

ArcGIS® 9

Using Maplex for ArcGIS



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Introduction to Maplex for ArcGIS

1

IN THIS CHAPTER

- **Extended label placement parameters**
- **Easy-to-use interface**
- **Maplex for ArcGIS label placement**
- **Tips on learning Maplex for ArcGIS**

Welcome to Maplex for ArcGIS®, the advanced label placement extension for ArcMap™. Well-placed labels can make a map more understandable and useful. Maplex for ArcGIS provides you with a special set of tools that allows you to improve the quality of the labels on your map. With Maplex for ArcGIS, you can define parameters to control the positioning and size of your labels; Maplex for ArcGIS then uses these parameters to calculate the best placement for all of the labels on your map. You can assign different levels of importance to features to ensure that more important features are labeled before less important ones, and you can specify size ranges for labels to allow a larger number of smaller labels to be placed in areas where features are densely packed.

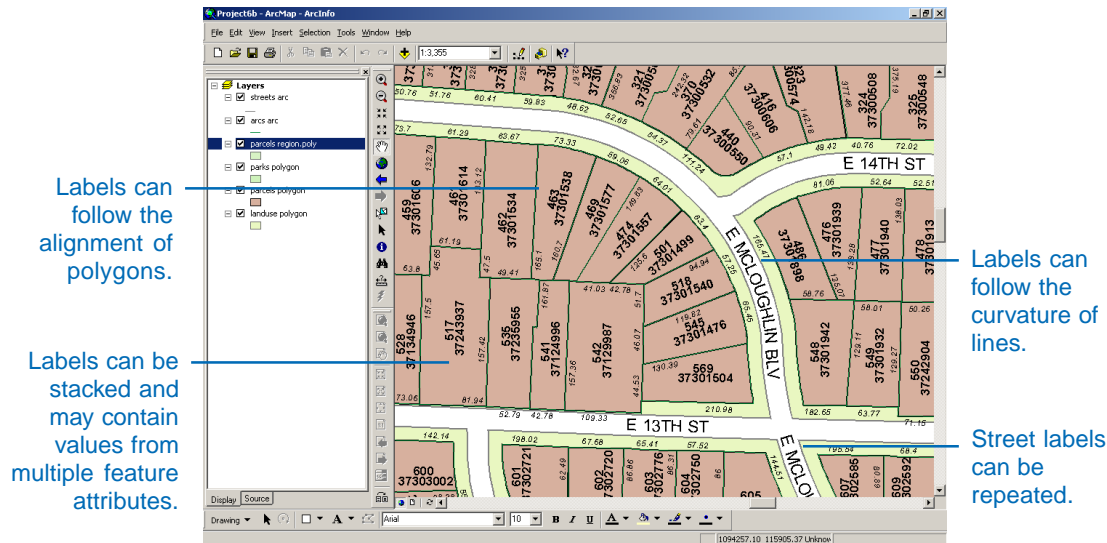
Maplex for ArcGIS lets you control how labels should be placed relative to features, how labels may be modified or reduced to allow more placement when the available space is constrained, and how to resolve conflicts between labels when the available space is limited. The labels you create using Maplex for ArcGIS can also be converted to annotation and shared and edited in a geodatabase. Generating annotation from labels placed with Maplex for ArcGIS cuts the time needed to manually edit annotation on maps, increasing your productivity.

This book will show you how to use the ESRI® Maplex for ArcGIS extension to create high-quality labels for your maps.

Extended label placement parameters

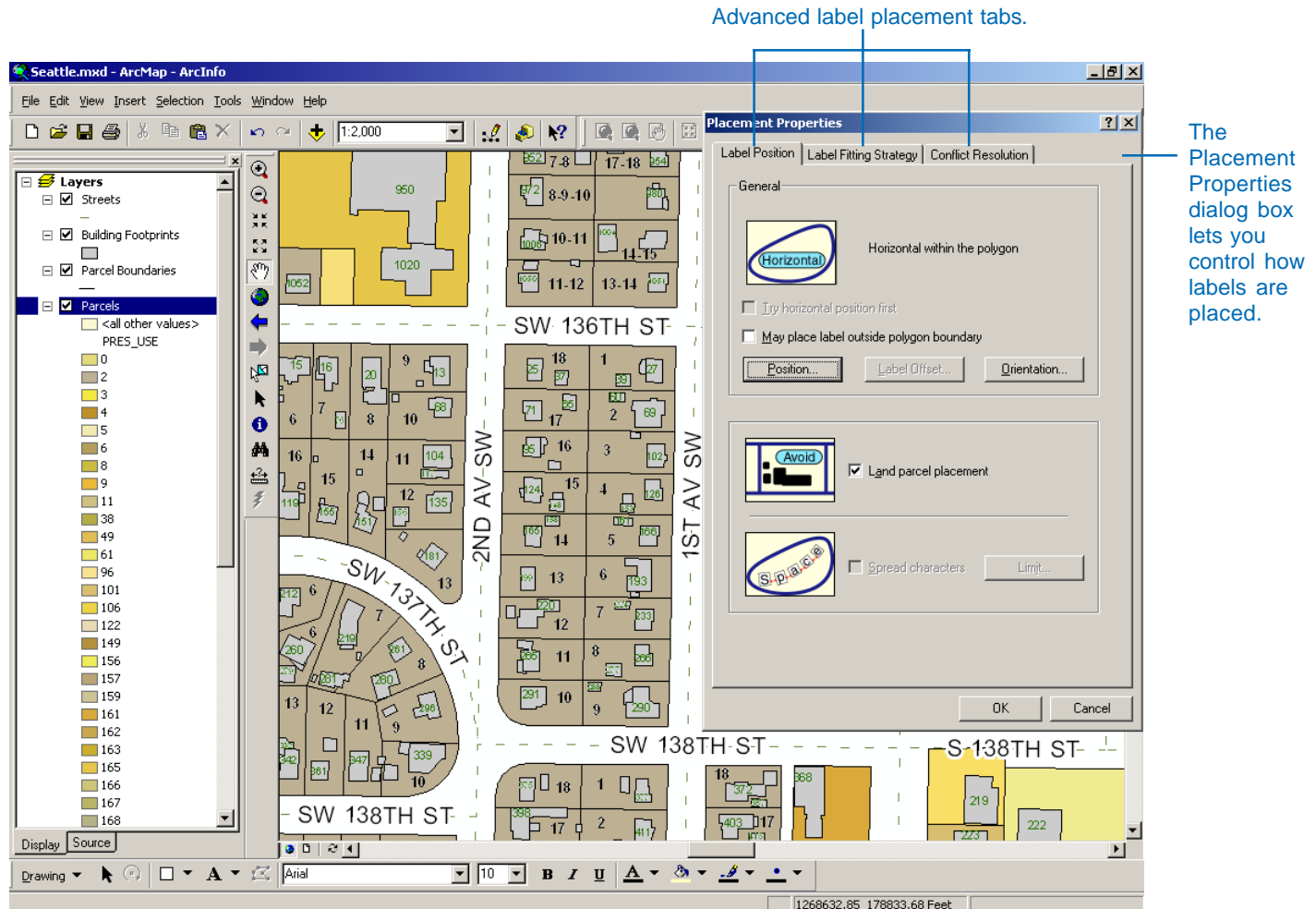
Maplex for ArcGIS provides:

- New placement styles for polygons
- Special placement for lines that represent street features
- Ability to offset labels from features
- Repetition of labels at a specified distance along a line
- Control of word spacing
- Control of character spacing
- Alignment of labels to projection graticules
- Control of label placement zones
- Flexible placement to allow more labels to fit in an area
- Fine control of label stacking
- Label abbreviation
- Font reduction parameters for congested areas
- Control of whether a label may extend beyond a feature
- Enhanced weighting of features to determine label placement
- Ability to prioritize which labels are placed
- Placement of labels as background text
- Search tolerance to remove duplicate labels



Easy-to-use interface

Maplex for ArcGIS adds a new dialog box to ArcMap that organizes the advanced label placement parameters into three easy-to-access groups: Label Position, Label Fitting Strategy, and Conflict Resolution. The new label placement controls have illustrations to help you quickly see what they do.

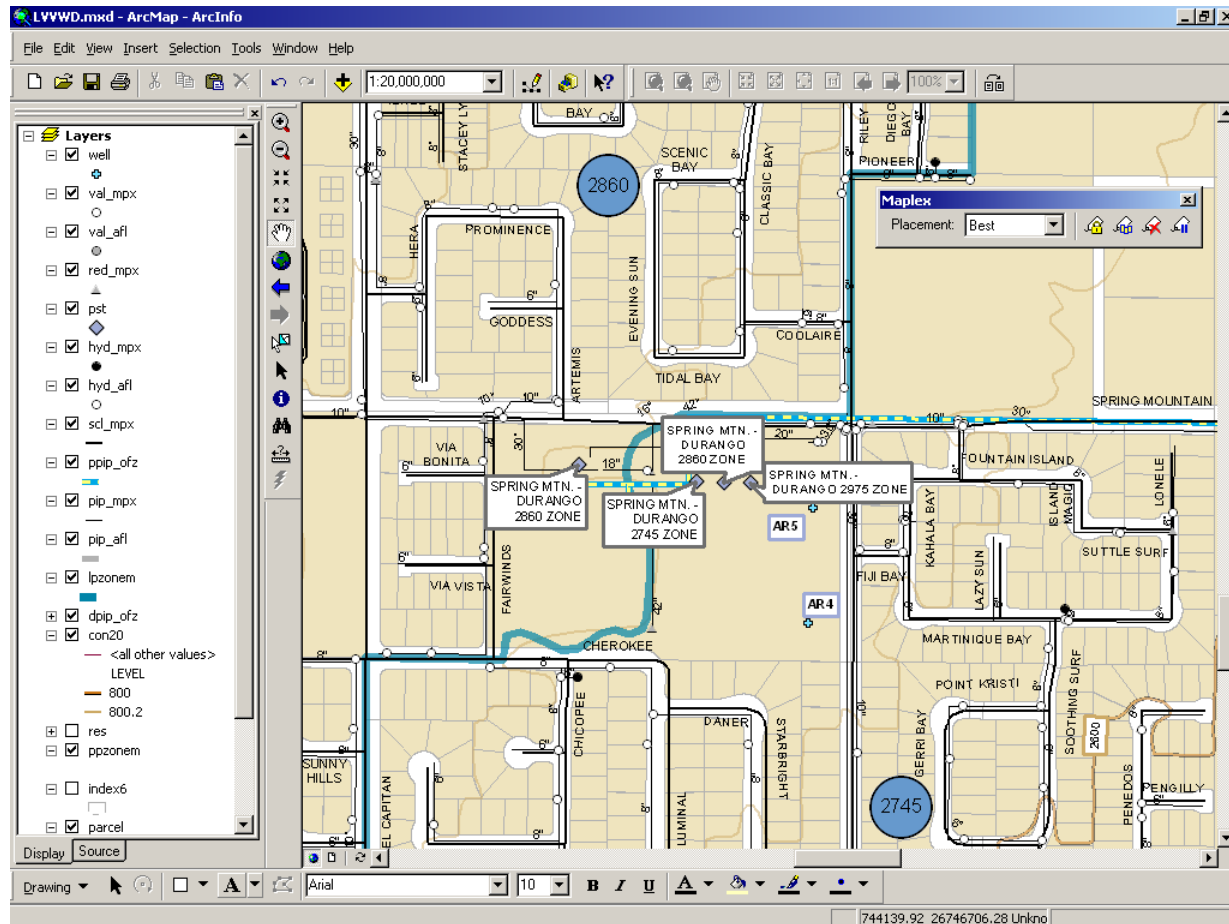


The Land parcel placement option keeps the parcel ID numbers from overlapping the building footprint outlines.

The Maplex for ArcGIS label placement extension greatly improves label placement quality, automatically stacking longer labels and rotating them to align with the map graticule lines.



The Maplex Label Engine places labels to minimize overlap.



Tips on learning Maplex for ArcGIS

If you are new to Maplex for ArcGIS, remember that you do not have to learn everything about the software to get immediate results. Begin learning Maplex for ArcGIS by reading Chapter 2, ‘Quick-start tutorial’. In Chapter 2 you will learn how easy it is to get high-quality cartographic labeling results quickly. Maplex for ArcGIS comes with the data used in these tutorials, so you can follow along step-by-step on your computer. You can also read the tutorial without using your computer.

Finding answers to questions

Like most people, your goal is probably to complete your tasks while investing a minimum amount of time and effort on learning how to use software. You want intuitive, easy-to-use software that gives you immediate results without having to read pages of documentation. However, when you do have a question, you want the answer quickly so that you can complete your task. That’s what this book is all about: providing the answers you need, when you need them.

This book describes how to label your map using Maplex for ArcGIS. Although you can read the book from start to finish, you’ll likely use it more as a reference. When you want to know how to do a particular task, such as assigning an abbreviation dictionary to a label class, just look it up in the table of contents or index. What you will find is a concise, step-by-step description of how to complete the task. Some chapters also include detailed information that you can read if you want to learn more about the concepts behind the tasks. You may also refer to the glossary in this book if you come across any unfamiliar geographic information system (GIS) terms or need to refresh your memory.

About this book

This book is designed to introduce Maplex for ArcGIS and its capabilities. The topics covered in the various tasks and tutorial in Chapter 2 assume you are familiar with the fundamentals of GIS and ArcMap. If you have never used a GIS or ArcMap before or feel you need a refresher, take some time to read *Getting Started With ArcGIS* and *Using ArcMap*. It is not necessary to do so to continue with this book, but you should use those as references if you encounter tasks with which you are unfamiliar.

For more information about creating custom tools using Maplex for ArcGIS, see the ArcGIS Developer Online Web site at <http://arcgisdeveloperonline.esri.com>.

Getting help on your computer

In addition to this book, the Maplex for ArcGIS online Help system is a valuable resource for learning how to use the software.

Contacting ESRI

If you need to contact ESRI for technical support, refer to ‘Contacting Technical Support’ in the ‘Getting more help’ section of the ArcGIS Desktop Help system. You can also visit ESRI on the Web at www.esri.com and support.esri.com for more information on Maplex for ArcGIS and ArcMap.

ESRI education solutions

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Quick-start tutorial

2

IN THIS CHAPTER

- **Labeling with Maplex for ArcGIS**

A good way to learn how to use Maplex for ArcGIS is to work through the process of labeling a map and storing labels permanently as annotation. This tutorial introduces you to some labeling techniques in the context of mapping land parcels and streets.

In this tutorial you will use Maplex for ArcGIS to:

- Place labels for polygon features.
- Place labels for line features.
- Improve label placements for street features.
- Export labels to annotation in a geodatabase feature class.
- Manually place unplaced annotation.
- Edit annotation.

The exercises in this chapter use the tutorial data distributed with Maplex for ArcGIS. The default install location of the data is C:\ArcGIS\ArcTutor\Maplex. The exercises require that you have write access to this data. If you don't have write access, copy the data to a location for which you have write access.

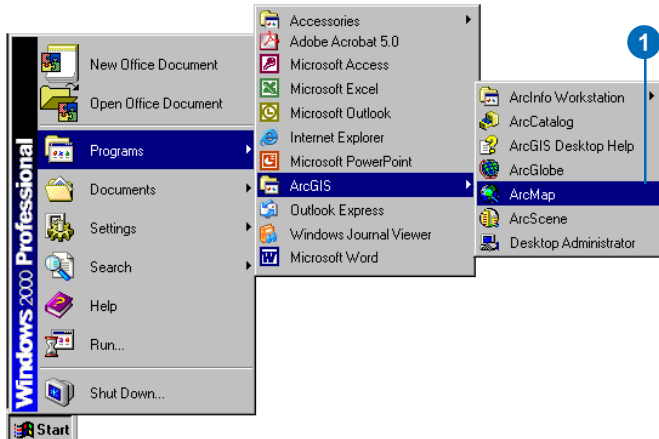
Labeling with Maplex for ArcGIS

Imagine that you work for a small city and you need to make a map for the assessor. This map must have parcels labeled with a two-part parcel number, lot lines labeled with their length, and streets labeled with their street names. You've almost finished the map, but the labels aren't quite right. Now you are going to use the Maplex for ArcGIS extension to complete the labeling, and export the labels as annotation so they can be reused by other departments in the city.

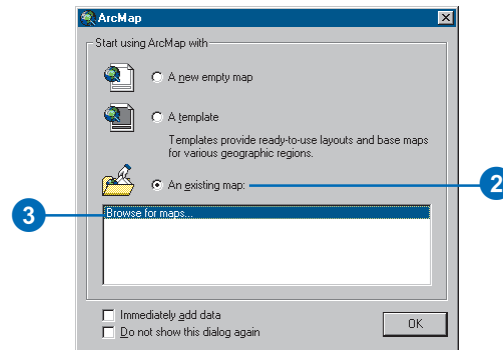
Starting ArcMap and opening the Parcels map

The first step to improve the labels on your map is to start ArcMap and turn on the Maplex for ArcGIS extension.

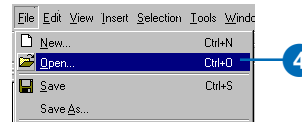
1. Click the Start button on the Windows taskbar, point to Programs, point to ArcGIS, and click ArcMap.



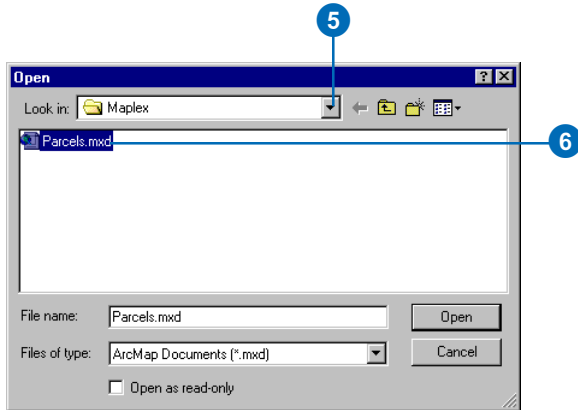
2. If ArcMap starts with a map selection dialog box, click the An existing map radio button. If it does not, skip to step 4.
3. Double-click Browse for maps. Skip to step 5.



4. If the map selection dialog box does not open when ArcMap starts, click File on the main menu and click Open.



5. In the Open dialog box, click the dropdown arrow and navigate to the drive where you installed the tutorial data. The default installation path is C:\ArcGIS\ArcTutor\Maplex.



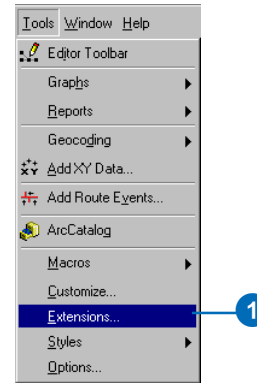
6. Double-click Parcels.mxd.

The Parcels map opens. This map contains several layers in a data frame named Parcel Map. Two of the layers, Streets and Parcels, have been labelled and have *label expressions* already built for them. You will improve the way their labels are drawn on the map. Another layer, Parcel Boundaries, is not currently labeled. You will add labels for this layer.

Enabling Maplex for ArcGIS

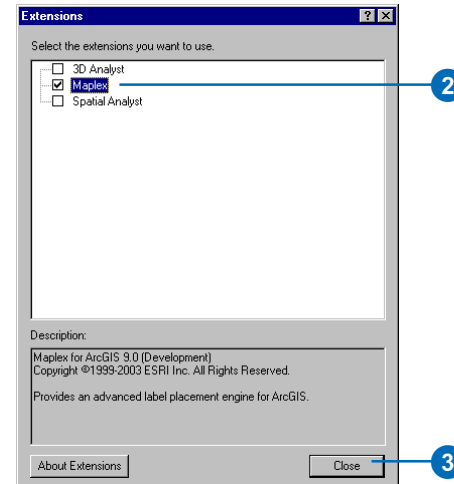
Before you can use Maplex for ArcGIS, you must enable the extension and set the Maplex Label Engine as the label engine for the data frame.

1. Click Tools and click Extensions.



The Extensions dialog box appears.

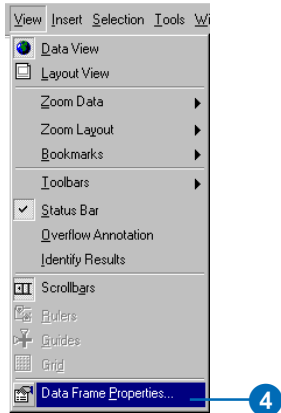
2. Check Maplex to enable the extension.



3. Click Close.

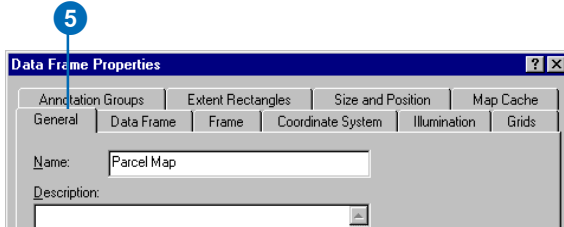
Now that the extension is turned on, you can switch from the default label engine to the ESRI Maplex Label Engine.

4. Click View and click Data Frame Properties.



The Data Frame Properties dialog box appears.

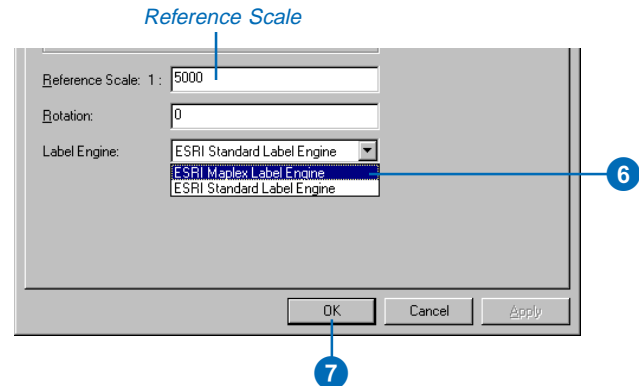
5. Click the General tab.



This map has a reference scale of 1:5,000. This means that, regardless of the current map scale, the feature and font symbol sizes drawn onscreen are scaled relative to their size at 1:5,000 scale. Zooming out makes the

symbols and fonts appear smaller, and zooming in makes them appear larger. When you are making a map that will be printed at a particular scale, it is a good idea to set the reference scale before you begin labeling the map. Otherwise, you will not have a clear idea how the map labels will appear when the map is printed; more labels will appear on the map when you are zoomed in and fewer when you are zoomed out. With a reference scale, labels behave more like annotation.

6. Click the Label Engine dropdown arrow and click ESRI Maplex Label Engine.



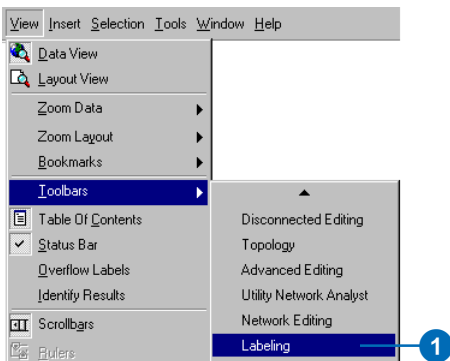
7. Click OK.

The Maplex Label Engine will automatically start to recalculate the placement of the map's existing labels. Some of the labels that were previously visible may disappear, and the formatting of others may change. You will adjust the label placement settings later to ensure that all of the labels will be placed and formatted to suit your map design.

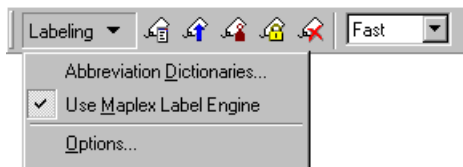
Adding the Labeling toolbar

Maplex for ArcGIS adds some tools to the Labeling toolbar. Now you'll add the Labeling toolbar to ArcMap.

1. Click View, point to Toolbars, and click Labeling.



Because the Maplex for ArcGIS extension has been installed, the Labeling toolbar includes the Placement Quality dropdown list, and the Labeling menu has some new items. These additional controls are active because you turned on Maplex for ArcGIS in the Extensions dialog box. You can dock the toolbar to the ArcMap window, or you can leave it floating.



The tools on the Labeling toolbar are:

Abbreviation Dictionaries—Lets you specify how words in labels are abbreviated.

Use Maplex Label Engine—Lets you switch the Maplex Label Engine on or off for the active data frame.

Options—Lets you set basic and advanced Maplex Label Engine options for the active data frame.

Label Manager button—Lets you control all of the label classes in your map from a single dialog box.

Label Priority Ranking button—Lets you control the order in which label classes are placed. More of the labels from higher priority classes are usually placed.

Label Weight Ranking button—Lets you control the relative importance of features as barriers to label placement.

Lock Labels button—Locks the labels displayed in the current extent. This allows you to navigate around a map without having to wait for the label placements to be recalculated each time you pan or zoom.

View Unplaced Labels button—Shows the labels that could not be placed in a different color (the default color is red).

Placement Quality dropdown list—“Fast” allows you to place labels quickly using a simple calculation. “Best” uses a more complex calculation and takes longer.

Reviewing the labeling requirements for the map

Next you'll use Maplex for ArcGIS to label the features on your map to meet the assessor's specifications.

Two pieces of information, a serial number and a parcel number, must be displayed on the map for each parcel. This information is stored in two different fields of the parcel attribute table, and for labeling purposes they are concatenated together using a simple label expression. Since all of the information is numeric, the parts of the label should be stacked so that each number is placed on its own line where it can be clearly identified. When you switched to the ESRI Maplex Label Engine, many of the labels were stacked in order to fit them on the map. You will change the labeling options so that all of the labels will be stacked.

To avoid ambiguity about which labels belong to which parcels, the labels must fit within the parcels. The assessor's office works with printed maps at a 1:5,000 scale. This map already has a reference scale set to 1:5,000, so fonts and symbols on the map are drawn so that their size would be correct when printed at 1:5,000. Many of the parcels are too small when represented at this scale to contain the labels at their current font size. To allow labels for these parcels to be placed, you will allow the Maplex label engine to reduce the font size of labels, when necessary, to fit them in the parcels.

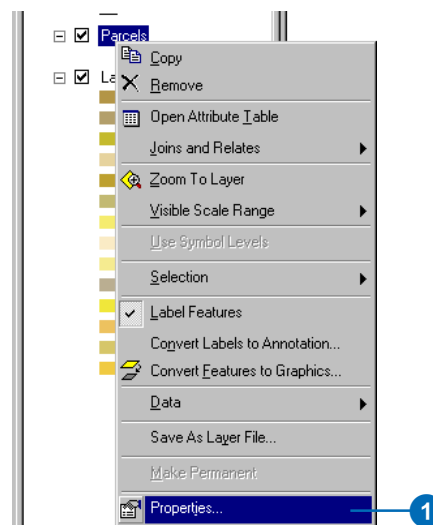
The perimeters of the parcel polygons must be labeled with the length of the parcel boundaries. In order to make these labels easily legible, the text should be aligned with and slightly offset from the line symbol.

The streets are currently labeled with their street names. Because each street is represented by multiple street features, some of the streets have too many labels. This is a common problem with street labels. You'll improve the street labeling by identifying these line features as streets for the Maplex Label Engine, which will then consider all street segments of the same name to be one feature for labeling purposes.

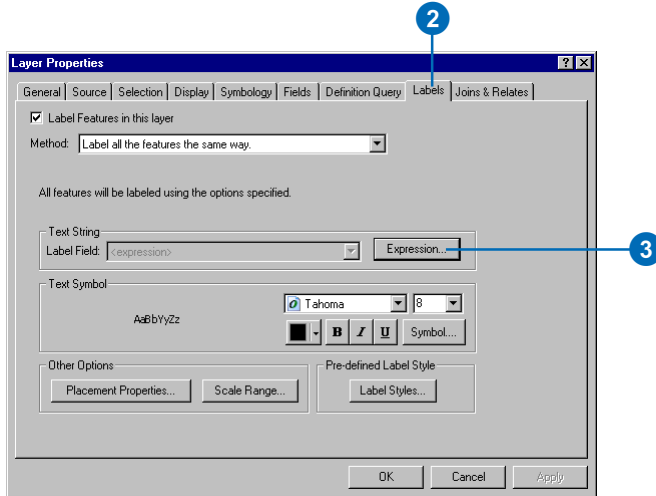
Viewing the Parcels layer label expression

You'll begin by making the Parcels layer match the assessor's specifications.

1. Right-click Parcels and click Properties.



2. Click the Labels tab.



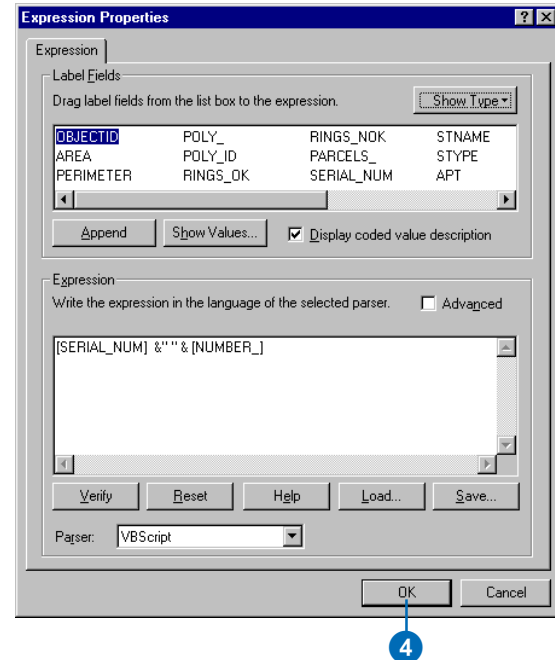
The Label Features in this layer check box is checked, as the layer was saved with labeling turned on. If you were starting to label a new layer, you would need to check this box.

The label placement method is set to label all the features the same way. In this exercise, you will use this method of labeling the layer. It is also possible to define classes of features within a layer and label them in different ways. See the topics on labeling classes in Chapter 3 of this book for more information on setting up multiple label classes for a layer.

3. Click Expression.

This layer already has a label expression that concatenates the values of two numeric fields, SERIAL_NUM and NUMBER_, with a space character between them to produce the labels for the parcel polygons.

4. Click OK.

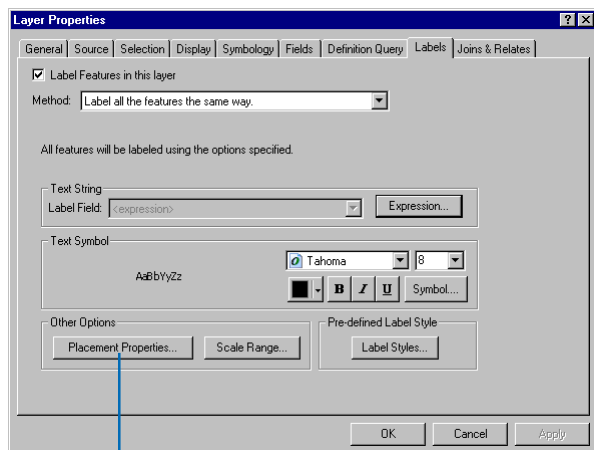


In the next task, you will use the space character between the quotation marks to split and stack the labels.

Stacking all of the parcel labels

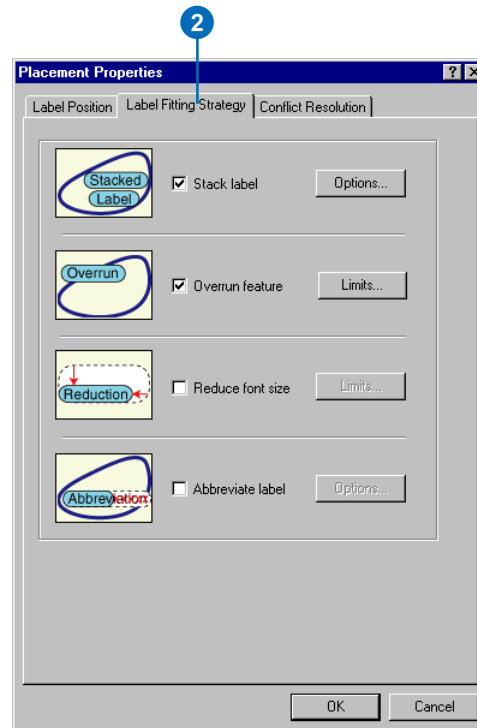
Your map requirements state that, in addition to being separated by a space, the two parts of the parcel labels should be stacked. When you switched to the ESRI Maplex Label Engine, many of the labels were stacked to make them fit within the parcels, though the labels in larger parcels may not have been stacked. Now you will force all of the labels to be split and stacked at the space character.

1. Click Placement Properties.



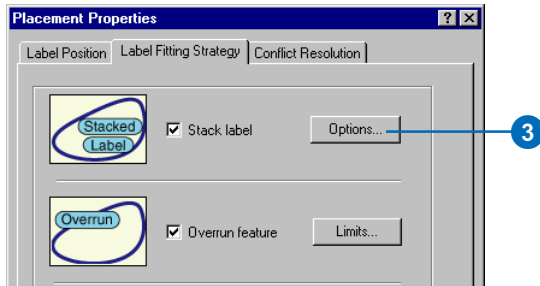
The Placement Properties dialog box appears. This dialog box has three tabs that vary in appearance depending on whether you are labeling a point, line, or polygon layer. These tabs allow you to control how the ESRI Maplex Label Engine places labels.

2. Click the Label Fitting Strategy tab.



Note that the first label fitting strategy on this list, Stack label is checked by default. This means that the ESRI Maplex Label Engine will try to make labels more compact by splitting and stacking them on two or more lines when space is an issue.

3. Click Options to change the label stacking options.



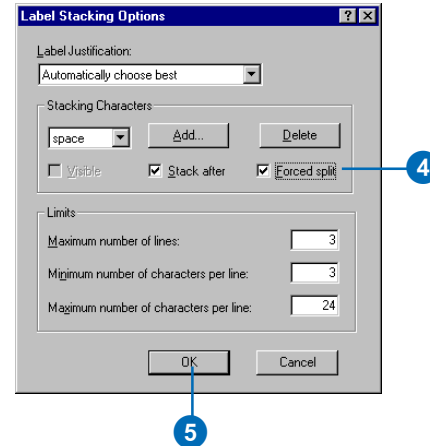
The Label Stacking Options dialog box appears.

This dialog box allows you to control how the stacked lines within the label are justified, what characters will be used to split lines, where the split should occur relative to the stacking characters, and whether or not the stacking characters should be visible in the label. It also allows you control whether stacking occurs only when space is an issue or whenever a stacking character is encountered in the label. Finally, it allows you to control the overall shape of the stacked label by specifying the number of lines and the minimum and maximum number of characters per line in the label.

The Stacking Characters dropdown list shows all of the stacking characters that Maplex will use to split and stack labels. By default three characters—a space, a comma, and a hyphen—may be used to split a label. The Add and Delete buttons allow you to change the list of stacking characters. You can specify for each character in the list whether it will always split a label by checking Forced split.

Space is the first stacking character in the default list, and it is the one that you want to use to split and stack the parcel labels.

4. Check Forced split.



All labels will be automatically split and stacked at the space character.

5. Click OK.

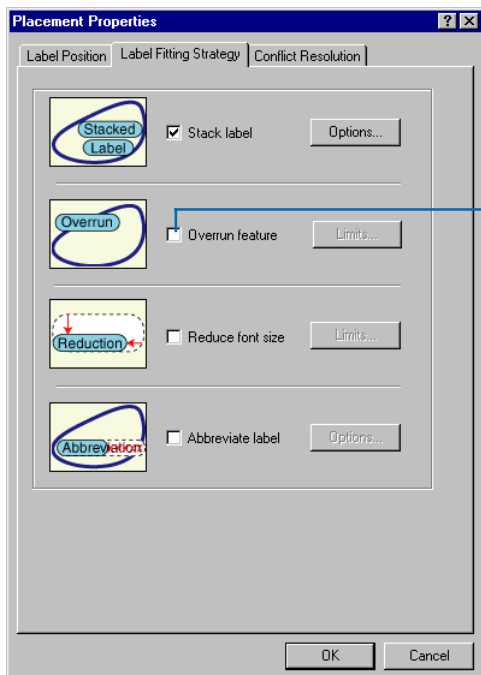
If a label contains either of the other two stacking characters, it might also be split at those characters if it made the label or its neighbors easier to place.

You've set the labels to fit the first of the assessor's specifications. In the next step, you'll make sure that all the labels fit within their own parcels.

Making all parcel labels fit within parcels

Many of the parcel labels fit inside the parcels at the moment, but some don't quite fit. The parcels map specification requires that all parcel labels fit within the parcels, so you'll set Maplex to force the labels to fit.

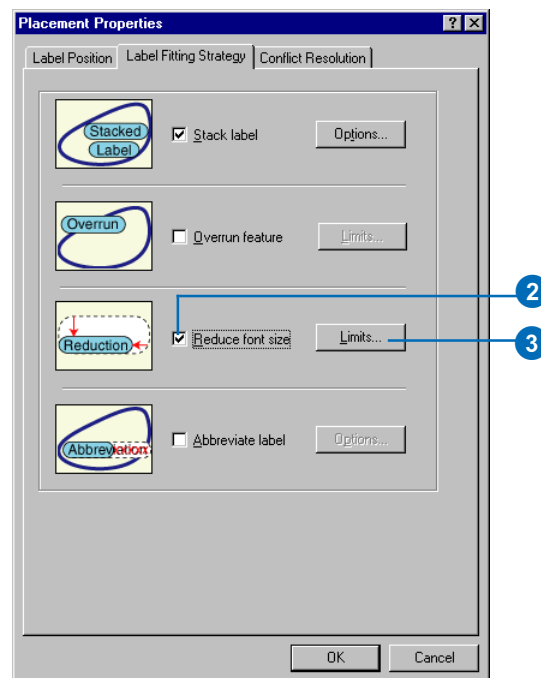
1. Uncheck Overrun feature.



Labels may no longer overrun the boundary of polygons. However, this creates a new problem: some of the labels are larger than the polygons at the 1:5,000 map scale. Now that they cannot overrun the polygons, these labels will not be placed. To place them, you'll

need to allow the Maplex Label Engine to reduce their size.

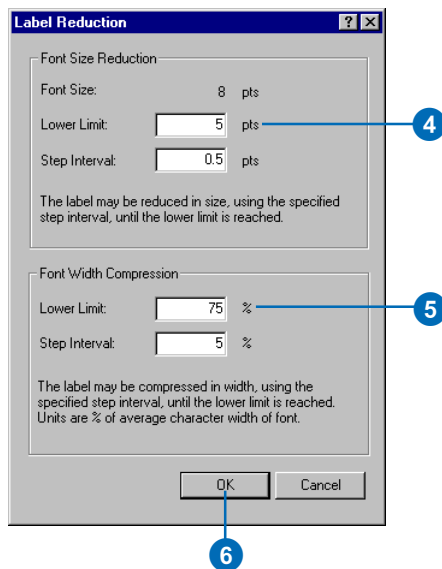
2. Check Reduce font size.



3. Click Limits.

The current font size is displayed at the top of the Label Reduction dialog box. In this case it is 8 points. You'll allow the font size to be reduced by three points, to 5 points, in increments of one-half of a point. You'll also allow the width of the font to be compressed to three-quarters of its original width.

4. Type "5" in the Lower Limit text box, under Font Size Reduction.



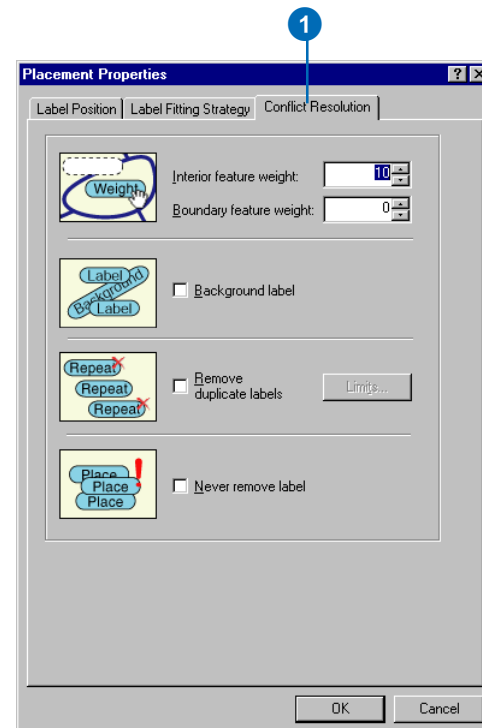
5. Type "75" in the Lower Limit text box for Font Width Reduction.
6. Click OK.

The labels will be placed inside the parcels and reduced slightly in size when space is an issue.

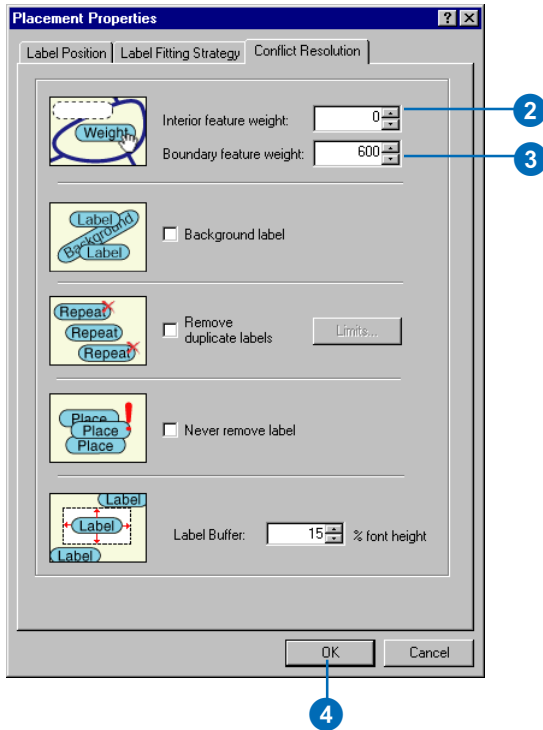
Setting the priority weighting of the parcels and labels

Maplex for ArcGIS first places labels in empty areas on the map. Sometimes, due to space constraints, labels must overlap features. You can control which labels have placement priority and how labels may overlap features by setting weights.

1. Click the Conflict Resolution tab.



2. Type “0” for the Interior feature weight text box.



A weight of zero means that the map space used by that feature or label can still be regarded as available for other map labels or features.

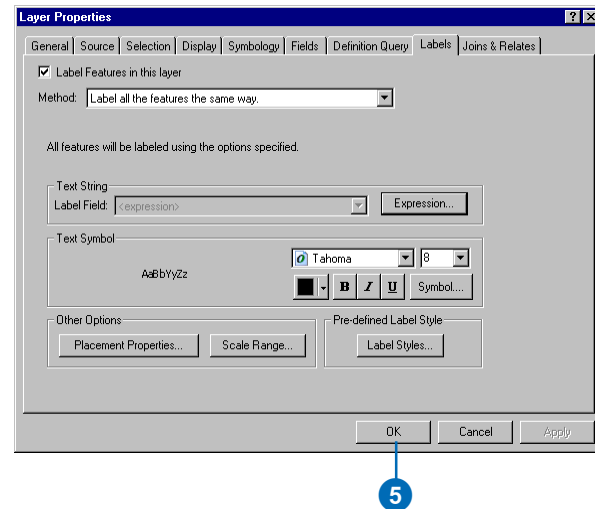
3. Type “600” for the Boundary feature weight.

A label or feature with a weight of one thousand may not be overlapped. A weight of 600 is an intermediate value that will tend to prevent labels from overlapping

the parcel boundaries. If a feature or label must be overlapped by a label, Maplex will choose to overlap the feature or label with the lower weight.

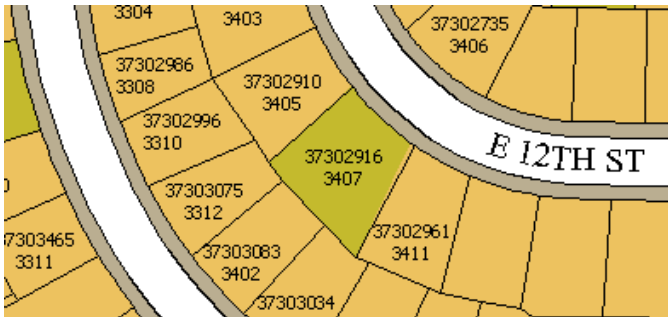
4. Click OK.

