layers
- Maps also contain other text
  - Titles, legends, narratives, etc.
  - Consider:
    - Content (the wording)
    - Form (the display)


# Functions of Lettering

- **Nominal symbol** - different features are lettered differently (states, cities, rivers, etc.)


**No use of type characteristics to differentiate between map feature types – BAD.**


**Using multiple nominal type characteristics (font, style, hue and arrangement) to differentiate between river and city labels – GOOD.**

# Functions of Lettering

- **Ordinal symbol** - show hierarchy or relative importance of geographic phenomena
  - size and weight in one type family are more important than style

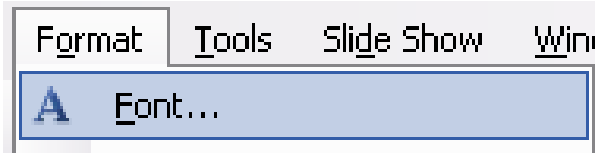

# Resources

- Chapters 2 and 3 in Designing Better Maps
- Chapter 10 in Making Maps
- Web:
  - http://www.typebrewer.org/
  - http://resources.arcgis.com/en/help/main/10.1/#/About_adding_new_text_to_a_map/00s80000000800000/

# Type Basics

## Typefaces

- Defines the shape of each character ("glyphs")
- What we often refer to as a **font** – i.e. a name we choose in a document:
  - Arial, Times New Roman, Courier New, etc.




**Some are designed for print, others for screen**


See http://www.papress.com/other/thinkingwithtype/letter/few_fonts.htm

# Type Basics

## Type families

- Complete set of related typefaces, with differences in **weight**, **width**, and other **styles** (regular, bold, italic)

| | | |
|---|---|---|
| Arial Regular | Arial Narrow Regular | **Arial Black Regular** |
| **Arial Bold** | **Arial Narrow Bold** | ***Arial Black Italic*** |
| *Arial Italic* | *Arial Narrow Italic* | |
| ***Arial Bold Italic*** | ***Arial Narrow Bold Italic*** | |

Part of the Arial font family

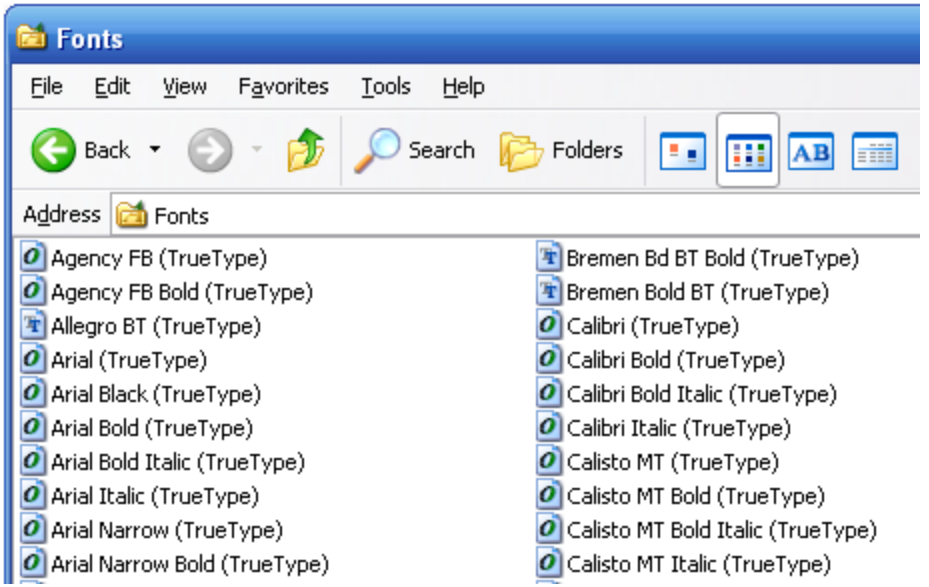
# Type Basics

- **Type categories**
  - **Serif** – (aka "Roman") have little "finishing strokes" or "lines" (i.e. "serifs") at the ends of letters
    - Times New Roman, Book Antiqua , **Courier New**
    - (if too small, tough to read on screen)
  - **Sans serif** – without serifs
    - Arial, Verdana, Tahoma, Century Gothic
  - **Display** – distinctive and decorative; may be hard to read. Use judiciously.
    - **Impact**, *Viner Hand ITC*, **Snap ITC**

# So What is a "Font"?

- A complete set of characters (A-Z, plus numbers, symbols) of one specific style and weight of a typeface
  - Stored as files on your PC
    - True Type, Open Type, Postscript, etc.
    - Included on PC
    - Purchase or download
    - Many install with ArcGIS
      - Basis of character symbols

Fonts



# Type Basics

- Other characteristics
  - **Size** – measure in points (about 1/72 inch)

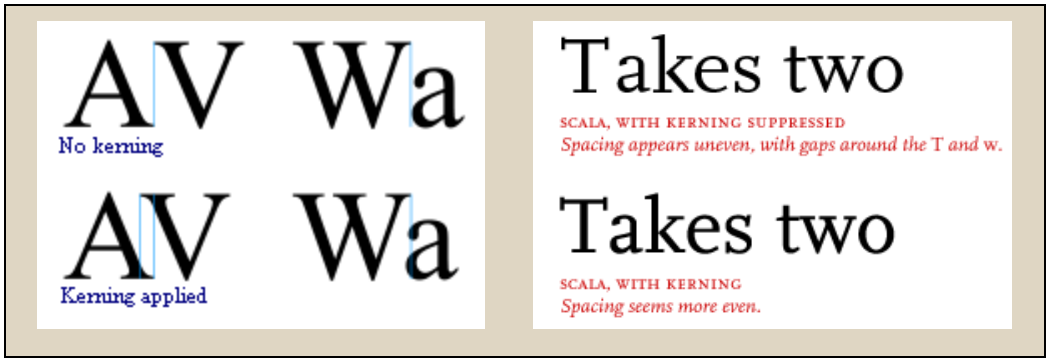
8 point 14 point 36 point

  - **Metrics** – vertical parameters

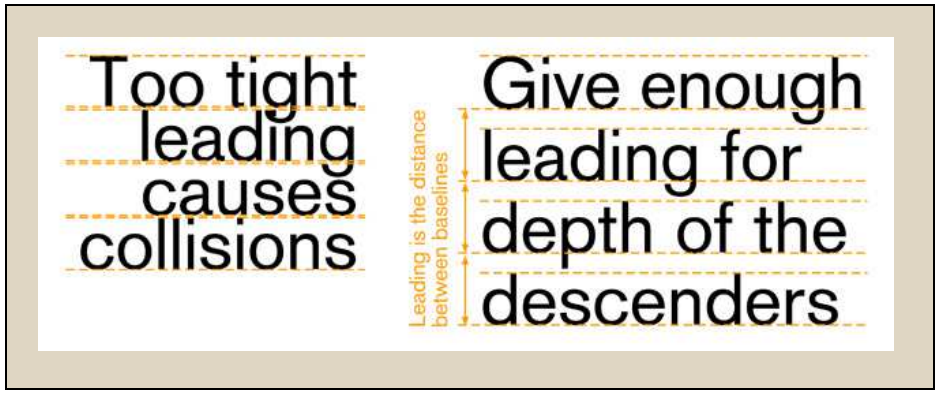

  - **Proportion** – "proportional" vs "fixed-width"/ "monospaced"

