

Standard Operating Procedures for Creating Geologic Map Labels in ArcMap 10.1+

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PURPOSE

Unit labels are a critical part of effectively communicating information in a geologic map – they need to clearly identify units and features without obstructing view of the underlying content. Simply turning on Labels for a layer typically creates a cluttered, unintelligible map, and creating labels individually as graphics is inefficient. ArcMap's Maplex engine supports highly customizable label styles and placement properties, which can then be converted to annotation and edited so they appear publication-ready. This workflow may be used in whole or in part to create labels or annotation for other features as well.

Required systems/software

ArcGIS Desktop 10.1 or higher Advanced License

Basic ArcGIS features used in this SOP

[Layer Properties](#)

[Maplex Label Engine](#)

[Annotation](#)

Set Data Frame Properties

- 1) Before configuring any label properties the label engine and reference scale of the map must be set. To do this, open the data frame properties window and navigate to the General tab (Figure 1). Set the Reference Scale to the printed scale of the map, and ensure that the Maplex Label Engine is used (the Standard Label Engine is the default).

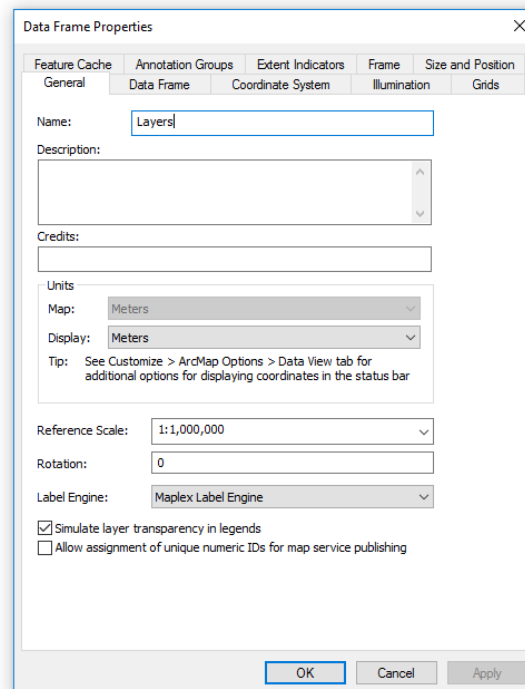


Figure 1.

Set Label Symbol Properties

- 2) According to the Federal Geographic Data Committee (FGDC) [Digital Cartographic Standard for Map Symbolization](#) (FGDC Document Number FGDC-STD-013-2006) the recommended geologic unit label is 8 point Arial font, placed horizontally, with a straight leader, when needed. While these guidelines are straight-forward, and intentionally flexible, the following steps navigate the many levels of symbol properties needed to replicate this standard in ArcMap.

To begin, open the Properties window of the geologic units layer and, under the Labels tab, locate the Text Symbol section. Set the font to 8 point Arial, and then click “Symbol...” to access the text symbol properties (Figure 2; ensure the box is checked to label features in this layer, and “GeoUnit” is the label field.).