5. Click OK.

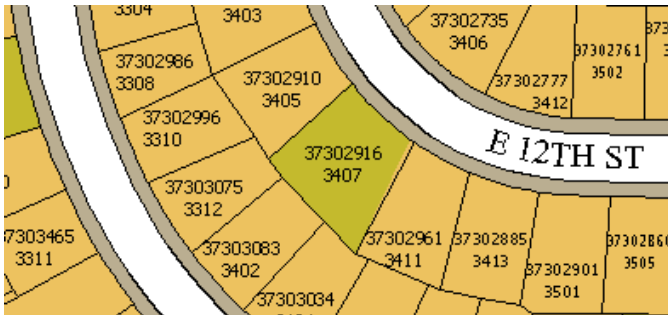


The map labels will be recalculated by Maplex for ArcGIS according to the new rules you have applied to the Parcels layer.

Take a moment to compare the labeling results from before and after you made these changes.



Before the changes you made, many labels were unplaced because of conflicts with features or other labels.



After you enabled font size reduction and font width compression, more labels could be fit onto the map without space conflicts.

You've met the assessor's map specification for labeling the parcels. In the next section, you'll work on labeling the lot lines.

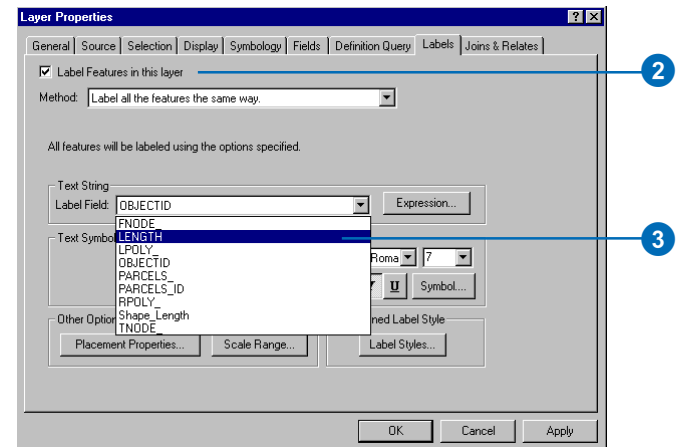
Labeling the parcel boundaries

The lot lines between the parcels are stored in a separate line feature class. One of the requirements for the map is that these lines must be labeled with their length. In this section, you will label the parcel boundaries.

1. Right-click Parcel Boundaries and click Properties.



2. Check the box to Label Features in this layer.



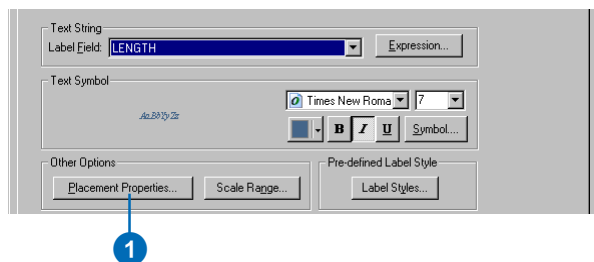
3. Click the Label Field dropdown arrow and click LENGTH so the parcel lines will be labeled with the right attribute.

The parcel boundaries will be labeled with their length.

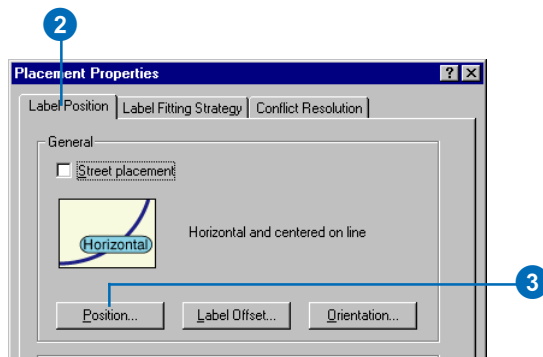
Aligning labels with the parcel lines

According to the assessor's map specification, the labels for the parcel lines should be aligned with the lines. You'll make sure that the label position aligns with the lines.

1. Click Placement Properties.



2. Click the Label Position tab.

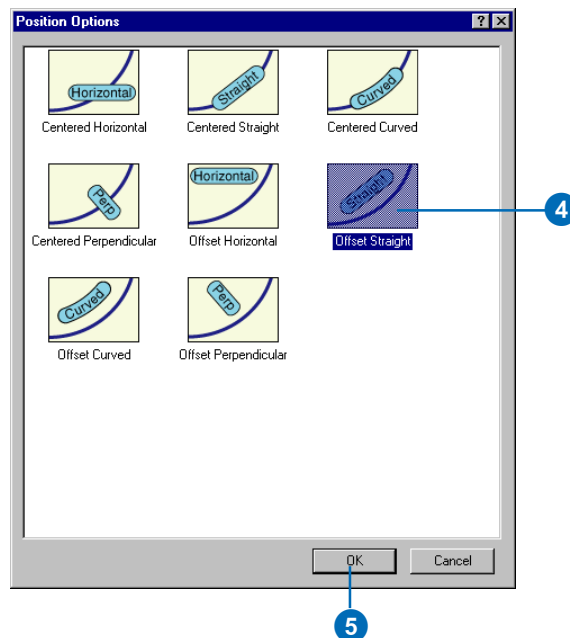


3. Click Position.

The Position Options dialog box appears. There are different position options available for point, line, and polygon features. Because you are labeling the parcel

lines, you see the label position options that are available for line features.

4. Click Offset Straight.



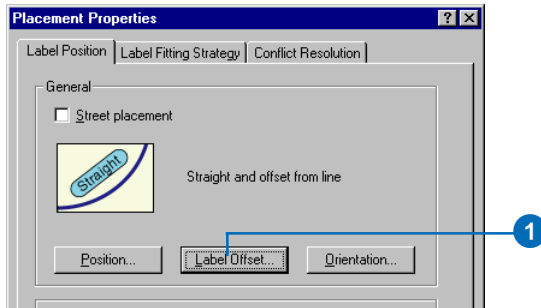
5. Click OK.

The parcel line labels will now be aligned with the lines.

Offsetting labels from the parcel lines

To make the line lengths easier to read, you will offset the labels slightly from the parcel lines.

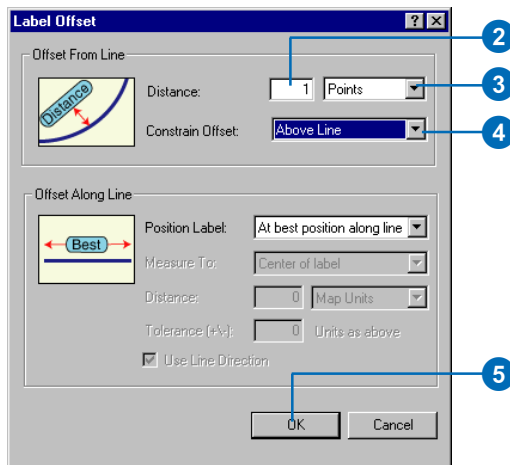
1. Click Label Offset.



The Label Offset dialog box appears.

You can set offsets at a distance from a line and from the end of a line. For this map, you want the labels to be offset from the lines by one point.

2. Type “1” in the Distance text box.



3. Click the dropdown arrow and click Points.

4. Click the dropdown arrow and click Above Line.

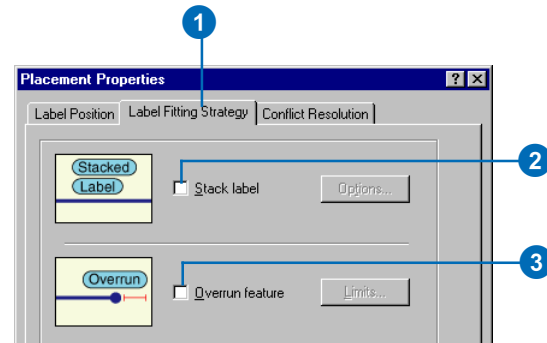
5. Click OK.

The parcel line labels will be placed one point above the lines.

Adjusting the label-fitting strategy for parcel lines

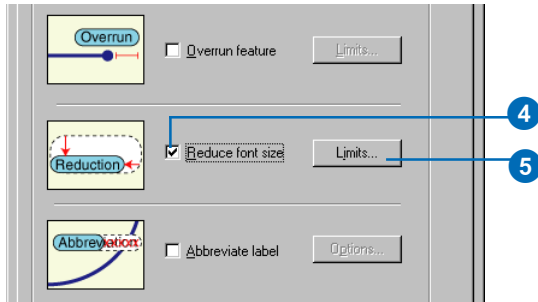
Now that you have set up the placement for the parcel line labels, you will adjust the label-fitting strategy. You will turn off stacking, allow the labels to extend slightly beyond short parcel line features, and let the label engine reduce the font size where that will allow it to place more labels.

1. Click the Label Fitting Strategy tab.

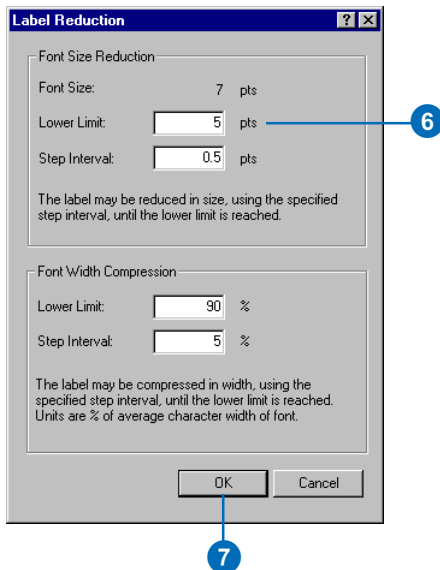


2. Uncheck the Stack label box so the labels won't be stacked.
3. Uncheck the Overrun feature box so the labels will not extend beyond the ends of the parcel lines.

4. Check the Reduce font size box.



5. Click Limits.
6. Type "5" in the Lower Limit text box to set the lower limit on the font size for the parcel line labels.



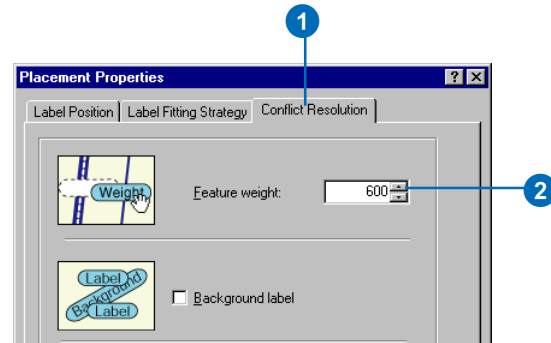
7. Click OK.

The parcel line labels will now be able to extend slightly beyond the shorter line features and may be reduced to as small as 5 points from their base font size of 7 points. This will allow a greater number of larger labels to be placed where there is more space available and smaller labels where there is less.

Adjusting the conflict resolution strategy for parcel lines

Now that you have set the label-fitting strategy for the parcel line labels, you will adjust the conflict resolution strategy.

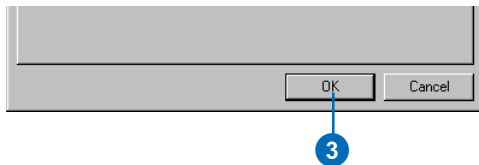
1. Click the Conflict Resolution tab.



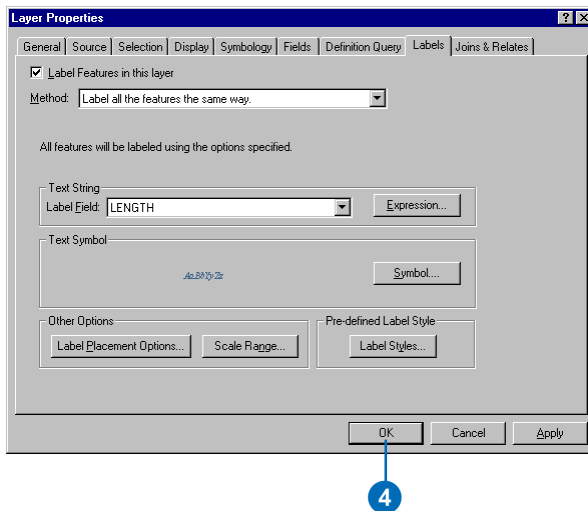
2. Type 600 in the Feature weight text box.

This is an intermediate weight value that will usually prevent these labels from overlapping the parcel line features, unless the other positions are blocked by more highly weighted features.

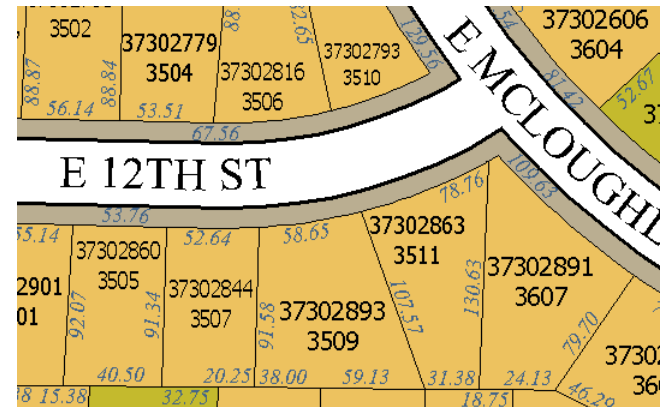
3. Click OK.



4. Click OK.



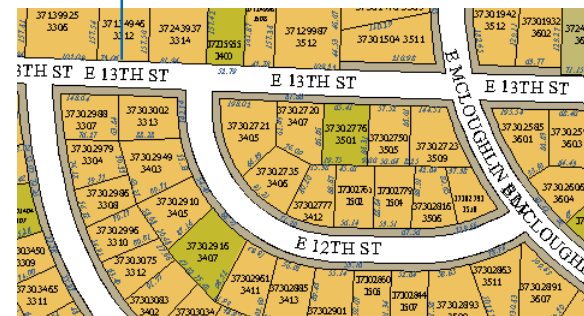
You've finished setting the labeling parameters for the parcel line features; they should now be placed according to the assessor's map requirements.



Removing the extra street names

There is one last label placement problem to fix. The street labels are currently repeated for some streets. This is because the streets are represented by several separate features, and each feature is currently being labeled. To reduce the visual clutter this causes on the map, you will remove the redundant street labels.

Redundant street label

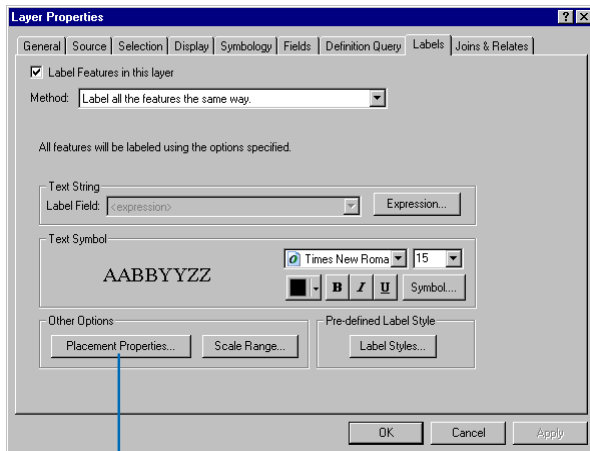


1. Right-click Streets and click Properties.

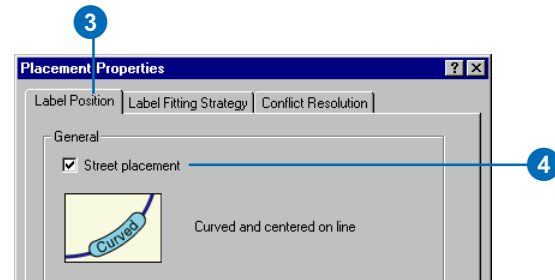


The Layer Properties dialog box appears.

2. Click Placement Properties.



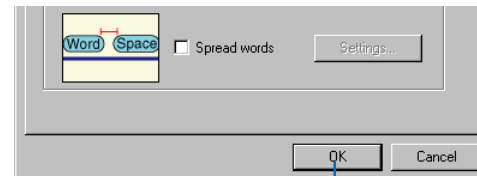
3. Click the Label Position tab.



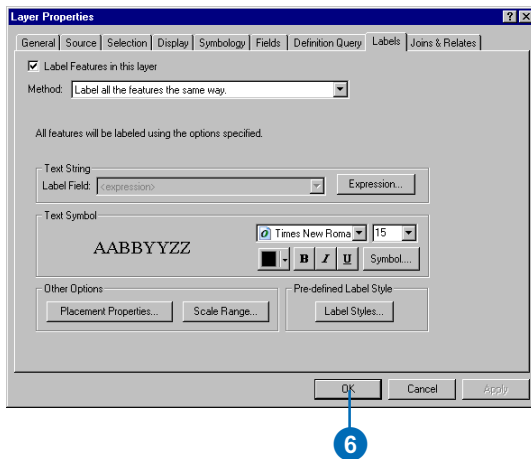
4. Check the box for Street placement.

Checking the Street placement box makes the ESRI Maplex Label Engine merge connected features with the same label, for purposes of labeling.

5. Click OK.

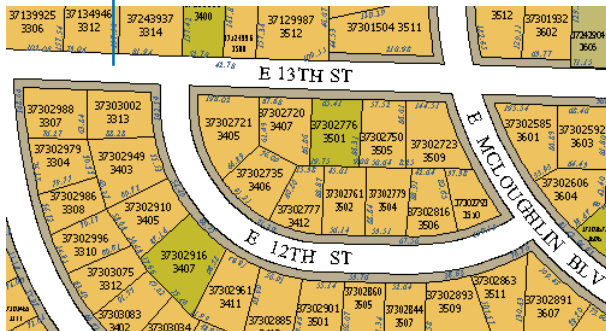


6. Click OK.



The map is redrawn and the redundant street labels are removed. Some streets may still have more than one label, however, to reduce ambiguity after intersections.

Redundant street label has been removed



On the Labeling toolbar there are two placement quality options, Fast and Best. Fast presents a quicker preview of the placed labels and is the default option. The Best option uses more complex placement calculations and places the labels in their final position.

7. Click the Placement Quality dropdown arrow and click Best.



You've succeeded in making the map labels conform to the assessor's requirements. At this point you could switch to layout view; add map elements such as a scalebar, North arrow, and legend; and print the map for the assessor.

In the next section, you will make the labels available for other departments that do not have Maplex for ArcGIS. To do this, you will need to convert the labels to annotation.

Converting labels to annotation

The labels that Maplex for ArcGIS generates are dynamic labels—they are placed each time the map is redrawn on the screen, unless you lock the labels using the Lock Labels button on the Labeling toolbar. When you save a map that uses the ESRI Maplex Label Engine, the map can be shared with others who have Maplex for ArcGIS installed on their computer, and the same parameters will be used to place the labels. However, people who have ArcMap but not Maplex for ArcGIS cannot see labels created using Maplex

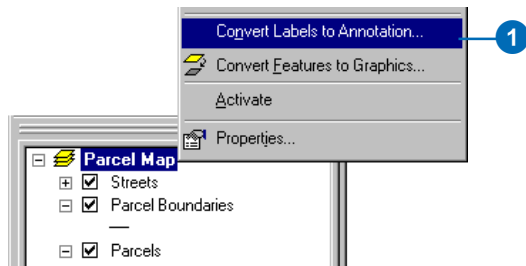
for ArcGIS. To share the labels, you must convert them into annotation and store them in a particular map document or in a geodatabase.

Storing annotation in a map document is a good option if there is relatively little of it, usually less than 100 pieces, and if it is only intended to be used with that map. Map document annotation may be organized into annotation groups, which can also be used to store other graphics. This kind of annotation is only editable using the tools on the Drawing toolbar and cannot be shared between map documents.

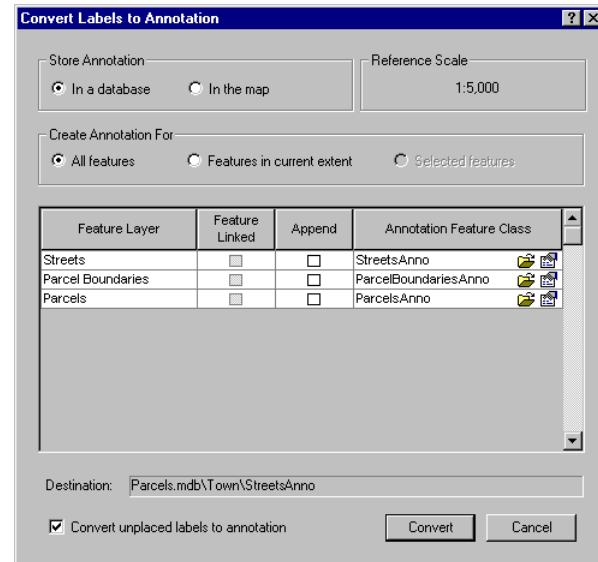
Storing annotation in a geodatabase is generally a better option than storing it in a map document. Annotation in a geodatabase is stored in annotation feature classes. These are editable with the Editor and Annotation toolbars and can be added to many maps. Drawing performance is better with geodatabase annotation, and such annotation is easier to edit and share.

You will convert this map's labels to annotation stored in a geodatabase so they can be shared by other departments.

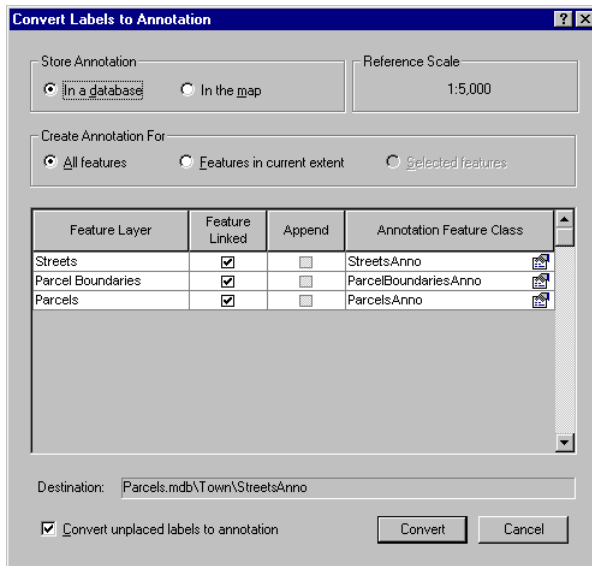
1. Right-click Parcel Map in the ArcMap table of contents and click Convert Labels to Annotation.



Depending on whether you are using an ArcView® or a higher (ArcEditor™ or ArcInfo™) licensed seat of ArcMap, there will be some differences in the Convert Labels to Annotation dialog box. The following screenshots illustrate those differences.



The Convert Labels to Annotation dialog box with an ArcView licensed seat of ArcMap. Creating feature-linked annotation is only possible with an ArcEditor or ArcInfo license. If you have geodatabase features labeled, the annotation will be stored in the current geodatabase by default, but you can browse to another geodatabase.

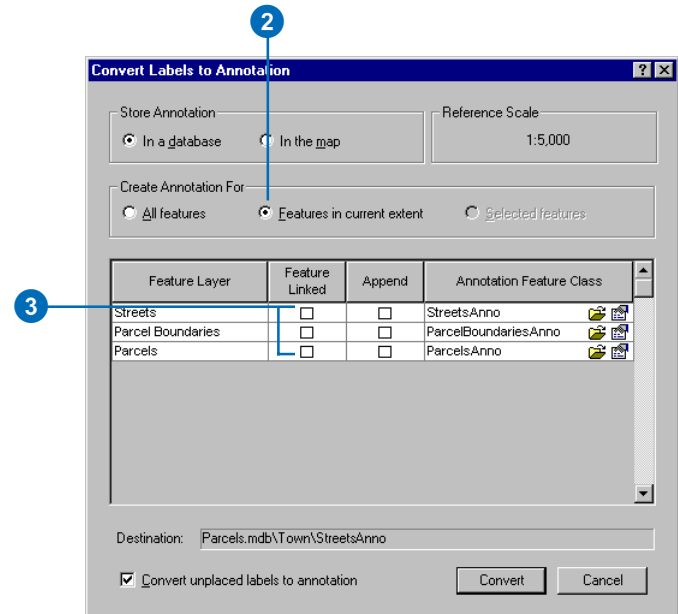


The Convert Labels to Annotation dialog box with an ArcEditor or ArcInfo licensed seat of ArcMap. Annotation will be feature-linked and stored in the current database by default. If you choose not to create feature-linked annotation, you can browse to the database where you want to store the annotation. Feature-linked annotation must be stored in the same geodatabase as the features to which it is linked.

The Convert Labels to Annotation dialog box allows you to convert the labels from each of the visible labeled layers on the map. If you did not want to convert a layer's labels to annotation, you could uncheck that layer in the ArcMap table of contents or turn labeling off for it before starting to convert the labels. You can convert labels to annotation for one layer at a time by right-clicking the layer instead of the data frame, then clicking Convert labels to annotation.

You will convert these labels to standard annotation, and to reduce processing time, you will only convert the labels in the current extent.

2. Click Features in current extent.



3. If the Feature Linked boxes are checked, uncheck them to create standard annotation features.

The Append check boxes allow you to store the new annotation features in an existing annotation feature class. You will not use this option, as there are no annotation feature classes in this geodatabase.

The names of the new annotation features classes are shown in the Annotation Feature Class column. You

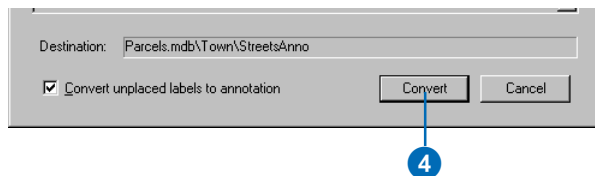
could type a new name for each annotation class, but for this exercise, you will accept the default names.

The Browse buttons beside the new annotation feature class names let you navigate to a geodatabase to store the annotation. You will store the annotation in the same geodatabase as the feature classes on the map.

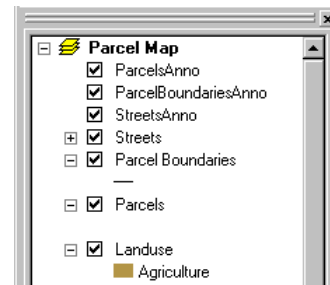
The Properties buttons let you control some details of how the annotation is stored and how it will behave during editing. You can enforce a consistent style and reduce database storage space for the annotation by requiring editors of the annotation features to select the symbol from the annotation symbol table. When you create feature-linked annotation, you can also control whether or not new annotation features are created when new features are created in the related feature class and whether the annotation will be updated when a related feature's shape is edited. When you store the annotation in a multiuser geodatabase, you can also specify a configuration keyword to set RDBMS-specific storage parameters for the feature class.

You do not need to set any of these advanced annotation properties for this exercise.

4. Click Convert.



A message box appears reporting the status of the conversion process. This process may take a minute or two because ArcMap is recalculating positions for all of the labeled features in the current extent, then converting them to annotation. When the conversion process is complete, three new layers are added to the map.



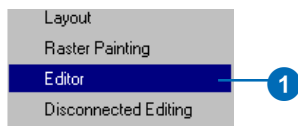
Next you will begin editing so you can place annotation derived from labels that could not be placed by the label engine.

Starting editing

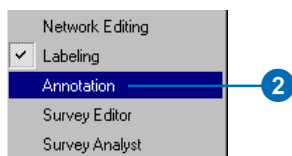
Some of the labels could not be placed on the map because of space constraints. These labels were converted to annotation features in the new feature classes, but they are marked as unplaced and do not appear on the map.

Unplaced annotation features are geodatabase features and must be added during an edit session. Now you'll start editing and get ready to place the unplaced annotation.

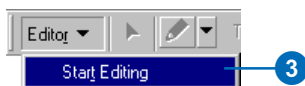
1. If the Editor toolbar is not currently visible, right-click on any toolbar and click Editor.



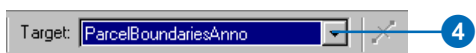
2. If the Annotation toolbar is not currently visible, right-click on any toolbar and click Annotation.



3. Click Editor and click Start Editing.



4. Click the Target dropdown arrow on the Editor toolbar and click ParcelBoundariesAnno.



5. Click the Unplaced Annotation Window button on the Annotation toolbar.



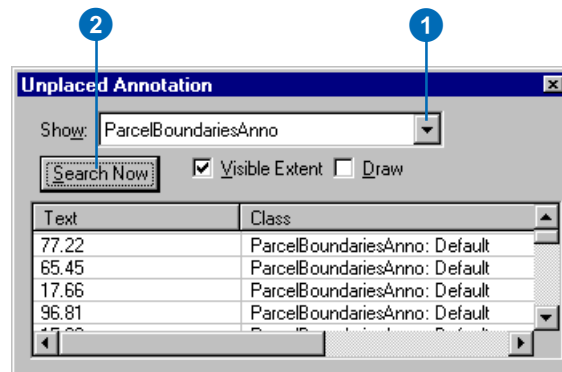
The Unplaced Annotation window appears. You can resize it, dock it to the ArcMap window, or leave it floating.

Next you'll place some unplaced annotation.

Placing unplaced annotation

The Unplaced Annotation window lets you manage the process of placing or deleting the unplaced annotation. You'll use the Edit Annotation tool on the Annotation toolbar to edit the annotation feature after you place it.

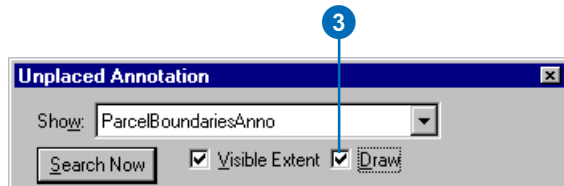
1. Click the Show dropdown arrow and click ParcelBoundariesAnno.



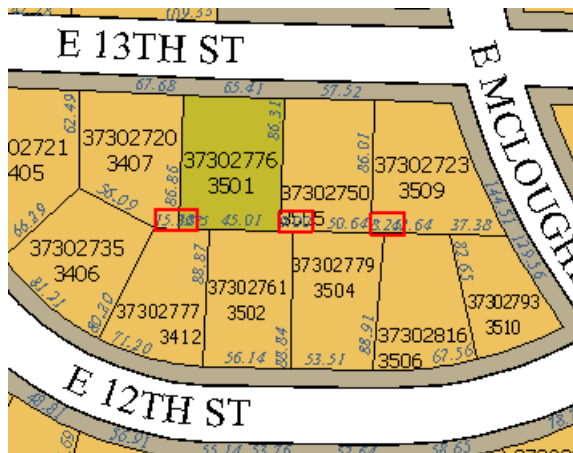
2. Click Search Now.

A number of annotation features could not be placed. Several of these were labels of features that were only partly within the visible map extent. These would probably have been placed if you had converted all of the labels to annotation, instead of just those in the visible extent.

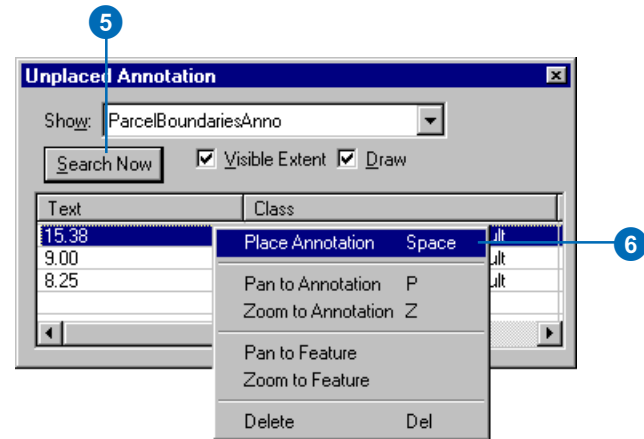
3. Check the Draw box.



4. Click the Zoom In tool and zoom in to the area between E 12th Street and E 13th Street.



5. Click Search Now.

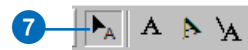


6. Right-click the first label on the overflow list and click Place Annotation.

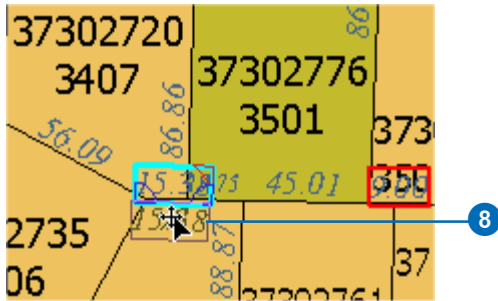
You could also use this context menu to pan or zoom to the unplaced annotation feature's location or to delete it.

The annotation feature appears on the map.

7. Click the Edit Annotation tool.

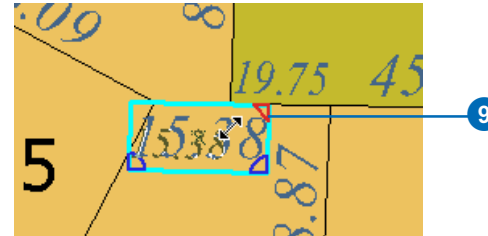


- Click in the middle of the annotation feature and drag it below the parcel boundary line.

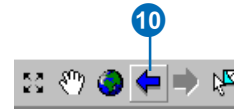


When you place the pointer on the middle of the annotation feature, you see the Move pointer. Clicking the middle of the annotation feature and dragging it with this pointer allows you to move the annotation feature. If you click and drag one of the blue Rotate handles on the lower right and left corners of the annotation feature, you can pivot the feature around the other Rotate handle. The red handle is the Resize handle. You'll use it to make the annotation feature smaller. The pointer becomes the Resize pointer when it is over the Resize handle. Dragging toward the center of the annotation feature makes it smaller. Dragging away from the center makes it larger.

- Click the red Resize handle on the upper right corner of the annotation feature and drag it down and toward the middle of the feature. When the annotation feature seems small enough, release the mouse button.



- Click the Back to Previous Extent button.



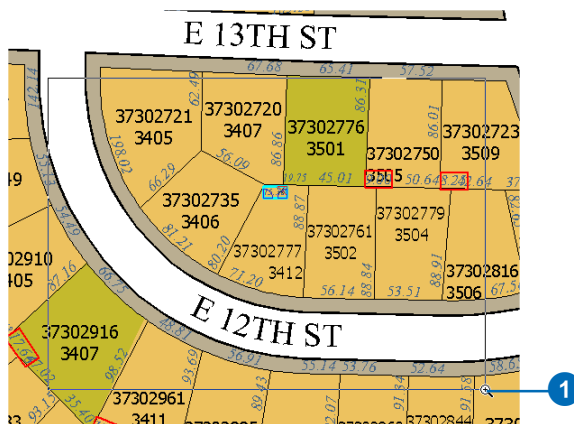
You have placed one of the unplaced annotation features, moved it into the correct position, and resized it to fit. You can find and place the other unplaced annotation features using the same technique.

You can also use the tools on the Annotation toolbar to edit annotation features on the map. In the next section, you will edit one of the street names that was placed when you converted the labels to annotation.

Editing an annotation feature

Some of the annotation that was placed by the ESRI Maplex Label Engine may not be exactly where you want it. Because annotation is editable, unlike labels, you can select these annotation features and move, modify, or delete them.

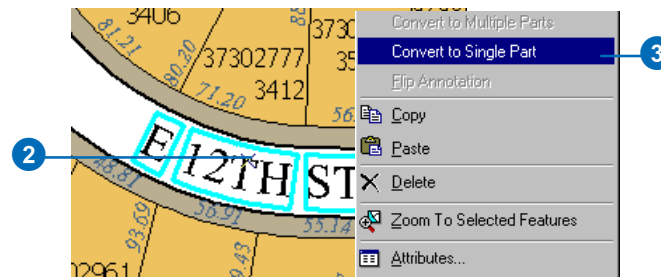
1. Press the Z key and click and drag a box around the E 12 TH ST area.



The Z key is an editing shortcut that lets you zoom in while you are using the editing tools. There are several other useful editing shortcut keys. For a complete list, look in the ArcGIS Desktop Help index under “Shortcut Keys” and the subtopic “for editing in ArcMap”.

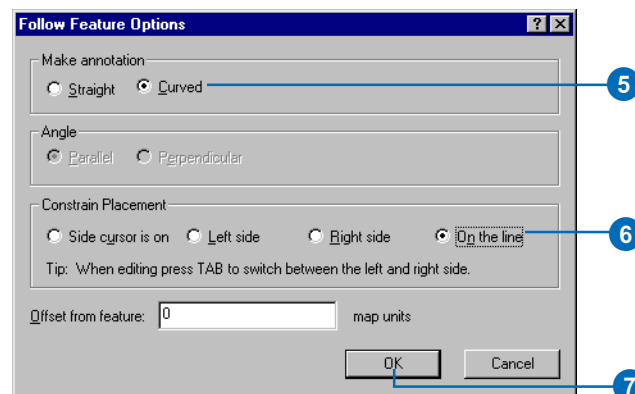
You are going to move the E 12TH ST annotation feature to a new location.

2. Click E 12TH ST.
3. Right-click and click Convert to single part.

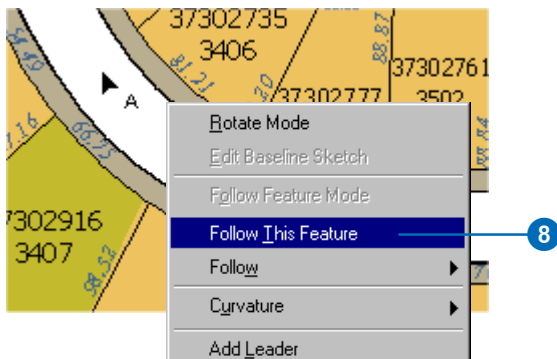


The parts of the annotation feature are aligned along the same path. You will constrain this annotation feature to follow the street feature, then move it.

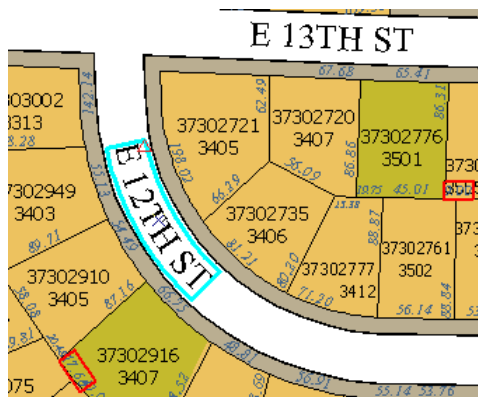
4. Press the O key.
5. Click Curved.
6. Click On the line.
7. Click OK.



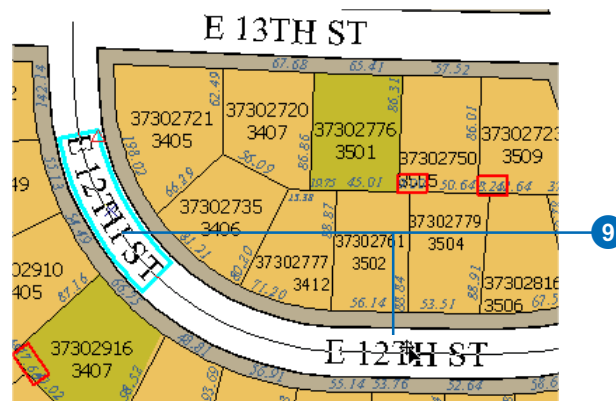
8. Move the pointer over the middle of the street feature, right-click, and click Follow this feature.



The street centerline flashes and the E 12TH ST annotation feature is placed along it where you clicked.



9. Click E 12TH ST and drag it to the right.



The annotation feature is constrained to follow the street feature.

You've used Maplex for ArcGIS to label a map, converted the labels to annotation features in a geodatabase feature class, and placed and edited some of the annotation. For more information about editing annotation, see the section on editing annotation in *Editing in ArcMap*.

The remainder of this book contains more detailed information about how to use Maplex for ArcGIS to produce high-quality labels for your maps.

Labeling in ArcGIS

3

IN THIS CHAPTER

- Labels and annotation
- Better labeling with label classes and label expressions
- Using text formatting tags
- Using the Map Cache to improve geodatabase labeling performance
- Labeling features of a layer
- Creating label classes and expressions
- Managing the labels on a map
- Maplex for ArcGIS label placement properties
- Enabling the ESRI Maplex Label Engine
- Label management basics

This chapter covers some basic ArcMap labeling concepts that you should understand before using Maplex for ArcGIS. These concepts include the differences between labels and annotation, the work flow for generating annotation from labels, how to manage simple labels, and how to construct and manage complex label expressions and label classes. Understanding these concepts will help you get the best possible results when using Maplex for ArcGIS.

Labels and annotation

Controlling what features are labeled

Labels are dynamically generated in ArcMap. The labels for a feature class are created using attributes of features from a layer in the map, and you can save a variety of parameters with a layer to adjust the appearance of its labels. As you pan and zoom around your map, ArcMap adjusts the labels to fit the available space. At smaller scales, you may see fewer labels because ArcMap has less empty space in which to place them, unless you set a reference scale for the data frame.

Because not all features can always be labeled, you might want to prioritize the labeling of some features. For instance, on a map of Europe, you may want ArcMap to label a country with its name instead of labeling a city if both labels won't fit. You can set the labeling priority for each layer on the map. When there are label placement conflicts, a feature in a layer with a higher priority will be labeled before a feature in a layer with a lower priority. Similarly, within a single layer you can set labeling priorities on specific groups of features—for example, you might set a high labeling priority on cities with larger populations and a low priority on cities with smaller populations. Groups of features within a layer are represented by label classes.

Labels are most useful for interactive maps, where the scale and extent varies with use and where it is not critical that any given label be placed in a particular spot. When you use such labels, there is no guarantee that you'll get exactly the labels you want, positioned exactly where you want them. When you need precise control over the placement of labels, such as when you are creating a map for publication, you must manage the labeling process more closely.

Maplex for ArcGIS is useful for creating high-quality dynamic labels for everyday use and for maximizing the number and quality of labels placed on a map. If you need even more control

of the placement of labels on a map, you may choose to refine the positioning of labels with Maplex for ArcGIS, then convert the labels to *annotation*.

Getting text exactly where you want it

When you need to be able to specify exactly where descriptive text will appear on a map, you can convert the labels to annotation. Converting labels to annotation allows you to manually adjust the label for each feature. Annotation differs from labels in that annotation is text that is stored at a specific geographic location. After you've converted labels to annotation, you can work with each piece of annotation independently—to move it, change its size or font, or change the text. For example, you might want to move a few pieces of annotation to make room for one that ArcMap was unable to place. ArcMap also provides you with a list of all the labels that weren't placed during the conversion process and lets you interactively place them on your map as needed.

While annotation is typically text, it can also be any graphic element that annotates your map—such as lines, circles, and polygons.

Another reason to convert labels to annotation is to enable you to share the high-quality labels generated by Maplex for ArcGIS when you publish an ArcIMS® service, a published map format (PMF) file for someone who has ArcReader™, or when you share the map document with someone who has ArcMap but not the Maplex for ArcGIS extension.

Deciding where to store annotation

Once you've decided to convert labels to annotation, you have a choice of where to store the annotation. You can store annotation in the map document in an *annotation group*, or you can store

annotation in a geodatabase as an *annotation feature class* and reference it like other data on your map.

Storing annotation in a geodatabase is similar to storing geographic features—line, point, and polygon—in a geodatabase. You can add annotation stored in a geodatabase to any map, and it will appear as a *layer* in the map's table of contents. A given annotation feature class can have *annotation classes* that store different sorts of annotation, somewhat like the different label classes that can be associated with a given feature layer. Every annotation feature class has at least one annotation class; to add more than one, or to edit an annotation feature class with multiple annotation classes, you need an ArcEditor or ArcInfo license.