# Type Basics

- Other characteristics
  - **Kerning** – spacing between characters

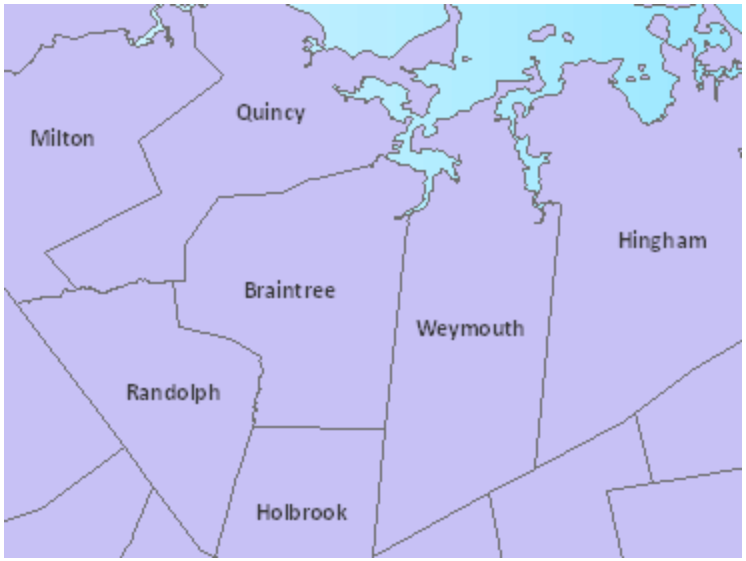



  - **Leading** – vertical spacing between lines of text



# General Guidelines

- Well-designed classic, modern, and sans serif forms are easy to read
- Fancy or ornate lettering is often hard to read




# General Guidelines

- The thinner the lines the harder to read – important for Web (also for the Web, labels shouldn't be too small)
- Thick, bold type may overshadow or obscure more important features
- Light type is better for less-important background features
- More important names in CAPS, less important in Mixed ("Proper") Case
- Names with wide separation in lettering are usually uppercase
- Subtle distinctions in style should be avoided
- Slant and italic suggests the fluidity of water, often used for natural features
- Upright or Roman type is often used for cultural features
- A combination of one serif and one sans serif is often a good choice, with form variations among each

# Considerations

- Size
  - can vary (even within one layer, depending on size of feature(s) -- **hierarchy**
  - Should not be too small or too large

Use interactive comparison at http://www.typebrewer.org

# Considerations

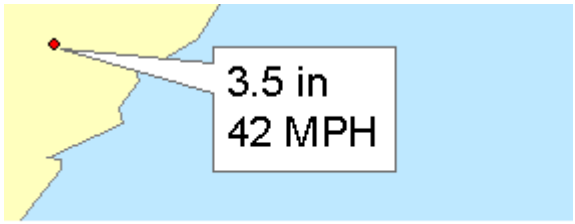
- Scale
  - Dictates how many labels may be placed on a map (see Google Maps)
  - Labels may be scale-dependent in ArcMap and other software – they appear only when zoomed in *(Best Practice to do so)*
  - May need to abbreviate some feature names

50 mi.

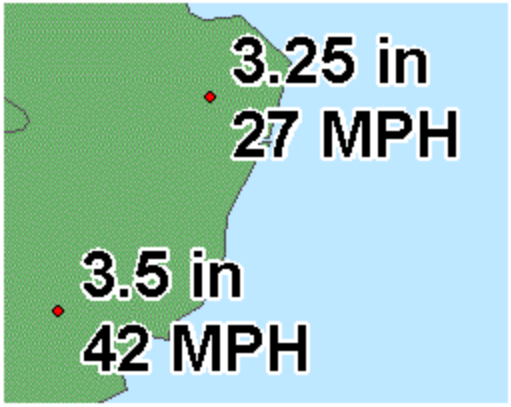

20 mi.

# Considerations

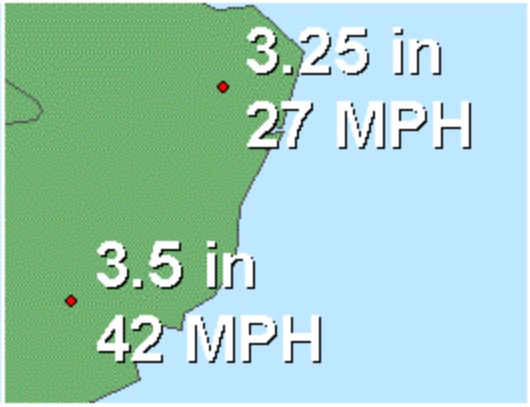
- Effects
  - Use shadows (highlights), halos, spacing, callouts, backgrounds, etc., to improve legibility



Balloon Callout



Halos



Drop Shadow

  - Changing CASE/Case/case

# Considerations

- Typefaces/Fonts/Families
  - don't use too many different font families, usually 2 or, at the most, 3
  - one style for one layer (vary size, color, weight, etc.) or label class
  - use a different style for each layer

See examples using interactive map at
http://www.typebrewer.org

# Cartographer Beware!

You don't have to USE every single font you have ON YOUR PC on one map

A map is not a ransom note!!!

# Label Placement

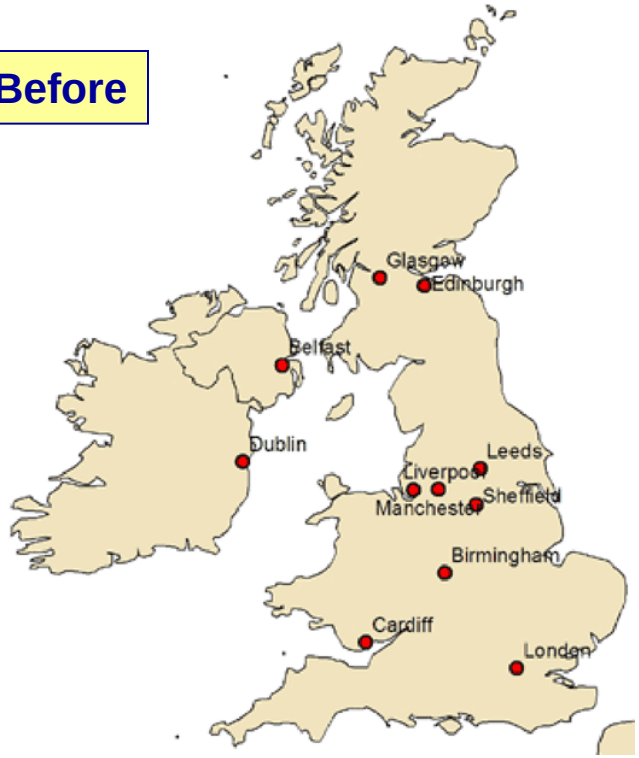
- Typically:
  - center of polygon
  - above or to right of line
  - to upper right of points
- Should not:
  - overlap other labels
  - not obscure features


- Should be clear which feature is labeled (use leaders if necessary)
- **It is fine not to place all labels** – based on scale, size, density of features, etc.