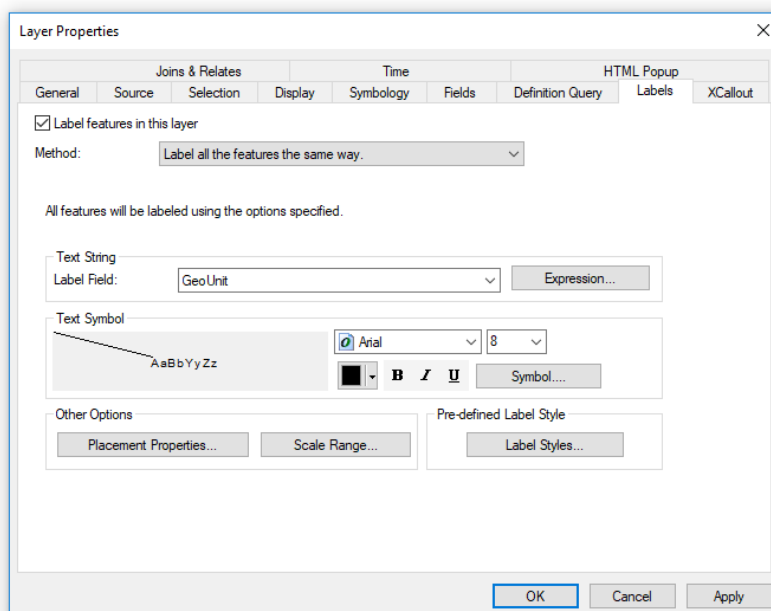


Figure 2.

Once in the Symbol Selector window click “Edit Symbol...” to create the leader (Figure 3). Note that once the symbol has been created this is where it can be saved to a style file for future use (addressed later).

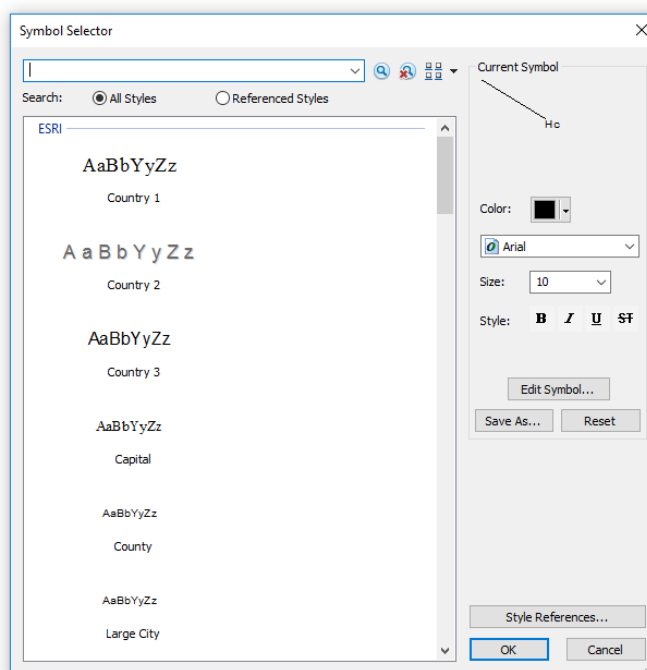


Figure 3.

In the editor window navigate to the Advanced Text tab and select the Text Background property, and click “Properties...” (Figure 4).

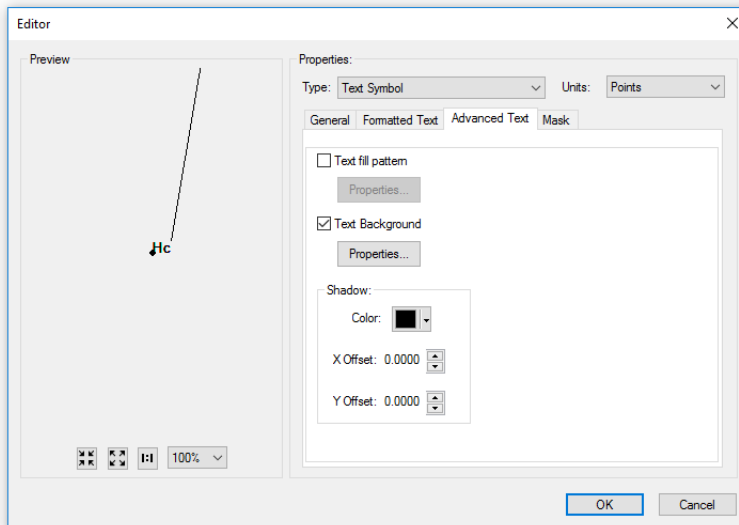


Figure 4.

In the next window change the Type to Simple Line Callout, and click on “Symbol...” to adjust the line leader properties (Figure 5).