When you convert the labels of a layer with multiple label classes to annotation in a geodatabase, you will get different results depending on your licensing. With an ArcView license, the label classes are merged into a single annotation class in the annotation feature class. The text symbol from each label class will be available in the Symbol dropdown list when you use the tools on the Annotation toolbar to edit the annotation feature class. With an ArcEditor or ArcInfo license, the label classes will be converted into separate annotation classes within the annotation feature class. The text symbol from each label class will be associated with the corresponding annotation class. Annotation feature classes with multiple annotation classes can be viewed but not edited with an ArcView license.

Where should you store annotation? The answer to this question depends on how you plan to use the annotation. Here are some guidelines:

- If you're creating a map specifically for printing and the annotation you've created applies only to this map, store the annotation in an annotation group in the map document.

Then, if you delete the map, the annotation is also deleted because it's stored in the map.

- If you want to use the annotation on other maps—because you've invested time and effort to position each piece—store it as an annotation feature class in a geodatabase. You can add the annotation as a layer to other maps.
- If you intend to use the map to interactively browse your data and that map has numerous labels—as a general rule, more than 100—store them as an annotation feature class in a geodatabase for better drawing performance. ArcMap can access and display an annotation feature class more rapidly than annotation in an annotation group in the map document.

You can also link annotation in a geodatabase directly to the feature it annotates, creating *feature-linked annotation*. Then, if you move the feature, the annotation moves with it; if you delete the feature, the annotation is also deleted; and if you change the attribute of the feature that the annotation is based on, the text of the annotation changes. To create or edit feature-linked annotation, you need an ArcEditor or ArcInfo license.

You create feature-linked annotation for a specific feature class—rather than the entire map—and store it in the geodatabase along with the feature class it's associated with. You'll typically create feature-linked annotation while editing your geographic data with the Editor tools. However, you can also convert labels into feature-linked annotation.

For more information on working with feature-linked annotation, see *Building a Geodatabase*.

Better labeling with label classes and label expressions

Labeling a map well entails more than simply placing a label near each feature. All the labels on a map must exist in harmony with each other so the map is legible and unambiguous. In order to be useful, labels must clearly and quickly identify named features for a map reader.

When labeling your map, you should have a clear sense of the purpose of the map and its intended audience. This will help you decide what features should be labeled. For example, a general reference map of a city might only include labels for major transportation arteries, while a street map of the same city might have labels for all streets.

Creating multiple labeling classes for a single layer

One way to improve the legibility of a map is to use different symbols for the labels of different kinds of features. By default each feature layer on the map will have one type of label. However, often you will want to label groups of features within a single layer differently. For example, in a streets layer, major streets might be labeled in a larger font than residential streets. You can create different label classes for a layer based on unique attribute values, the feature symbology, or a SQL query expression. Each label class can be assigned its own text string, text symbol, and placement options. See *Using ArcMap* for more details on label classes.

Using multiple fields in label expressions

Sometimes you may want to create labels that contain information stored in multiple attribute fields of a feature class, instead of simply labeling each feature with the contents of a single field. Label expressions allow you to concatenate text strings and the contents of one or more fields to create more informative labels. This is useful when you want features to be labeled with multiple

distinct pieces of information, such as the ID and area of a land parcel. It also allows you to add text to each label, for example, each parcel ID label could read “Parcel # [PARCEL_ID]”. This can also be useful when a modifier to an attribute is stored in another field, such as with street data where prefixes, such as North or South, may be stored separately from street names. You compose label expressions in the Expression Properties dialog box, which is accessible through the Expression button on the Labels tab of the Layer Properties dialog box and on the Label Manager dialog box. Each label class can have its own label expression.

Using scripts in label expressions

Label expressions can also contain VBScript or JScript to add logic, text processing, and formatting for the labels. Logic can be used in a label expression to label long features with one set of information and short features with another. Strings of characters from an attribute may be parsed and modified with scripts in label expressions. This could be used to capitalize the first letter of a street name when the street names are stored in lowercase or to specify that only the last five digits of a serial number be displayed. Label expressions can also contain *text formatting tags* to modify a part of a label so it is drawn differently from the base symbology assigned to the label. Text formatting tags are discussed in more detail in the ‘Using text formatting tags’ section of this chapter.

Use the VBScript & operator to concatenate strings. For example, this expression creates a label where the value of the PARCELNO field is preceded by the text “Parcel no: ”:

```
"Parcel no: " & [PARCELNO]
```

To control how decimal numbers are displayed, use the VBScript Round function. For example, this expression displays a field called Area rounded to one decimal place:

```
Round ([AREA], 1)
```

To convert your text labels to all uppercase or lowercase, use the VBScript UCase and LCase functions. For example, this expression makes a Name field all lower case:

```
LCase ([NAME])
```

To create stacked text, use the VBScript vbNewLine or vbCrLf constants between the field names:

```
"Name: " & [NAME] & vbNewLine & [ADDRESS_1] &  
vbNewLine & [ADDRESS_2]
```

Use the VBScript format functions to format your labels. For example, this expression displays the label as currency:

```
"Occupancy Revenue: " & FormatCurrency  
([MAXIMUM_OC] * [RATE])
```

This VBScript function uses multiple lines of code with a logical If-Then operation to label cities with their name if their population exceeds 250,000:

```
Function FindLabel ([NAME], [POPULATION])  
    if ([POPULATION] > 250000) then  
        FindLabel = [NAME]  
    end if  
End Function
```

This function would be used with the Advanced box checked to allow more than one line of script to be interpreted. Another example of a multiline label expression with logical branching is:

```
Function FindLabel ([Shape_length], [DIAMETER],  
[Material])  
    if ([Shape_length] > 200) then  
        FindLabel = [DIAMETER] & " " & [Material]  
    else  
        FindLabel = [DIAMETER]  
    end if  
End Function
```

This function would label pipe features longer than 200 feet with their diameter and material and those shorter than 200 feet with their diameter.

Using text formatting tags

Sometimes you want one part of a label to be displayed differently from another part. For example, you could create a label expression to label city features with the city name and population. In order to help map readers distinguish the two pieces of information, you might format the label expression so the city name would be drawn in black and the population of the city in red. Text formatting tags allow you to specify the text symbol of a particular part of a label. You can change the font color, height, type, and style and create subscripts and superscripts. You can also control character spacing, word spacing, and leading between lines.

Text formatting tags

Text formatting tags are entered in the Label Expression dialog box and can also be part of the attribute field itself. Text formatting tags are concatenated to the field name in the following generic format:

	<code>"<TAG>" & [FIELDNAME] & "</TAG>"</code>
Font	<code>"<FNT name='Aria' size='18'>" & [FIELDNAME] & "</FNT>"</code>
Color	<code>"<CLR red = '255' green = '255' blue = '255'>" & [LABELFIELD] & "</CLR>"</code> <code>"<CLR cyan = '100' magenta = '100' yellow = '100' black = '100'>" & [LABELFIELD] & "</CLR>"</code>
Bold	<code>"<BOL>" & [LABELFIELD] & "</BOL>"</code>
Italic	<code>"<ITA>" & [LABELFIELD] & "</ITA>"</code>
Underline	<code>"<UND>" & [LABELFIELD] & "</UND>"</code>
All Capitals	<code>"<ACP>" & [LABELFIELD] & "</ACP>"</code>
Small Capitals	<code>"<SCP>" & [LABELFIELD] & "</SCP>"</code>
Superscript	<code>"<SUP>" & [LABELFIELD] & "</SUP>"</code>

Character Spacing (%)	<code>"<CHR spacing = '25'>" & [LABELFIELD] & "</CHR>"</code>
Word Spacing (%)	<code>"<WRD spacing = '150'>" & [LABELFIELD] & "</WRD>"</code>
Leading (pts)	<code>"<LIN leading = '12'>" & [LABELFIELD] & "</LIN>"</code>

Multiple tags can be strung together to override multiple settings of the text symbol object. Tags that are concatenated have to be closed in reverse order, taking on the format:

```
"<TAG1><TAG2><TAGn>" & [FIELDNAME] &
"</TAGn></TAG2></TAG1>"
```

For a full reference to text formatting tags, refer to the online help.



In this example, the expression is:

```
[Name] & vbCrLf & "<FNT name = 'arial' size = '4'><CLR red = '255'>" & [POPULATION] & "</CLR></FNT>"
```

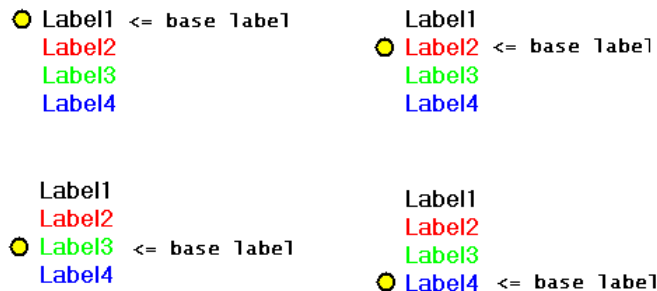
Maplex text formatting tags

Maplex for ArcGIS supports an additional tag that is unique to the extension.

Base: <BAS> When multiple label fields are used to label a feature, it is necessary to designate which label is the key or base label. The base label is used for the placement strategies, and the other labels are placed in relationship to the base label.

Format: "<BAS>" & [fieldname] & "</BAS>"

Example: These label classes have a placement location of East, so the label is placed due east of the yellow point features. By associating the base tag label with a particular line in the label expression, you can control how the complete label expression is placed relative to the feature.



The base tag is only supported by the Maplex Label Engine. If the ESRI label engine encounters the <bas> tag it will be ignored and removed before the label is placed.

Using text formatting tags with Maplex formatting parameters

Text formatting tags are designed to override the properties assigned to the text symbol of a label class. The Maplex Label Engine detects these tags during the label placement process. Because these tags dictate a label's appearance and override formatting parameters, the Maplex Label Engine will switch off its formatting parameters for a labeling class when it detects a text formatting tag in a label string. The parameters that are disabled are label stacking, character spacing, word spacing, font reduction, and label abbreviation.

NOTE: If some labels from a label class have text formatting tags but none of them are present in the current map extent, then no tag will be detected, and the Maplex formatting parameters will be applied instead.

Using the Map Cache to improve geodatabase labeling performance

The Map Cache allows you to temporarily store the features from a given extent in ArcMap in your desktop computer's RAM. Labeling is one of several rendering processes that can sometimes be improved by using the Map Cache in ArcMap. If you are labeling data stored in a multiuser geodatabase, creating a Map Cache can improve your labeling performance and reduce the load on your network and the geodatabase.

When should I use the Map Cache?

A Map Cache is most useful when working within a specific area; work that requires frequent panning and zooming across a large area will not usually benefit from the Map Cache.

When you display, edit, or label features in ArcMap, the features in the current display extent must be retrieved from the source geodatabase or files each time the display is updated. For multiuser geodatabases serving features over a network, this can take some time, particularly when large numbers of features are being retrieved. Retrieving the same features from the geodatabase for multiple layers on a map, retrieving features for layers with a definition query, and retrieving features for labeling are activities that can benefit from the Map Cache, which reduces roundtrips to the geodatabase. Labeling, in particular, can be a slow and costly process for the geodatabase, requiring multiple roundtrips to the geodatabase as the label engine attempts to place the maximum number of labels on the map.

In an enterprise environment, consistent use of the Map Cache in ArcMap can significantly improve the overall performance of the system by reducing the number of queries to the geodatabase, the number of features retrieved from the geodatabase, and the overall network traffic. Because retrieving the features from local memory is a fast operation, using the Map Cache will often result in performance improvements in ArcMap for editing, feature rendering, and labeling.

Is the Map Cache always useful?

Sometimes using the Map Cache does not provide any performance advantage. The Map Cache only stores geodatabase features, so if you are working with coverage or shapefile features no features will be cached. There may be some performance gain for personal geodatabase feature classes, although it is generally a small gain. Locking the labels on the map improves performance with all data types; when locked, the labels are not regenerated each time the display is redrawn. The advantages of the Map Cache are most pronounced when the data source is a multiuser geodatabase accessed over a network. One case where the Map Cache may be useful with personal geodatabase features is during editing of features with large numbers of vertices in the current display extent, when snapping is turned on. Personal geodatabases accessed over a network may also show a performance gain.

Because the Map Cache is stored in your desktop computer's RAM, building a cache for a large area with a large number of features may consume a large amount of memory and can take a while. You can cancel building the Map Cache by pressing the Esc key.

Using the Auto-Cache

You can use the Auto-Cache to automatically update the Map Cache whenever you move outside of the currently cached extent. This can be useful if you are going to be working in a series of different geographic areas and you don't want to have to rebuild the cache for each area. To avoid inadvertently building a cache of your whole geodatabase, set a minimum scale for the Auto-Cache. The Auto-Cache will then only rebuild the cache when you zoom in closer than the minimum scale.

Labeling features of a layer

In ArcMap it is easy to create basic labels for features using the default label engine. For more detailed information see the 'Labeling maps with text and graphics' chapter in *Using ArcMap*.

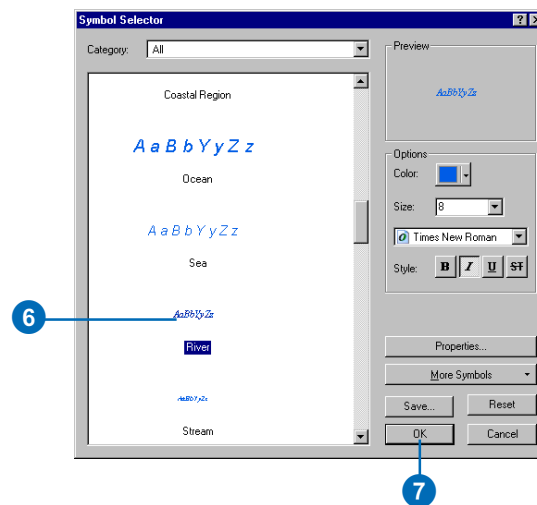
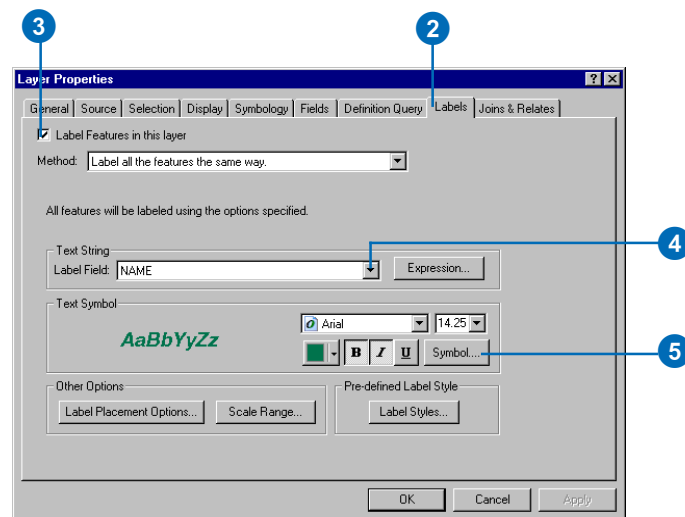
Tip

Using the Label Manager to set up feature labels

You can also use the Label Manager to set up and manage the symbology for the labels. The Label Manager button is on the Labeling toolbar.

Setting up a feature label and symbolization

1. In the table of contents, right-click the layer you want to label and click Properties.
2. Click the Labels tab.
3. Check Label Features in this layer.
4. Click the Label Field dropdown arrow and click the field you want to use as a label.
5. Click Symbol.
6. Click one of the label styles in the list.
7. Click OK.
8. Click OK.



Labeling features of a layer using label classes

Label classes allow you to label groups of features within a layer differently. You can use label classes to label a feature with multiple labels in different placement locations, such as street address ranges, or to specify and label a subset of features in the feature class by using a SQL query. For more information on creating labeling classes with a SQL query, see *Using ArcMap*.

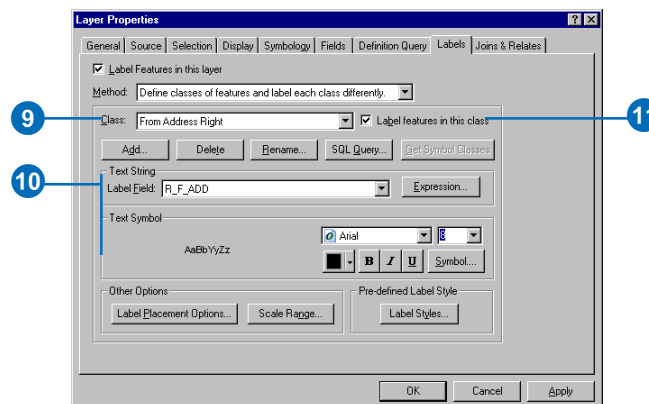
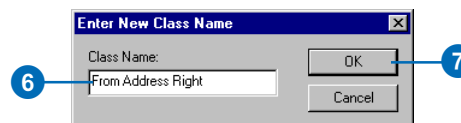
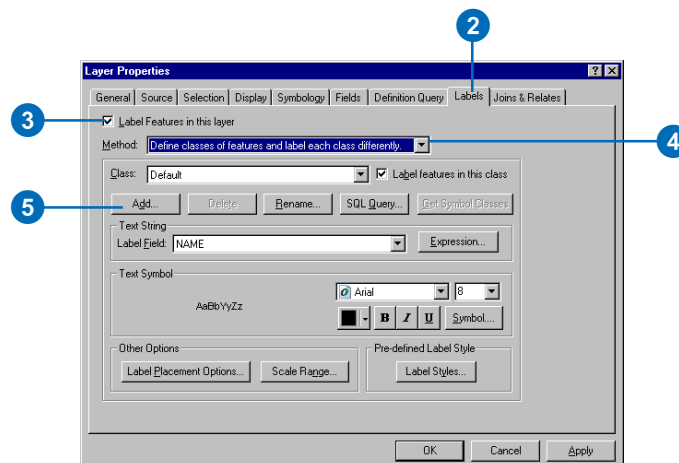
Tip

Labeling features in only some of a layer's label classes

When you create multiple label classes for a layer, you can specify whether or not each one will be labeled. All classes will be labeled by default. For each class you can check or uncheck the Label features in this class checkbox to turn labels on or off.

Creating label classes

1. In the table of contents, right-click the layer you want to label and click Properties.
2. Click the Labels tab.
3. Check Label Features in this layer.
4. Click the Method dropdown arrow and click Define classes of features and label each class differently.
5. Click Add.
6. Type a Class Name.
7. Click OK.
8. Repeat steps 5–7 for each class that you want to add.
9. Click the Class dropdown arrow and click the class name.
10. Set up the label for the selected label class by choosing a Text String and Text Symbol.
11. Check Label features in this class.
12. Repeat steps 9–11 for each class to be labeled on the map.
13. Click OK.

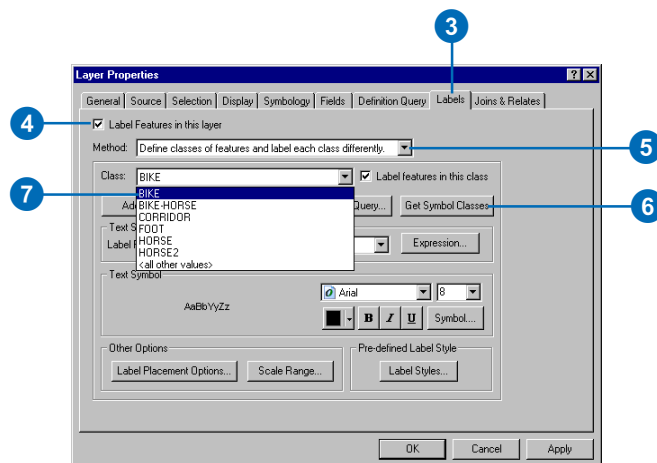
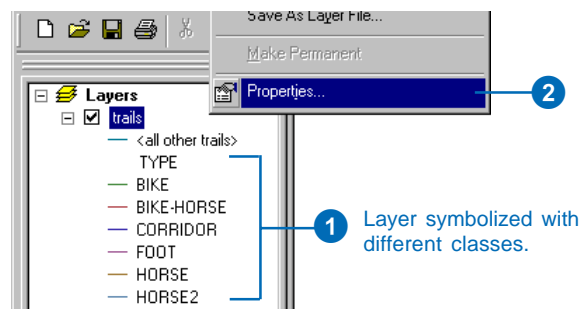


Creating label classes based on feature symbology

Sometimes you want to organize your labels into groups that correspond to the symbology classes for a layer, for example, to match colors or make larger labels for larger symbols. You can easily create a label class for each symbol class in a layer by clicking Get Symbol Classes. Once you've created label classes to match your symbol classes, you can customize the labels for each class.

Creating label classes based on symbol classes

1. Symbolize a layer using a set of classes.
2. In the table of contents, right-click the layer you want to label using different classes derived from the layer's symbol classes and click Properties.
3. Click the Labels tab.
4. Check Label Features in this layer.
5. Click the Method dropdown arrow and click Define classes of features and label each class differently.
6. Click Get Symbol Classes.
7. Select one of the classes and set up the label for the selected label class by choosing a Text String and Text Symbol.
8. Repeat step 7 for each class.
9. Click OK.



Creating label expressions

While you can easily label a feature with the content of a single attribute, you often need to add more information. Label expressions let you concatenate text strings and multiple attributes to create more informative labels.

The Label Expression dialog box lets you build an expression to derive the label string for each feature. The expression should be coded using the rules of the scripting language (VBScript or JScript) selected in the Parser dropdown list. The expression can include any valid statements supported by the selected scripting language.

Fields are enclosed in square brackets [] regardless of the data type of the layer's data source. The expression is limited to a single line of code, unless you check the Advanced box. Checking the Advanced box allows you to enter a function containing programming logic and spanning multiple lines of code.

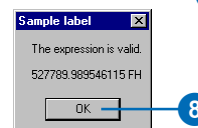
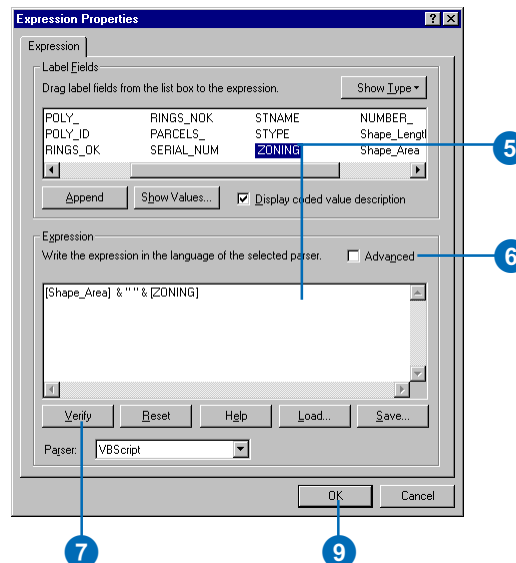
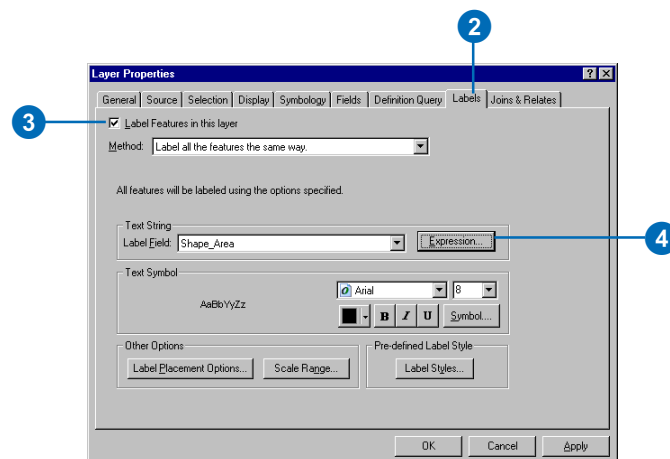
1. In the table of contents, right-click the layer you want to label using a label expression.
2. Click the Labels tab.
3. Check Label Features in this layer.
4. Click Expression.
5. Add fields; the concatenation operator "&", spaces in quotation marks "", or any other text or script statements to compose the label expression.

You can drag fields from the Label Fields box or click them and click the Append button.

6. Optionally, check the Advanced box, then add multiple lines of script.
7. Click Verify to check that your expression is valid.

If the expression is valid, a message will appear saying so. If the expression is invalid, you will see an error message and you will need to edit the expression to make it valid.

8. Click OK.
9. Click OK.
10. Click OK.



Managing the labels on a map

The ArcMap Labeling toolbar provides a set of tools for managing the labels on your map. When you install and enable Maplex for ArcGIS, some of the existing tools are modified, a Placement Quality dropdown list is added to the toolbar, and the Labeling menu has some new items. With Maplex for ArcGIS installed, the tools on the Labeling toolbar are:

Label Manager—Lets you control all of the label classes in your map from a single dialog box.

Label Priority Ranking—Lets you control the order in which label classes are placed. More of the labels from higher priority classes are usually placed.

Label Weight Ranking—Lets you control the relative importance of features as barriers to label placement.

Lock Labels—Locks the labels displayed in the current extent. This allows you to navigate around a map without having to wait for the label placements to be recalculated each time you pan or zoom.

View Unplaced Labels—Shows the labels that could not be placed. They are drawn in red by default.

Placement Quality—Fast allows you to specify whether labels are placed using a simple calculation. Best uses a more complex calculation and takes longer.

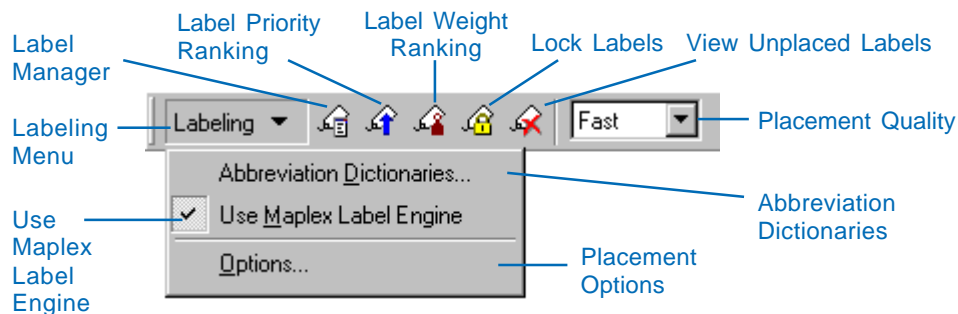
Abbreviation Dictionaries—Lets you specify how words in labels are abbreviated.

Placement Options—Lets you set basic and advanced Maplex Label Engine options for the active data frame.

Use Maplex Label Engine—Lets you switch the Maplex Label Engine on or off for the active data frame.

While you can always change the properties of a given layer's labels from the Layer Properties dialog box, when you have multiple labeled layers and multiple label classes, it is more convenient to have a centralized location from which to manage all of your labels. The Label Manager lets you view or change the label expression, text symbol, and placement properties for any of the label classes on your map.

The Label Manager is extended by Maplex for ArcGIS to give you access to the advanced Maplex label placement properties. These are introduced in the next section and discussed in later chapters.



Maplex for ArcGIS label placement properties

In order to use the Maplex for ArcGIS label placement tools and properties, you need to install the extension, turn the extension on in the ArcMap Extension dialog box, and switch from the ESRI Standard Label Engine to the ESRI Maplex Label Engine.

When you use the ESRI Maplex Label Engine, you get access to a new set of label placement properties that let you control:

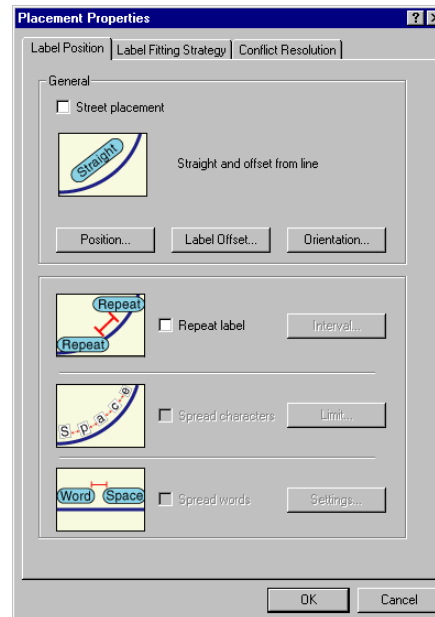
- How labels will be oriented and placed
- How labels will be formatted
- How labels will be placed in congested areas
- How ArcMap will resolve conflicts between labels

What happens when I switch labeling engines?

When you change labeling engines from the ESRI Standard Label Engine to the ESRI Maplex Label Engine the placement properties are converted into the advanced Maplex placement object model. No placement information is lost since there is a 1 to 1 correspondence between the basic placement properties used by both engines. However, if you set some advanced label placement parameters using the ESRI Maplex Label Engine, then switch back to the ESRI Standard Label Engine, the advanced placement properties will be lost. You will be warned when you attempt to switch, but any properties you lose in this manner cannot be recovered.

Label Position

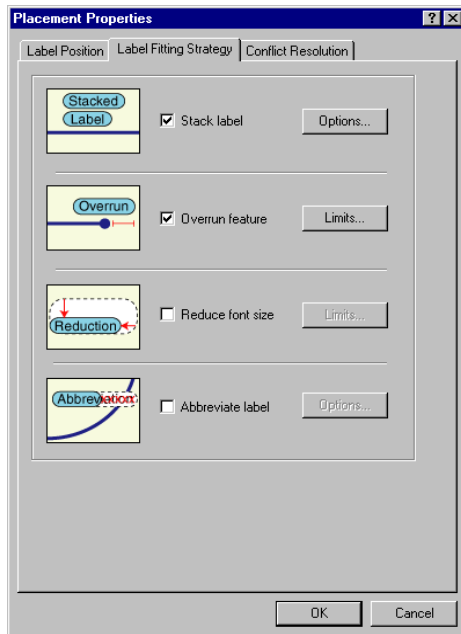
The first tab of the Placement Properties dialog box, Label Position, helps you answer the question, “Where does the label go?” This tab controls how a label is positioned with respect to a feature. Point, line, and polygon feature classes have different label position options. You can specify curved or straight label placement, align labels with features or with the projection graticules, choose single or repeating labels for line features, and set the word and character spacing within labels.



Label Position tab options for a line feature class. There are different position options for point and polygon feature classes.

Label-Fitting Strategy

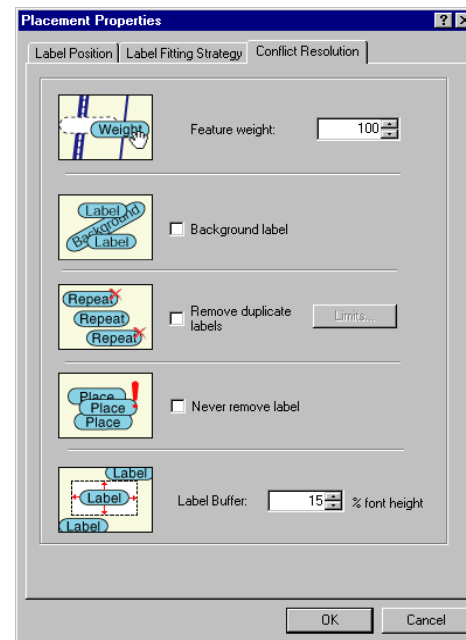
The second tab, Label Fitting Strategy, helps you answer the question, “What can I do to a label to make it fit on the map?” This tab allows you to control how and if Maplex for ArcGIS will alter a label’s placement or format when placing labels in crowded areas of the map. These parameters allow you to maintain the overall clarity of the map while increasing the number of labels that are placed on it. The label-fitting strategy parameters control label stacking, feature overrun, font size reduction, and label abbreviation.



Label Fitting Strategy tab options for a line feature class. There are different options for point and polygon feature classes.

Conflict Resolution

The third tab, Conflict Resolution, helps you answer the question “Who wins a space when multiple labels are competing for it?” This tab contains parameters that order the importance of a label class’s labels and their associated features. Maplex for ArcGIS has a number of label conflict resolution strategies to solve label problems in congested areas. Feature weights let you indicate which feature classes may be covered by labels. Background labels may be overlapped by other labels. You can also save space by removing duplicate labels or indicate that certain labels are so important that they must appear on the map.



Conflict Resolution tab options for a line feature class. There are different options for point and polygon feature classes.

Enabling the ESRI Maplex Label Engine

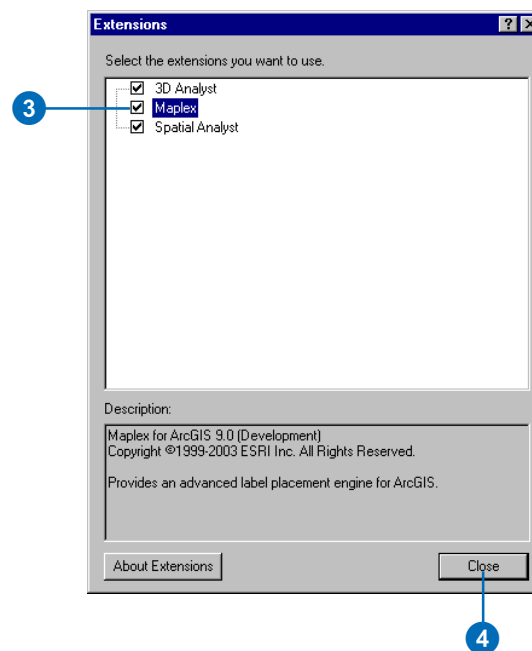
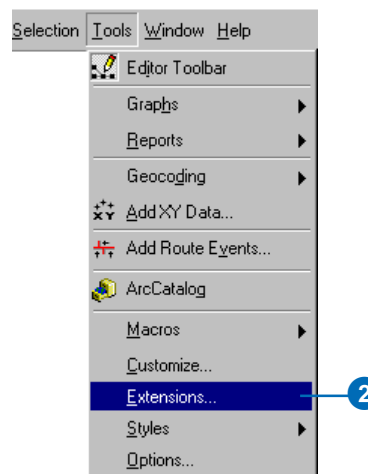
In order for you to be able to use the ESRI Maplex Label Engine, ArcMap and Maplex for ArcGIS must be installed on your computer, Maplex for ArcGIS must be turned on in the Extensions dialog box, and the Label Engine must be set to ESRI Maplex Label Engine in the Data Frame Properties dialog box or on the Labeling toolbar.

Tip

Page size limits

The ESRI Maplex Label Engine was designed to place labels on printed map sheets and is optimized to produce the best quality of placement on a map extent that does not exceed the size of an A0 sheet (841 mm X 1,189 mm). To place labels for a larger extent, you'll need to divide the total extent into tiles and place the labels for each tile separately. As a guideline, ensure that the tile size does not exceed the size of an A0 (or ANSI E size) sheet in page units. For map extents larger than A0, the placement quality may degrade and, in some cases, labels may not be produced by the placement engine.

1. Start ArcMap.
2. Click Tools and click Extensions.
3. Check Maplex.
4. Click Close. ►



Tip

Switching label engines

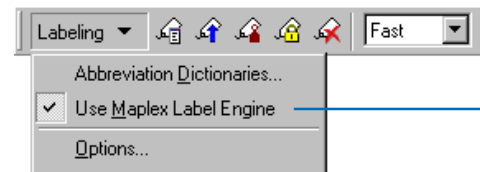
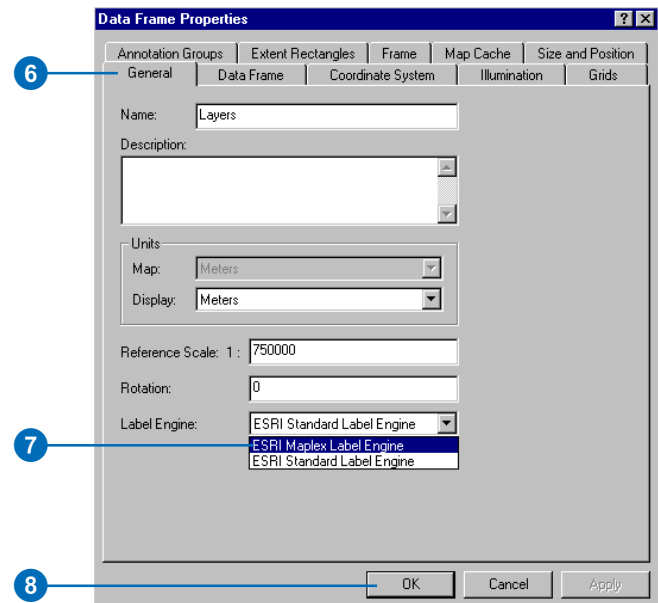
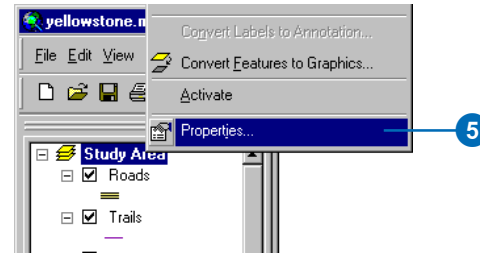
You can also turn the ESRI Maplex Label Engine on or off for a given data frame from the Labeling toolbar.

Tip

Maplex settings not saved

When you switch from the ESRI Maplex Label Engine to the ESRI Standard Label Engine, you will lose any advanced label placement settings you have made.

5. In ArcMap, right-click the data frame and click Properties.
6. Click the General tab.
7. Click the Label Engine dropdown list and click ESRI Maplex Label Engine.
8. Click OK.



You can also turn on the ESRI Maplex Label Engine from the Labeling toolbar.

Using a data frame reference scale for labeling

The reference scale of the data frame is the scale against which symbols and text are drawn. By default the current scale of the data frame is the reference scale. A 12-point label will be drawn at 12-point screen size, whether you are viewing your data at 1:5,000 or 1:20,000. You can set a reference scale to freeze the symbol and text sizes used in your data frame so that their size, relative to geographic features, at the reference scale is maintained at all scales.

For example, if you are producing a map at 1:25,000 scale, you might set the reference scale to 1:25,000 so the labels and features in the data frame will have the same size relationship when you are zooming in and out as when the map is printed. ►

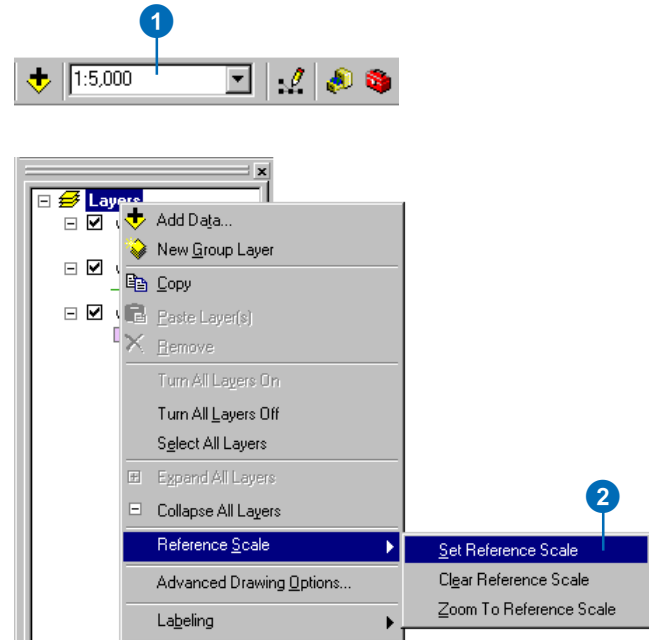
Tip

Exempt a layer from the reference scale

You can disable scaling for individual layers: double-click the layer, click the Display tab, and uncheck the Scale symbols when a reference scale is set option.

Setting a reference scale

1. Type the scale that you want to set as a reference scale in the Scale text box and press Enter.
2. In the table of contents, right-click the data frame, point to Reference Scale, and click Set Reference Scale.



This can be especially useful when setting up the font size of labels, because it lets you see how well labels of a given size fit along or within features. Similarly, because it causes labels to behave more like annotation—that has a font size that is measured against a fixed reference scale—setting a reference scale can be useful when designing labels to be converted to annotation.

Tip

Annotation reference scale

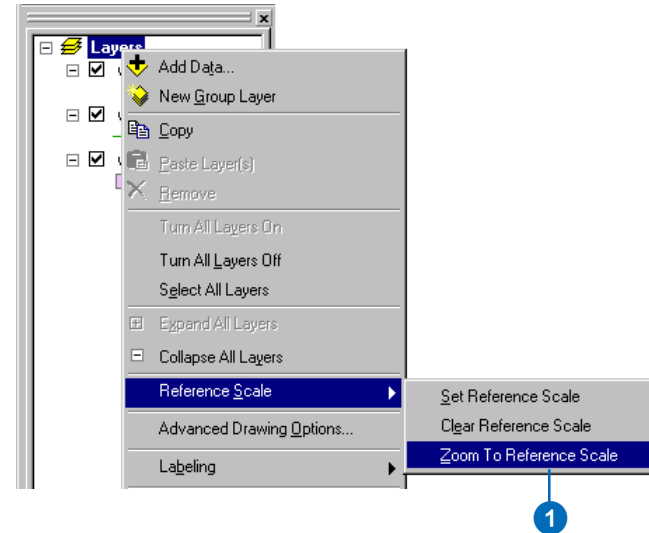
Annotation groups and annotation feature classes have their own reference scale, separate from the data frame reference scale.

When you convert labels from a data frame that has a reference scale to annotation, the reference scale for the new annotation is automatically set to the data frame's reference scale.

Zooming to the reference scale

1. In the table of contents, right-click the data frame, point to Reference Scale, and click Zoom To Reference Scale.

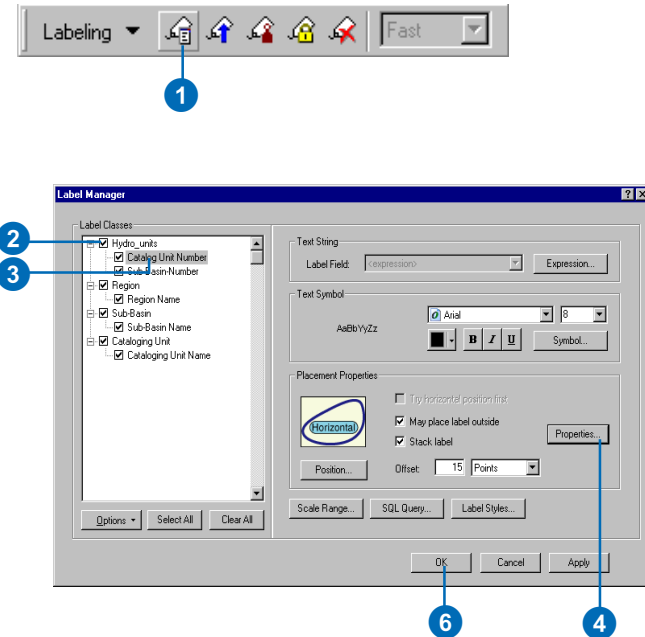
The map zooms to the reference scale.



Setting label placement properties with the Label Manager

The Label Manager provides a centralized location for you to select any of the label classes on your map to view or change its label expression, text symbol, and placement properties. When you are labeling with the ESRI Maplex Label Engine, the Label Manager also allows you to adjust the Maplex label placement properties for each label class.

1. Open the Label Manager by clicking the Label Manager button on the Labeling toolbar.
2. Check the box next to the layer you want to label.
3. Choose a label class under the layer.
4. Click Properties.
5. Set any of the Placement Properties for the label class, then click OK.
6. Click OK.