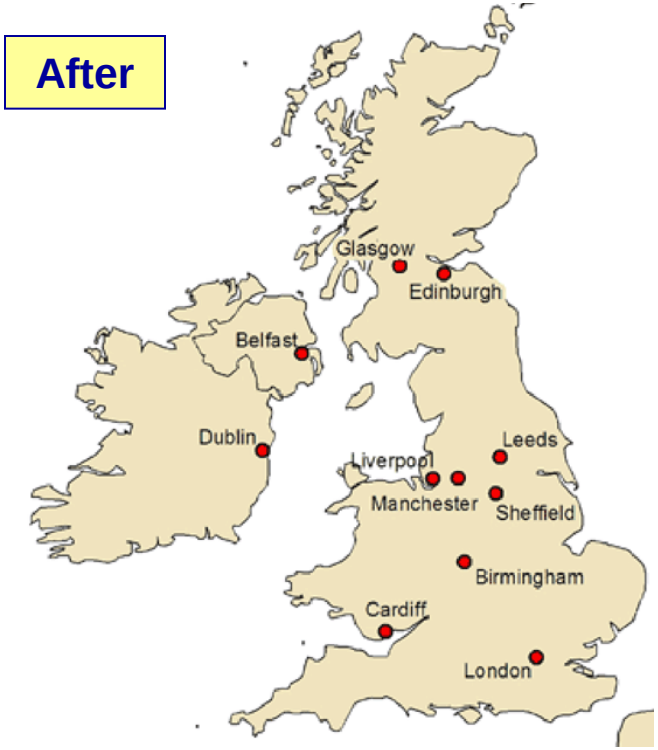
# Label Placement

- Adjusting placement to improve legibility and remove ambiguity

**Before**

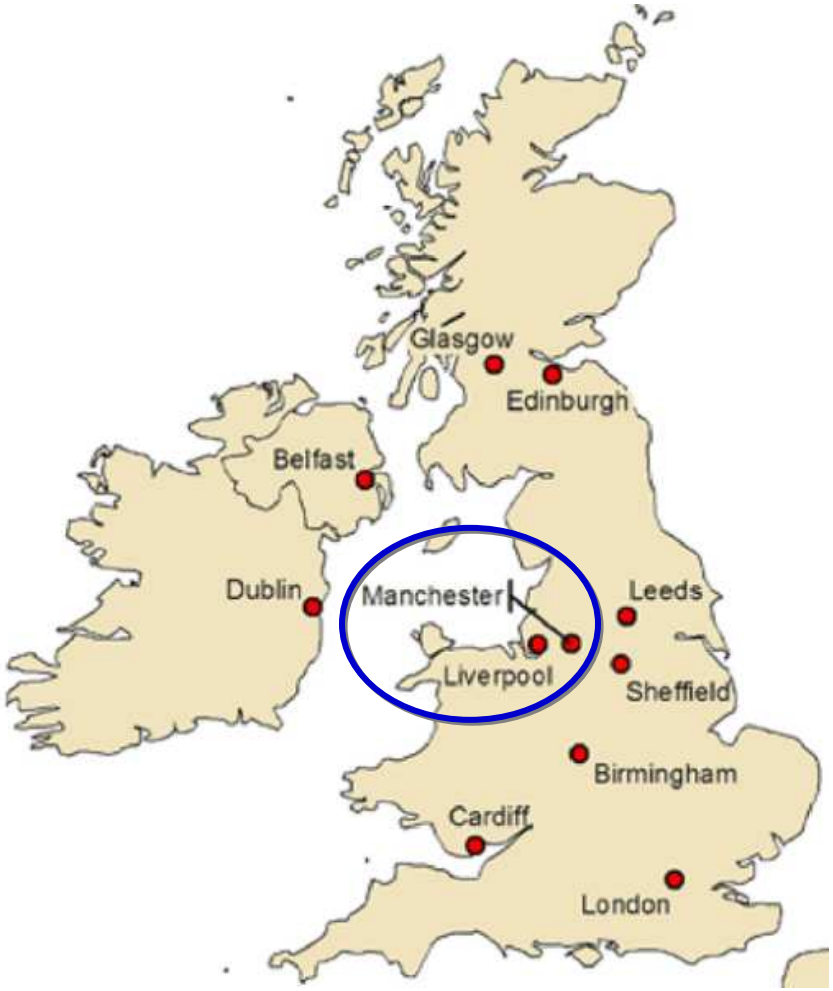



**After**



# Label Placement

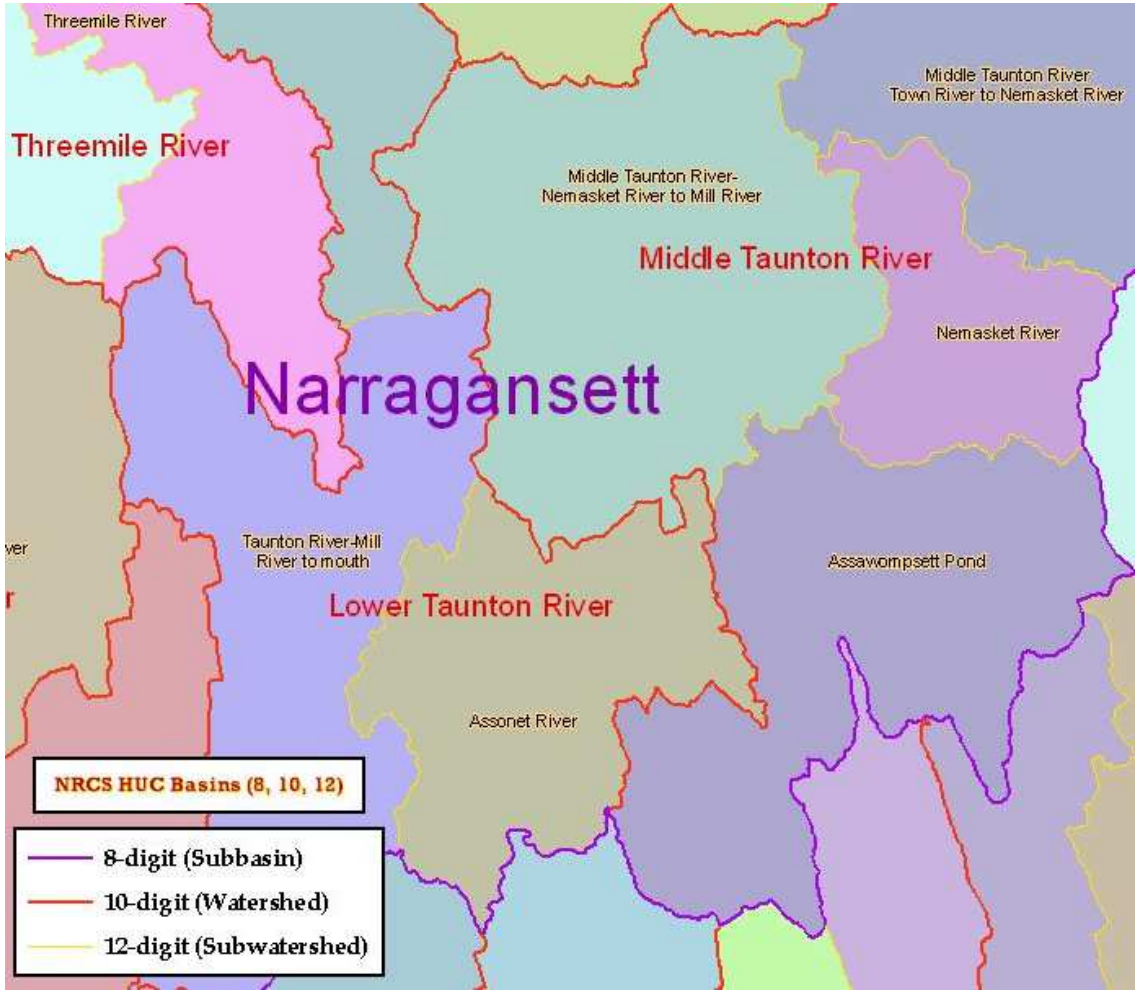
- Use leader lines if necessary



# Label Placement


Examples of city points labeled based on their position relative to the coast - **either all on land or in the water**