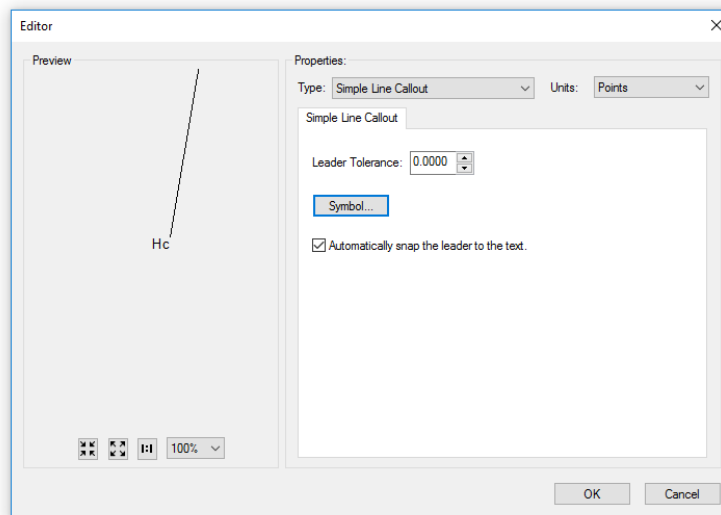


Figure 5.

Here the line color and width can be changed; the recommended line style is black, 0.43 point (Figure 6). Then, click OK and continue clicking OK in each window to get back to Layer Properties.

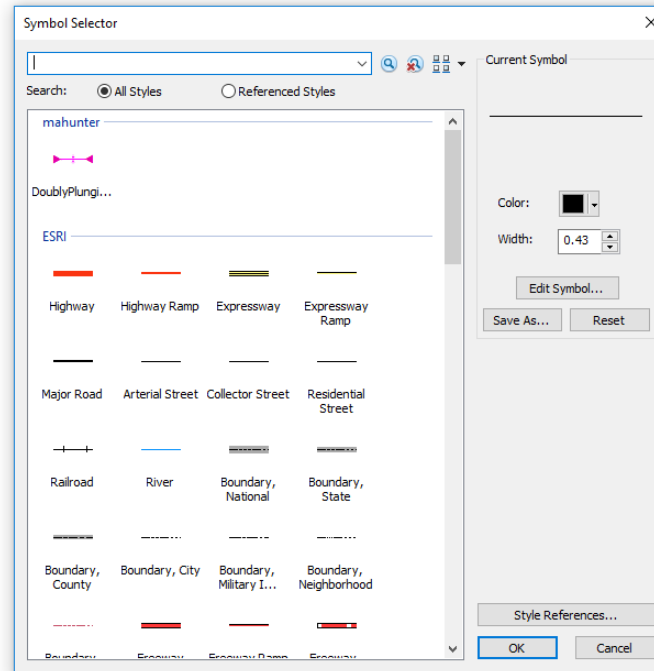


Figure 6.

As mentioned earlier, to save this style for use in future maps click “Save As...” in the Symbol Selector window, and save to an external style file or the default user style file. This can be accessed later through Style References.

Set Label Placement Properties

- 3) With the text symbol defined the next step is to configure the Maplex label engine via the Placement Properties window (Figure 7). In the Label Position tab ensure Regular Placement is selected, and check the box next to “May place label outside polygon boundary”. The rest of the default values may be used, but can be modified as desired. For example, the External Zones property may be changed to adjust the default placement for labels that don’t fit inside the polygon.

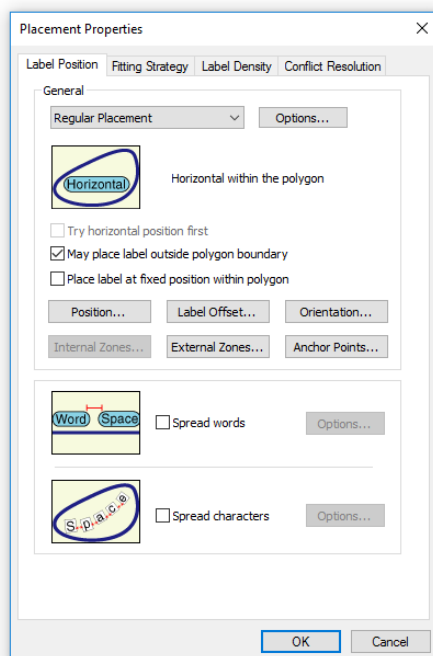


Figure 7.