Setting scale ranges for label classes

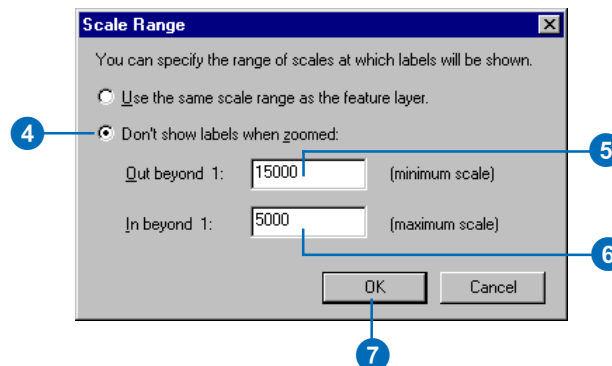
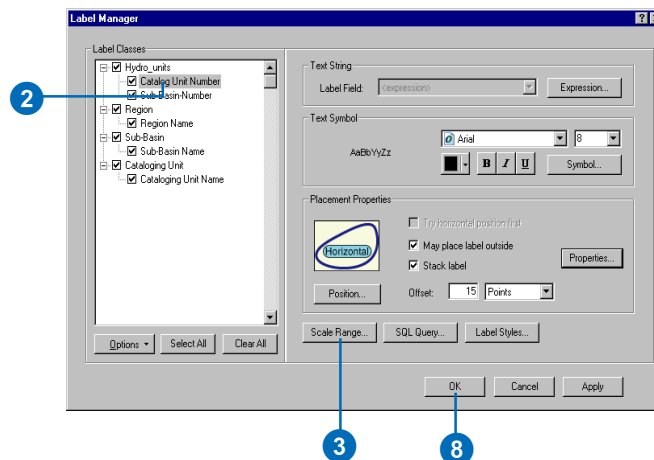
Some labels are most useful within a given scale range. For example, on a city map, a label class of all street names might be useful up to some minimum scale. As you zoom out beyond that scale, the labels would become too crowded—or too small, if there is a reference scale set—and you might prefer to display a label class that only showed major street names.

Setting a minimum scale for labels can improve the overall redraw performance of your map, making panning and zooming more responsive, as labels are only drawn within the scale range at which they are useful.

1. Click the Label Manager button on the Labeling toolbar.
2. Choose a label class under the layer.
3. Click Scale Range.

The labels will have the same scale range as the features if you have set one for the feature layer.

4. Optionally, click the Don't show labels when zoomed out button.
5. Optionally, type a minimum scale.
6. Optionally, type a maximum scale.
7. Click OK.
8. Click OK.



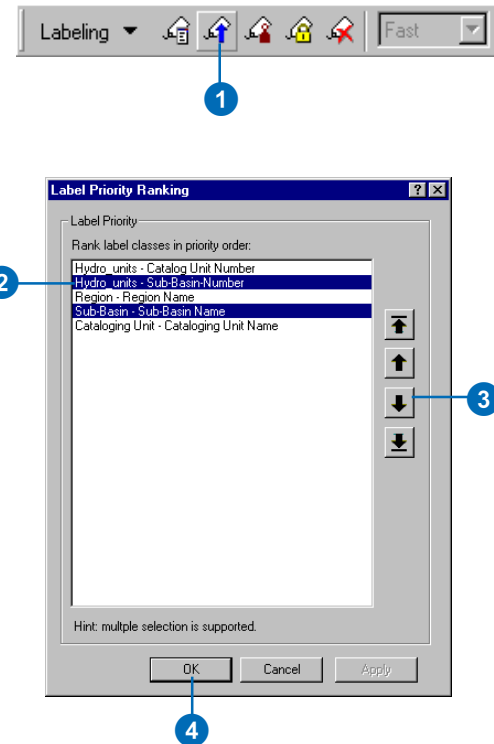
Setting the label priority ranking

The Label Priority Ranking dialog box allows you to specify the relative importance of the label classes in your map. You can arrange the priority ranking order to place labels from more important label classes on the map before other label classes. Placing a label class earlier in the labeling process means that more of the labels from that class will be placed in the available space.

1. Click the Label Priority Ranking button on the Labeling toolbar.
2. Click the label class or classes that you want to move up or down in the priority ranking.

You can select more than one label class at a time. Press the Ctrl key and click to select nonadjacent label classes, or press the Shift key and click to select blocks of adjacent label classes.

3. Click the up or down arrow button to move the selected label classes up or down in the priority ranking.
4. Click OK.



Setting the label weight ranking

The Weight Ranking dialog box allows you to specify how important it is to avoid covering features with labels. For polygon features you can specify different weights for the interior of the features and the boundary of the features. Label weights can be between 0 and 1,000, with higher values indicating more important features that should have a lower chance of being hidden by a label.

You can also set weights for the graphics and annotation groups stored in your map document.

Tip

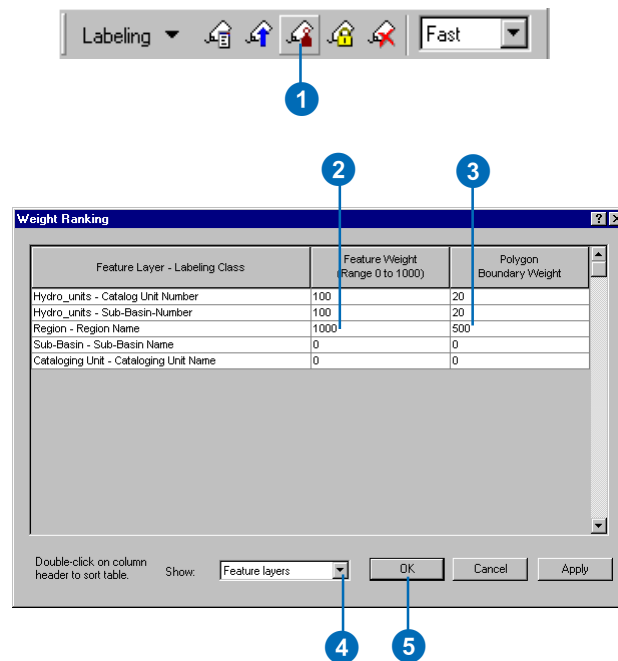
Label weights and performance

Generally, as you increase weights it becomes harder for ArcMap to place all of your labels. It may also increase the time it takes to place the labels.

1. Click the Label Weight Ranking button on the Labeling toolbar.
2. Click in the Feature Weight column for a feature layer and type a weight between 0 and 1,000. Higher values will tend to repel labels; features with values of 0 will be considered blank space for placing labels.
3. Optionally, for polygon features, click in the Polygon Boundary Weight column for a feature layer and type a weight between 0 and 1,000.
4. Optionally, click the Show dropdown list and click Graphic layers.

You can set weight ranks for the annotation groups stored in the map document.

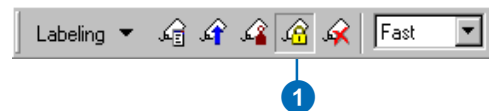
5. Click OK.



Locking the labels in an area

You can temporarily lock the labels that have been placed in the current view extent. This allows you to pan and zoom around the map more quickly. Labels outside the current extent will not be placed if you zoom or pan outside the current extent.

1. Click the Lock Labels button on the Labeling toolbar.
2. Pan or zoom around the map.
3. When you want the label engine to resume placing labels, click the Lock Labels button again.



Showing unplaced labels

Often there is not quite enough room to place the labels for all of the features on your map. You can view the labels that were not placed by clicking the View Unplaced Labels button.

Unplaced labels appear in red by default, though you can change the color of unplaced labels on the Maplex menu's Advanced Options dialog box.

1. Click the View Unplaced Labels button on the Labeling toolbar.
The unplaced labels appear in red.
2. When you want to hide the unplaced labels, click the View Unplaced Labels button again.



Changing the label placement quality

The ESRI Maplex Label Engine supports two levels of label placement quality. The Fast placement option applies the current advanced label placement settings but uses a simpler placement calculation. You can treat these placements as a representative draft version of the output with Best quality.

1. Click the Placement Quality dropdown list on the Labeling toolbar, and click Fast or Best to set the label placement quality.



Setting label positions

4

IN THIS CHAPTER

- **Labeling point, line, and polygon features**
- **Selecting a label placement style**
- **Label placement settings for point, line, and polygon features**
- **Advanced label placement settings**

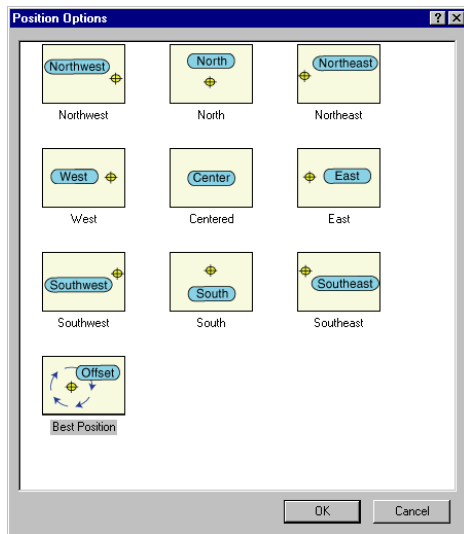
Label representation on a map should be considered just as seriously as feature symbolization. Font size, font type, font color, and placement location are important elements when labeling a map. Large labels will tend to catch your attention before smaller labels, and larger labels appear more important than the smaller labels. It is a common practice to label populated places with labels that reflect the relative size or importance of the places. Major cities with a large population are often given a larger font size than towns with a smaller population. Good planning and design are essential for good label placement results. Some parameters to consider include selecting the proper fonts, font sizes, and colors. You should also consider the size, shape, and density of features that will require labels on the map. Failing to take these into account can result in badly labeled features and a confusing map—imagine trying to read a map where a series of small, closely spaced polygons are labeled using an extremely large font size. The location of labels relative to their features is another important factor—a well-placed label is clearly related to a given feature. Maplex for ArcGIS is designed to place labels to minimize label-to-feature ambiguity and maintain the overall clarity and readability of your map.

Labeling point features

You can set the ESRI Maplex Label Engine to be as flexible or rigid as you need in placing labels relative to features. You can specify a fixed distance that a label will be placed from a feature by defining an offset distance, or you can specify a maximum distance and allow labels to be placed within a range of acceptable distances. If you specify a maximum distance, the label is placed within that range and as close to the offset distance as possible. You can rotate point labels by an angle stored in an attribute of the points or align the labels to the graticules of the data frame.

Labeling styles for point features

There are 10 predefined placement positions for point labels, they are Northwest, North, Northeast, West, Centered, East, Southwest, South, Southeast, and Best Position.

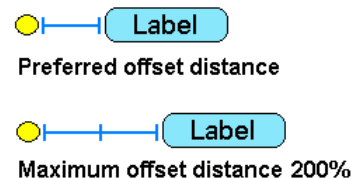


Label offset

The label offset controls the distance a label is placed from its feature. The offset is measured from the boundary of the feature symbol to the outer edge of the label. The boundary for simple geometric symbols is the edge of the symbol; for graphic and font symbols the bounding rectangle around the symbol is the symbol boundary. A value of zero will cause the label to touch the symbol boundary.

You can specify a distance measured in map units, inches, millimeters, or points for the offset. The label is placed at that offset distance according to the placement position.

If the offset distance cannot be honored, for example, because of label or feature conflicts, the label will be placed within the maximum distance. The maximum distance is measured as a percentage of the offset distance. The default value for the maximum distance is 100 percent of, or equal to, the offset distance. A maximum distance value of 200 percent would allow the label to be placed up to twice the offset distance from the feature. If the Maplex Label Engine cannot place the label at the offset distance, it will try to place the label farther from the feature, up to the maximum distance.



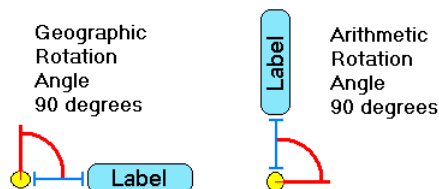
Note: Increasing the maximum offset value will increase processing time. When using this parameter, the ESRI Maplex Label Engine creates a range of offsets between the specified offset and the maximum offset. This increases the trial positions to be tested and, therefore, increases processing time.

Label orientation

When labeling point features, you may sometimes want your labels to have an alignment other than simply horizontal. There are two ways to set the orientation of labels—you can choose to align horizontal labels to the data frame graticule or rotate labels by an attribute value.

Aligning horizontal labels to a graticule will rotate all horizontal labels for a particular label class to a tangential line along the graticule for the data frame. In order to have your labels align with the graticule lines, the data frame must be set to a projected coordinate system. If this is the case you can simply check the box to Align horizontal labels to graticule.

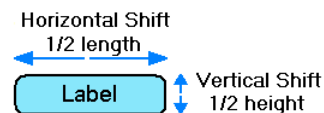
Rotating labels by an attribute value will place each label on the map rotated by a specified angle. The rotation angle is taken from an attribute value you've associated with the feature. If the center placement option is selected, the label is placed at the center of the symbol and rotated by the specified angle. If any of the offset placement options are selected, the label is placed at the offset distance and rotated to the specified angle. The selected placement location will be overridden if you choose to rotate labels by an attribute value. The angle represents either geographic or arithmetic coordinates.



Shifting labels from a fixed position

Sometimes, even when you have specified that labels should be placed at a fixed position, it may be desirable to allow a label to shift slightly from that position. For example, if a label cannot be placed due to an obstacle, allowing it to shift a small amount may allow the label to be placed on the map.

You can choose the option, May Shift Label Upon Fixed Position, to give the Maplex Label Engine the flexibility to slightly move labels to avoid label or feature conflicts. When you use this option, the shift can be up to 1/2 the height of the label in the vertical direction and up to 1/2 the label's length in the horizontal direction.



The direction that the label can be shifted depends on the placement position you selected for the label.

- Center—allows both vertical and horizontal shift
- North—allows horizontal shift
- East—allows vertical shift
- South—allows horizontal shift
- West—allows vertical shift
- All the rest—none

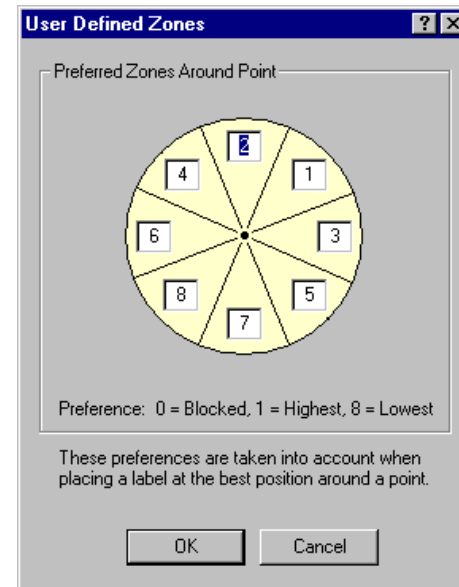
A label with a placement position of North or South can only shift in the horizontal direction, since any shift in the vertical direction would violate the offset distance. Likewise a label with the position style of East and West can only shift a label in the vertical direction, since any shift in the horizontal direction would violate the offset distance.

Specifying placement zones

With the default, Best Position label placement option, labels may be placed in any of eight zones around a point. For cartographic consistency, the Maplex Label Engine first tries to place each label to the northeast of the feature. If the label can't be placed there, it tries the North and East zones, then works its way around the zones until the label is placed. You can control the order that the Maplex Label Engine tries the zones.

If you are using the Best Position label placement option, you can check User-defined zones then click the Zones button to display the User Defined Zones dialog box.

The Maplex Label Engine attempts to place each feature's label in each zone in the order that you specify. You control the search order by ranking the zones on a 1–8 scale, where 1 is the first zone you want it to try to place the label and 8 is the last zone. You can give a zone the value 0 to prohibit labels from being placed in it. While multiple zones may be blocked with 0 ranks, the other zones must have unique ranks. When the Maplex Label Engine starts to place the labels, it evaluates the blocked zones and the amount of congestion around the point feature, considers the location of other features and other labels, and places the label in the best available zone.



Each zone gets a unique rank from 1–8; zero is used to block a zone from having a label placed in it.

Opening the Placement Properties dialog box for advanced labeling

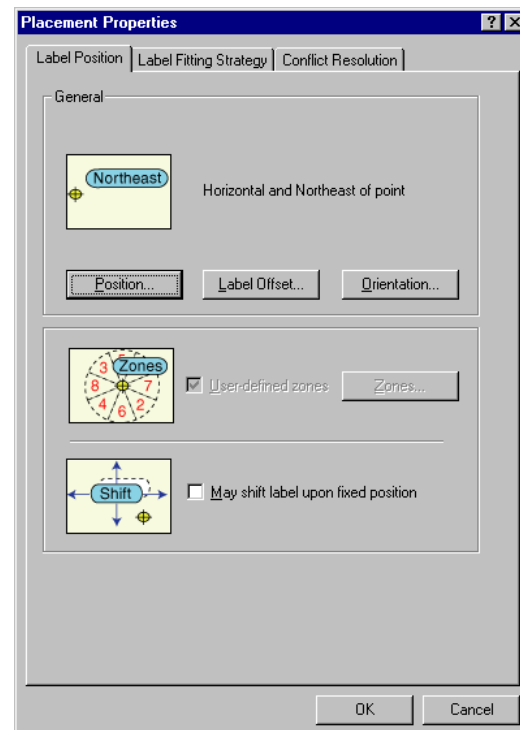
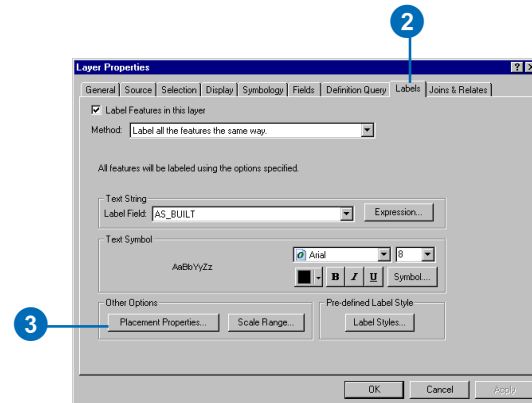
The advanced label placement controls that Maplex for ArcGIS adds to ArcMap are available on three tabs of the Placement Properties dialog box. To use these controls you must first install Maplex for ArcGIS, turn on the Maplex extension in the ArcMap Extension Manager, and set the map to use the ESRI Maplex Label Engine.

You can open the Placement Properties dialog box by clicking the Placement Properties button on the Labels tab of the Layer Properties dialog box for the layer that you want to label. You can also quickly get to the Placement Properties for each of the layers on the map by clicking the Label Manager button on the Labeling toolbar, clicking a label class, and clicking Properties.

Make sure that Maplex for ArcGIS is installed on your computer, Maplex is checked in the Extension Manager, and the Maplex Label Engine is selected in the data frame properties dialog box.

1. In the table of contents, right-click the point layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.

The Placement Properties dialog box appears, and you have access to the Maplex for ArcGIS advanced label placement controls.



Selecting a point label placement style

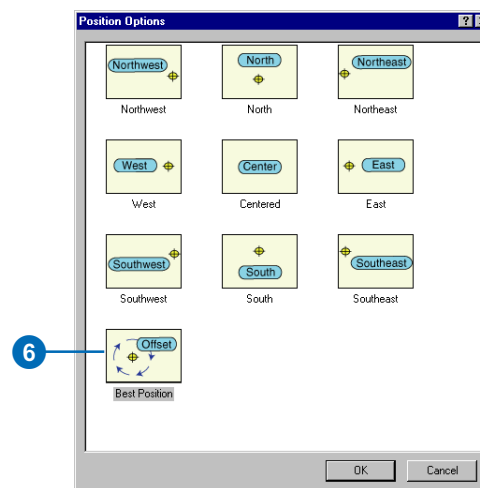
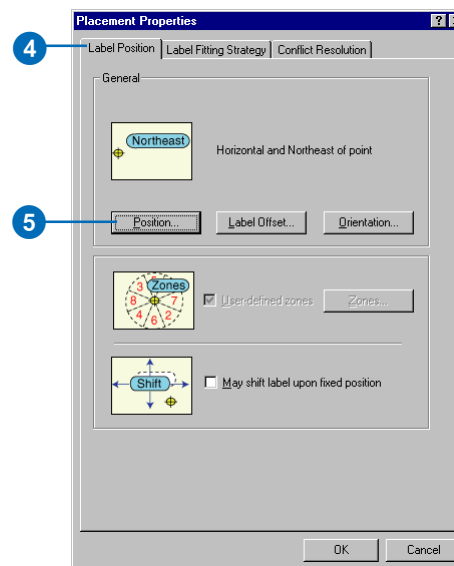
The label placement style is the first placement property you set for a labeling class. The default placement style, Best Position, will find the best placement locations for labels in most situations.

Tip

Using the Label Manager to set label placement properties

You can quickly get to the Placement Properties dialog box for each of the label classes on the map by clicking the Label Manager button on the Labeling toolbar, clicking a label class, and clicking Properties.

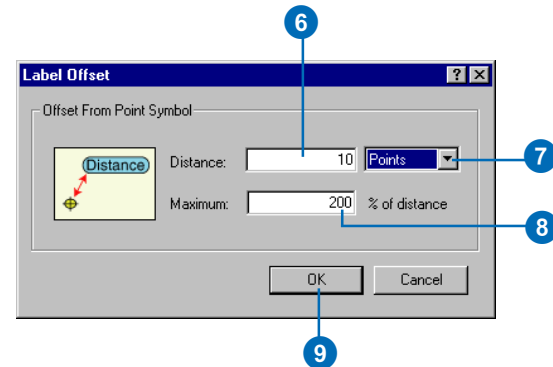
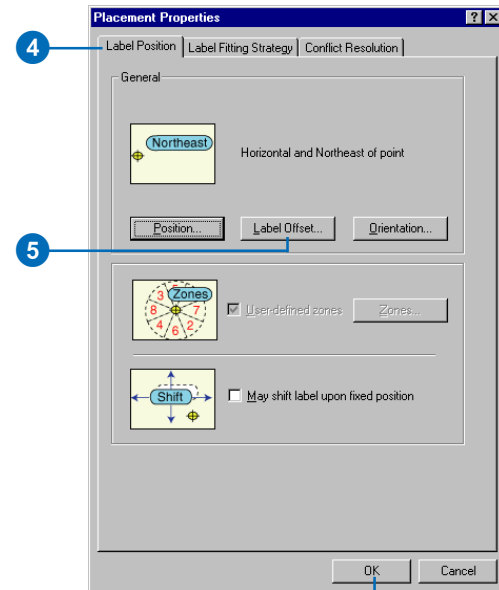
1. In the table of contents, right-click the point layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Position tab.
5. Click Position.
6. Click a placement style.



Setting an offset distance

You can control the distance a label is placed from its feature by assigning values to the preferred and maximum offset distances. Maplex for ArcGIS will use all options and try to place the label at the preferred distance first. If it cannot place the label at the preferred distance it will then try to place the label up to the maximum distance using all allowed options.

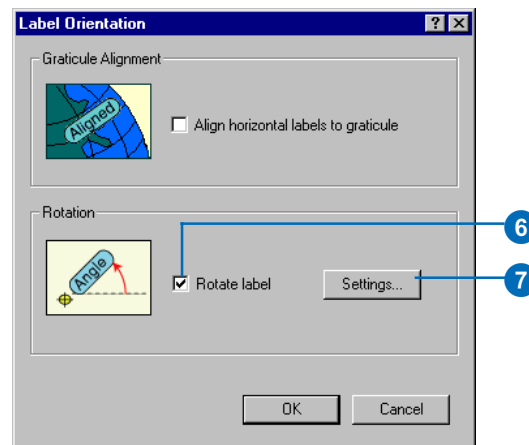
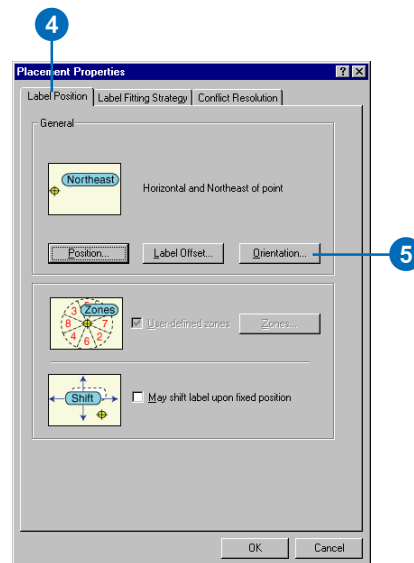
1. In the table of contents, right-click the point layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Position tab.
5. Click Label Offset.
6. Type a Distance for the preferred offset value.
7. Click the dropdown arrow and click the units in which you want to measure the offset.
8. Type a Maximum offset value, expressed as a percentage of the offset Distance.
9. Click OK.
10. Click OK.
11. Click OK.



Setting label alignment using a numeric field

You can rotate the labels for the features in a layer using an angle value stored as an attribute of the features.

1. In the table of contents, right-click the point layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Position tab.
5. Click Orientation.
6. Check Rotate label.
7. Click Settings. ►

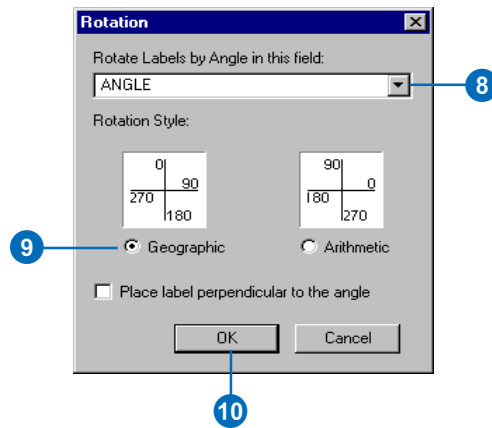


Tip

Placement position override

The angle overrides the selected offset placement position.

8. Select a field name from the dropdown list.
9. Check either Geographic or Arithmetic.
10. Click OK.
11. Click OK.
12. Click OK.
13. Click OK.



Setting zones for point label placement

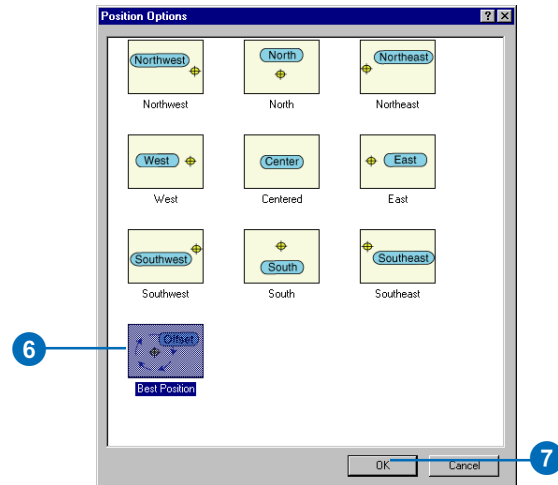
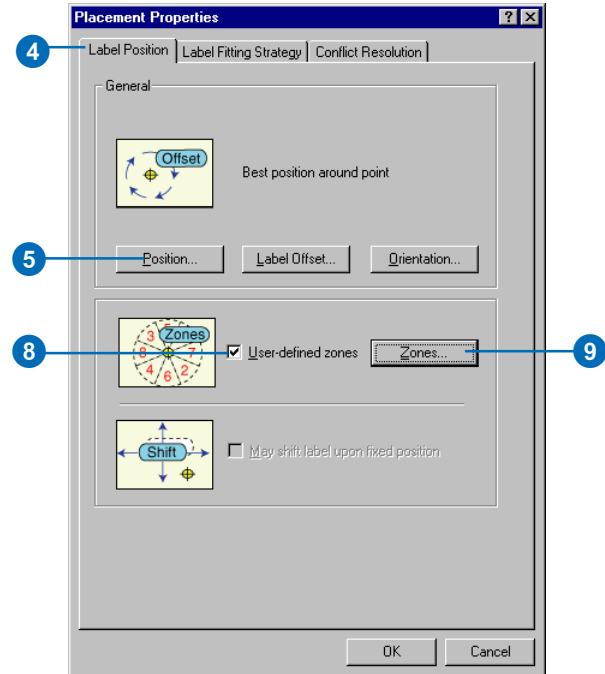
When you use the Best Placement option for point labels, you can control where around a point feature a label will be placed. You can specify a priority value for a series of eight placement zones around the point, and Maplex will attempt to place the label in each zone in order of their priority.

Tip

Zone numbers

The numbers 1–8 can only be used once. The number 0 blocks a zone from being considered and can be used multiple times.

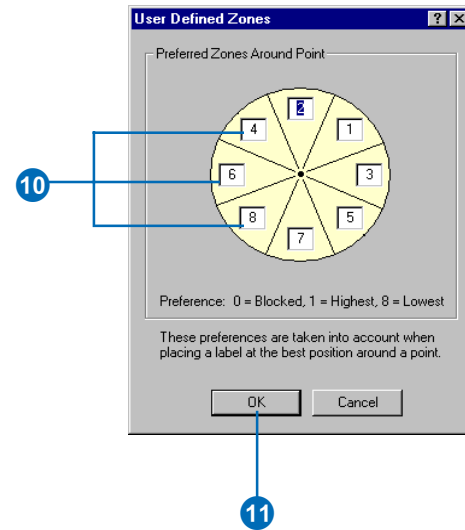
1. In the table of contents, right-click the point layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Position tab.
5. Click Position.
6. Click Best Position.
7. Click OK.
8. Check User-defined zones.
9. Click Zones. ►



10. Type a priority value between 1 and 8 for each zone.

Each zone should have a unique value between 1 and 8. You can block one or more zones from consideration by typing a priority value of 0 for the zone.

11. Click OK.
12. Click OK.
13. Click OK.



Labeling lines

Linear features, such as streets, rivers, utility lines, and airways, are typically labeled using different labeling styles. For example, you might want the label for a river to follow the curvature of the feature but the label for an interstate highway to be placed horizontally in a highway shield symbol. Maplex for ArcGIS offers a wide variety of placement styles for an array of label placement scenarios.

Street maps have their own special label placement requirements. Maplex for ArcGIS has some placement strategies that are optimized for placing street labels. You can apply these street placement procedures to any type of line feature.

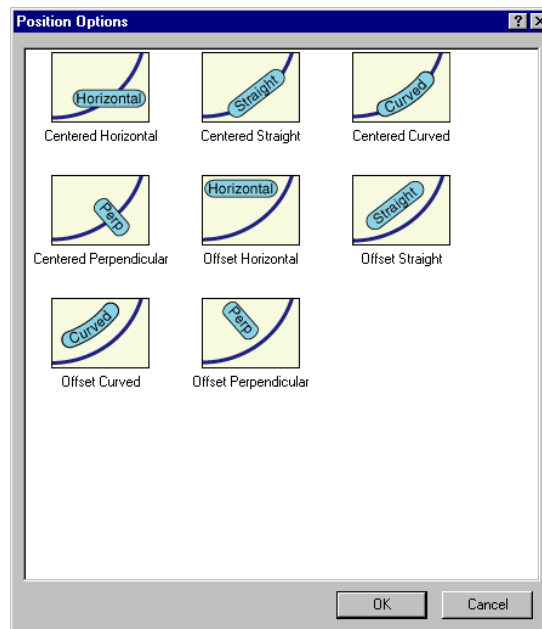
Labeling styles for line features

There are eight combinations of label position styles. The first two are:

- Centered—places the midpoint of the label on the feature.
- Offset—places the label at a default or user-defined distance from the line feature's symbol.

These two placement positions are combined with the next four to create the eight choices. The final four are:

- Horizontal—places the label horizontally relative to the upper and lower map border.
- Straight—places the label on a straight line tangent to the feature.
- Curved—places the label along the curve of the line feature.
- Perpendicular—places the label perpendicular to a straight line tangent to the line feature.

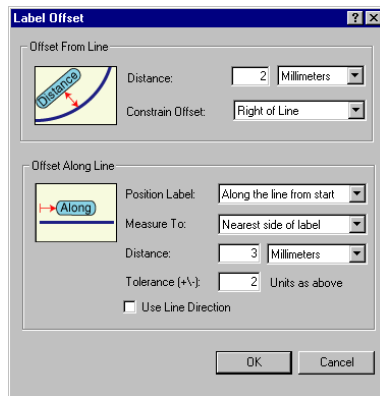


Label offset distances

Sometimes you may need precise control over how a label is placed on a line. This is particularly useful when placing multiple labels on a feature. For example, it's common to see diameter, material, and flow labels for individual pipe features on a utility map. Such maps may require that specific labels be placed at the beginnings or ends of the lines and sometimes either above or below the lines. You can control these placement parameters with the controls in the Label Offset dialog box.

Offsetting from a line

For each of the offset styles (Offset Horizontal, Offset Straight, Offset Curved, and Offset Perpendicular) you can control how far a label is from the line feature and constrain the side of the feature that the label is placed on. You can set a preferred offset distance from the line, measured in map units, millimeters, inches, or points.



Constraining the label offset

You can constrain which side of a feature the label is placed on using the Constraint Offset dropdown list. The options are:

- No Constraint—The label may be placed on either side of the line, although the Maplex Label Engine will attempt to place the label above it first, following common cartographic convention.



- Above Line—The label will be placed above the line, in relation to the page orientation of the map.



- Below Line—The label will be placed below the line, in relation to the page orientation of the map.



- Left of Line—The label will be placed on the left side of the line, relative to the order of the coordinates in the feature.



- Right of Line—The label will be placed on the right side of the line, relative to the order of the coordinates in the feature.



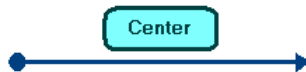
Offsetting along a line

You can control the location of a label along a line for all of the placement styles. You can use the default setting, At best position along line, or you can specify a label position relative to the ends of a line. There is also a variety of measurement options available for offsetting labels along a line.

Positioning a label along a line

The default setting is At best position along line. When this is selected the Maplex Label Engine will find an available location somewhere along the line (the default location is toward the center of the line) to place the label. The options are:

- At best position along line—Finds the closest available location to the midpoint of the line.



- Before start of line—Places the label at a specified distance before the starting point of the line. The starting point of a line is determined using one of two possible methods. If Use Line Direction is checked, the starting point is determined based on the order of the coordinates in the line feature. If it is not checked then the left-most end node of a line relative to the map page is the start of the line.



- Along the line from start—Places the label at a specified distance after the starting point of the line. The starting point of a line is determined using one of two possible methods. If Use Line Direction is checked, the starting point is determined based on the order of the coordinates in the line feature. If it is not checked then the left-most end node of a line relative to the map page is the start of the line.



- Along the line from end—Places the label at a specified distance before the ending point of the line. The ending point of a line is determined using one of two possible methods. If Use Line Direction is checked, the ending point is determined based on the order of the coordinates in the line feature. If it is not checked then the right-most end node of a line relative to the map page is the start of the line.



- After end of line—Places the label at a specified distance after the ending point of the line. The ending point of a line is determined using one of two possible methods. If Use Line Direction is checked, the ending point is determined based on the order of the coordinates in the line feature. If it is not checked then the right-most end node of a line relative to the map page is the end of the line.



Measure To

You can control which part of the label is measured to when an offset distance is applied. The Measure To control sets the anchor point of the label.

- Center of label—Measures from the middle of the label.



- Nearest side of label—Sets the anchor point to the edge of the label nearest to the feature. If no offset distances are specified, the label tends to extend beyond the feature.



- Farthest side of the label—Sets the anchor point to the edge of the label farthest from the feature. If no offset distances are specified, the label will tend to lie on the feature.



Distance

This parameter controls how far a label is placed from the start or endpoint of a line feature.

You can choose to measure in map units, millimeters, inches, points, or a percentage of the line length. Percent of line length is useful when you want to place a label at a specific location on the line, but the lines vary in length. For example, if you want to place all labels along the first quarter of a line, you would enter a distance of 25, and units of % of Line Length.

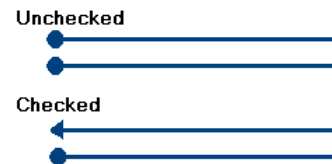
Tolerance (+/-)

The tolerance parameter gives the label some freedom to move along the line. A tolerance value of 0 specifies that the label should only be placed at the distance entered in the distance edit box. The tolerance units are the same as the units for the distance.



Use Line Direction

When Use Line Direction is checked, the order of the coordinates in the line feature determines the start and endpoints of a line. When it is not checked the start point is the left-most end node of a line and the endpoint is the right-most end node of the line, relative to the map page.



Placing labels for line features

You can select from a number of different placement positions, offset types, and distances when placing labels for line features. You can also control whether labels must be placed exactly at the location specified by the placement parameters you set or whether they may vary within a given distance from that position.

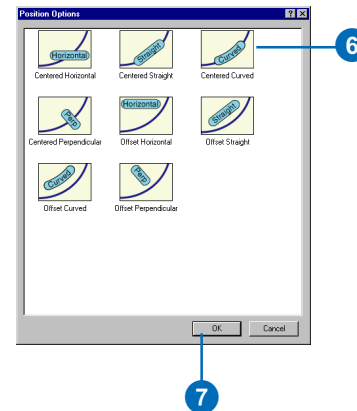
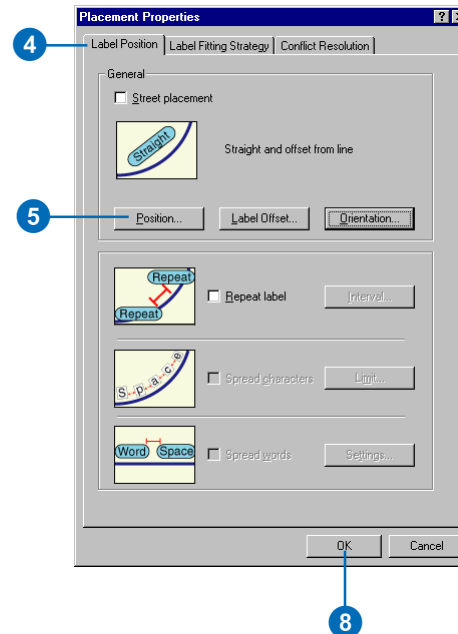
Tip

Use the Label Manager to set label placement properties

You can quickly get to the Placement Properties for each of the label classes on the map by clicking the Label Manager button on the Labeling toolbar, clicking a label class, and clicking Properties.

Selecting a placement position

1. In the table of contents, right-click the line layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Position tab.
5. Click Position.
6. Click a placement style.
7. Click OK.
8. Click OK.
9. Click OK.



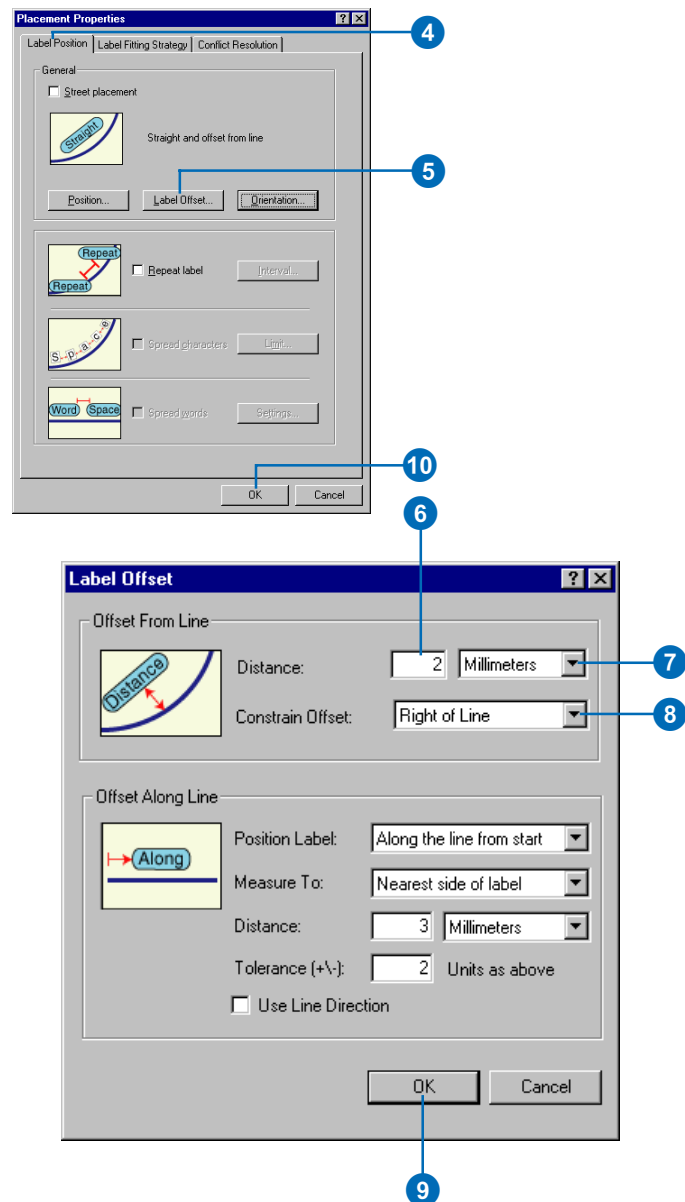
Tip

The Offset From Line option

The Offset From Line option applies only to the label positions Offset Horizontal, Offset Straight, Offset Curved, and Offset Perpendicular.

Offsetting a label from a line

1. In the table of contents, right-click the line layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Label Placement Options.
4. Click the Label Position tab.
5. Click Label Offset.
6. Type a Distance to offset the labels from the lines.
7. Click the dropdown arrow and click the units in which you want to measure the offset.
8. Click the Constrain Offset dropdown list and click an offset constraint.
9. Click OK.
10. Click OK.
11. Click OK.



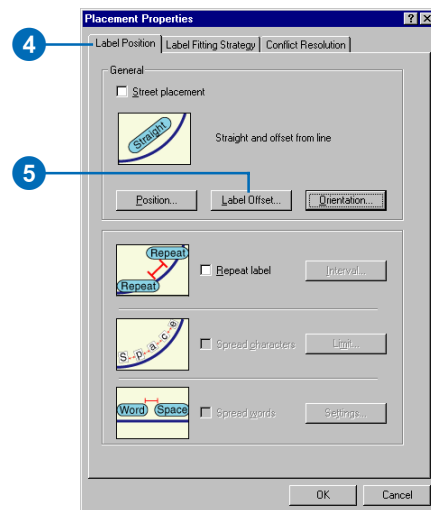
Tip

Tolerance value of 0

A tolerance value of 0 requires that a label be fixed at its specified location. No movement is allowed.

Offsetting a label along a line

1. In the table of contents, right-click the line layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Position tab.
5. Click Label Offset. ►

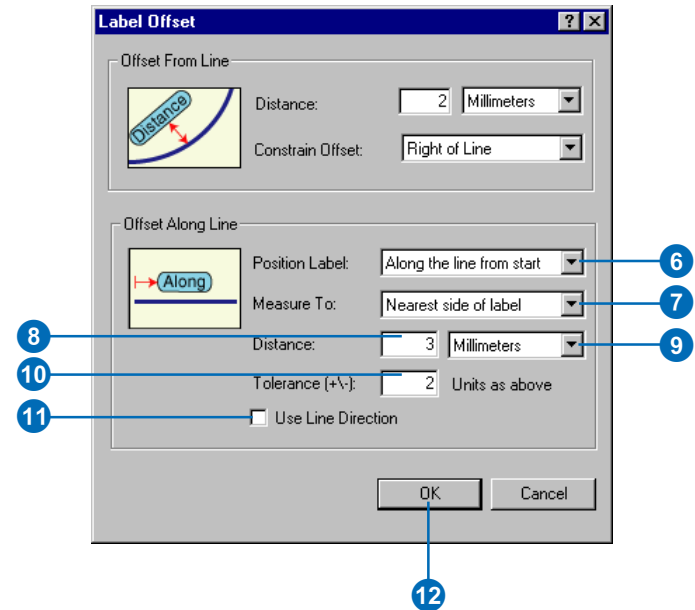


Tip

Offset From Line options

The parameters for Offset From Line are only available for offset line positions. You will not see them if you select a centered line position.

6. Click the Position Label dropdown list and click a position along the line where you want labels to be placed.
7. Click the Measure To dropdown list and click the position on the label to which the offset should be measured.
8. Type the Distance that the label should be offset along the line.
9. Click the dropdown arrow and click the units in which you want to measure the offset.
10. Optionally, type a distance up to which the label may vary from the offset distance you typed. A tolerance of 0 indicates that the label must be placed at exactly the specified distance. Larger values allow the label to be moved along the line in case of conflicts.
11. Optionally, check Use Line Direction. This uses the order of the coordinates in the line feature to identify the direction of the line. When this is not checked the left-most end node of the line is considered to be the start of the line.
12. Click OK.
13. Click OK.
14. Click OK.