# *Matching Label Colors to Feature Colors*




Helps identify features being labeled.

Change font color and size, but keep same typeface (Arial in this example).

# Label Orientation

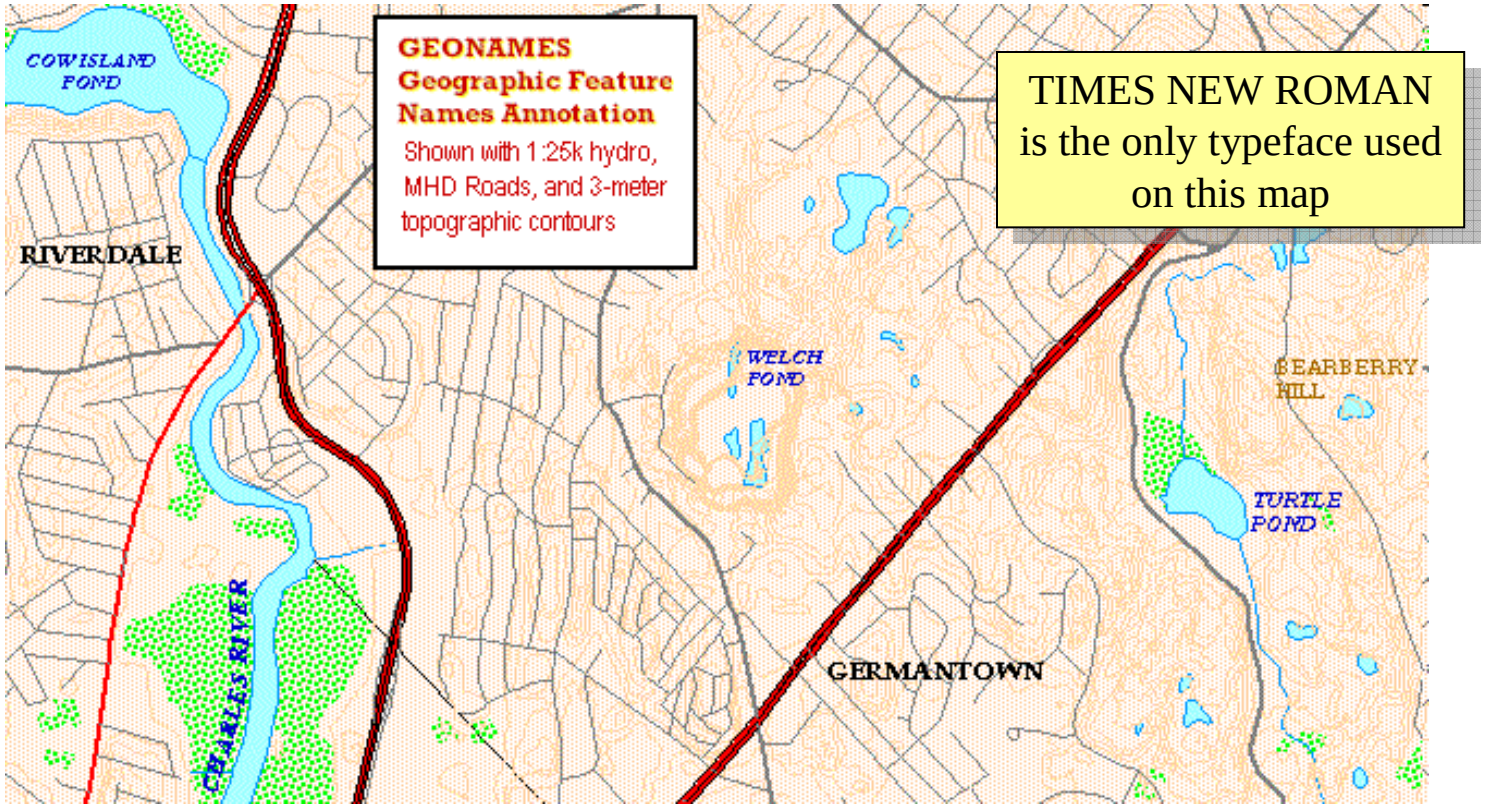
- Can curve to follow linear features (rivers, streets)
- Read left to right, top to bottom, depending of angle of line
- May be tilted (rotated) to fit inside a polygon



You can also S P A C E labels that cover large areas (use character spacing setting in ArcMap)