The Fitting Strategy properties can all be left unchecked (Figure 8).

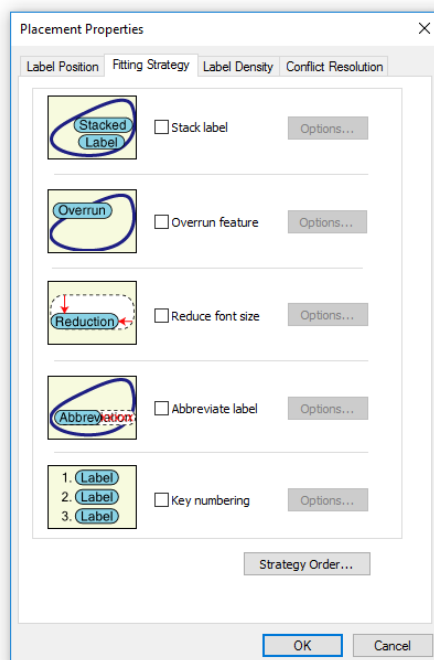


Figure 8.

Under the Label Density tab, the only property to change is “Minimum feature size for labelling” (Figure 9). This value is different for each map, and is largely dependent on the map scale. To determine an appropriate value, select 4-10 features that represent the smallest unit that would require a label, and look at the SHAPE_AREA field in the attribute table. Determine a threshold at or below the lowest area, and adjust from there.

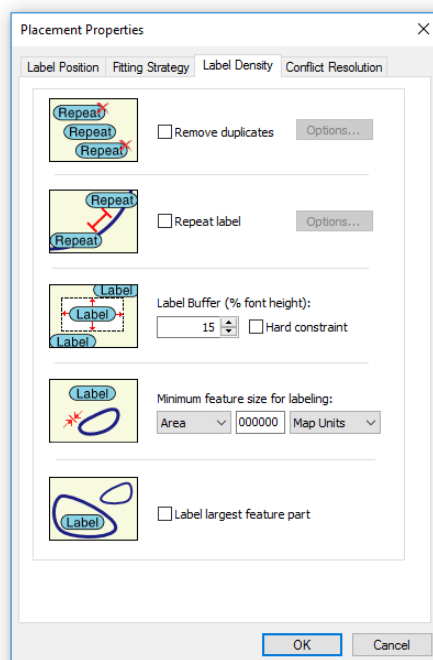


Figure 9.

Under the Conflict Resolution tab select “Never remove (place overlapping)” to ensure that all labels are created (Figure 10). Overlapping labels can be corrected later as annotation; however, if they will not be converted to annotation then this may be left unchecked.

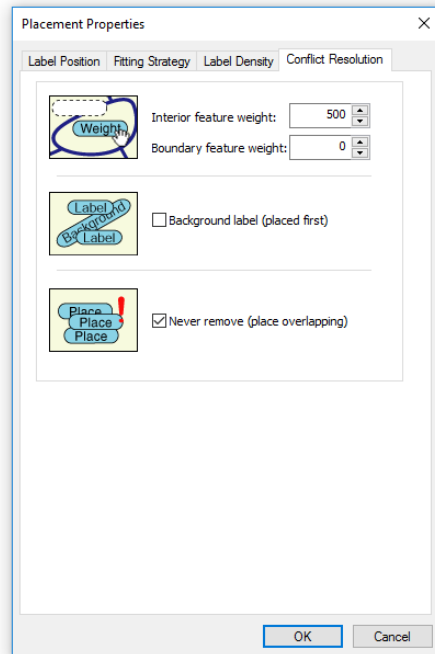


Figure 10.