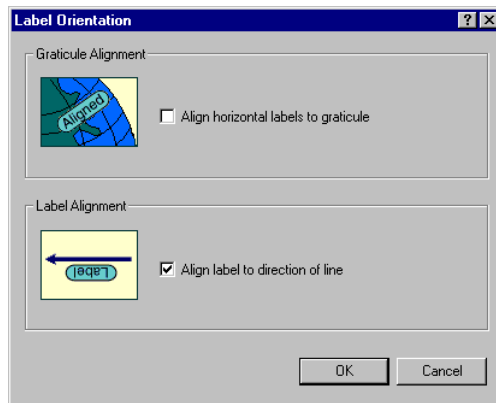


Orientation

You can control how line labels are oriented on the map. If you select a placement position of Horizontal and your map is in projected space, then you can choose to align the labels with the latitude graticules.

Aligning labels to line direction

By default, labels are placed in top-down and left-to-right readable positions. Occasionally, you may need to place labels in the same direction as the line feature. In these cases you can choose to align labels to the direction of the line. This is useful for placing flow symbols on lines, such as the one-way arrows on a street map or the water flow direction on a hydrography map.



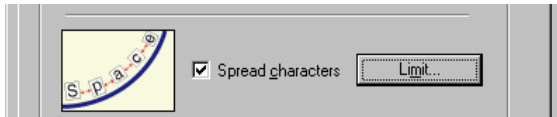
Repeating labels

You may want to repeat a label multiple times along long line features. The Repeat label option allows you to set a minimum distance between repeated labels. The repeated label will honor the location of other labels and features that may obstruct the next label location. The Minimum Repetition Interval doesn't guarantee that labels will be placed at the interval distance, just that the distance between duplicate labels will be at least the specified interval distance.



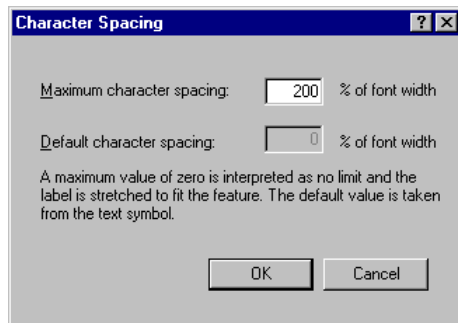
Spreading characters

You can choose to allow the characters of labels to be spread. Spreading the characters within a label can allow the Maplex Label Engine to make text fit linear features better without overlapping other labels. When you choose to allow the characters of labels to be spread you can set a maximum character spacing. The character width of the labels' text symbol is used as the minimum spacing.



This parameter is available for the Centered Curved line placement style. When labels are being placed with the Street Placement option it can also be applied with the Offset Curved, Centered Straight, and Offset Straight line placement styles.

If you set the maximum value to 0 the labels will be stretched to fit the length of the feature in the map extent.



Setting up the spread characters parameter

The Spread characters option works within a given spread range. The lower limit is set in the Text Symbol Properties dialog box. This is the default character spacing if you do not choose to spread the characters in your labels. Maplex for ArcGIS allows you to specify the maximum value of the character spacing range for certain line labeling styles.

Tip

Character Spacing values in the Symbol Editor

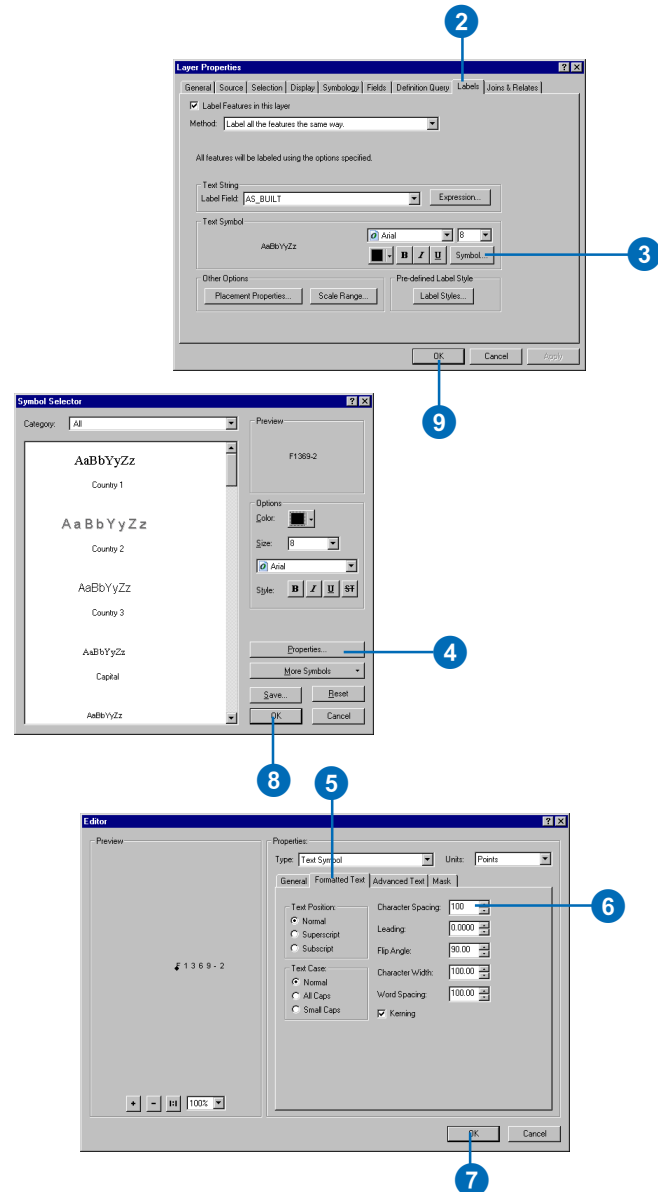
A value of 0 (default) means that no character spacing is desired between characters. A value of 100 means add a full character space (average character width of the font) between each character.

Setting the base character spacing

1. Right-click the line layer and click Properties.
2. Click the Labels tab.
3. Click Symbol.
4. Click Properties.
5. Click the Formatted Text tab.
6. Type a value for the Character Spacing.

This will be the minimum character spacing when you choose to spread the characters in your labels.

7. Click OK.
8. Click OK.
9. Click OK.



Tip

Spread characters option

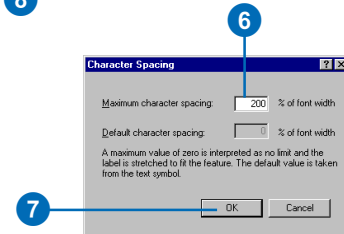
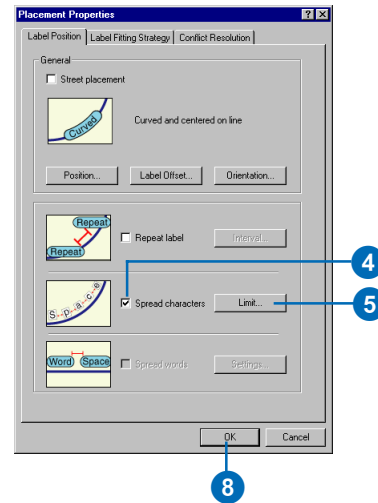
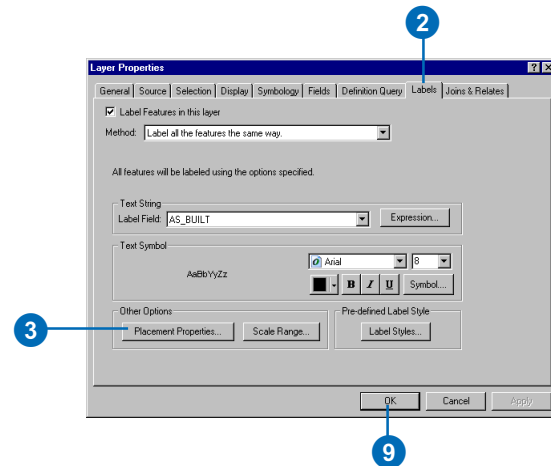
The *Spread characters* option will only be available if the label position is set to *Centered Curved* on line or if the *Street placement* box is checked.

Setting the maximum character spacing

1. Right-click the layer and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Check Spread characters.
5. Click Limit.
6. Type a Maximum character spacing value.

If you type 0, the labels will be spread to fit the length of the features.

7. Click OK.
8. Click OK.
9. Click OK.



Labeling streets

A given street is often represented by many individual line features in a GIS, which can result in many more labels being placed than necessary. To avoid this problem, line features that represent streets can be treated as special types of line features.



Maplex for ArcGIS groups the segments of street features, if the symbology and label match and the features are connected, and treats them as single, long features. This allows labels to be placed for the street as a whole rather than for each segment. When labeling streets, Maplex for ArcGIS places labels to avoid street junctions.

There are four placement positions for street features: Centered Curved, Offset Curved, Centered Straight, and Offset Straight. You can also set the word spacing for street features. When you set the word spacing you can also set the End of Street Clearance to avoid placing labels in or near street junctions. The maximum number of lines for stacking text is set internally. For centered placement styles it is 3, and for offset styles it is set to 2. As the objective of a street map is to clearly and completely identify street features, Maplex for ArcGIS places street labels before any other labels.

Spreading words

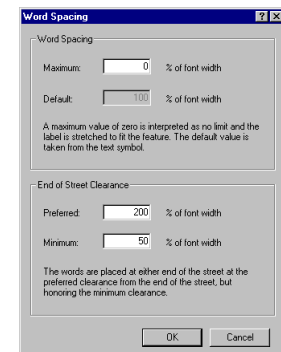
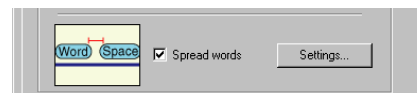
When you are placing street labels you can control the spacing between words within a label by checking the Spread words box. This option is only available for line features that you've identified as streets. When you check Spread words, you can specify a maximum distance that words in the label can be spread apart. The word spacing of the labels' text symbol is used as the minimum spacing. The default spacing is one character width. You can alter this minimum value in the text symbol editor following the steps used for Setting the base character spacing described earlier and entering a new value for Word Spacing.

Word Spacing Maximum—The maximum distance allowed between words. This distance must be larger than the text symbol word spacing. If you set the Word Spacing Maximum to 0, Maplex for ArcGIS will automatically stretch the words proportionately to fit along the entire length of the street feature.

Word Spacing Default—The minimum distance between words. This is set using the label's text symbol properties.

End of Street Clearance Preferred—The preferred distance between a label and the end of a street. Setting an end of street clearance is useful to keep labels from competing with other street labels at intersections.

End of Street Clearance Minimum—The minimum distance between a label and the end of a street.



Labeling streets

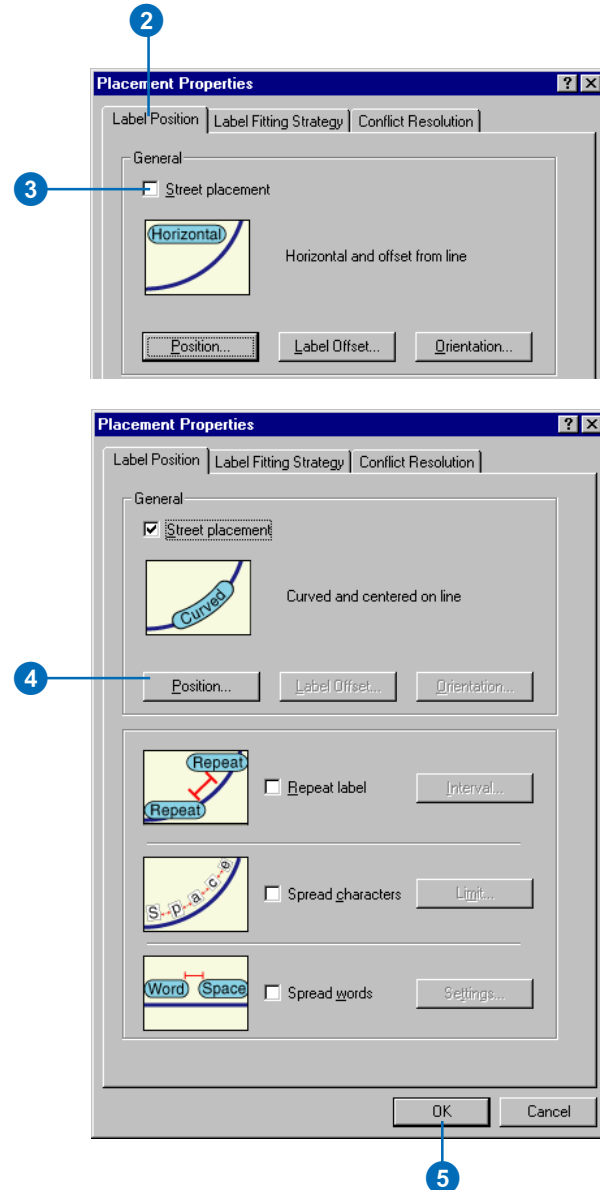
Streets are often represented by many line features that share the same name. In order to avoid labeling each segment of the street, you can choose to label line features with the Street Labeling option.

Turning on street labeling

1. Right-click the line layer and click Properties.
2. Click the Label Position tab.
3. Check the Street placement box.

The label position may change when you check Street placement. This is because there are four placement positions for street features: Centered Curved, Offset Curved, Centered Straight, and Offset Straight.

4. Optionally, click Position, choose a different label placement position for your street features, and click OK.
5. Click OK.
6. Click OK.

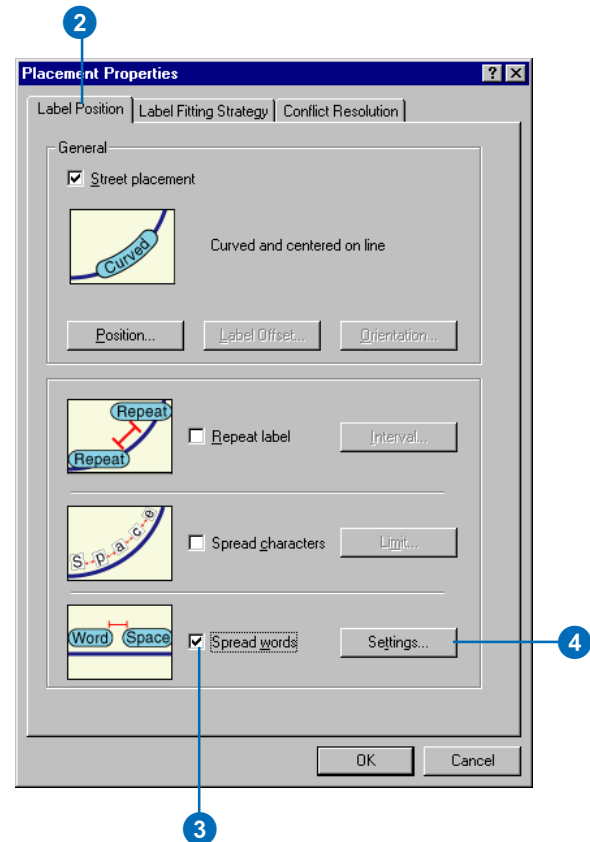


Setting the word spacing for street labels

1. Right-click the line layer and click Properties.
2. Click the Label Position tab.
3. Check the Spread words box.

If the Spread words box is unavailable, you will need to check Street placement. The Spread words option is only available for label classes that are placed with Street placement.

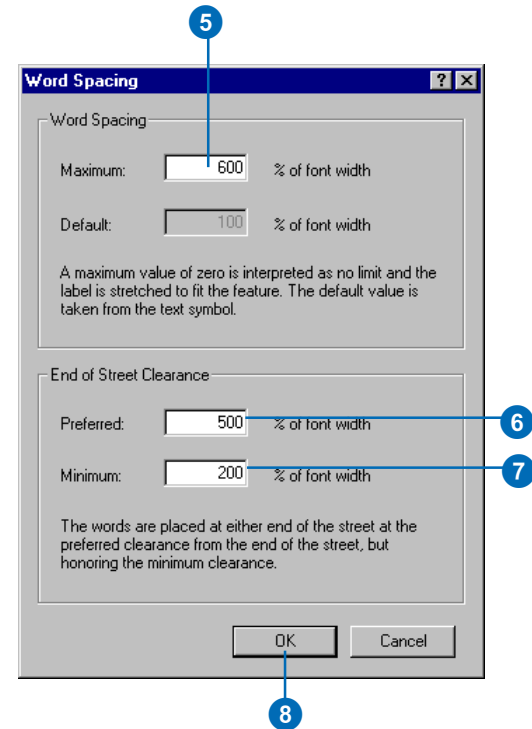
4. Click Settings. ►



5. Optionally, type a Maximum word spacing. This is measured as a percentage of the average width of a character in the font. A value of 600 would place six character spaces between the words in the label.

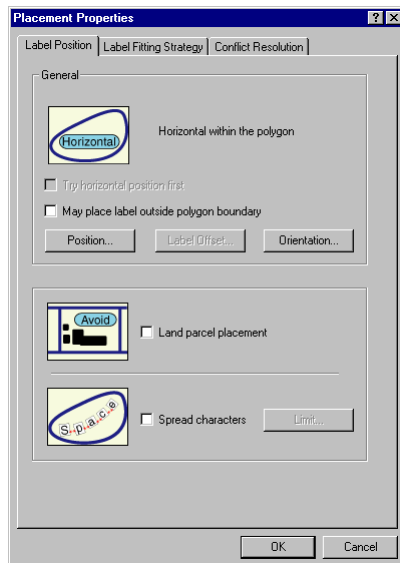
If you accept the special default value of 0, the words in the label will be spread evenly across the length of the street feature.

6. Optionally, type a Preferred End of Street Clearance. This is measured as a percentage of the average width of a character in the font. A value of 500 would place five character spaces between the ends of the street feature and the ends of the label text. If the Preferred placement for the label is obstructed, the Minimum End of Street Clearance is used instead.
7. Optionally, type a Minimum End of Street Clearance. This is measured as a percentage of the average width of a character in the font. A value of 200 would place two character spaces between the ends of the street feature and the ends of the label text.
8. Click OK.
9. Click OK.



Labeling polygons

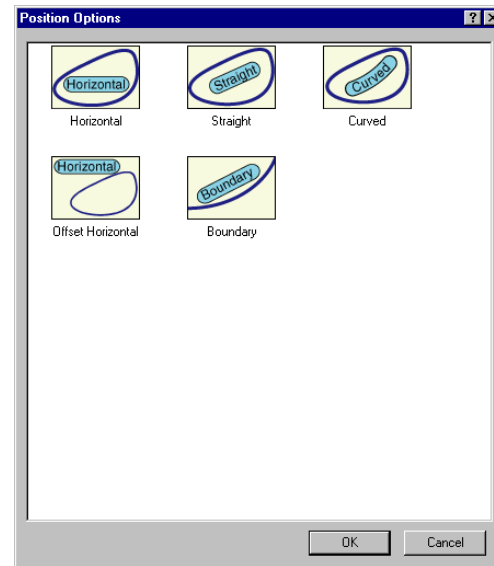
There are several label position options for polygons. By default, polygon labels are placed horizontally within the polygons. You can also place labels along the medial axis or following the general curvature of the polygon. If the polygons are too small to contain the labels, you can place the labels horizontally outside of the polygons. You can also label the boundaries of polygons, for example, to help the map reader differentiate two sides of a political border. Some polygons contain other polygon features—for example, parcel polygons may contain buildings, or lakes may contain islands. You can set polygon labels to avoid other polygons that are contained within the polygon. You can also stretch labels, by increasing the letter spacing, to extend them across polygons.



Labeling styles for polygon features

Maplex for ArcGIS offers five polygon placement styles.

- Horizontal—places the label horizontally inside the polygon.
- Straight—places the label linearly inside the polygon.
- Curved—places the label horizontally, and if this is not possible, the label is curved to fit the shape of the polygon feature.
- Offset Horizontal—places the label horizontally at the best position outside of the polygon.
- Boundary—places labels around the polygon, within its perimeter, usually matching labels of adjoining polygons.



Allowing labels to be placed outside of polygons

The Maplex Label Engine will attempt to place each label inside its polygon when you use any of the three interior polygon labeling styles. Sometimes labels will not fit within their polygons. In these cases you can override the interior placement by checking the box May place label outside of polygon boundary. When this box is checked the Maplex Label Engine will place labels that do not fit within their polygons outside of the polygons, oriented horizontally, and at the Label Offset distance from the polygon boundary.



There is an advanced option, available through the Maplex menu, to only label the largest polygon in a multipart polygon. In the illustration above, the islands of Hawaii are represented by a single, multipart polygon feature, with the label placed outside of the largest of the parts of the island group.

Offsetting labels from the polygon boundary

When a label is placed horizontally outside of a polygon, you can control the distance that the label is placed from the boundary of the feature. The Label Offset distance can be measured in map

units, millimeters, inches, or points. If the placement style doesn't allow a label to be placed outside of the polygon, this option is not available.

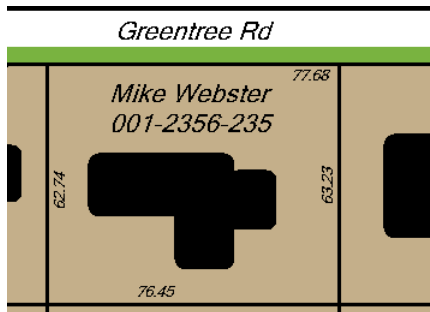
Orienting polygon labels to graticules

If you are labeling polygons on a map with a projected coordinate system, you can specify that horizontal labels be aligned to the projection graticules. Only labels that are placed horizontally will be aligned to graticules. Curved labels or labels that are placed straight but not horizontally, will not be affected.



Placing labels to avoid interior polygons

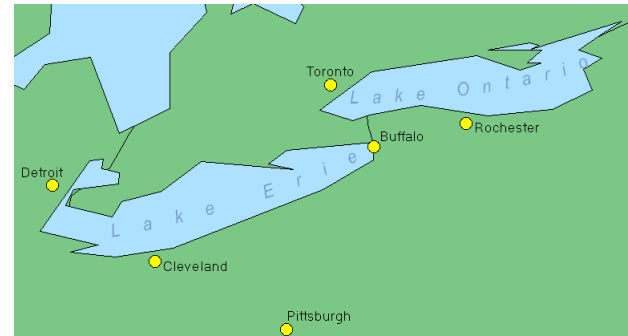
When your polygon features contain other polygons, such as islands or building footprints, you may want to avoid placing a polygon's label over one of the contained features. For example, when labeling parcel polygons that contain building footprints, the parcel label should be placed inside the parcel polygon but should avoid the building footprint polygon. Checking the Land parcel placement box will treat any polygons contained within the polygons being labeled as barriers, unless the interior polygons have a feature weight of 0. You may need to set the feature weight of the interior polygons.



The labels for the owner name and lot ID number are placed to avoid the building footprint polygon.

Spreading the characters in a label

For polygon labels placed with the curved placement style, you have the option to spread the characters in the label. You can specify a maximum distance allowed between characters, expressed as a percentage of the font width. The Maplex Label Engine will stretch the label until it either encounters the boundaries of the feature, conflicts with other labels, or reaches the maximum character spacing distance. If you set the maximum spacing to 0, the label will be stretched to the extent of the feature.



The labels for the two Great Lakes are stretched to fit the length of the polygon feature.

Selecting a polygon placement style

You can select from a number of different placement positions when placing labels for polygon features.

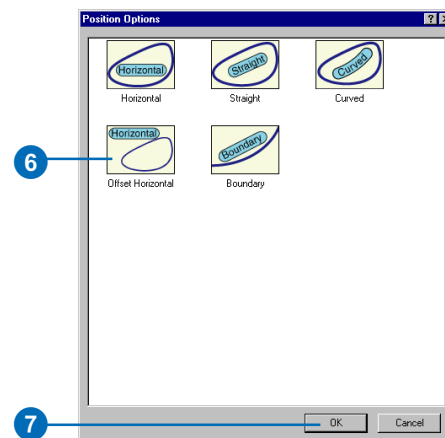
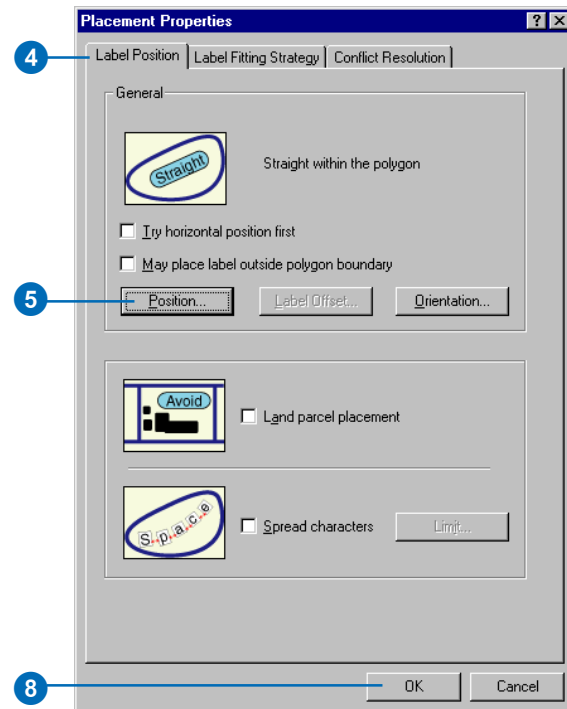
Sometimes a given label will not fit within a given polygon. When it is important for these polygons to be labeled, you can allow the labels that do not fit within polygons to be placed outside of the polygons. When you check the May place label outside polygon boundary box, these labels will be placed outside of the polygons, rather than being rejected.

The Try horizontal position first option is available with straight or curved polygon placement styles. When this option is checked, the ESRI Maplex Label Engine will first try to place the label horizontally inside the polygon before it attempts to place the label using the selected placement style (straight or curved). If this option is not checked the Maplex Label Engine will place the label using the selected placement style.

1. In the table of contents, right-click the polygon layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.

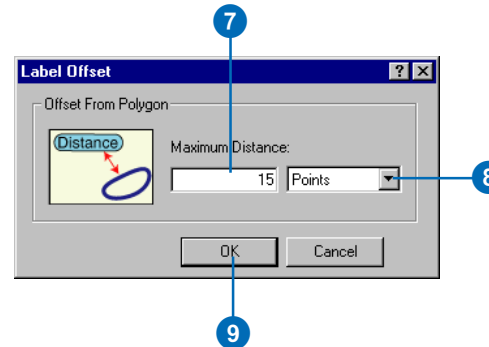
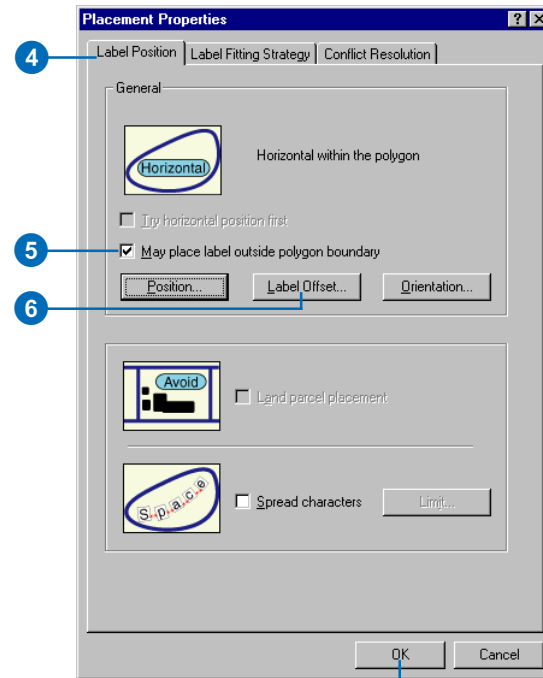
You can also get to the Placement Properties for each of the label classes on the map by clicking the Label Manager button on the Labeling toolbar, clicking a label class, and clicking Properties.

4. Click the Label Position tab.
5. Click Position.
6. Click a label placement style.
7. Click OK.
8. Click OK.
9. Click OK.



Allowing labels to be placed outside of polygons in case of conflict

1. In the table of contents, right-click the polygon layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Position tab.
5. Check the box labeled May place label outside polygon boundary.
6. Click Label Offset.
7. Type a Maximum Distance that the label may be offset.
8. Click the dropdown arrow and choose the units with which the offset will be measured.
9. Click OK.
10. Click OK.
11. Click OK.



Avoiding interior polygons

1. In the table of contents, right-click the polygon layer you want to label and click Properties.

2. Click the Labels tab.

3. Click Placement Properties.

4. Click the Label Position tab.

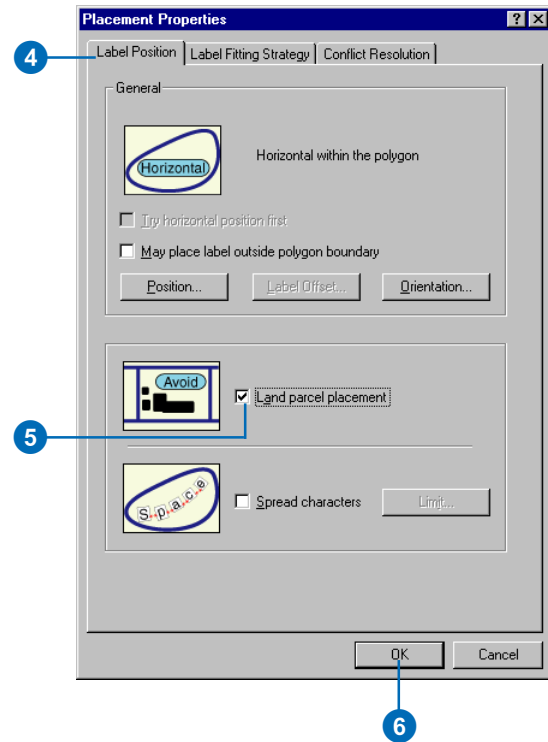
5. Check the box labeled Land parcel placement.

The polygon features that you want to avoid placing labels over must have interior feature weights that are greater than zero.

6. Click OK.

7. Click OK.

8. Click OK.



Tip

0 is treated as a special value

When setting the Maximum character spacing, 0 is treated as a special value that instructs the ESRI Maplex Label Engine to stretch the label proportionately across the length of the polygon feature.

Tip

Working with the Text Symbol

The label's Text Symbol properties control the default character and word spacing. These values become the minimum values when you use the spread characters or spread words labeling options. You can change the base properties of the label text by clicking the Symbol button in the Text Symbol section of the Label tab of the Layer Properties dialog box, and clicking Properties.

Tip

The Spread characters option

The Spread characters option for polygon layers is only available for the Curved label position.

Stretching a label inside a polygon

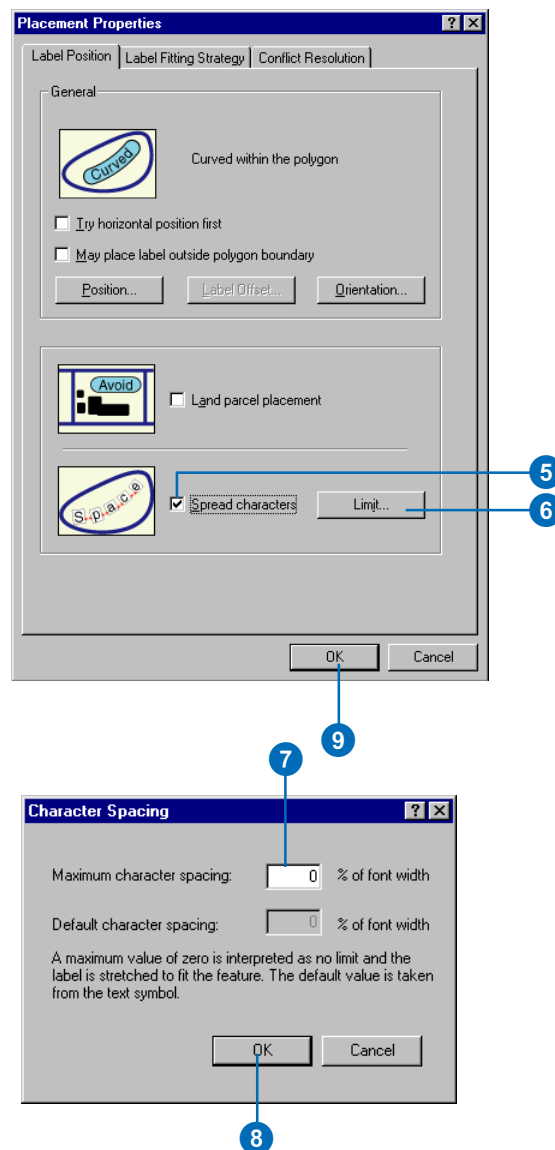
1. In the table of contents, right-click the polygon layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Position tab.

If the label position is not currently Curved, click Position, click Curved, and click OK.

5. Check the Spread characters box.
6. Click Limit.
7. Type a distance to be the Maximum character spacing.

The maximum character spacing is measured as a percentage of the font width. It must be greater than the default character spacing, which is set on the Label symbol Text Properties Editor dialog box. A value of 0 will spread the characters to stretch the label to the extent of the polygon.

8. Click OK.
9. Click OK.
10. Click OK.



Advanced label placement settings

In addition to the parameters that you can set to control the labeling of individual label classes, there are some global parameters that you can use to control how labels for all layers are placed. Because these are global parameters, you set them from the Labeling Options dialog box, which you can open from the Labeling menu.

Unplaced label color

This controls the color of the labels that could not be placed on the map. By default, unplaced labels are drawn in red. If your map already contains many red labels you may want to change the color of the unplaced labels to something different.

Data frame rotation

This controls whether point and polygon labels will also be rotated when the data frame is rotated.

Orientation of vertical labels

Labels are typically placed to read from left to right, following the convention of most Western languages. When labeling nearly vertical line features, the natural break point would be at 0 degrees, or due north. In places where the streets are laid out in a north–south/east–west oriented grid, the labels of nearly parallel streets may be placed in opposite directions. This may be reasonable for reading the map on a computer screen, but for printed maps it is often desirable that nearly parallel streets be labeled in the same direction.

The Orientation of Vertical Labels Angle controls whether the label is placed slightly upside down or flipped to the opposite direction. A small angle prevents labels from switching their reading order when labeling nearly vertical lines. For example, suppose you have two lines, where one line is oriented 6 degrees east of north and the other is oriented 6 degrees west of north.



On the left, the Orientation of Vertical Labels angle is zero. The reading direction of the label for the second line is opposite the reading direction of the first line in order for the label to read from left to right. On the right, the angle is 15 degrees. The label for the second line has the same reading direction (south to north) as the label for the first line, even though it is slightly upside down. Someone with a printed version of the map would be able to read the second pair of street names more easily, because rotating the paper map results in both of these labels being right-side up. Only one of the first pair of labels would be easily legible if the map were turned.

The first will have a label that is read from south to north (left to right). If you specify an angle of 0, the label of the second line would be flipped to read from north to south, rather than have it be placed slightly upside down. If you would prefer to have some labels go slightly upside down in order to keep a consistent reading direction, increase the angle, in this case to more than 6 degrees. Using a negative angle forces the labels to change direction at a given angle east of north. The default angle is 0 degrees, and the maximum angle is 30 degrees. The angle also applies to north–south oriented polygons, or their boundaries, when using the Straight and Boundary label positions.

Line connection

Line connection combines groups of individual line features with the same name into a single linear feature for the label engine. This is usually desirable because linear features such as roads and rivers are often digitized as many small segments that must be connected together to represent a single real-world feature. If the segments are not connected, the feature may appear to be

over-labeled, with the same label repeated along its length for each segment.



On the left the streets are labeled with line connection on. On the right the streets are labeled with line connection off.

In some cases you may want to turn line connection off, such as when:

- You need every line feature to be individually labeled.
- You want to view labels for all of the segments to identify problems with your labels.
- You want to compare the number of segments being labeled to the number of features with the label attributes. When line connection is on, the label engine will always connect line segments so the number of output labels will not match the number of input label features.

Line connection type

The line connection type lets you control how junctions are handled when lines are connected. There are two options:

- Unambiguous—Junctions in the road network will be labeled so there will be no ambiguity about which road is which. This tends to place more labels on the map than the minimize option, because the same feature may be labeled on either side of the junction.

- Minimize Labels—This option puts the emphasis on labeling the features so that a minimum number of labels are required. Rather than placing a label on either side of the junction for the same feature, it may place a single label on one side of the junction or the label may span the junction.

Allowing labels to overlap the map border

By default, labels are placed within the border of the map's data frame. You can allow parts of labels to overlap the border to increase the likelihood that they will be placed, although the part of the label outside of the border will not be visible on the map. This is useful when making a map series and merging map tiles, where it may be desirable to have the label placed on the map (albeit running into the next tile) so it is available when editing the map border.

Compound polygons

Some polygons have multiple parts. The separate parts of compound, or multipart, polygons can each be labeled with the same label, or you can choose to only label the largest part of the feature.

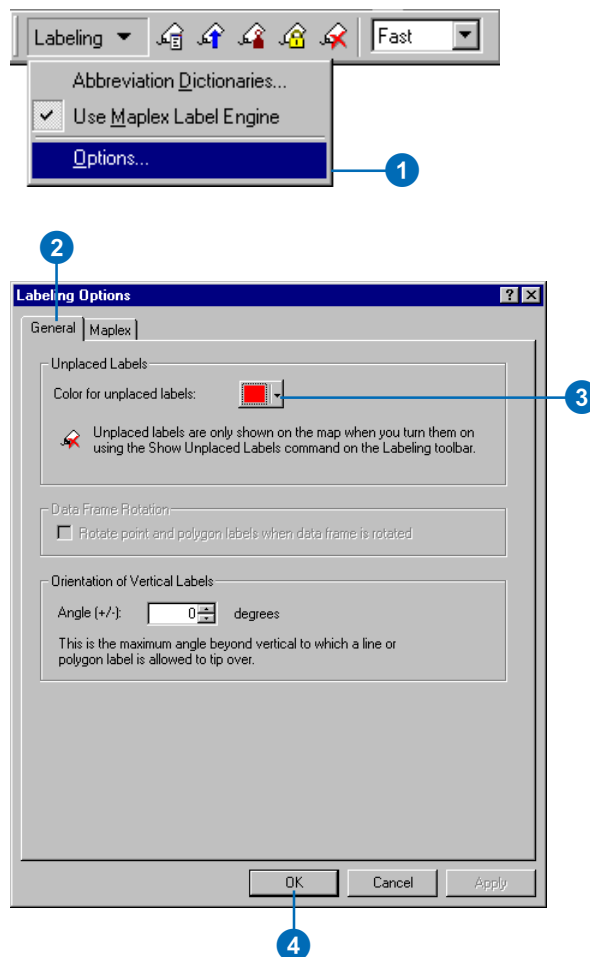
Setting the unplaced label color

The default color for unplaced labels is red. You can change the color of unplaced labels on the General tab of the Options dialog box.

1. On the Labeling toolbar, click Labeling and click Options.
2. Click the General tab.
3. Click the Color dropdown arrow and click a color.

If you would like to use a color that is not on the palette, click More Colors to open the Color Selector. Mix your own color, then click OK.

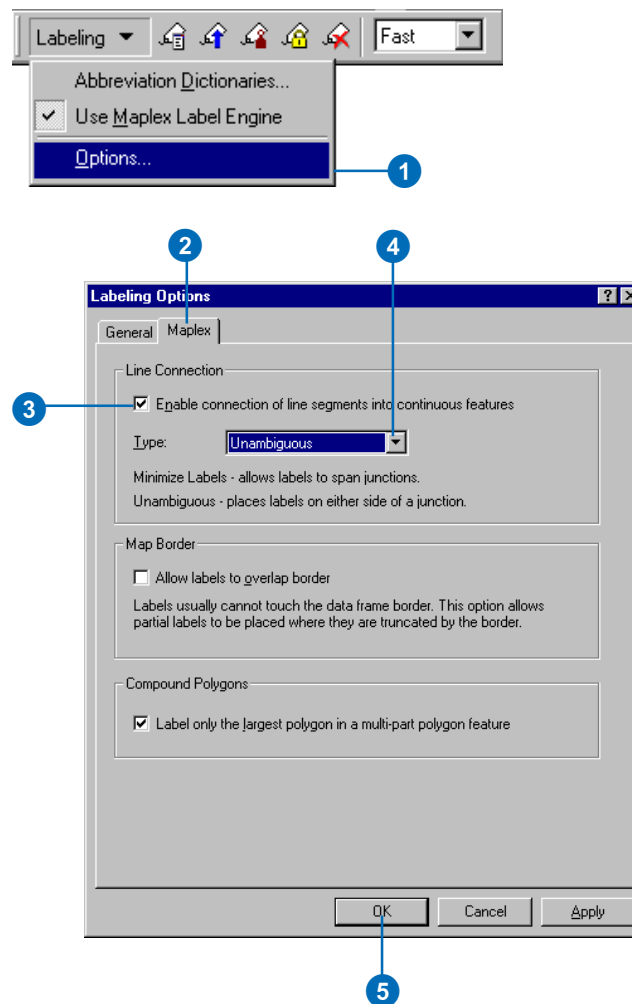
4. Click OK.



Connecting line segments for labeling

When you have a number of line features that make up a single geographic feature, such as a pipeline, highway, or river, you may not want to label all of the individual segments. When using line connection you can choose between two labeling strategies. Unambiguous line connection will place labels at junctions of differently named features. The other strategy is to minimize labels, which will allow labels to span junctions of differently named features. This strategy usually results in fewer labels being placed for a given set of connected features.

1. On the Labeling toolbar, click Labeling and click Options.
2. Click the Maplex tab.
3. Check the box to Enable connection of line segments into continuous features.
4. Click the Type dropdown arrow and click one of the line connection labeling strategies.
5. Click OK.



Allowing labels to be cut off by the map border

Labels are not usually allowed to touch the edge of the data frame in which they are placed. This sometimes results in labels not being placed for features at the edge of the data frame. If it is important for at least part of the label for such features to be placed, you can use the Advanced Option to Allow labels to overlap border. The data frame border will no longer be considered an obstacle for labels, though only the part of the labels that are within the data frame will be visible.

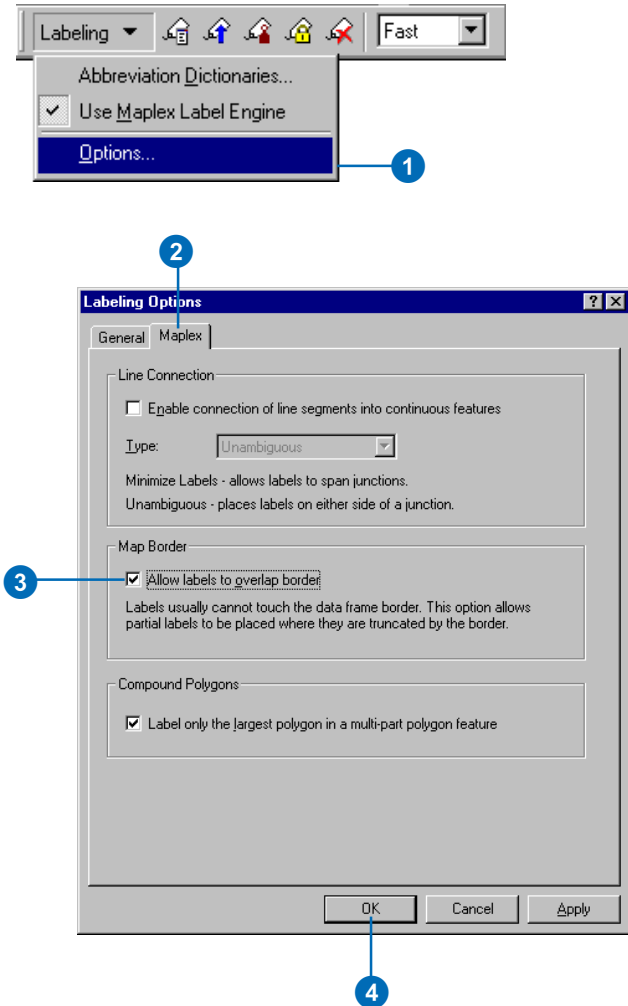
1. On the Labeling toolbar, click Labeling and click Options.

2. Click the Maplex tab.

3. Check the box to Allow labels to overlap border.

Only the part of the label that falls within the data frame will be visible.