# Vary Styles – Use 1 Typeface

- Varying orientation and style (color, italics) while still using one typeface

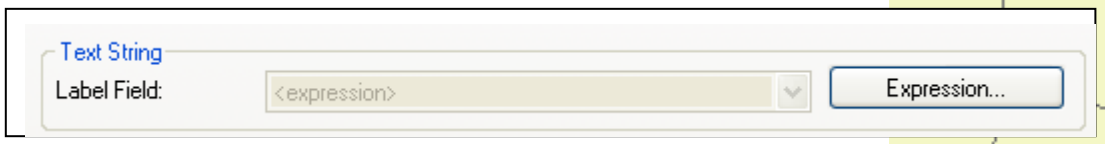


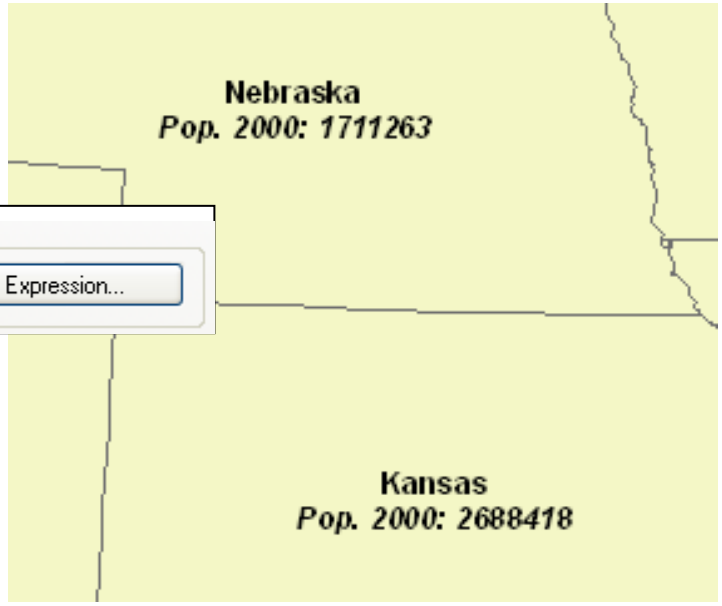
# ArcMap Labeling

- In ArcMap, labels may be **dynamic** (placed automatically) or **placed manually** (by user in exact desired location
- Labels may be **converted to annotation** (in map or geodatabase) or saved as part of **layer file** for reuse

# ArcMap Labeling

- **Label expressions** combine fields and/or add fixed text to each label
- **Text formatting tags** may be part of label expressions



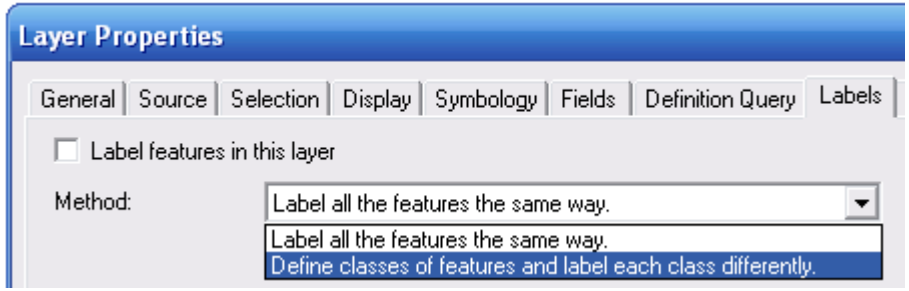




To make the population (bottom) line italics use the <ITA> opening and </ITA> closing tags around the text and field name:

[STATE_NAME] & vbnewline & "<ITA>" & "Pop. 2000: " & [POP2000] & "</ITA>"

# ArcMap Labeling

- **Label classes** can help manage labels for one layer

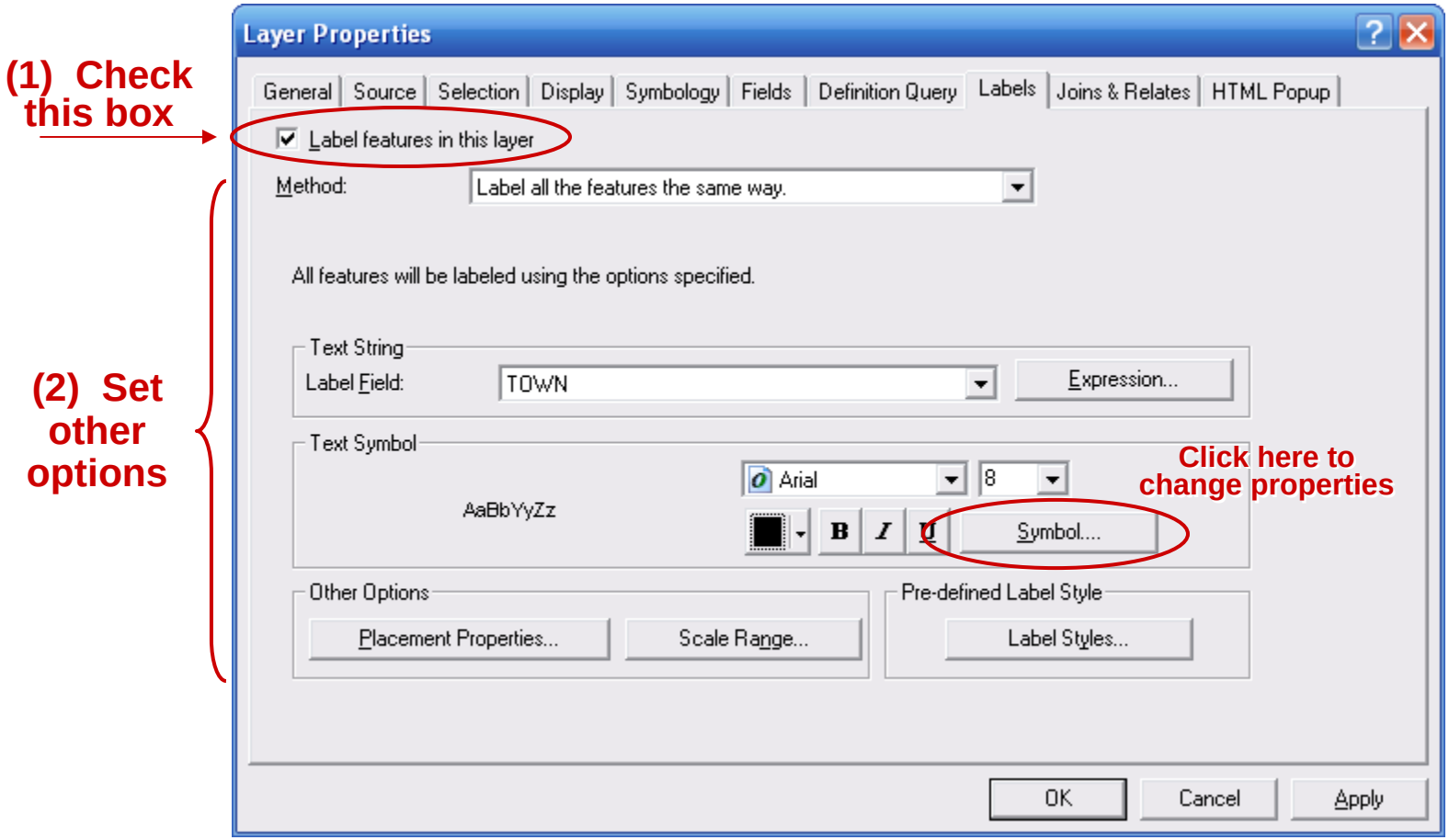



- The **Labeling toolbar** – with "Label Manager" – helps manage all labels in one MXD