4. Click OK.



Aligning the reading direction of north–south oriented labels

When you want labels for a group of generally north–south oriented features to be placed so that they all read in the same direction, use an angle greater than the divergence of the feature orientation from true north for the orientation of vertical labels.

With an angle of 0, labels of features oriented slightly west of north will read from north to south, while labels of features oriented slightly east of north will be read from south to north. With an angle of 10, labels of features oriented up to 10 degrees west of north will also read from south to north.

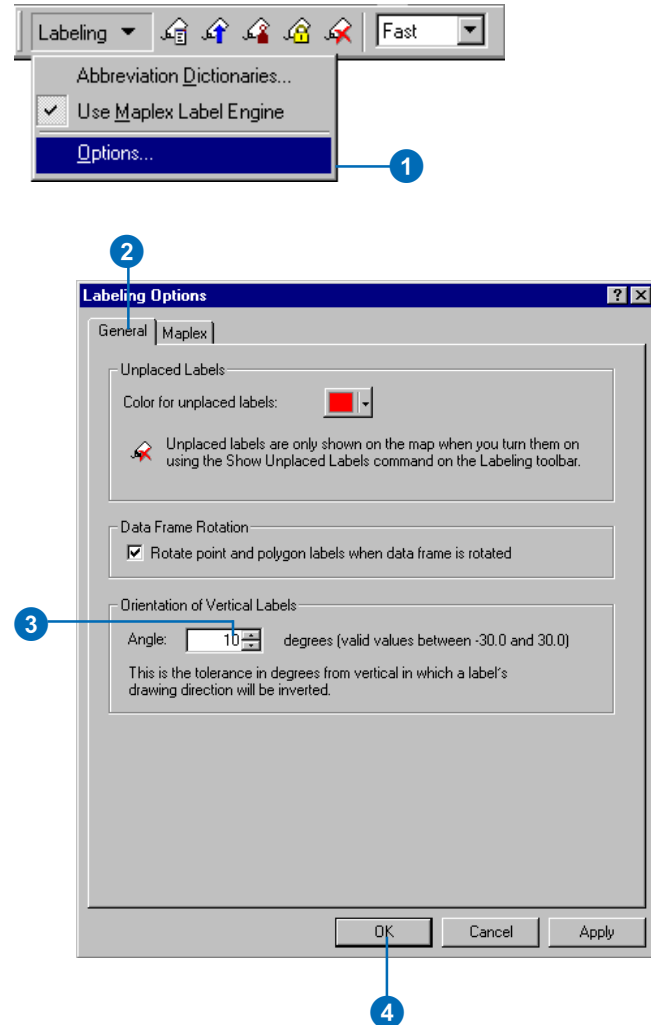
1. On the Labeling toolbar, click Labeling and click Options.
2. Click the General tab.
3. Type a number between -30 and 30 degrees in the Orientation of Vertical Labels Angle text box.

Positive numbers will force labels of lines oriented slightly west of north to read from south to north.

Negative numbers will force labels of lines oriented slightly east of north to read from north to south.

The angle also applies to polygon labels.

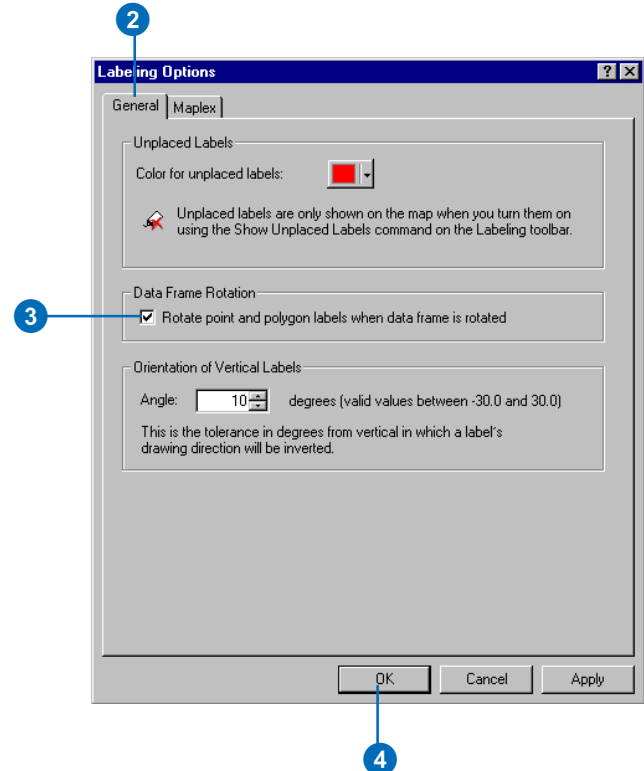
4. Click OK.



Rotating labels with the data frame

You can rotate data frames of a map using the tools on the Data Frame toolbar. When the data frame is rotated, you may want the angle of the labels to change along with it.

1. On the Labeling toolbar, click Labeling and click Options.
2. Click the General tab.
3. Check the box to Rotate point and polygon labels when the data frame is rotated.
4. Click OK.



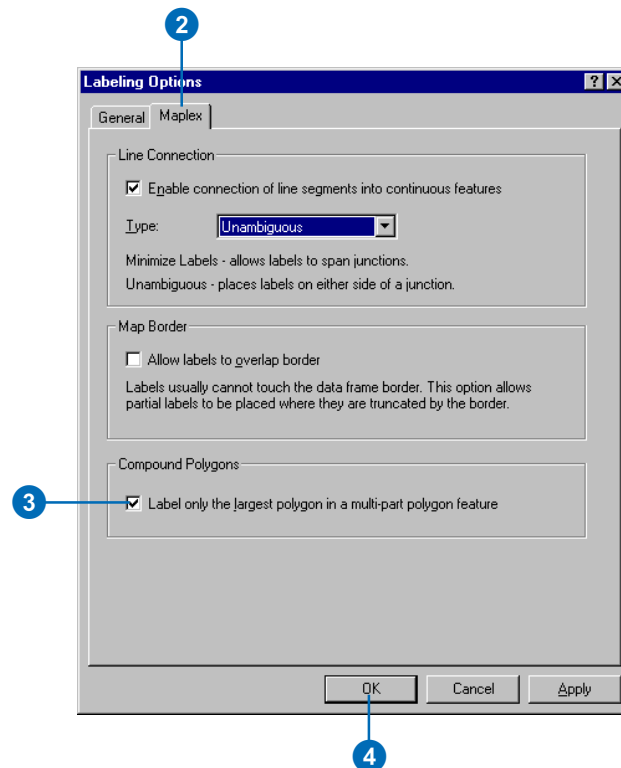
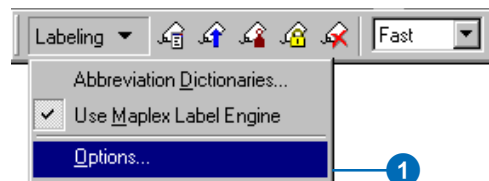
Labeling multipart polygons

Sometimes a group of geographic features is represented by a single multipart polygon feature. For example, in a feature class of the United States of America, the state of Hawaii could be represented as one polygon with several parts. When labeling such features you can choose between labeling each part of the feature with the same label or placing one label for the largest part.

1. On the Labeling toolbar, click Labeling and click Options.
2. Click the Maplex tab.
3. Check the box to Label only the largest polygon in a multipart polygon feature.

If you want each part of a multipart polygon feature to have a copy of the feature's label, uncheck this box.

4. Click OK.



Label-fitting strategies

IN THIS CHAPTER

- **Why use additional strategies for placing labels?**
- **Label stacking**
- **Stacking labels with a special character**
- **Allowing labels to extend beyond features**
- **Font reduction**
- **Reducing label size with font size and width reduction**
- **Abbreviating words to place more labels**
- **Building an abbreviation dictionary**
- **Using an abbreviation dictionary**
- **Saving and loading an abbreviation dictionary**

A common challenge when labeling a map is to fit many labels into a small area. Although Maplex for ArcGIS places labels to avoid conflicts, sometimes there is simply not enough space in a given area to place labels for all of the features. There are several strategies for fitting labels to maximize the number of labeled features. These include stacking labels to reduce their overall length, reducing the font size of labels, and abbreviating certain words in labels. A label fitting strategy that is useful when the labels are large compared to the size of line or polygon features is to allow labels to extend beyond features. These strategies are applied to the labels where there are conflicts. This allows more labels to be placed when there are conflicts but leaves the easily placed labels unchanged to maintain the clarity of your map.

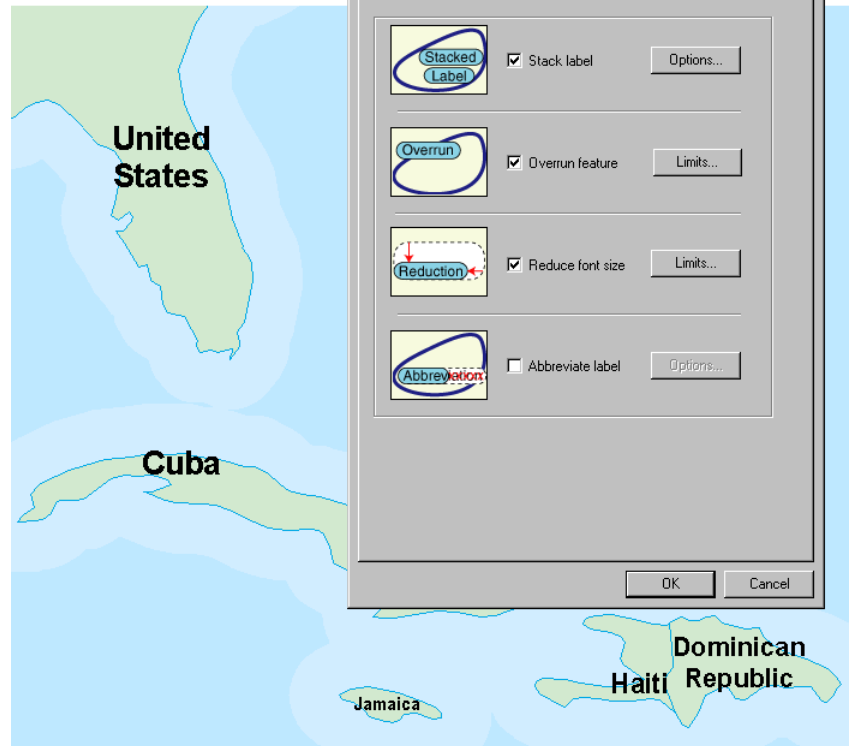
Maplex for ArcGIS allows you to apply the strategy or strategies that best fit your map design and labeling goals. In this chapter you will learn how to apply these label-fitting strategies.

Why use additional strategies for placing labels?

When you are producing a map at a scale where the labels are large with respect to the features or when there are numerous features in a small area, you may be faced with a choice of not labeling features where conflicts occur or modifying the labels so that more will fit. Maplex for ArcGIS allows you to choose from a number of space-saving styles.

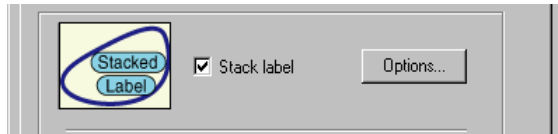
Labels can be stacked, extend beyond features, be reduced in size, or be abbreviated. You can apply one or more of these space-saving methods to produce the best result for your map. When you allow Maplex for ArcGIS to abbreviate certain words in labels, the abbreviations will only be applied when there are conflicts. In other places the full words will be used.

In this simple example the label placement style is Horizontal and within the polygon. You can see that labels are stacked, extend beyond the polygon boundary, and are reduced in size so that all the countries have labels within the polygon. These label-fitting strategies allow more labels to be placed on the map.



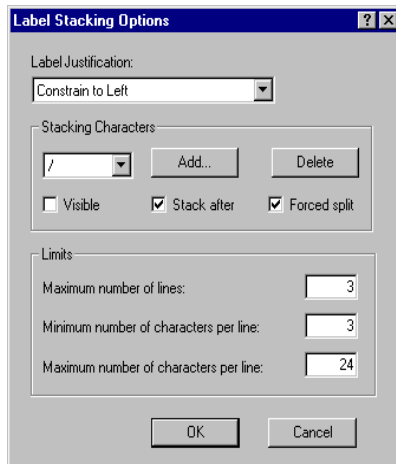
Label stacking

When a label does not fit in the available space, you can have Maplex for ArcGIS split it into two or more parts and stack them to reduce its horizontal length. When you check Stack label, Maplex for ArcGIS automatically stacks labels that are too long. You can change the stacking parameters to fit your map.



Label stacking parameters

You can control how Maplex for ArcGIS stacks labels, including how the stacked label text is justified, what characters are used to indicate where the text should be split, whether and where these characters should appear in the label, and whether all labels should be split at the stacking character or just when there is not enough room.



Stacked label justification

You can choose how the text in stacked labels is justified. There are several options:

- Automatically Choose Best—Depending on the location of the stacked label relative to the feature, the Maplex for ArcGIS will center-, left-, or right-justify the label.
- Constrain to Left or Right—Depending on the location of the stacked label Maplex for ArcGIS will either right or left justify the label. Labels placed to the left of a feature will be right-justified, and labels placed to the right of a feature will be left-justified.
- Constrain to Left—The stacked label will be left-justified regardless of its location.
- Constrain to Right—The stacked label will be right-justified regardless of its location.
- Constrain to Center—The stacked label will be center-justified regardless of its location.

Stacking characters

You can specify where the label is split when it is stacked by using stacking characters. Spaces, hyphens, and commas are frequently used to split words and are the default stacking characters, but you can use any character to split your labels. If you do not want your labels to be split at the default characters, you can remove them from the stacking character list. Choosing a special stacking character can be useful when you must split a label in a specific place. When this is the case, you can create a label expression with a special character separator between the label fields, such as:

[field1] & “/” & [field2]

In this example, the special character ‘/’ is used to make the split for the stack.

You can control how and when the stacking character will split labels. When the Visible box is checked, the split character will appear on the map. If it is left unchecked the character will not appear on the map. If Stack After is checked the split will happen after the stacking character; otherwise it will occur before the character. If Forced Split is checked a split will always happen at the character and stacking will always occur.

Here is an example where all three parameters are checked and ‘&’ has been substituted for ‘space’ as a stack character:

Label Expression [Field1] & “&” & [Field2]

Field1 value = Jekyll

Field2 value = Hyde

Split character = &

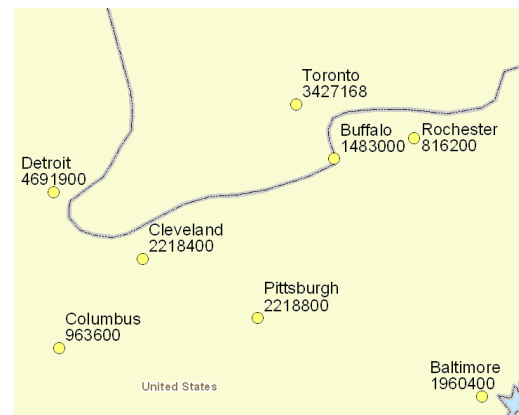
Label string before being placed “Jekyll & Hyde”

After placement	Jekyll & Hyde
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Stacking limits

You can set some limits on the number of lines and the number of characters per line to control the shape of a stacked label. These limits can be used to prevent short labels from being stacked, while allowing other longer ones to be stacked. If the stacking character limits cannot be satisfied for a given label, the label will be split as close to the limits as possible.

- Maximum number of lines—Specifies the maximum number of lines, from 1–50, that a label can be split into.
- Minimum number of characters per line—Specifies the minimum number of characters, from 1–8, that must be in the shortest part of a stacked label. For example, if this parameter is set to 3 then the label “St David” will not be stacked, even if the space character is used as a stacking character.
- Maximum number of characters per line—Specifies the maximum number of characters, from 2–80, that can be on a given line of a label.



In this example, city names are stacked above city populations. All labels are left-justified, and the stacking character “/” does not appear in the labels.

Stacking labels with a special character

You can create label expressions that contain stacking characters that will be used to split the label into two or more lines of text on the map. Once the expression is created you turn on label stacking and indicate which characters to use as stacking characters and whether or not they should appear in the label.

Tip

Selecting a split character

Any character can be used as a stacking character, but it is best to use a character that does not appear in your field names.

Tip

Showing specific field types

You can filter the list of attribute fields by field type. This is useful when a feature class has many attributes and you want to select only fields of a certain type for the label expression.

Tip

Showing sample field values

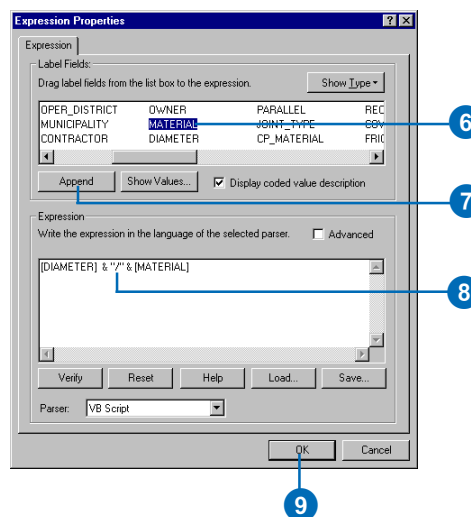
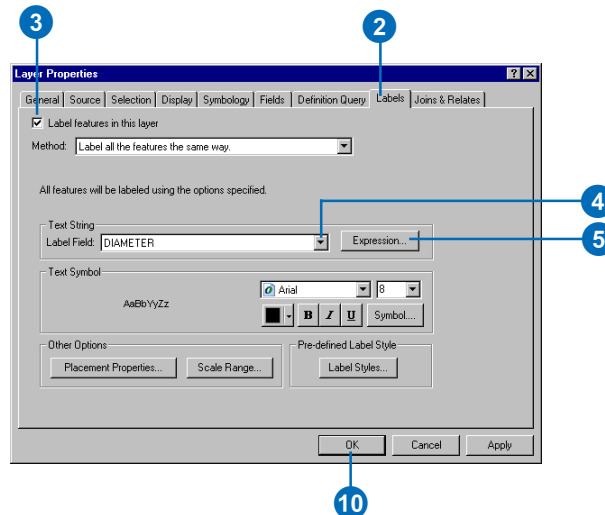
You can click Show Values to see a sample of the values of an attribute to ensure that you are choosing the right fields.

Creating a label expression with a special character for stacking

1. In the table of contents, right-click the layer you want to label and click Properties.
2. Click the Labels tab.
3. Check Label Features in this layer.
4. Click the Label Field dropdown arrow and click the field you want to use as the first part of the label expression. In this example, TYPE was selected.
5. Click Expression.
6. Click the next field that you want to label features with, from the Label Fields list.
7. Click Append.

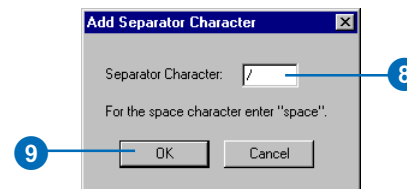
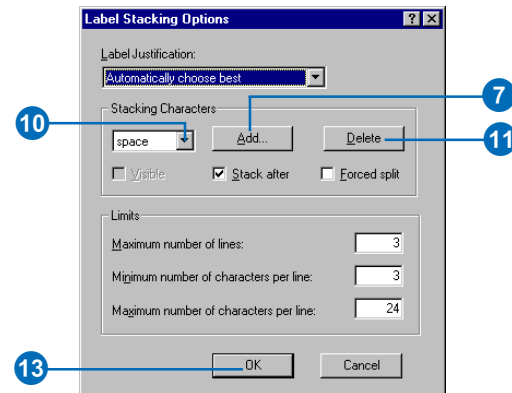
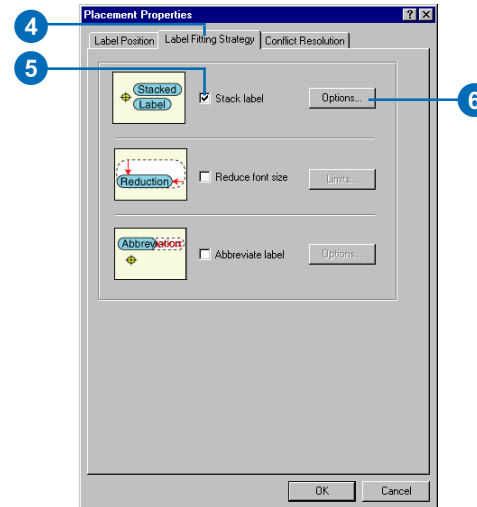
When you use the Append button to add fields to the label expression, the fields are automatically concatenated with the "&" symbol, and a space is inserted in the label between the fields.

8. Select the space and type the character "/" between the fields.
9. Click OK.
10. Click OK.



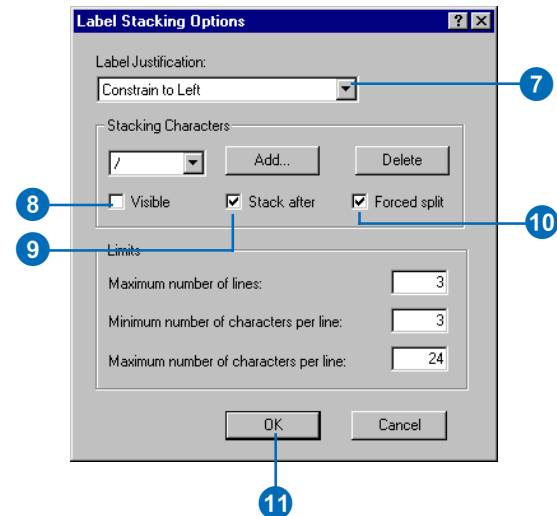
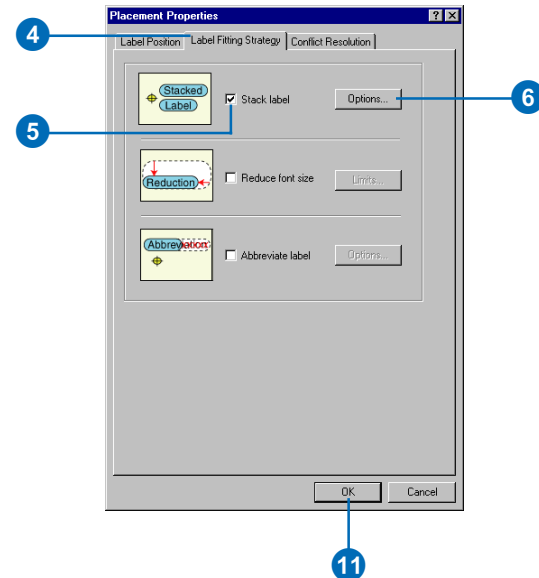
Adding and removing stacking characters

1. In the table of contents, right-click the layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Fitting Strategy tab.
5. Check Stack label.
6. Click Options.
7. Click Add.
8. Type the stacking character in the Separator Character text box.
9. Click OK.
10. Optionally, click the Stacking Characters dropdown arrow and select any stacking character that you do not want to use.
11. Optionally, click Delete to delete the selected stacking character.
12. Repeat steps 10 and 11 until only the stacking characters that you want to use are listed.
13. Click OK.
14. Click OK.
15. Click OK.



Controlling how stacking characters work

1. In the table of contents, right-click the layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Fitting Strategy tab.
5. Check Stack label.
6. Click Options...
7. Click the Label Justification dropdown arrow and click the justification constraints that you want to apply to your labels.
8. Check or uncheck the Visible check box.
If it is unchecked, the stacking character will not be visible in the label.
9. Check or uncheck Stack after.
If it is checked, the label will be split after the stacking character.
10. Check or uncheck Forced split.
When Forced split is checked, labels will always be split at the stacking character.
11. Click OK on the Label Stacking Options and Placement Properties dialog boxes.



Allowing labels to extend beyond features

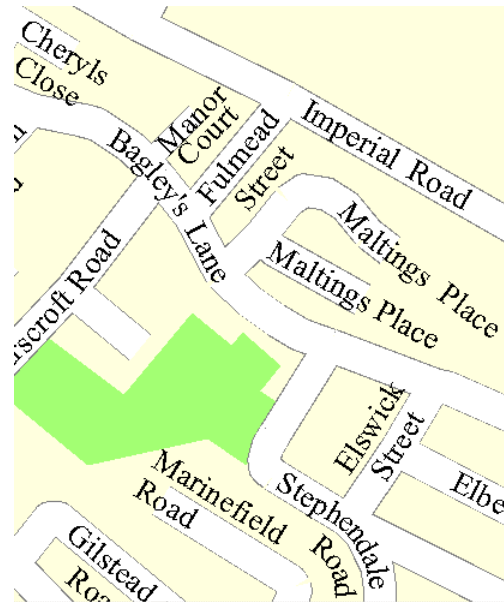
If a label does not fit within a polygon or is longer than the length of a line, it may be placed on the label overflow list rather than on the map. You can use the label overrun parameters to allow the Maplex Label Engine to use free space beyond the feature to place labels.

Polygon feature overrun

For most polygon label placement styles, the Maplex Label Engine will try to place the label inside a polygon. If the label is larger than the polygon, the label won't be placed on the map and will instead be placed into the label overflow list. Checking the Overrun feature box allows the Maplex Label Engine to utilize free space outside the boundary of the polygon to place the label. You can limit the distance that a label may extend beyond a polygon by setting a Maximum label overrun limit, measured in points.

Line feature overrun

When the Maplex Label Engine places labels for lines, it will always try to place the label between the start and endpoints of the line. If the label is longer than the line feature, the label may not be placed on the map and may instead be placed in the label overflow list. Checking the Overrun feature box allows the label to extend beyond the ends of the line. You can limit the distance that a label may extend beyond a line by setting a Maximum label overrun limit, measured in points.



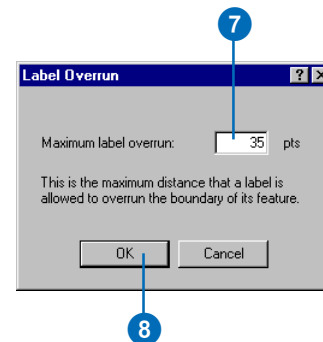
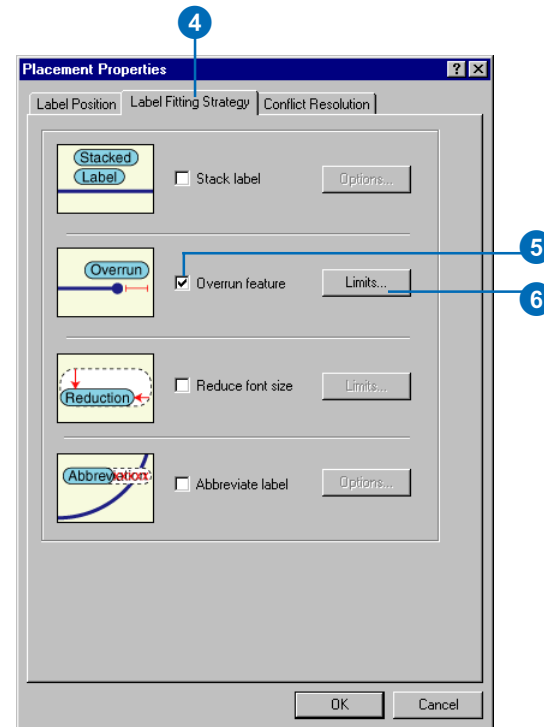
Allowing a label to overrun the length of a feature

You can allow labels to extend beyond the boundaries of polygons and past the endpoints of lines by checking the Overrun feature box. The Limits button allows you to limit the distance beyond the feature to which the label can extend. This limit is measured in points.

1. In the table of contents, right-click the line or polygon layer you want to label and click Properties.

NOTE: Although the steps are the same, the dialog boxes for line and polygon layers differ.

2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Fitting Strategy tab.
5. Check the Overrun feature box.
6. Click Limits.
7. Type the distance you want to allow the label to extend beyond the length or perimeter of the feature.
8. Click OK.
9. Click OK.
10. Click OK.



Font reduction

Another strategy for fitting labels into small areas is to reduce the size of the label text. You can allow the Maplex Label Engine to reduce the font size, compress the font width, or both.

Reducing the font size

Reducing the font size reduces the overall size of labels in areas where there are conflicts. This proportionally reduces the height and width of the font. When you allow the Maplex Label Engine to reduce the font size, you can set a lower limit on the font size and define a step interval that specifies the font size variants for the label engine to try between the font's original size and the lower limit.

Font Size	Label font size = 18 point
Font Size	Step interval = 4 points
Font Size	Minimum font size = 6 point

In this example, the font size is reduced from 18 point to 6 point with a 4-point step interval. In practice you might use a minimum font size that is closer to the base font size of the labels and use a step interval of a fraction of a point.

For example, for a label with a base font size of 10 pt. you might set a lower limit of 6 pt. and a step interval of 0.5. The Maplex Label Engine will try placing variants of the label using 10 pt., 9.5 pt., 9.0 pt., and 8.5 pt. fonts, starting at the base font size and reducing it by the step interval until the lower limit is reached. Once the label is placed, the smaller size levels are not tried. The maximum number of label font size variants that the label engine will try is 10.

Compressing the font width

Compressing the width of the font for a label reduces the length of the label but not its height. As with font size reduction, you control how much the label is reduced by setting a minimum and a step interval; however, for font width compression these limits are specified in terms of a percentage of the base font width of the label. The lower limit can range between 10 and 100 percent of the original font width, and the step interval can range between 1 and 50 percent of the base font width.

Font Width	No compression = 100%
Font Width	Step interval = 10%
Font Width	Lower limit = 70%

In this example, the font width is compressed from its original width to 70 percent of its original width, in 10 percent step intervals.

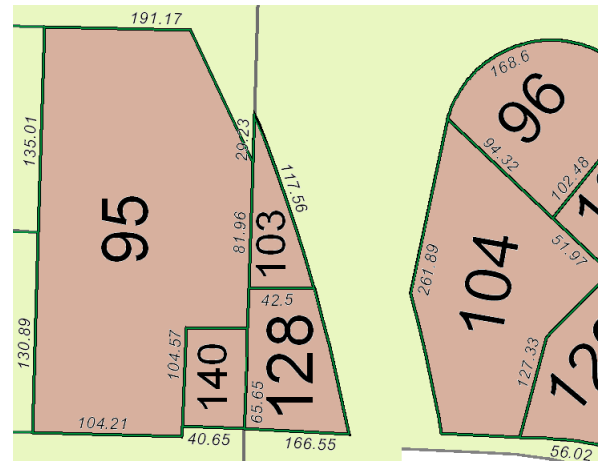
For example, you might allow the label engine to compress the width of the font in a label to 85 percent of its original width and use a step interval of 5 percent. The label engine would try to place the label at 100 percent of its original width. If it didn't fit then it would try compressing to 95 percent, 90 percent, and 85 percent, stopping when it fit. Once the label is placed at a certain compression level, the lower levels are not tried.

Reducing and compressing labels

You can use font size reduction and font width compression together to increase the number of labels that will be placed. The label engine will try all of the font compression levels for each font size before the font size is reduced by its step interval.

For example, if the base font size for a label is 10 pt. and you set the lower font size limit to 8 pt. and a font size step interval of 0.5 pt., there are five font size possibilities. If you also set the font compression lower limit to 85 percent and the compression step interval to 5 percent there are four font compression levels. The ESRI Maplex Label Engine would try the resulting 20 size and width combinations in the following order:

1. Font size of 10 pt., 100% font width
2. Font size of 10 pt., 95% font width
3. Font size of 10 pt., 90% font width
4. Font size of 10 pt., 85% font width
5. Font size of 9.5 pt., 100% font width
6. Font size of 9.5 pt., 95% font width
- .
- .
- .
19. Font size of 8 pt., 90% font width
20. Font size of 8 pt., 85% font width



This map illustrates the use of the font reduction settings for size and width.

Reducing label size with font size and width reduction

You can increase the number of labels placed in areas where there are label or feature conflicts by allowing the font size and width to be reduced. You can reduce the font size from the label's base font size to a minimum font size, using steps of a given size. You can also reduce the length of the label by compressing it horizontally to a given percentage of its original length in discrete steps. These techniques can be applied together, so the font width compression steps will be tried for each of the font size steps. ►

Tip

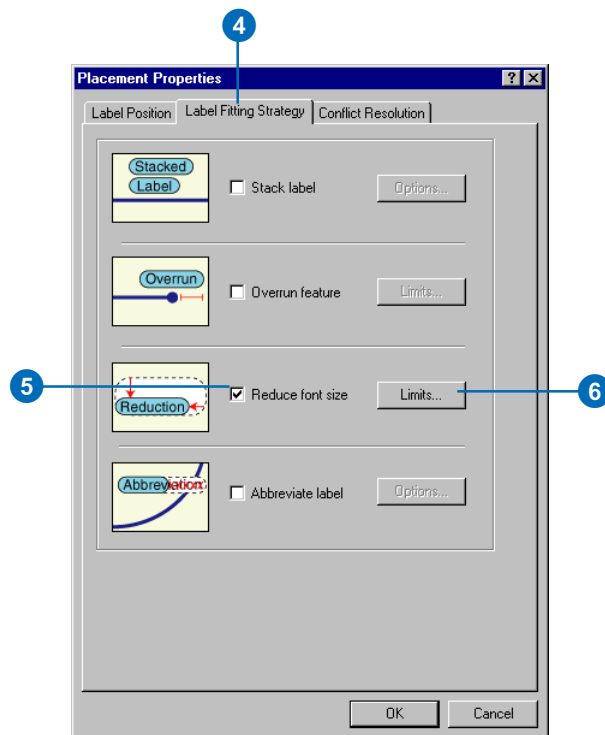
Formatted text tags prevent font reduction

The font size and width will not be reduced if the label expression contains formatted text tags that specify the label's font size and type.

1. In the table of contents, right-click the layer you want to label and click Properties.

NOTE: Although the steps are the same, the dialog boxes for line and polygon layers differ.

2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Fitting Strategy tab.
5. Check the Reduce font size box.
6. Click Limits. ►



Font Size Reduction Lower Limit is the smallest allowable reduced font size. This parameter instructs Maplex for ArcGIS to reduce both the font height and width, without changing the aspect ratio.

Font Size Reduction Step Interval is the amount by which the font size may be progressively reduced in order to place a label.

Font Width Compression Lower Limit is the smallest allowable font compression ratio.

Font Width Compression Step Interval is the amount by which the font width may be progressively compressed.

Tip

Increased Processing Time

Be conscious of the proportion of the initial font size, lower limit, and step interval values. More trial sizes means more processing time.

The top section of the Label Reduction dialog box lets you control font size reduction. The label's base Font Size is listed for reference.

7. Type a Lower Limit.

The font size of the labels will not be reduced below this value.

8. Type a Step Interval.

The font will be reduced from its current size to the lower limit in steps of this size.

9. The bottom section of the Label Reduction dialog box lets you control font width compression. Font height is not affected.

Type a Lower Limit.

The font will not be compressed beyond this percentage of its current width.

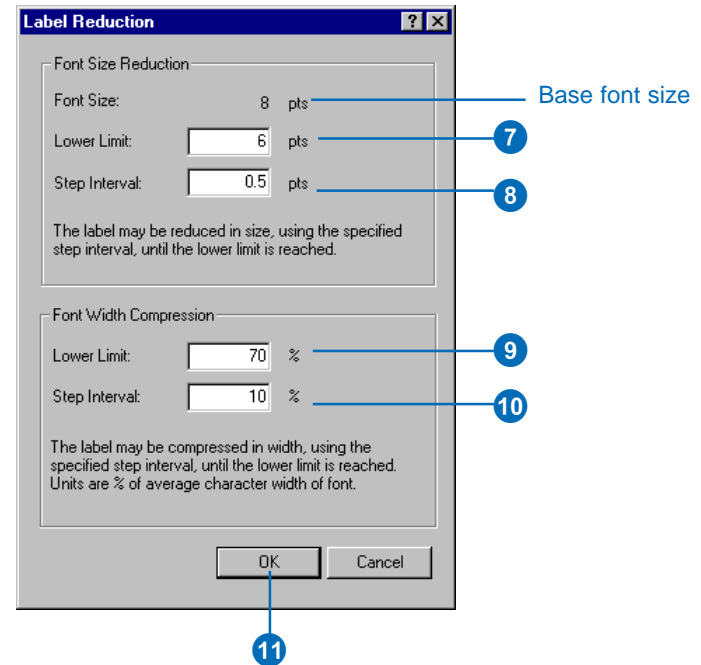
10. Type in a Step Interval.

The font width will be compressed in steps of this size.

11. Click OK.

12. Click OK.

13. Click OK.



Abbreviating words to place more labels

The Maplex Label Engine can automatically shorten words in order to fit a given label with its feature if you specify the word and abbreviation in an abbreviation dictionary. When you use an abbreviation dictionary, the Maplex Label Engine will first attempt to place the full text of the label, then abbreviate any words found in the dictionary for labels that could not be placed.

Abbreviation dictionaries are applied to individual label classes. The abbreviation is applied to a freestanding word or groups of words, not parts of words, with the exception of certain non-English words. Individual words such as Road and Street can be abbreviated as Rd or St, or longer strings such as Post Office can be abbreviated as PO. Portions of words will not be abbreviated. For example, if you had a dictionary entry mapping Road as Rd, the label Roadrunner Road would be abbreviated as Roadrunner Rd, not Rdrunner Rd.

Entering abbreviations in a dictionary

In order to use abbreviations in labels, you must first create an abbreviation dictionary and add to it some words and their abbreviations. Once you've created a dictionary you can save it as a file that you can load to use with other maps.

To add words to an abbreviation dictionary, you add a row to the dictionary table, type the word in the keyword column, type one or more abbreviations separated by spaces, and specify what type of dictionary entry it is. Multiple-word keywords and abbreviations, as well as nonalphabetical characters, must be contained within double-quotation marks. For example, the two-word string "Post Office" might be abbreviated as "Post Off." or "P.O." The alternative abbreviations must be separated by a space.

Types of abbreviation dictionary entries

There are three types of abbreviation dictionary entries: keywords, endings, and translations. Two of these types, keywords and endings, are only applied to words when the original string cannot be placed because of space, label-to-label, or label-to-feature conflicts. Translation entries are always applied to all matching words.

- **Keywords**—Can be applied to all words in a string except the last word. You would use keywords to replace common words such as "Mount" or "International" with abbreviations such as "Mt." and "Int'l."
- **Endings**—Can be applied to only the last word of a string. You would use this type of abbreviation to shorten street endings such as Street to St, Road to Rd, and Avenue to Ave.
- **Translations**—Always applied to all words of a string. Translation entries may be useful when you translate a map into another language, when you wish to remove words from a label string, or when you want all occurrences of a word to be abbreviated.

Non-English street names

In some Germanic languages, the generic street ending is appended to the street name; for example, Fredrichstrasse. To deal with these special cases, the Maplex Label Engine can recognize four special character strings that can be abbreviated when they are found within a longer string. These four words are:

strasse	(German)
gatan	(Swedish)
straat	(Dutch)
gade	(Danish)

In order to abbreviate these words, you must still add them to the abbreviation dictionary. You can use any abbreviation for these special words, but you must set the abbreviation type to Ending in order for the abbreviation to be implemented. No other character strings will be abbreviated when they are contained within a string.

Saving abbreviation dictionary files

Abbreviation dictionaries can be used in other map documents by saving them and loading them into the new map document. The files are formatted text files and are saved with the file extension .dic.

Abbreviation dictionary file format

Lines that begin with the * character are comment lines. The format of an abbreviation entry follows:

<Word> <Option1> <Option2> <OptionN> <Type>

Example of an abbreviation file:

```
* Maplex Extension Dictionary File - v1.0
* Format: TEXT ABBREVIATION(S) TYPE
* where TYPE=[Translation|Keyword|Ending]
Street Str St Ending
Road Rd Ending
"Post Office" "P.O." PO Keyword
* [end]
```

Building an abbreviation dictionary

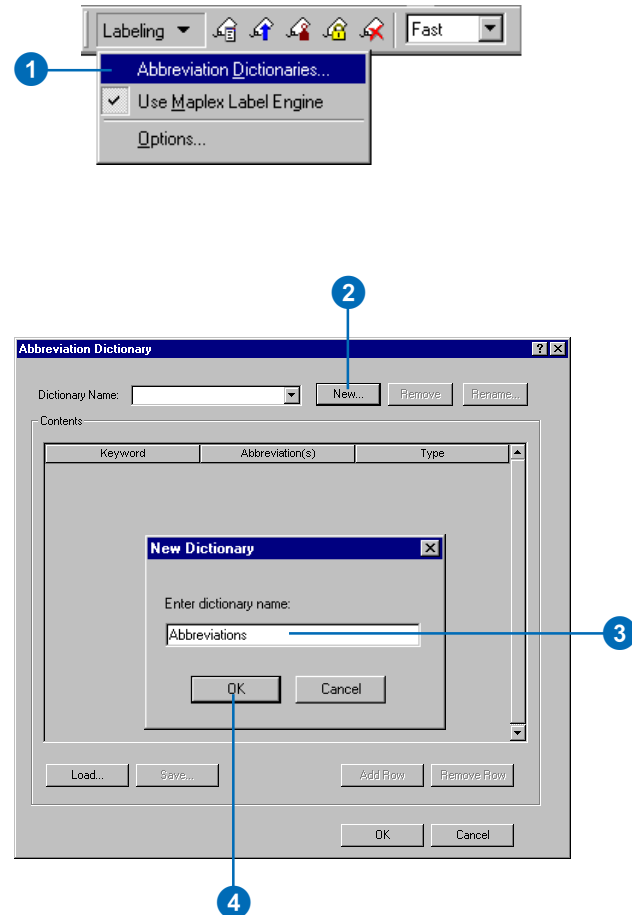
Abbreviation dictionaries allow the label engine to shorten long names to fit within small spaces. For example, “Martin Luther King Boulevard” can be abbreviated to “MLK Boulevard”. Street endings can also be abbreviated, so “Road”, “Avenue”, and “Boulevard” can be shortened to “Rd”, “Ave”, and “Blvd”.

The words being abbreviated must be separated by spaces within the label. This restriction prevents problems such as “Broadside Road” becoming “Brdside Rd”.

Creating an abbreviation dictionary

1. On the Labeling toolbar, click Labeling and click Abbreviation Dictionaries.
2. Click New.
3. Type a name for a new Abbreviation Dictionary.
4. Click OK.

You can now add words and their abbreviations to the dictionary.



Tip

Using more than one abbreviation

When more than one abbreviation is possible, separate the entries with a space. The first abbreviation entry will be tried first, followed by the next, and so forth. As soon as the string is placed, no further abbreviation entries are tried.

Adding words to an abbreviation dictionary

1. On the Labeling toolbar, click Labeling and click Abbreviation Dictionaries.
2. Click the Dictionary Name dropdown list and click a dictionary, or create a new dictionary using the steps outlined in 'Creating an abbreviation dictionary'.

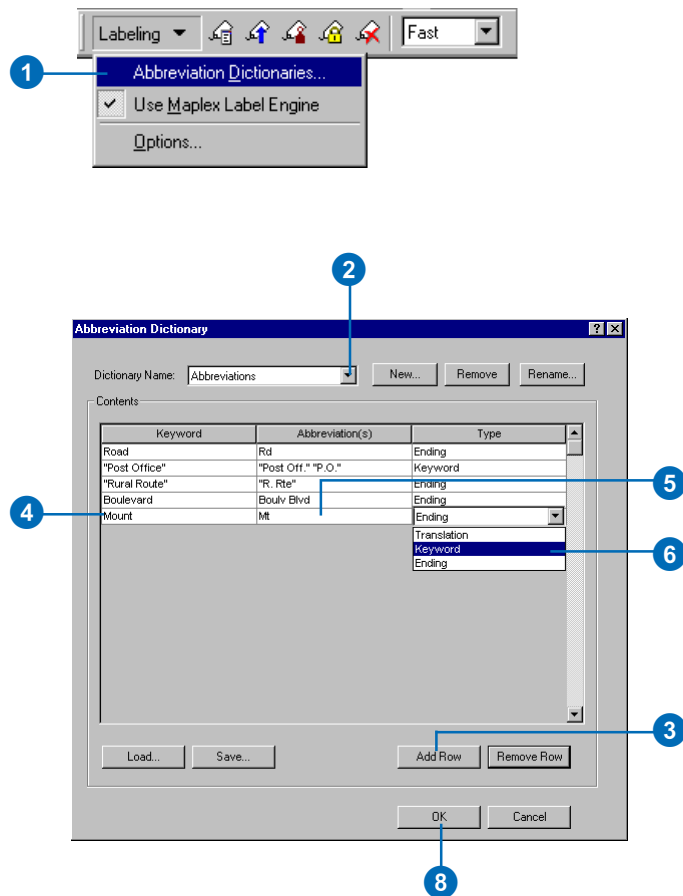
3. Click Add Row.
4. Type a word that you want to abbreviate.