- For advanced labeling you can use the **Maplex extension**

# Dynamic Labeling

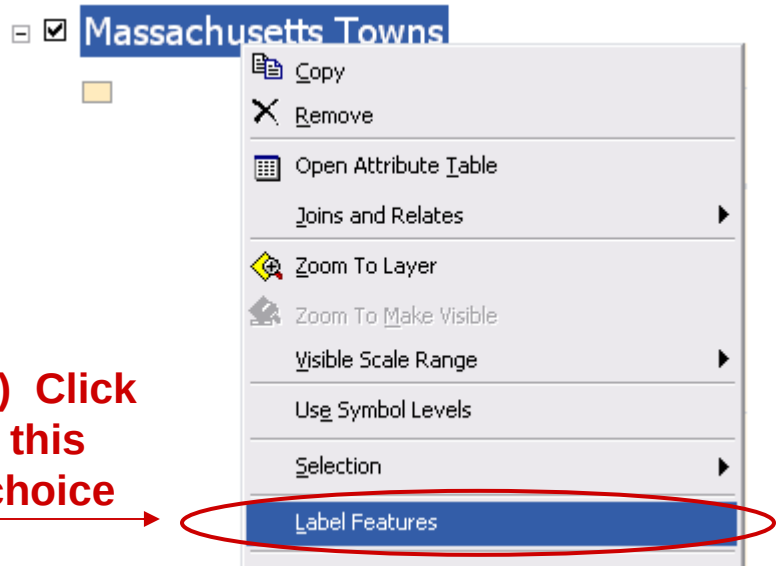
- How to turn on



# Dynamic Labeling

- Another way to turn on

**(1) Right-click a layer in the table of contents**




**(2) Click this choice**

# Dynamic Labeling

- Default vs. modified properties


Default "Label Features"

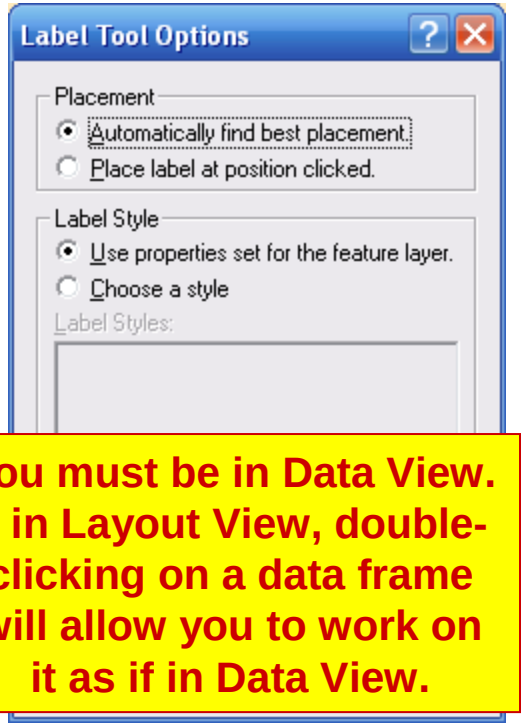

Modified Properties (with Maplex)

# Manual Labeling

- How to manually label features

**(1) Click this tool on Draw toolbar**


**(2) Choose options**



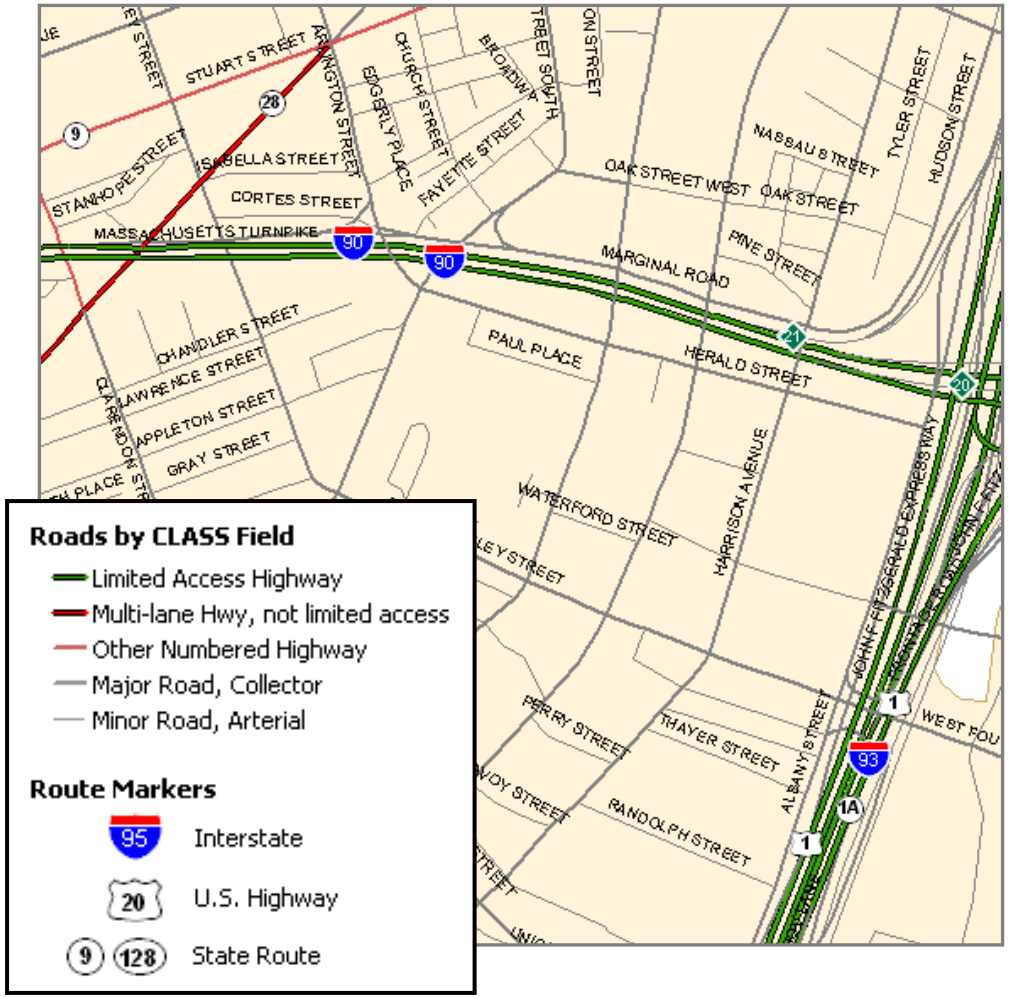

**You must be in Data View. If in Layout View, double-clicking on a data frame will allow you to work on it as if in Data View.**