If you want to abbreviate a group of words, such as "Post Office", you should enclose the words in double quotation marks.

5. Type an Abbreviation for the word.

If you want to use more than one abbreviation, separate them with a space. If your abbreviation contains a space or nonalphabetical characters, enclose the abbreviation in double quotation marks.

6. Click in the Type column and choose the type of abbreviation that you want to use from the dropdown list.
7. Repeat steps 3–6 for each word you wish to abbreviate.
8. Click OK.



Using an abbreviation dictionary

Once an abbreviation dictionary has been created you can assign it to the label class in which you want to use abbreviations.

Selecting an abbreviation dictionary

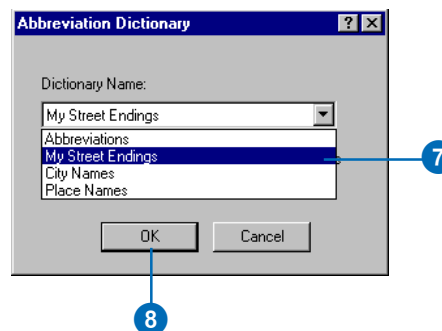
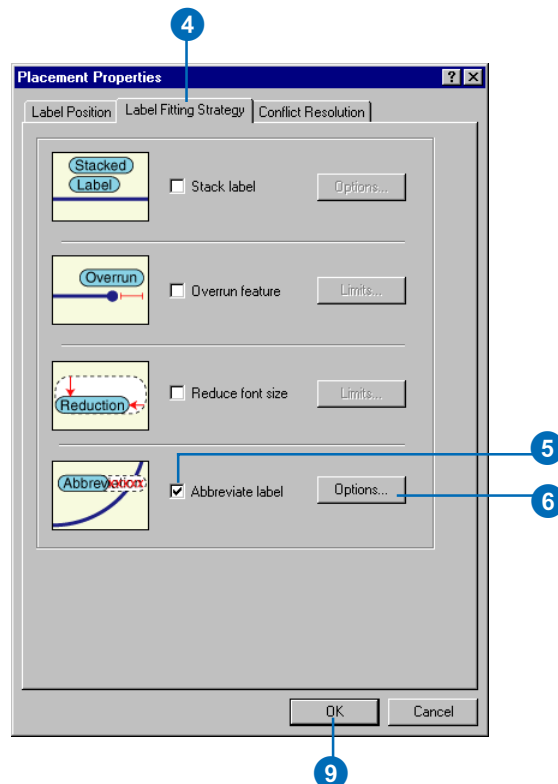
1. In the table of contents, right-click the layer you want to label and click Properties.

NOTE: Although the steps are the same, the dialog boxes for line and polygon layers differ.

2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Label Fitting Strategy tab.
5. Check Abbreviate Label.
6. Click Options.
7. Click the dropdown arrow and click the abbreviation dictionary that you want to use.

If you do not see any abbreviation dictionaries listed, you will need to create or load one for the map.

8. Click OK.
9. Click OK.
10. Click OK.



Saving and loading an abbreviation dictionary

Once you've created an abbreviation dictionary in one map, you can use it in other map documents. To reuse an abbreviation dictionary save it as a .dic file, then you can load it into another map document.

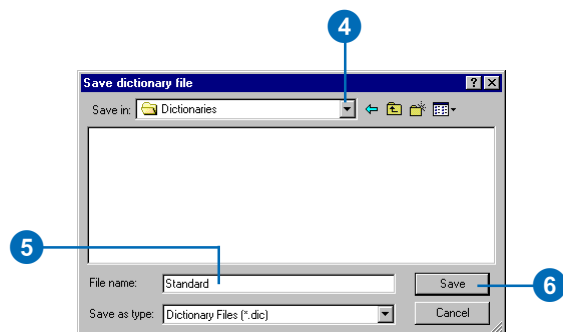
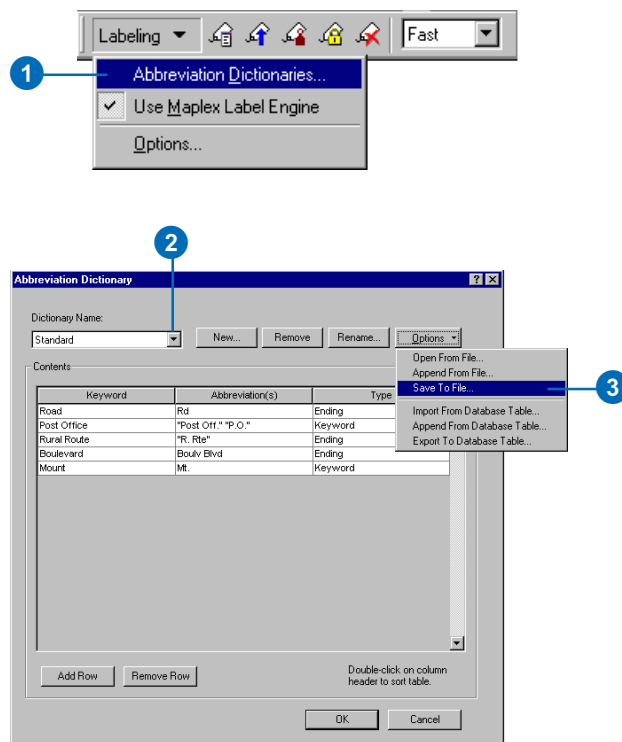
When a dictionary is loaded, the contents are added to the currently selected dictionary.

Saving an abbreviation dictionary

1. On the Labeling toolbar, click Labeling and click Abbreviation Dictionaries.
2. Click the Dictionary Name dropdown list and click an abbreviation dictionary.
3. Click Options and click Save To File.

You can also choose Export To Database Table.

4. Navigate to the location where you want to save the abbreviation dictionary file.
5. Type a name for the dictionary.
6. Click Save.
7. Click OK.

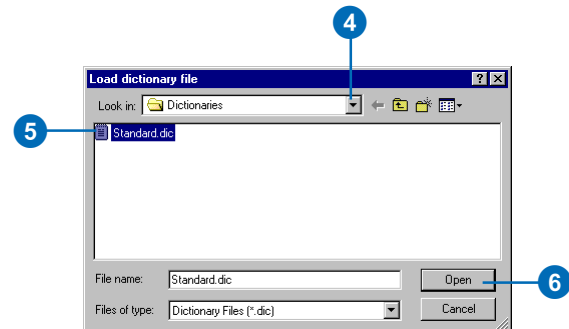
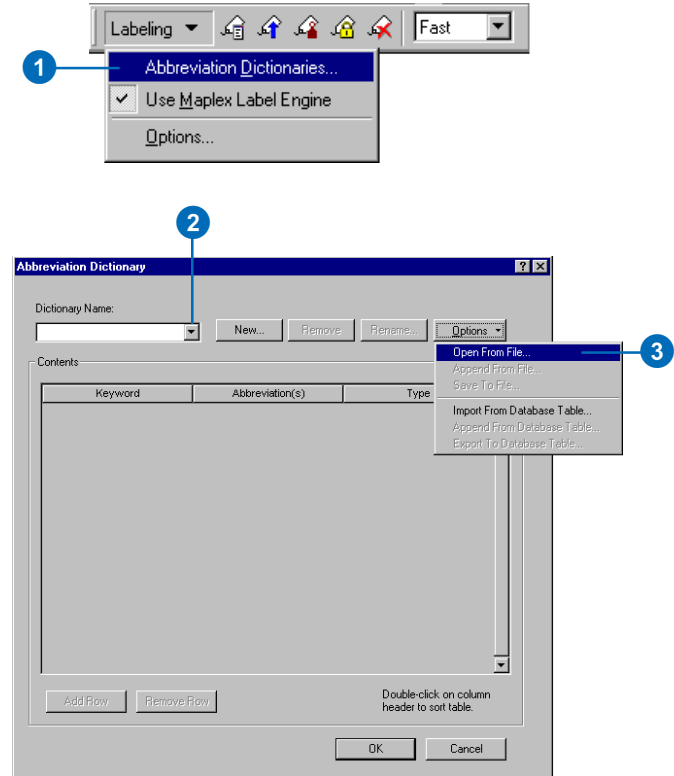


Loading an abbreviation dictionary

1. On the Labeling toolbar, click Labeling and click Abbreviation Dictionaries.
2. Click the Dictionary Name dropdown list and click the abbreviation dictionary into which you want to load the contents of the dictionary file.

If you do not see a dictionary in the dropdown list, you may need to create one.
3. Click Options and click Open From File.

You can also import a dictionary from a database table.
4. Navigate to the location where the dictionary file that you want to load is saved.
5. Click the dictionary file.
6. Click Open.
7. Click OK.



Resolving label conflicts

6

IN THIS CHAPTER

- **Feature weights**
- **Preventing labels from overlapping certain feature classes**
- **Allowing labels to be overlapped by other labels**
- **Removing duplicate labels within a given radius**
- **Placing all labels for a feature class**
- **Buffering labels**

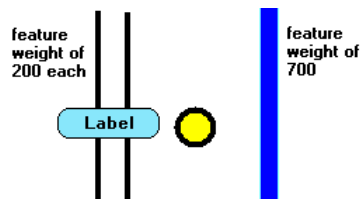
Frequently, more than one label will compete for a given space. You can control which label class will prevail in the event of a conflict by setting label weights. You can also give weights to features to discourage the placement of labels that might hide the features. Labels that you are less concerned about placing you can identify as background labels. These will be placed, but other labels may be placed over them. For multipart features, or features with the same label, you can specify a radius within which duplicate labels will be removed to make space for other labels.

Feature weights

Some features on a map may be more important than others. Feature weights let you indicate the relative importance of feature classes. You can reduce the chance that important features from a given class will be overlapped by labels by assigning the feature class a larger feature weight than other feature classes.

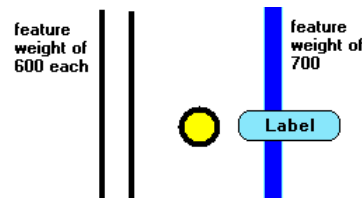
Feature weight

The feature weight ranks the importance of features labeled by a given label class, compared to other features, on a scale of 0–1,000. Maplex for ArcGIS will place labels to avoid overlapping important features. A feature weight of 0 indicates that the feature should be treated as available space, while a weight of 1,000 indicates that the feature should not be overlapped by labels. The Maplex Label Engine first attempts to place labels in an area of free space. If there is no free space available and a feature must be overlapped, then the Maplex Label Engine will choose a location with the lowest total feature weight.

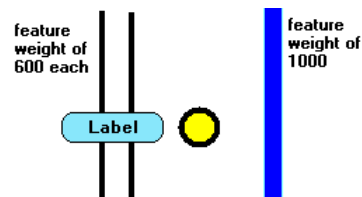


In this example the label is placed over the two black line features with a feature weight of 200 each. The total feature weight at this location is 400, which is less than the blue line's weight of 700.

You can set a feature weight for point and line feature classes; polygon feature classes have two weights, interior weight and boundary weight, which are set separately.



By changing the feature weights you can change the label placement. Increasing the feature weight for the black lines to 600 results in a total feature weight of 1,200, so the label is placed over the blue line with the weight of 700.



A feature weight of 1,000 is a special value that prohibits labels from overlapping the feature. Even though the black lines have a greater total feature weight of 1,200, the blue line has the maximum weight of 1,000 and must not be overlapped. The Never remove label option will override any feature weight.

Interior and boundary weight

Polygon features have two types of feature weights. The interior weight lets you specify how important the interior of the polygon is, relative to other features. The boundary weight lets you specify how important the edge of the polygon is, relative to other features. You can allow labels to overlap the interior but not the edges of a polygon, or vice versa.

Preventing labels from overlapping certain feature classes

You can indicate the relative importance of different feature classes or of features being labeled by a given label class in order to control which features will be overlapped by labels. Features with high weights will be less likely to have labels placed over them than features with low weights.

The maximum feature weight is 1,000. Features with weights of 1,000 are treated as unavailable space for labels.

Setting feature weights

1. In the table of contents, right-click the layer you want to label and click Properties.

NOTE: Although the steps are the same, the dialog boxes for line and polygon layers differ.

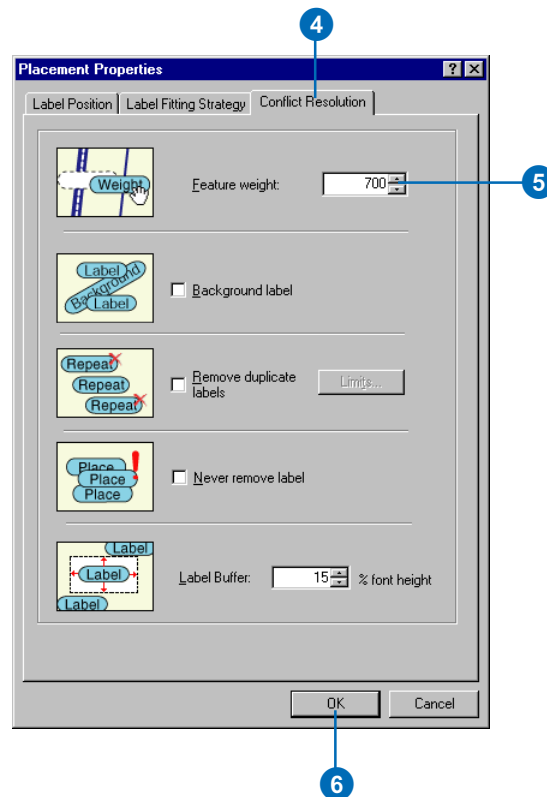
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Conflict Resolution tab.

If you are labeling a point or line feature class, you can set a feature weight. If you are labeling a polygon feature class, you can set weights for the interiors and the boundaries of the polygons.

5. Type a weight for the features or, for polygons, separate weights for the interior and boundary of the features.

Weights may range from 0–1,000. Features with high weights are less likely to have labels placed over them.

6. Click OK.
7. Click OK.



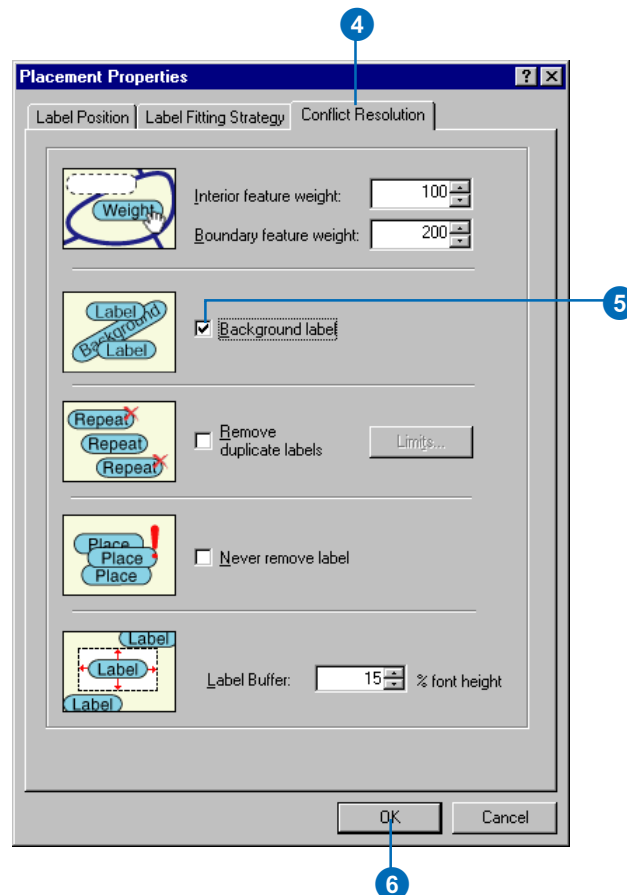
Allowing labels to be overlapped by other labels

Some labels are less important than others. When you want labels from one class to appear on the map but you do not mind if they are sometimes hidden by more important label classes, you can designate the less important labels as background labels. Background labels will be treated as empty space by other label classes and will appear behind other labels where they overlap.

1. In the table of contents, right-click the layer you want to label and click Properties.

NOTE: Although the steps are the same, the dialog boxes for line and polygon layers differ.

2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Conflict Resolution tab.
5. Check the Background label box.
6. Click OK.
7. Click OK.



Removing duplicate labels within a given radius

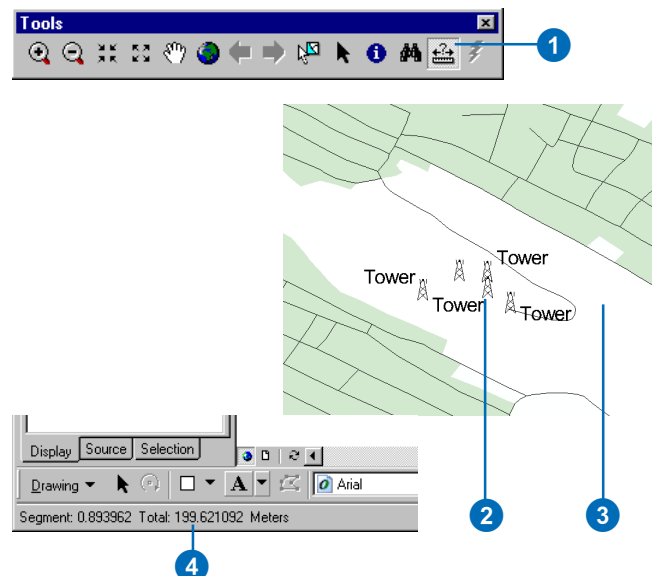
Some locations on a map may contain several labels with the same content. For clarity, and to make space for other labels, you can have the redundant labels within a given search area removed from the map.

Once you have labeled the features, you can identify the clusters having the same labels. The next step is to measure the radius of the identified cluster. You will use this distance as the search radius for removing redundant labels.

The search radius is applied to all the labels, beginning with the first feature in the table or with the largest polygon in a dataset.

Measuring the size of label clusters

1. Click the Measure tool, located on the Tools toolbar.
2. Click once near the center of the cluster of labels.
3. Drag the Measure tool line to an area outside of the congested area of labels and double-click.
4. Note the distance in map units.

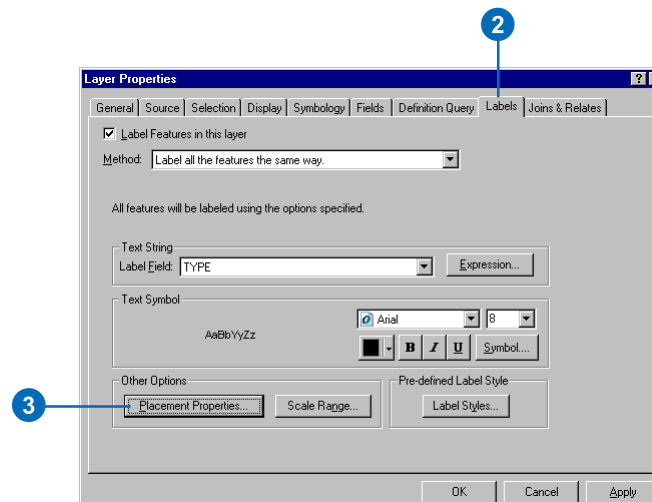


Removing duplicate labels within a cluster

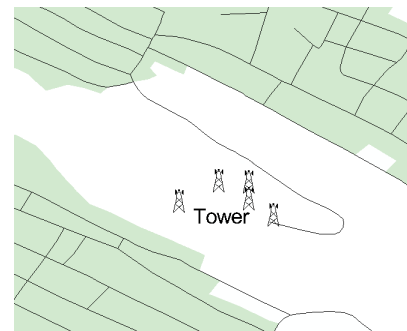
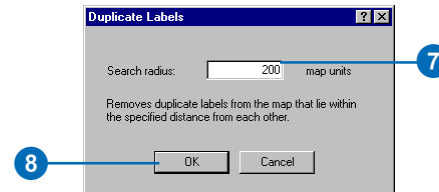
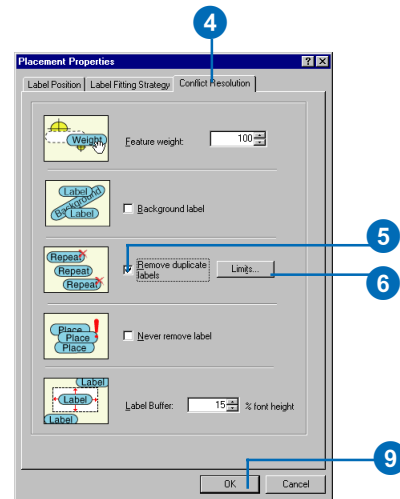
1. In the table of contents, right-click the layer you want to label and click Properties.

NOTE: Although the steps are the same, the dialog boxes for line and polygon layers differ.

2. Click the Labels tab.
3. Click Placement Properties. ►



4. Click the Conflict Resolution tab.
5. Check Remove duplicate labels.
6. Click the Limits button.
7. Enter the distance within which duplicate labels should be removed.
8. Click OK.
9. Click OK.
10. Click OK.

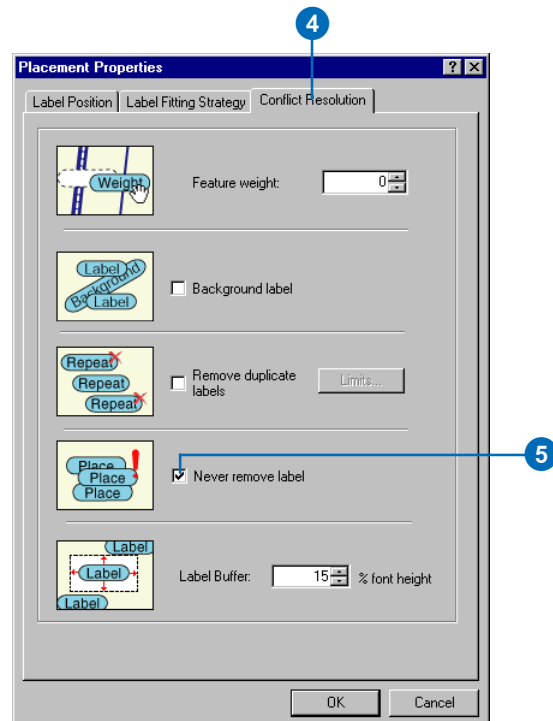
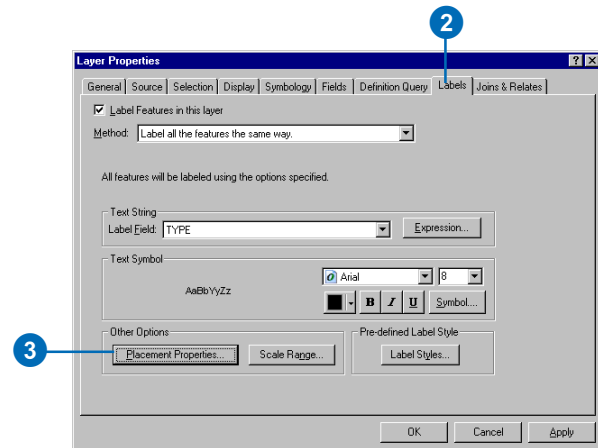


Placing all labels for a feature class

You can guarantee that all of the labels belonging to a given label class will be placed on the map with the Never remove label option. The Maplex Label Engine will place these labels first, then attempt to place other labels around them. Some labels may overlap. Feature weights, even the maximum feature weight of 1,000, are ignored when you check Never remove label for a label class.

You should use this option with some caution; since all labels from the label class are placed, there is no guarantee the labels won't overlap.

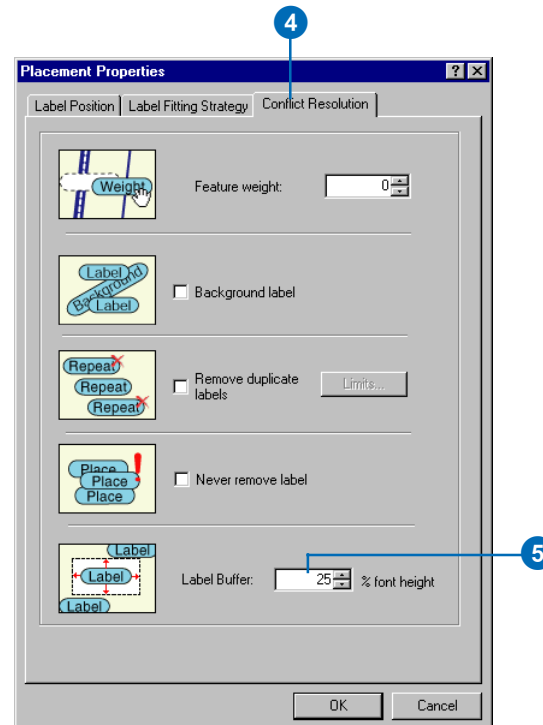
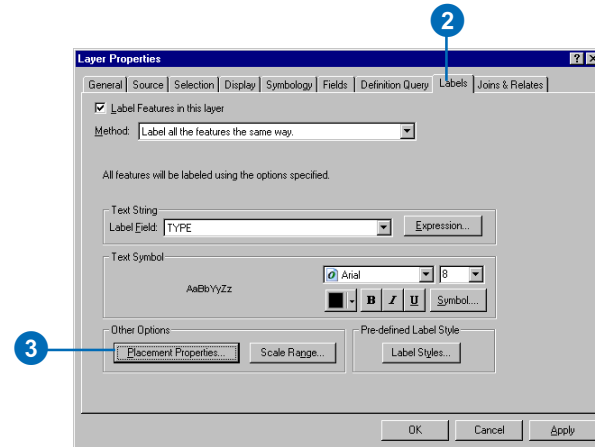
1. In the table of contents, right-click the layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Conflict Resolution tab.
5. Check Never remove label.
6. Click OK.
7. Click OK.



Buffering labels

You can add a buffer zone around labels to keep them from being placed too close to other labels. The buffer size is expressed as a percentage of the label font height. This will reduce the amount of available space and may reduce the number of labels that can be placed. Conversely, reducing the buffer size may increase the number of labels that can be placed.

1. In the table of contents, right-click the layer you want to label and click Properties.
2. Click the Labels tab.
3. Click Placement Properties.
4. Click the Conflict Resolution tab.
5. Type a buffer size.
6. Click OK.
7. Click OK.



Labeling and annotation work flow

7

IN THIS CHAPTER

- Labeling work flow with Maplex for ArcGIS
- Converting labels to annotation
- Placing unplaced annotation
- Converting labels to annotation in the map document
- Converting labels to annotation in a database
- Converting labels to feature-linked annotation
- Placing unplaced annotation in the map document
- Managing annotation in the map document
- Placing unplaced annotation in an annotation feature class
- Publishing maps labeled with Maplex for ArcGIS

Once you have placed labels on your map using Maplex for ArcGIS, you can save and print your map. If you want to share the map document with colleagues who do not have Maplex for ArcGIS or publish it as a .pmf file for ArcReader or as an ArcIMS service, you will need to convert the labels to annotation.

Converting labels to annotation allows you to take the high-quality labels that Maplex for ArcGIS dynamically generates in ArcMap and save them as graphics in a map document or as annotation features in a geodatabase.

Depending on the density of the features on the map, not all labels may be placed. When you convert labels to annotation, you can also convert the unplaced labels and interactively place them in the new annotation class or delete them.

Labeling work flow with Maplex for ArcGIS

Making a printable map with high-quality labels is a multistep process. This section provides a general outline of the work flow to create such a map. Adjusting the label placement using Maplex for ArcGIS is a part of the process, discussed in detail in the earlier parts of this book. There are other steps in the process, perhaps the most important of which are the steps involved in designing the map before you begin labeling features.

Another important set of steps sometimes comes after you've used Maplex for ArcGIS to label the features. If the label engine is unable to place some labels that you need on the map, if you want to manually adjust the position of certain labels, or if you want to share or electronically publish the map for others who do not have Maplex for ArcGIS, you will need to convert the labels to annotation. You will be able to place labels that could not be automatically placed as new annotation, and you may choose to edit the placement of some of the annotation. Annotation you create from labels can be stored in a geodatabase, edited, shared in other maps, or published in PMF documents or via ArcIMS with ArcMap Server.

This section will touch on these other steps, but they are covered in more detail in other books, including *Using ArcMap*, *Editing in ArcMap*, and *Building a Geodatabase*.

Designing the map

Some of the first things to consider when making a map are:

- What is the purpose of the map?
- What data will be on the map?
- What is the level of detail of the data?
- What is the final paper size?
- What is the area of interest?
- What is the scale of the map?

Answering these questions is an important part of the map design and composition process. Knowing the purpose of the map will help you decide which features to label and which features to emphasize with larger or differently colored labels. You may decide to coordinate the labels with the symbology of a set of features by creating label classes for each symbol class.

The map size and scale and the level of detail of the data will have important ramifications for the label design. A larger map may allow more detailed data to be shown and more labels to be placed. A smaller map may limit the geographic area or the level of detail that you can show and may require you to limit the number and types of features that will be labeled. Knowing the final map size and scale allows you to calculate an appropriate size for the labels so they will be large enough to be legible, yet small enough to fit on the map.

The ESRI Maplex Label Engine was designed to place labels on printed map sheets and is optimized to produce the best quality of placement on a map extent that does not exceed the size of an A0 sheet (841 mm X 1,189 mm). To place labels for a larger extent, you'll need to divide the total extent into tiles, and place the labels for each tile separately. As a guideline, ensure that the tile size does not exceed the size of an A0 (or ANSI E size) sheet in page units. For map extents larger than A0, the placement quality may degrade and, in some cases, labels may not be produced by the placement engine.

Setting up the map for labeling

Once you've decided on the map's purpose and content and obtained the appropriate data, you can add data to the map. If you are using an existing map document, turn off or remove the layers that are not needed, then pan and zoom to the area of interest.

When you've determined the final shape, size, and scale of the map, you can use the Page Setup dialog box to select the printer you'll use to print the map and to set the page size and orientation of your map.

At this point it is useful to switch to layout view and add a title, North arrow, scalebar, neatline, descriptive text, and other map elements to the layout. In the course of laying out these map elements, you may find that you have to adjust the size and shape of the data frame. Because the size of the data frame affects the amount of space available for label placement, it is better to make such changes before you invest time in refining the label placement on the map.

Next, set the map scale by selecting a predefined scale from the Map Scale dropdown list or by typing a map scale value. The map scale should usually be a round number, such as 1:1,000, 1:24,000, 1:500,000, or 1:3,000,000, to make scale calculations easier for map readers. You can also zoom to the area of interest and let the map extent dictate the map's scale.

Once you have the map centered on the area of interest and set to the right scale, you should set the reference scale for the map. You can set the reference scale on the General tab of the Data Frame Properties dialog box. You can also set the reference scale by right-clicking within the data frame, pointing to Reference Scale, and clicking Set Reference Scale. This will maintain the ratio of feature size to symbol size on your map, regardless of how you pan and zoom while inspecting the labels. It may also be useful to create a bookmark for the area of interest so you can return to it easily.

Symbolizing features and text

After the data is loaded and the reference scale is set, you can set the symbology for the features. You can use the predefined symbols that come with ArcMap or use some of these symbols as

a starting point and customize them using the Symbol Property Editor.

Once you've decided the symbology for the features, you can create labels. You can create labels for a single layer using the Labels tab of the Layer Properties dialog box, or you can define and manage labels in each of the layers and label classes for your map with the Label Manager, which you can open from the Labeling toolbar.

In order to add labels, you need to identify a Label Field or create a Label Expression to define the text that will label your features. You can use the single default label class or define multiple classes of labels, each with their own Label Expression and symbology.

You can set the text symbols for the labels using one of the predefined text symbols or customize text symbols using the Properties Editor. You can use different font sizes, colors, and styles to add information to the labels. For example, you can label more important features with larger text, or with a color that contrasts strongly with the features over which the label will be placed. For more information on feature or text symbology, see *Using ArcMap*.

Labeling

Once you've created label classes for features and defined how they will be labeled, you should check to see how the labels actually look on the map. If it is not already enabled, check Maplex for ArcGIS in the Extensions dialog box. Switch the label engine of the data frame to use the ESRI Maplex Label Engine, and place the labels using the Fast option on the Labeling toolbar. This will allow you to preview how your labels will look in relationship to their features and other labels. Using the Label Manager, or the Layer Properties dialog boxes, turn on the labels for the layers.

At this point you may find that you need to adjust the label text symbols. For example, you may find that the text colors you initially chose do not show up well against the features on the map or that the text size of some labels should be increased or decreased. It may also be useful to print a test plot of the map to help you identify and correct problems with the label text, font, color, or size.

The next step is to adjust the advanced label placement options in Maplex for ArcGIS to improve the way each layer is labeled. Changing the Maplex for ArcGIS label placement properties can solve many problems with the way labels are placed relative to features. You can also use these placement properties to control whether labels should overrun features, be stacked, or be reduced in size when space is at a premium, and you can control how conflicts between features and labels are resolved.

Use the Lock Labels tool on the Labeling toolbar to freeze the labels after you've zoomed to the full extent of the map and placed the labels, then use the pan and zoom tools to inspect problem areas of the map to see the effects of the new label placement parameters.

Once the placement adjustments have been made to each layer, label the map using the Best quality option on the Labeling toolbar. The placement of labels will take longer than with Fast quality, but the overall placement will improve. Lock the labels again and examine them. Consider printing and examining another test plot of the map. If the label placement is not acceptable, revisit the placement parameters and make adjustments.

Viewing unplaced labels

After you have refined the label placement parameters, it is useful to check for unplaced labels. Unfortunately, because of space constraints and conflicts, Maplex for ArcGIS cannot always place all labels. The View Unplaced Labels button allows you to see the

labels that the label engine could not place. If the map suits your needs, you can turn off the unplaced labels, then save and print the map. If it is important for the missing labels to appear on the map, you can continue to adjust the label placement properties, or you can convert the labels to annotation and place them by hand.

Converting labels to annotation

Labels are dynamically generated, which means that each time the map display is refreshed, the text and position are regenerated by the label engine. Annotation can be thought of as a stored label with a set position, content, and symbol.

Before creating annotation, you should consider how you want it to be organized and stored. To facilitate printing, you may need to organize the labels into different annotation groups or annotation feature classes, based on their font colors. Alternatively, you might want to organize the annotation thematically, with street labels placed in one annotation group or feature class and places of interest in another.

Annotation can be stored in a geodatabase or in a map document. Labels from a given label class are converted into an annotation feature class in a geodatabase. With an ArcEditor or higher licensed ArcGIS seat, you can store multiple label classes for a given feature class as subtypes of a single annotation feature class. You can also create feature-linked annotation with an ArcEditor license. Such annotation is linked to a geodatabase feature class by a relationship class and can be automatically updated when features are created, modified, or deleted.

Labels may also be converted into annotation in a map document. This is a good option when there are fewer than 100 labels and they are only relevant for the current map document. Annotation stored in a map document can be organized into different annotation groups, but these cannot be used in other map documents, and since they are simple graphics, they cannot be

edited with the advanced annotation feature editing tools on the Annotation toolbar.

Editing unplaced annotation

When you convert the labels on the map to annotation, you can also choose to convert the unplaced labels to annotation. For annotation stored in the map document, unplaced labels go in the overflow annotation list. The Overflow Annotation dialog box allows you to place this annotation into an annotation group. For annotation stored in a geodatabase feature class, unplaced labels are converted to annotation features but are marked as unplaced. During an edit session, you can use the Unplaced Annotation manager to interactively place these features. You can also move, resize, edit, and format any of the annotation features in the annotation feature class.

You can work through the unplaced annotation, adding or deleting annotation, until all the labels that could not be placed are placed as new annotation features or are deleted.

To learn more about annotation, see *Editing with ArcMap*, *Building a Geodatabase*, or the Online Help.

Publishing your map

At any point in the process you can print your map or export it to PDF or other graphic formats. If you need to publish the map as a PMF file for ArcReader or as an Internet service using ArcMap Server, or if you need to share the map document with people who do not have Maplex for ArcGIS, you will first need to convert the labels to annotation.

Converting labels to annotation

Converting labels to annotation allows you to add labels that could not be placed and edit the position and content of individual pieces of annotation. When you convert labels to annotation, you can store them with the map as an *annotation group* or in a geodatabase as an *annotation feature class* that you can add to your map as a separate layer.

Storing annotation in a geodatabase is similar to storing geographic features—lines, points, and polygons—in a geodatabase. You can add annotation stored in a geodatabase to any map. It appears as an *annotation layer* in the table of contents.

When you convert the labels of a layer with multiple label classes to annotation in a geodatabase, you will get different results depending on your licensing. With an ArcView license, the label classes are merged into a single annotation class in the annotation feature class. The text symbol from each label class will be available in the Symbol dropdown list when you use the tools on the Annotation toolbar to edit the annotation feature class. With an ArcEditor or ArcInfo license, the label classes will be converted into separate annotation classes within the annotation feature class. The text symbol from each label class will be associated with the corresponding annotation class. Annotation feature classes with multiple annotation classes can be viewed but not edited with an ArcView license.

Where should you store your converted labels? The answer to this question depends on how you plan to use the labels. Here are some guidelines:

- If you're creating a map specifically for printing and the labels you've created apply only to this map, store the labels as an annotation group in the map document. Then, if you delete the map, the annotation is also deleted because it's stored with the map.

- If you want to use the labels you've just placed on other maps—because you've invested the time and effort to position them—store them as an annotation feature class in a geodatabase. You can add the annotation as a layer to other maps.
- If you intend to use the map to browse your data and the map has numerous labels—as a general rule, more than 100—store them as an annotation feature class in a geodatabase for better drawing performance. ArcMap can access and display labels stored in an annotation feature class much more rapidly than labels stored as an annotation group in the map document.

With an ArcEditor or ArcInfo license, you can also create *feature-linked annotation*, where a relationship class in the geodatabase directly links a given annotation feature to the feature it annotates. Then, if you move the feature, the annotation moves with it; if you delete the feature, the annotation is also deleted; and if you change the attribute of the feature that the annotation is based on, the text of the annotation changes.

You create feature-linked annotation for a specific feature class—rather than the entire map—and store it in the geodatabase along with the feature class it is associated with. You can also create feature-linked annotation while editing geographic data with the Editor.

Annotation in the geodatabase

Annotation in the geodatabase is stored in special feature classes called annotation feature classes. Unlike points, lines, and polygons, which are stored as ESRI Simple Features, annotation is stored as ESRI Annotation Features.

What is geodatabase annotation?

Like other feature classes in the geodatabase, all features in an annotation class have a geographic location and attributes and can either be inside a feature dataset or a standalone annotation class. Each annotation feature has its own symbology including font, color, and so on. Annotation need not only be text—it can also include shapes such as boxes and arrows.

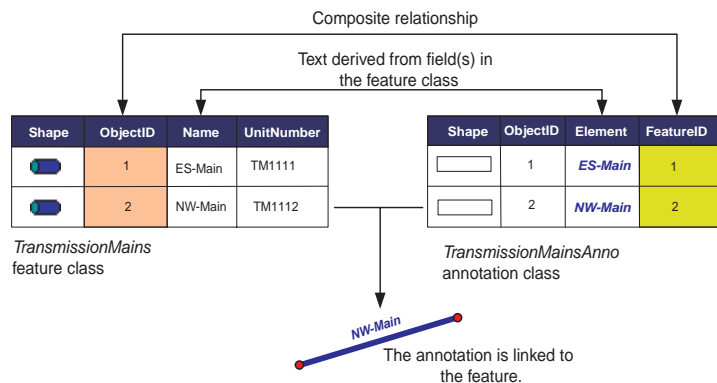
There are two kinds of annotation in the geodatabase—feature-linked annotation and standard annotation. Standard annotation is geographically placed text that are not associated with features in the geodatabase. An example of standard annotation is the text on a map for a mountain range. No specific feature represents the mountain range, but it is an area you would want to mark.

Feature-linked annotation is associated with a specific feature in another feature class in the geodatabase. The text in feature-linked annotation reflects the value of a field or fields from the feature to which it is linked. The annotation feature class participates in a composite relationship with the feature class that it is annotating. The annotation feature class is the destination class in the relationship, while the feature class it is annotating is the origin class. This means the feature controls the location and lifetime of the annotation. For more information, see the chapter ‘Defining relationship classes’ in *Building a Geodatabase*.

As an example of feature-linked annotation, a hydrant in a water network may be annotated with its pressure, which is stored in a field in the feature class. In the same network, the water transmission mains may be annotated with their names.

As with other composite relationships, the origin feature controls the destination feature. Therefore, when the origin feature is moved or rotated, the linked annotation moves or rotates with it. When the origin feature is deleted from the database, its linked annotation feature is also deleted. If the value of a field from which the annotation text is derived changes in the feature, the annotation feature has special behaviors not part of standard relationship classes to respond to those changes and to automatically update its text.

In the water network example, a hydrant may be too close to a busy intersection and may need to be moved by 50 feet. When the hydrant is moved, its linked annotation moves with it. In the same network, the name of a transmission main may change. When the value in its name field is modified, the text stored in its linked annotation feature is automatically changed to reflect this.



The link between a feature and its annotation is maintained through a composite relationship. Special behaviors in the ESRI Annotation Features allow you to derive an annotation feature's text from a field or combination of fields in the feature class.

Creating annotation

You can convert labels created using Maplex for ArcGIS into standard or feature-linked annotation in existing or new annotation feature classes. Large geodatabase feature classes may need to be divided into tiles for labeling in ArcMap; then the labels for each tile may be appended to the annotation feature class.

ArcCatalog™ contains tools to create both feature-linked and standard annotation feature classes. You have two options when creating feature-linked annotation classes. You can specify the field in the origin feature class on which to base your annotation. Alternatively, you can use more advanced labeling methods to derive the annotation from multiple fields and specify different labeling rules for different groups of features. Once you have created your annotation feature class, you can use ArcMap to populate it either on its linked feature or interactively with the drawing tools.

When a new feature is created in a feature class that has linked annotation, an annotation feature is automatically created in the annotation class and is linked to that feature. If the feature has default values associated with the fields from which the annotation is derived, its text will automatically be generated and placed.

Performance considerations

Annotation features are both expensive to draw and expensive to retrieve from the database. When working with annotation classes, you should apply a visible scale range so that the annotation features only draw when you are zoomed in enough to read their text. To learn more about applying a visible scale range to map layers, see *Using ArcMap*.

Managing annotation classes

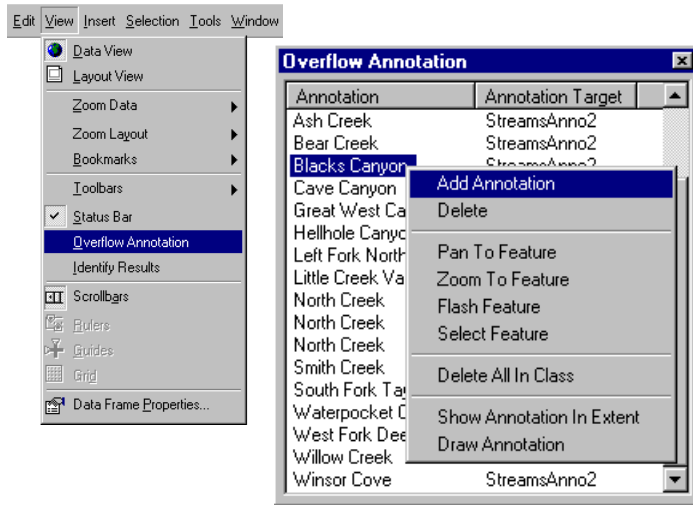
Annotation classes can be managed in the same way as other feature classes and tables. They can be renamed and deleted using ArcCatalog.