**(3) Click on feature – label will be added**

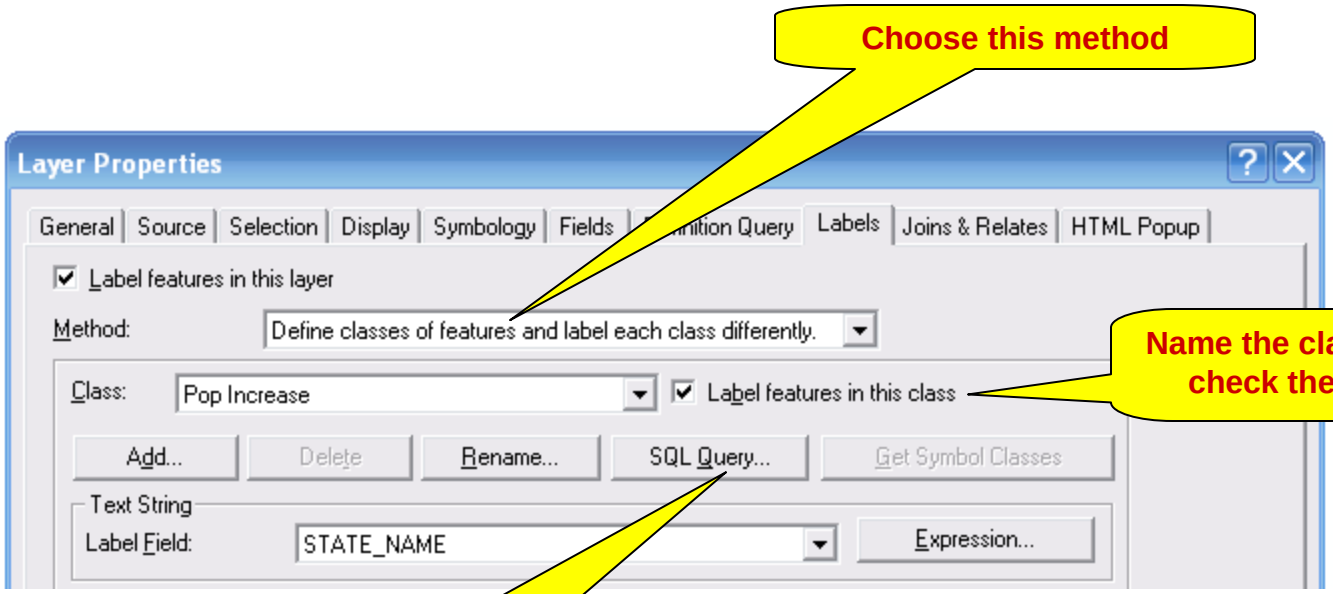
**(4) Label then may be moved or edited**

# Label Classes

- MassDOT Streets labeled with many "label classes" for street names and route shields in ArcMap (and symbolized using Categories method on CLASS field)

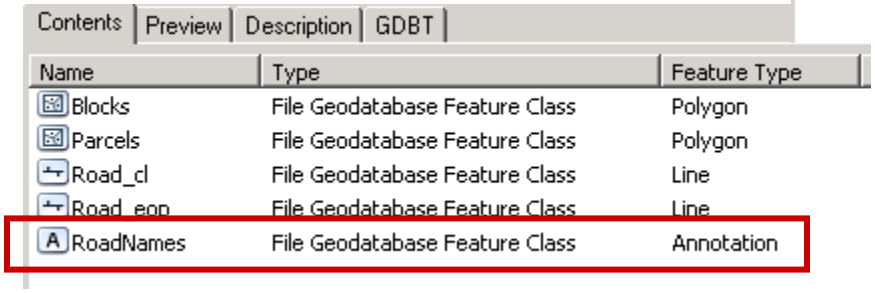


# Label Classes



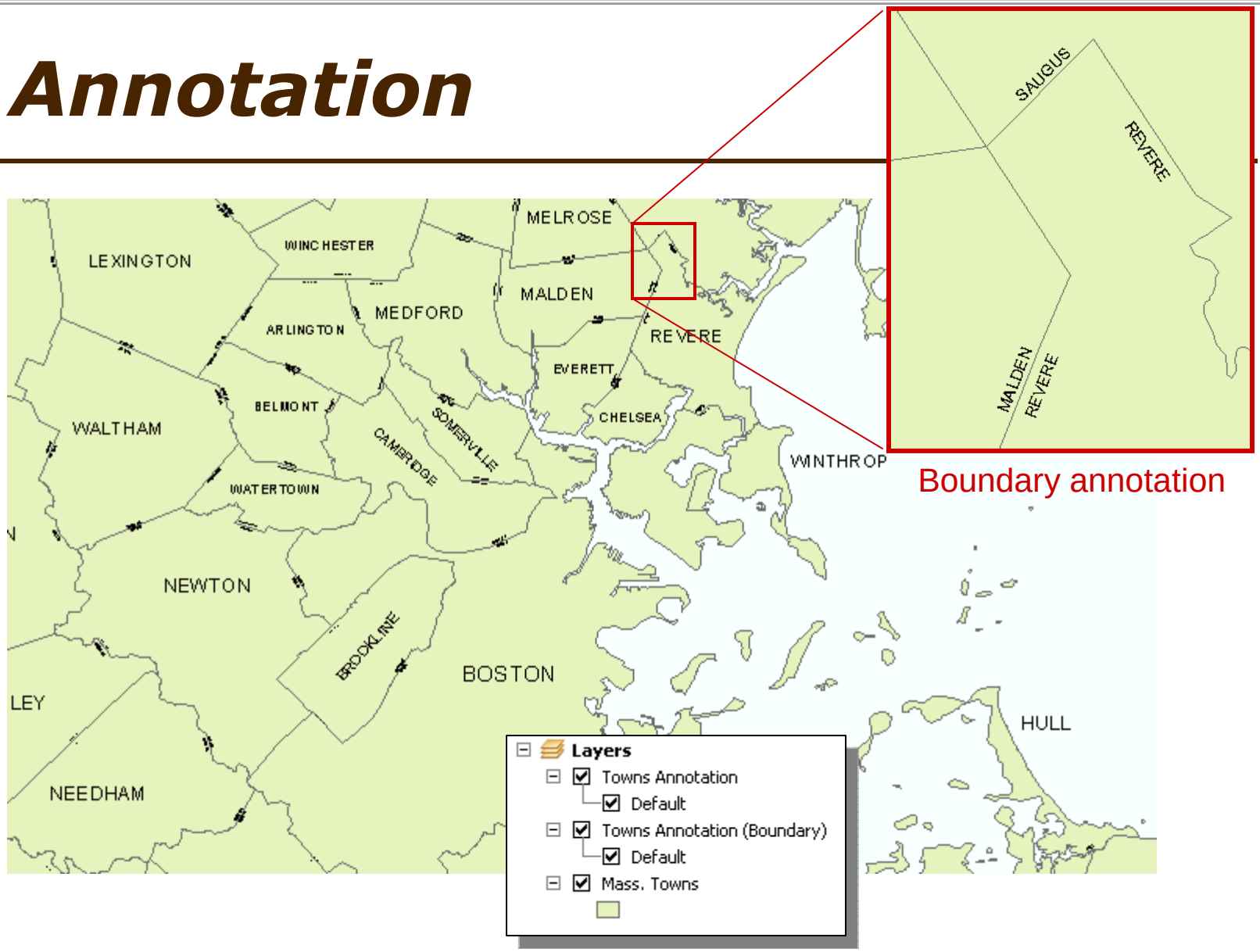
# Annotation

- **Feature classes** that are text labels
  - Alternative to dynamic or manually-placed labels
  - Store own position, text string, size, and other display properties
  - Store in a Geodatabase or map document
  - Coverage anno also usable and may be converted to GDB anno