Similarly, the relationship class that links a feature-linked annotation class to its feature class is also managed like any other relationship class. For information on managing relationship classes, see the chapter ‘Defining relationship classes’ in *Building a Geodatabase*.

It is important to note that if the relationship class that links the annotation to its features is deleted, the annotation will no longer be feature-linked but will behave as a standard annotation class. To learn how to re-create this relationship class, see the chapter ‘Defining relationship classes’ in *Building a Geodatabase*.

Placing unplaced annotation

There are two ways to place annotation created from unplaced labels, depending on how the annotation is stored. Unplaced annotation in a map document can be placed using the Overflow Annotation dialog box and the tools on the Draw toolbar.

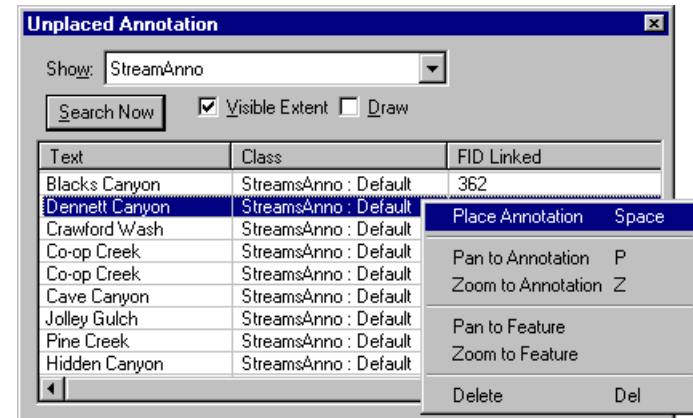


The Overflow Annotation dialog box lets you place or delete unplaced annotation stored in the map document.



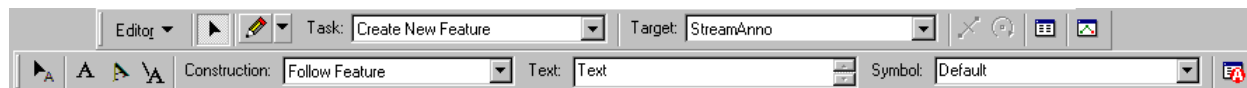
You can edit annotation stored in the map document with the tools on the Draw toolbar.

Unplaced annotation stored in a geodatabase feature class can be placed using the Unplaced Annotation Manager. Both tools allow you to select a piece of unplaced annotation, pan or zoom to the general location where it belongs, and place or delete it.



The Unplaced Annotation Manager lets you search for annotation in specific feature classes, sort the unplaced annotation, and place or delete it.

The Unplaced Annotation Manager also allows you to search for annotation within a specific feature class; search the whole extent of the map or just the visible portion; sort the unplaced annotation by text, feature class, or related feature; and show or hide the unplaced annotation on the map.



Unplaced Annotation Manager

The Unplaced Annotation Manager is available on the Annotation toolbar while you are editing an annotation feature class in a geodatabase.

Converting labels to annotation in the map document

Once your labels are placed on your map, you may decide to convert them to annotation. If you have a small number of labels, you can convert them into annotation in the map document. If you have more than 100 labels, or if you want to be able to use the labels in other maps, convert them into annotation in a geodatabase.

Annotation has a fixed size, determined by the font size at the annotation's reference scale. If the map has a reference scale set, the annotation will use the map's reference scale. If it does not, the annotation will use the current scale of the map as the reference scale.

Tip

Converting labels to annotation for all layers in one step

You can convert the labels for all of the layers on the map to annotation at the same time. In the table of contents, right-click the data frame and click Convert Labels to Annotation.

1. In the table of contents, right-click the layer for which you want to save labels and click Convert Labels to Annotation.
2. Click the button to store annotation in the map.
3. Verify that the reference scale is correct. If it is not, click Cancel and set the reference scale for the map to the desired scale, then begin exporting the annotation again.

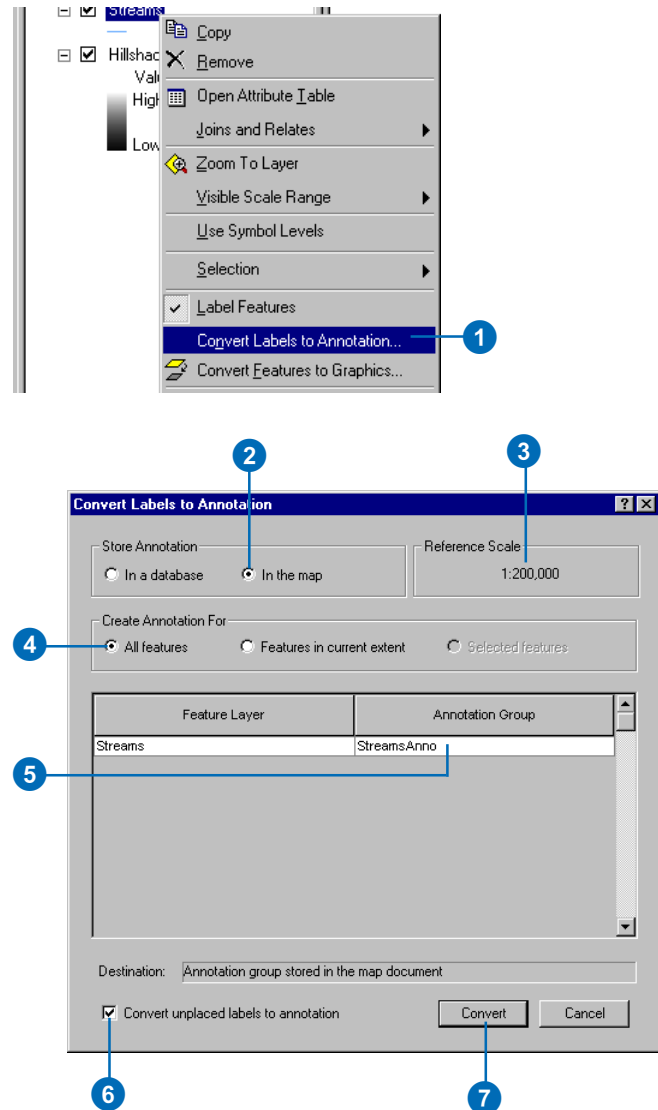
4. Click the button for All features to create annotation for all features in the layer.

Click the button for Features in current extent to only create annotation for features displayed in the current extent of the map.

If there are selected features, you can choose to create annotation for only the selected features.

5. Type a name for the annotation group within which this annotation will be stored.
6. Optionally, check the box to convert unplaced labels to annotation. You will be able to add these unplaced pieces of annotation to the map from the Overflow Annotation dialog box.

7. Click Convert.



Converting labels to annotation in a database

You can share and modify high-quality labels placed with the ESRI Maplex Label Engine by converting them to annotation. Annotation stored in a geodatabase can be reused in many maps, edited with the advanced editing tools on the Annotation toolbar, and published in PMF files or with ArcMap Server.

Tip

Versioning

When possible, convert your labels to annotation before you version your data.

Tip

New annotation class

When all of the labels have been converted to annotation, the new annotation class is automatically added to the map.

Tip

Annotation storage

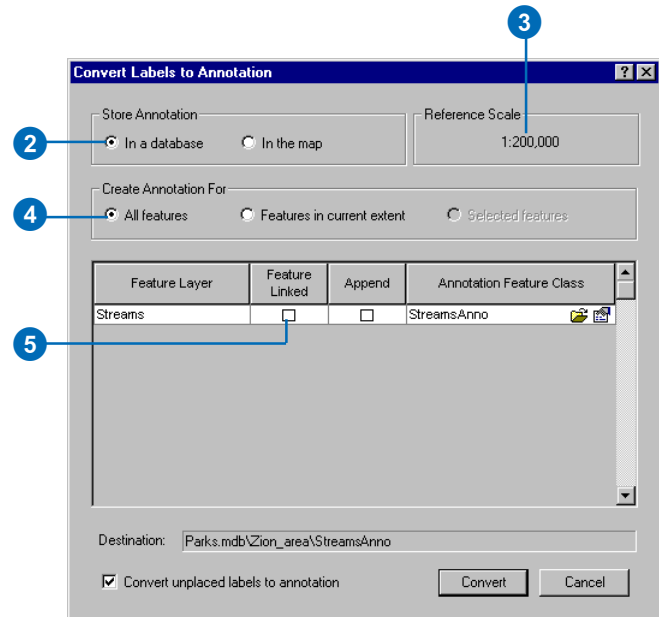
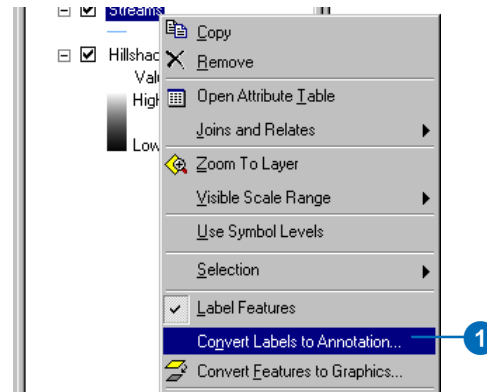
When storing geodatabase annotation in a DBMS, the row length is between 80 and 100 bytes.

1. In the table of contents, right-click the layer for which you want to save labels and click Convert Labels to Annotation.
2. Click the button to store annotation in a database.
3. Verify that the reference scale is correct. If it is not, click Cancel and set the reference scale for the map to the desired scale, then begin exporting the annotation again.
4. Click the button for All features to create annotation for all of the features in the layer.

Click the button for Features in current extent to only create annotation for features displayed in the current extent of the map.

If there are selected features, you can choose to create annotation for only the selected features.

5. If the features that you are creating annotation for are in a geodatabase and you have an ArcEditor or higher license of ArcMap, you can check the Feature Linked check box to create feature-linked annotation. ►



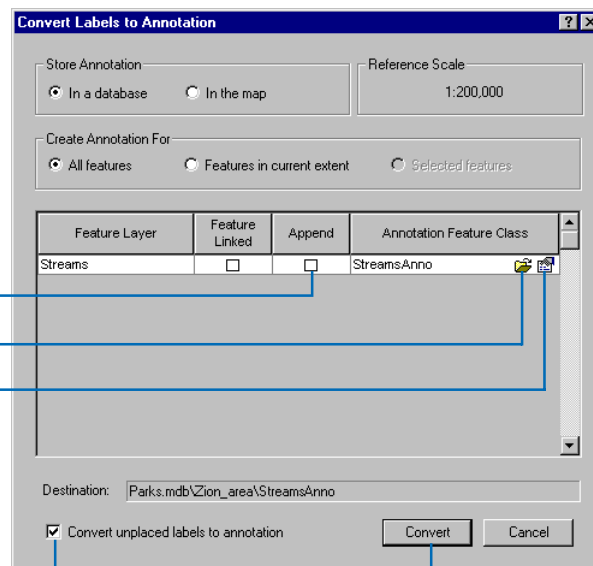
Tip

Using the Annotation symbol table

Rather than storing the symbol for every feature, the annotation features reference a table of the symbols used by the original label classes. Editors can only use symbols from the symbol table when creating new annotation features. This reduces the amount of storage space used by the annotation feature class by reducing storage of redundant information. You can modify the Annotation symbol table in ArcCatalog, from the Annotation tab of the Feature Class Properties dialog box for the annotation feature class.

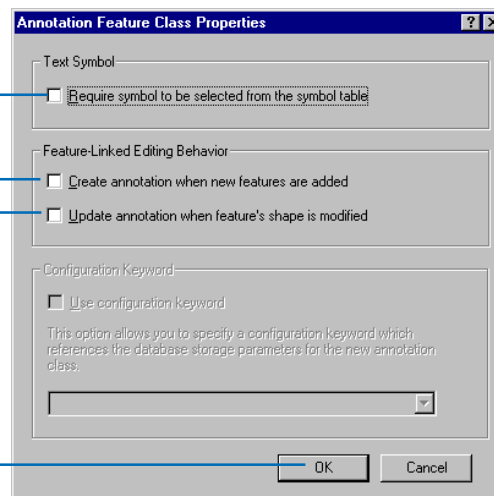
6. If there is already an annotation feature class in the geodatabase that you want to add these annotation features to, you can check the Append box.
7. Click the Browse button, navigate to the geodatabase where you want to store the annotation, and type a name for the new annotation feature class.
8. Optionally, click the Properties button. If you choose not to, skip to step 13.
9. Optionally, check the box to require symbol to be selected from the symbol table.
10. Optionally, if you are creating feature-linked annotation, check the box to create annotation when new features are added.
11. Optionally, if you are creating feature-linked annotation, check the box to update annotation when feature's shape is modified.
12. Click OK.
13. Optionally, check the box to convert unplaced labels to annotation.
14. Click Convert.

The Editor and Annotation toolbars have tools for placing and editing unplaced annotation.



13

14



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Converting labels to feature-linked annotation

You can share and modify high-quality labels placed with the ESRI Maplex Label Engine by converting them to annotation. Annotation stored in a geodatabase can be reused in many maps, edited with the advanced editing tools on the Annotation toolbar, and published in PMF files or with ArcMap Server.

For features that are stored in a geodatabase feature class, you can convert labels to feature-linked annotation. In addition to the annotation feature class, a geodatabase relationship class will be created to maintain the link.

Tip

Versioning

When possible, convert your labels to annotation before you version your data.

See Also

For a detailed discussion about labeling maps and the different advanced labeling methods you can use, see Using ArcMap.

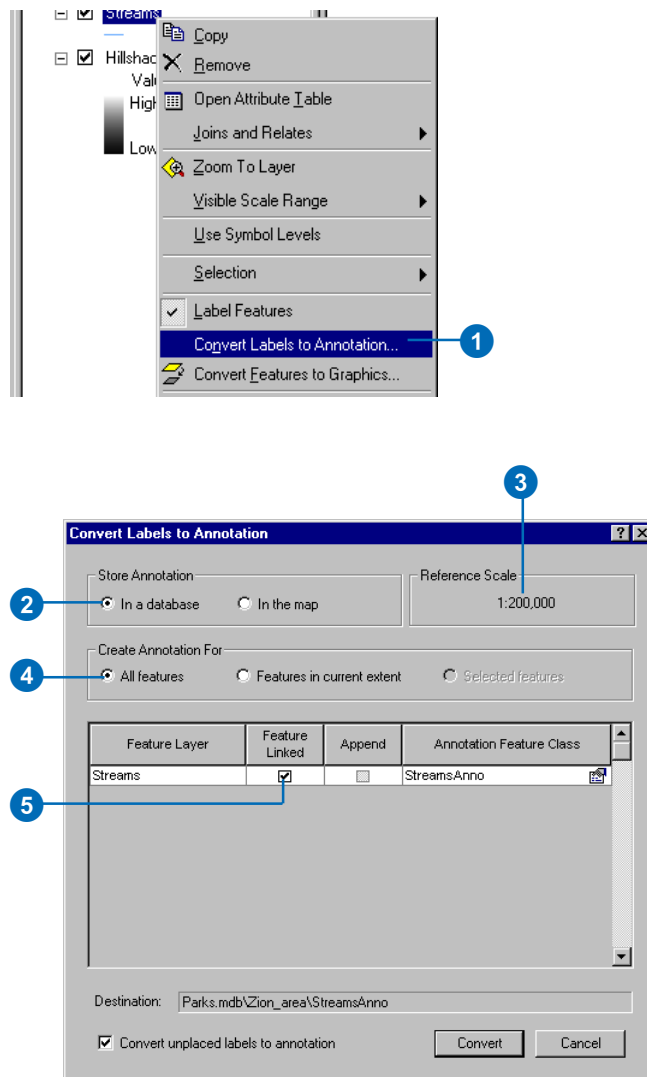
1. In the table of contents, right-click the layer for which you want to save labels and click Convert Labels to Annotation.
2. Click the button to store annotation in a database.
3. Verify that the reference scale is correct. If it is not, click Cancel and set the reference scale for the map to the desired scale, then begin exporting the annotation again.
4. Click the button for all features to create annotation for all of the features in the layer.

Click the button for features in current extent to only create annotation for features displayed in the current extent of the map.

If there are selected features, you can choose to create annotation for only the selected features.

5. Check the Feature Linked box to create feature-linked annotation.

You can only create feature-linked annotation if the features for which you are creating annotation are in a geodatabase and you have an ArcEditor or higher license of ArcMap. ►



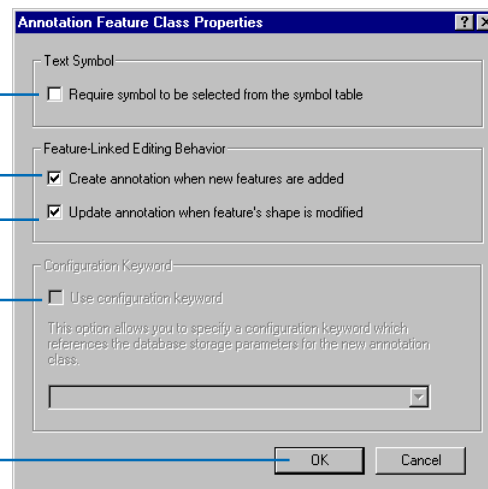
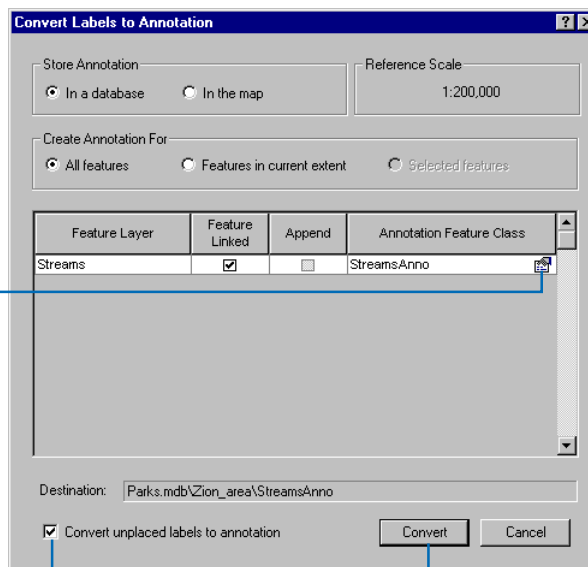
Tip

Using the Annotation symbol collection

Rather than storing the symbol for every feature, the annotation features reference a table of the symbols used by the original label classes. Editors can use symbols from the symbol table when creating new annotation features. This reduces the amount of storage space used by the annotation feature class by reducing storage of redundant information. If necessary, the symbol for a given annotation feature can be customized and stored with that feature. You can modify the Annotation symbol table in ArcCatalog, from the Annotation tab of Feature Class Properties dialog box for the annotation feature class.

6. Optionally, click the Properties button. If you choose not to, skip to step 12.
7. Optionally, check the box to require symbols to be selected from the symbol table.
8. Optionally, check the box to create annotation when new features are added.
9. Optionally, check the box to update annotation when the feature's shape is modified.
10. Optionally, if you are creating annotation in a multiuser geodatabase, check the box to use a configuration keyword and specify the keyword.
11. Click OK.
12. Optionally, check the box to convert unplaced labels to annotation.
13. Click Convert.

The Editor and Annotation toolbars have tools for placing and editing unplaced annotation.



Placing unplaced annotation in the map document

When you convert a set of labels to annotation, you have the option to convert the unplaced labels as well. For annotation that is stored in an annotation group in the map document, unplaced labels appear in the Overflow Annotation dialog box. You can use the Overflow Annotation dialog box and the tools on the Draw toolbar to place and adjust the unplaced annotation. Because the annotation is stored as graphics in an annotation group in the map document, you do not have to start an edit session before beginning to place the annotation. If you convert more than one label class into annotation at a time, a separate annotation group will be created for each label class. You can change the properties of annotation groups and turn them on or off with the Annotation Groups tab of the Data Frame Properties dialog box.

See Also

For more information and other examples on how to edit map annotation, see Using ArcMap.

1. Convert labels to annotation in a map document, using the option to convert unplaced labels to unplaced annotation.
2. If the Overflow Annotation window is not visible, click View and click Overflow Annotation.
3. Optionally, right-click the Overflow Annotation window and click Show Annotation in Extent.

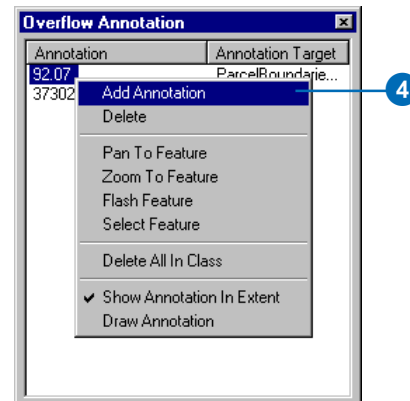
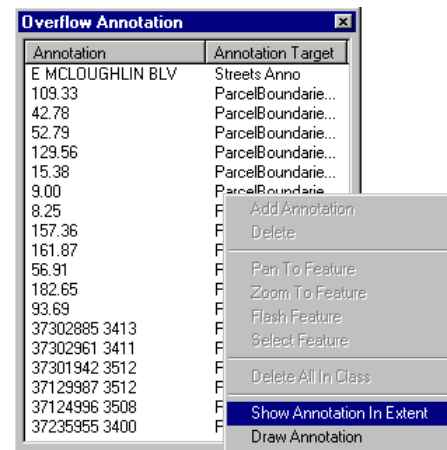
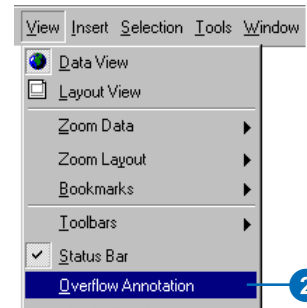
Only the unplaced annotation that falls within the current map extent will be shown in the Overflow Annotation window.

To see all of the overflow annotation again, right-click the Overflow Annotation window and click Show Annotation in Extent again.

4. Right-click one of the pieces of unplaced map annotation and click Add Annotation.

The annotation is added to the target annotation group. You can manage annotation groups with the Annotation Groups tab of the Data Frame Properties dialog box.

You can also delete unplaced annotation, or pan and zoom to the location where unplaced annotation will be placed, using this context menu. ►



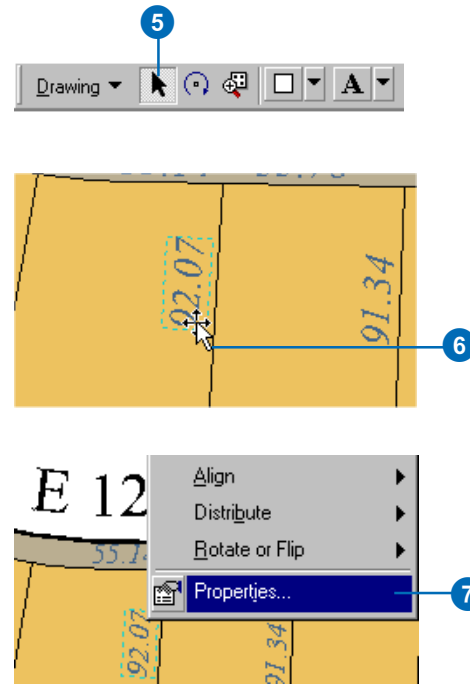
5. Click the Select Elements tool on the Drawing toolbar.
6. Click, drag, and drop the newly placed map annotation to place it where you want it.

You can use the Rotate tool on the Drawing toolbar to adjust the angle of the map annotation.

7. Optionally, right-click the map annotation and click Properties.

You can change the content of the annotation as well as its formatting, size, position, and symbol from the Properties dialog box.

8. Click OK.
9. Repeat steps 3–8 to place the remaining unplaced map annotation.



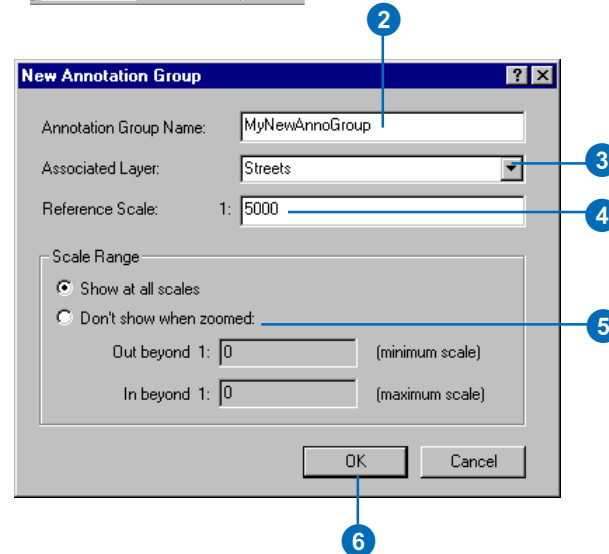
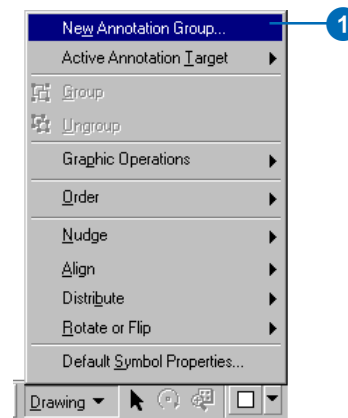
Managing annotation in the map document

Annotation stored in a map document is placed into one or more annotation groups. These may be associated with a given layer in the map so that the annotation turns on and off with the layer. Annotation groups can be created by the process of converting labels to annotation or as needed from the Drawing menu on the Draw toolbar or the Annotation Groups tab of the Data Frame Properties dialog box. Annotation groups created by converting labels to annotation have the same reference scale as the label class they are derived from and can be given minimum and maximum drawing scales. These properties of an annotation group can be changed from the Annotation Groups tab of the Data Frame Properties dialog box. Annotation groups can also be turned off or removed from the map from this dialog box.

Unplaced annotation has a target group associated with it, so when you place it, it is added to the right group. You can add other text or graphics to an annotation group by ►

Creating a new annotation group

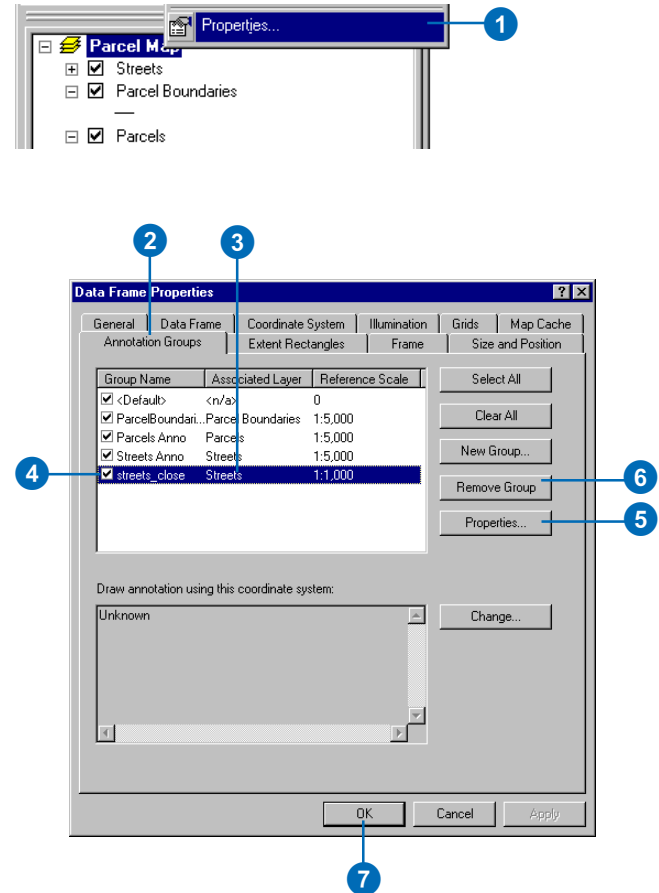
1. On the Draw toolbar click Drawing, then click New Annotation Group.
2. Type a name for the new annotation group.
3. Optionally, click the dropdown list and click a layer that the annotation group will be associated with. The annotation will be turned on and off when you turn this layer on or off.
4. Optionally, type a reference scale for the new annotation group.
5. Optionally, click the Don't show when zoomed button and type a minimum and maximum scale for the annotation group.
6. Click OK.



selecting an Active Annotation Target from the Drawing menu on the Draw toolbar, then adding the text or graphics with the tools on the Drawing toolbar.

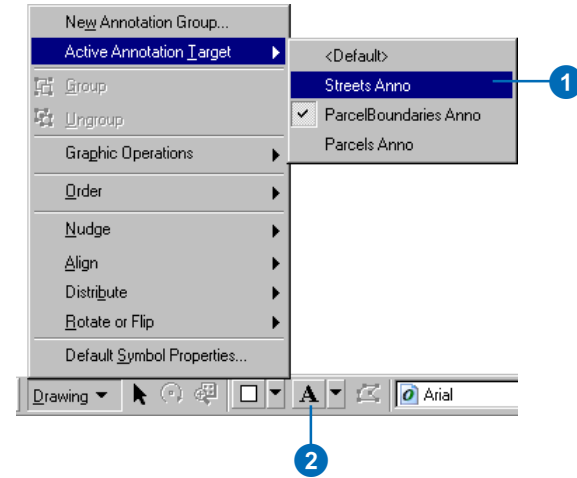
Managing annotation groups

1. Right-click the data frame in the ArcMap table of contents and click Properties.
2. Click the Annotation Groups tab.
3. Click an annotation group.
4. Uncheck the annotation group to turn it off.
5. Optionally, click Properties to change the name, associated layer, reference scale, and scale range for the group.
6. Optionally, click Remove Group to delete the group.
7. Click OK.



Adding text or graphics to a specific annotation group

1. On the Draw toolbar, click Drawing, point to Active Annotation Target, and click the annotation group to which you want to add graphics or text.
2. Click one of the graphics or text tools on the Drawing toolbar and add the text or graphic to the map. It will be stored in the annotation group that you chose.

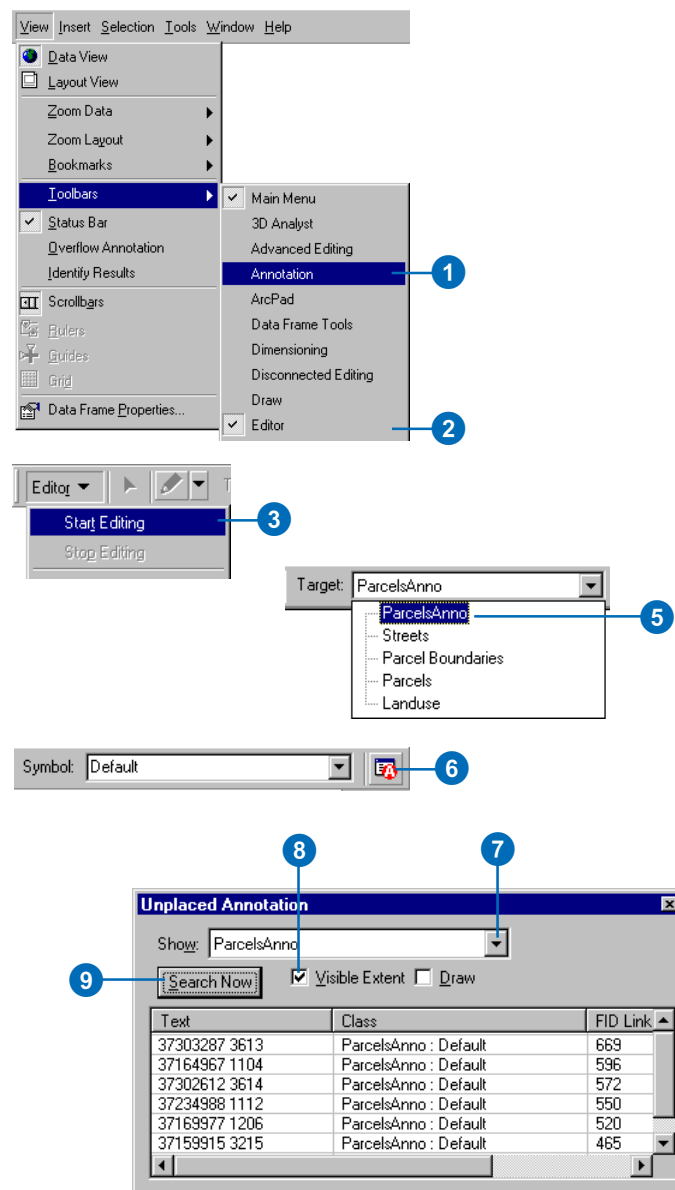


Placing unplaced annotation in an annotation feature class

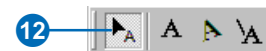
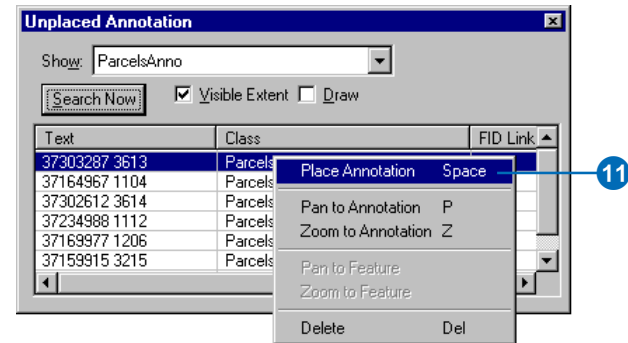
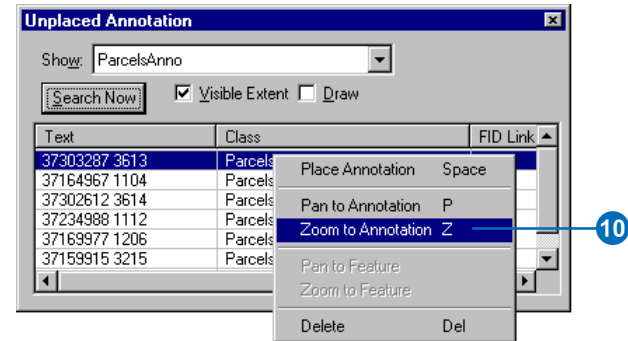
When you convert a set of labels to annotation, you have the option to convert the unplaced labels as well. For annotation that is stored in an annotation feature class in a geodatabase, unplaced labels appear in the Unplaced Annotation dialog box. You can interactively place these annotation features during an edit session, using tools on the Editor and Annotation toolbars.

1. If the Annotation toolbar is not visible, click View, point to Toolbars, and click Annotation.
2. If the Editor toolbar is not visible, click View, point to Toolbars, and click Editor.
3. On the Editor toolbar, click Editor, and click Start Editing.
4. If there is more than one database or folder of data on the map, select the database that contains the annotation feature class that you want to edit.
5. Click the the Target dropdown arrow and click the Annotation layer that you want to place unplaced annotation in.
6. On the Annotation toolbar, click Unplaced Annotation.
7. Optionally, click the Show dropdown arrow and click the Annotation feature class for which you want to view unplaced annotation.
8. Optionally, check the box to show unplaced annotation within the Visible Extent.
9. Click Search Now. ►

Unplaced annotation outside of the visible extent will not appear on the list.



10. Right-click an unplaced annotation feature and click Zoom to Annotation.
11. Right-click the unplaced annotation feature and click Place Annotation.
12. Click the Annotation Edit tool on the Annotation toolbar.
13. Optionally move, stack, resize, rotate, or otherwise edit the newly placed annotation feature.
14. Continue placing and editing the annotation in the unplaced annotation list.
Pan and zoom around the map, or uncheck Visible Extent, to see more unplaced annotation features in the list.
15. Click Editor and click Save Edits.
16. Click Editor and click Stop Editing.



Publishing maps labeled with Maplex for ArcGIS

You can share maps that are labeled with Maplex for ArcGIS with others who have ArcMap. If the person with whom you share the map also has Maplex for ArcGIS, the labels will be placed using the ESRI Maplex Label Engine, and the map will look the same. If the person with whom you share the map does not have Maplex for ArcGIS, the person will receive a warning that opening the map will remove the Maplex for ArcGIS placement properties. At this point the map may be opened, though it will not be labeled using the ESRI Maplex Label Engine. If the document is saved after being opened without Maplex for ArcGIS, the advanced label placement settings will be lost.

Publisher

You cannot use the Publisher extension to create PMF files that contain layers labeled using Maplex for ArcGIS. If you attempt to publish such a map, the layers that are labeled using the ESRI Maplex Label Engine will be omitted from the published map file.

In order to share high-quality labels generated using Maplex for ArcGIS, you need to convert them to annotation in the map document or in an annotation feature class in a geodatabase. The annotation can then be published in the PMF file.

ArcMap Server

ArcMap Server does not support the ArcGIS extensions at this release, so you cannot use Maplex for ArcGIS to place labels with ArcMap Server. However, ArcMap Server does support geodatabase annotation, so you can create your labels with Maplex for ArcGIS and convert them to geodatabase annotation for ArcMap Server.

Glossary

abbreviation

A shortened form of a word or phrase that represents the whole. Abbreviations are commonly a letter or group of letters taken from the complete form of the word, such as the usage of St. in place of Street.

abbreviation dictionary

In Maplex for ArcGIS, a file that contains whole words and their abbreviated forms to allow automated shortening of labels.

annotation

Descriptive text used to label features on or around a map. Information stored for annotation includes a text string, a position at which it can be displayed, and display characteristics.

annotation feature class

A geodatabase feature class that stores text or graphics that provide additional information about features or general areas of a map (annotation). An annotation feature class may be linked to another feature class so edits to the features are reflected in the annotation (feature-linked annotation). Annotation in a geodatabase is edited during an edit session using the tools on the Annotation toolbar. See also annotation group.

annotation group

A container within a map document for organizing and managing text or graphics that provide additional information about features or general areas of a map. Annotation groups allow control of the display of different sets of annotation. Annotation stored in a map document is edited with the tools on the Drawing toolbar. See also annotation feature class.

annotation target

In ArcMap, the annotation group in a map document where new annotation will be created when using the New Text tools on the Draw toolbar or when copy-pasting annotation. Annotation created with the Annotation Edit tools are created in the current editing target, not in the annotation target.

base tag

A text formatting tag that allows control of how the ESRI Maplex Labeling Engine places labels based on multiple fields relative to a feature. The field identified with the base tag is placed nearest the feature, and other fields are placed relative to the position of the base field.

boundary feature weight

One of two types of feature weights that allow control of how labels are placed relative to polygon features. Higher feature weights prevent labels from being placed over features. A high boundary feature weight keeps labels off of the edge of a polygon but does not prevent the label from being placed within the boundary. See also feature weight, interior feature weight.

conflict resolution

In labeling with the Maplex Labeling Extension, the process of solving conflicts for space between features and other labels. The label engine uses a set of parameters to determine whether or not to place a label in spite of space conflicts, and various label-fitting strategies may be used to make labels more compact to fit into smaller spaces.

duplicate labels

Labels with identical content. Maplex for ArcGIS provides the option of labeling only a single feature out of a cluster of similar features. Identical labels will not be placed within the user-defined distance of a placed label.

Edit Annotation tool

A tool on the Annotation toolbar that is used to manipulate geodatabase annotation. Text can be interactively moved, scaled, and rotated. Context menu options allow control of the position, orientation, symbology, content, size, and style of text.

Edit cache

See map cache.

ESRI Maplex Label Engine

In Maplex for ArcGIS, extended software that allows finer control of how labels are placed. See also ESRI Standard Label Engine.

ESRI Standard Label Engine

In ArcMap, the software used to place labels. See also ESRI Maplex Label Engine.

feature weight

A ranking system that indicates whether features from a given feature class may be covered by a label in cases where the label cannot be placed in free space. Feature classes with lower weights will tend to have labels placed over their features before feature classes with higher weights. Polygon feature classes have two types of weights: boundary weights and interior weights. See also boundary feature weight, interior feature weight.

feature-linked annotation

Annotation that is stored in the geodatabase with links to features through a geodatabase relationship class. Feature-linked annotation reflects the current state of features in the geodatabase: it is automatically updated when features are moved, edited, or deleted.

graticule alignment of labels

A label positioning option in which labels are oriented along the graticule of the data frame. For cartographic or stylistic reasons, this may be useful for maps of large areas.

Labels may also be placed horizontally or oriented at an angle stored as an attribute of a point.

interior feature weight

One of two weights that allow control of how labels are placed relative to polygon features. Higher feature weights prevent labels from being placed over features. A high interior weight prevent labels from occupying the interior of polygon features. See also feature weight, boundary feature weight.

label

1. Text placed next to a feature on a map to describe or identify it.
2. To run the labeling process in ArcMap; to begin dynamically placing attribute driven text for map features.

label class

A category of labels that represents features with the same labeling properties. For example, in a roads layer, label classes could be created to define information and style for each type of road: interstate, state highway, county road, and so on.

label engine

See ESRI Standard Label Engine.

label expression

A statement that determines the label text. Label expressions typically concatenate or modify the contents of one or more fields and may add additional text strings to create more informative labels. They can contain Visual Basic script or JavaScript to add logic, text processing, and formatting for the labels.

Label Fitting Strategy tab

In Maplex for ArcGIS, a tab on the Placement Properties dialog box that allows control of the ways the label engine can fit more labels into a limited area. Methods that can increase label placement are stacking labels, reducing their font size in congested areas, or abbreviating them.

Label Manager

The tool used to display and set labeling properties for the currently active data frame. The Label Manager is accessible from the Labeling toolbar.

label offset

The distance a label should be from the feature it labels. A label offset and a maximum label offset can be set for point features. Maximum label offsets are expressed as a percentage of the label offset. For line features, a label offset can be set from the line (similar to the label offset for point features) and along the line (which controls the position of the label relative to the ends of the line). Label offsets are not available for all label position options.

label offset constraint

The maximum distance away from a point feature that a label may be placed beyond the specified offset.

label orientation

The angle or direction of alignment for point feature labels. Labels for point features are usually placed horizontally, but they may also be oriented at an angle stored as an attribute of the point, or along the graticule of the data frame. For cartographic and stylistic reasons, alignment along the graticule of the data frame may be useful for maps of large areas.

label placement zone

One of eight designated areas on a map, radiating from a point, in which labels may be placed. The user can indicate in which of the eight zones labels should be placed, relative to the point. These preferences are taken into account when placing point labels using the Best Position placement option.

label position tab

In Maplex for ArcGIS, a tab on the Placement Properties dialog box that allows control of how labels are placed relative to features. The position of a label is determined by such parameters as the orientation, offset, and position style for a given feature geometry.

label priority

A ranking system that determines the order in which labels will be placed on a map. Labels with higher priority will be placed before labels with lower priority. Labels placed last will have a greater chance of being crowded out or placed in an alternate position.

label stacking

The splitting of long labels to place the text on two or more lines. Maplex for ArcGIS allows you to specify which characters trigger a split and whether or not they show up in the label.

line connection

A procedure that combines groups of individual line features with the same name into a single linear feature for the label engine. This is often necessary because linear features, such as roads and rivers, are usually digitized as many small segments that must be connected together to represent a single real-world feature.

map cache

A setting used in ArcMap that allows temporary storage of features from a given map extent in the desktop computer's RAM, which may result in performance improvements in ArcMap for editing, feature rendering, and labeling.

offset distance

See label offset.

orientation of vertical labels

An option that controls whether a label can be placed upside down or sideways. A small angle prevents labels from switching their reading order in the labeling of nearly vertical lines.

overflow list

A list of labels that could not be placed, generated during the process of converting labels to annotation. This list allows the manual placement or deletion of these labels.

split character

A user-designated character that divides long labels into two or more lines during the labeling process. There can be more than one split character.

text format tag

A markup tag that allows control of the color, font, size, and so forth, of a text string in ArcMap, regardless of the base format of the text string.

weight

A number that tells how important a variable is for a particular calculation. The larger the weight assigned to the variable, the more that variable will influence the outcome of the operation.

word abbreviation

See abbreviation.

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