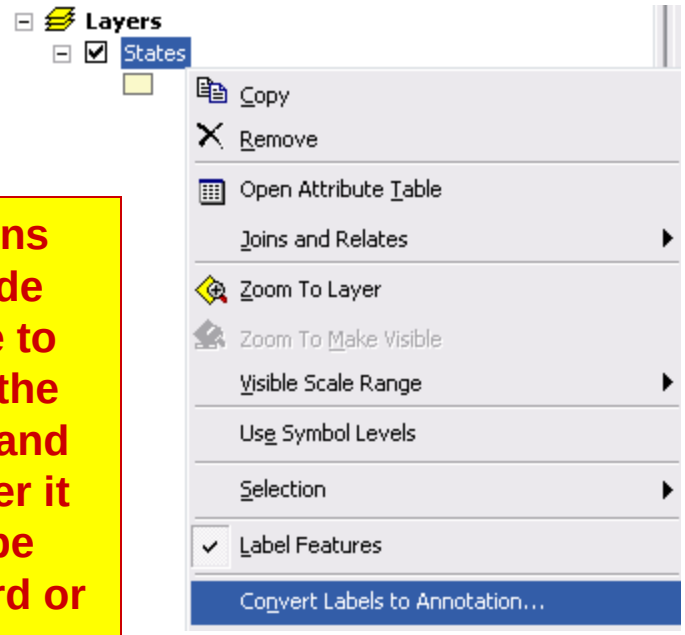

**How annotation feature classes appear in ArcCatalog**

# Annotation


SAUGUS
REVERE
MALDEN
REVERE
Boundary annotation
MELROSE
LEXINGTON
WINCHESTER
MALDEN
MEDFORD
ARLINGTON
REVERE
EVERETT
BELMONT
CHELSEA
WALTHAM
SOMERVILLE
CAMBRIDGE
WINTHROP
WATERTOWN
NEWTON
BROOKLINE
BOSTON
HULL
LEY
NEEDHAM
Layers
Towns Annotation
Default
Towns Annotation (Boundary)
Default
Mass. Towns

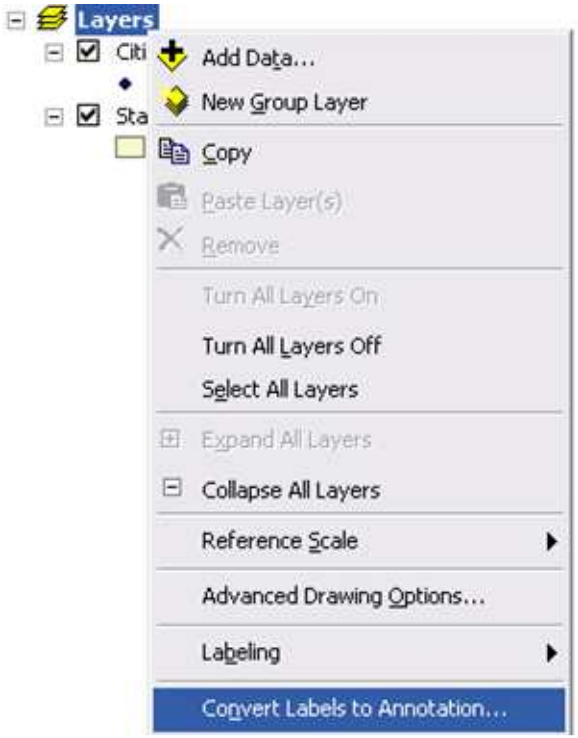
# Creating Annotation

- Label features, then choose 'Convert Labels to Annotation'




**Options include where to store the anno, and whether it will be standard or feature-linked**

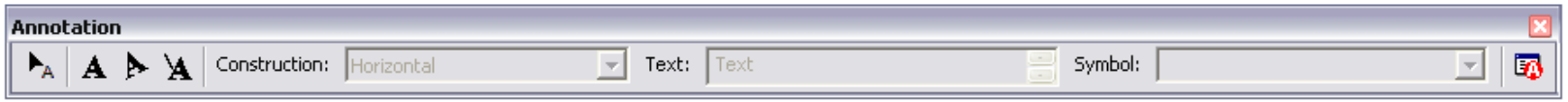
One layer




All layers in a data frame

# Creating/Editing Annotation

- You can also create geodatabase annotation from scratch and edit any anno with tools on the Annotation Toolbar




**Annotation toolbar buttons and their functions**

| Button | Name | Function |
|---|---|---|
| | Edit Annotation | Edits annotation features |
| | Construct Horizontal Annotation | Sets up the editor to construct horizontal annotation |
| | Construct Straight Annotation | Sets up the editor to construct straight annotation |
| | Construct Annotation With A Leader Line | Sets up the editor to construct annotation with a leader line |
| | Unplaced Annotation Window | Shows or hides the unplaced annotation window |

# Labels vs. Annotation

| LABELS | ANNOTATION |
|---|---|
| Dynamically placed* | Static |
| Managed as a group | Managed individually |
| Stored in map document or layer file | Stored in map document or geodatabase |
| Based on feature | May be linked to feature |

* **Labels also may be manually placed with the Label tool from the Drawing toolbar. See http://proceedings.esri.com/library/userconf/egug2005/papers/annotation.pdf for more details.**

# Labeling Toolbar

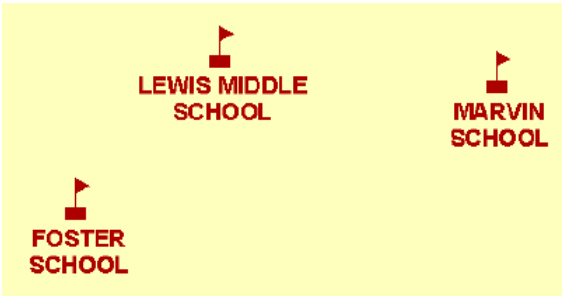
- Manage labels for an entire MXD


**Labeling toolbar buttons and their functions**

| Button | Name | Function |
|---|---|---|
| | Label Manager | Opens the Label Manager dialog box |
| | Label Priority Ranking | Opens the Label Priority Ranking dialog box so you can change the priority order of labels |
| | Label Weight Ranking | Opens the Label Weight Ranking dialog box so you can change label and feature weights |
| | Lock Labels | Locks labels in their current size and position |
| | Pause Labeling | Suspends labels from drawing |
| | View Unplaced Labels | Displays the labels that could not be placed on the map |

# Maplex Extension

- Adds advanced label (and annotation) placement and conflict detection to ArcMap.
  - Label stacking
  - Dynamic font resizing
  - Abbreviations
  - Polygon borders
  - Repeat label parameters, etc.




- Can save significant production time.
- At 10.1 included with all Desktop license levels.
- Activate extension, then switch to Maplex label engine for a data frame (must set for each frame separately)
  - Right-click data frame Properties > General tab > Label Engine
  - Use Labeling menu > Use Maplex Label Engine on Labeling toolbar
- See "Maplex, tutorial" in Help and
  **http://www.esri.com/software/arcgis/extensions/maplex/demos**