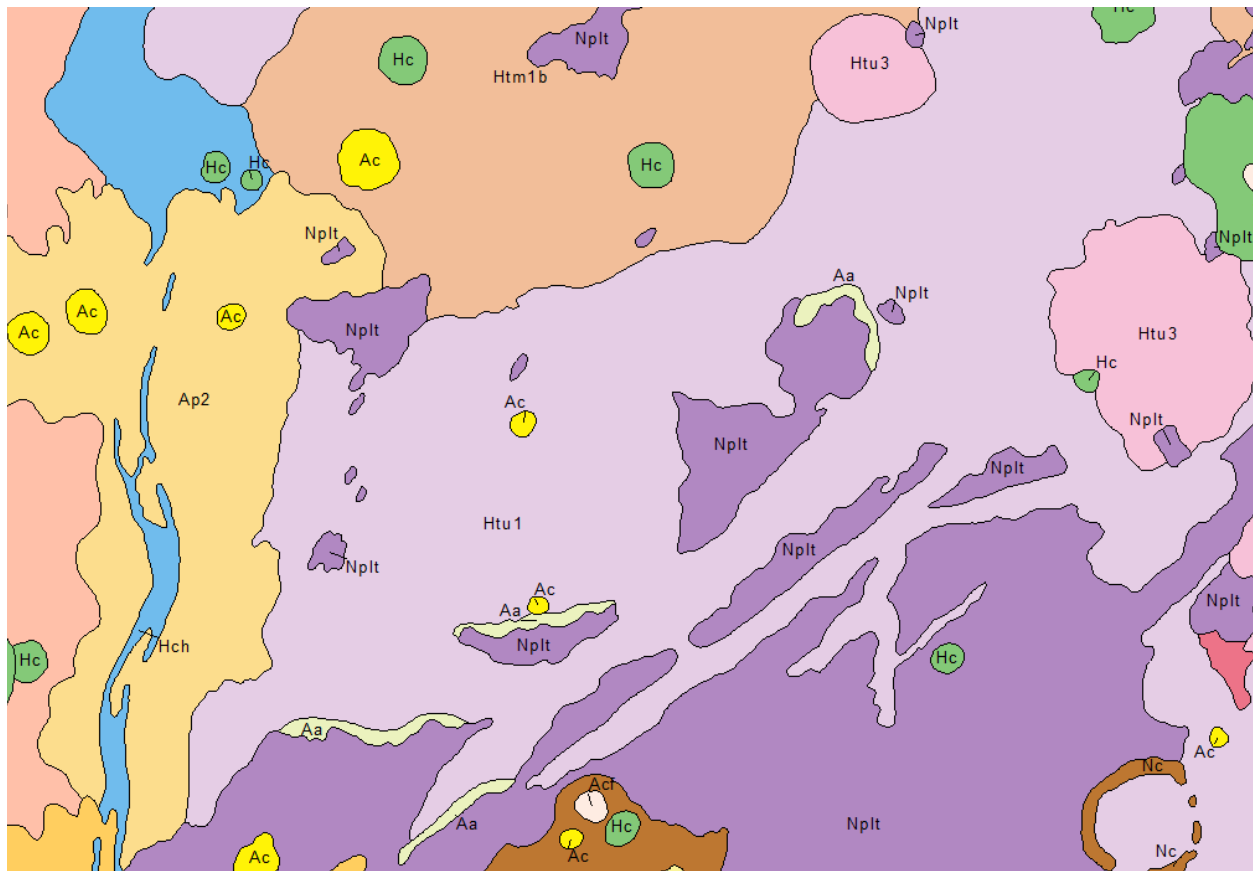


Figure 14. Example labels created from this workflow. GIS for I-2727 *Geologic Map of the Tempe-Mareotis Region of Mars* (Moore, 2001).

Customize Labels as Annotation

- 4) Following the previous steps creates quality labels that are ideally placed roughly 90% of the time, and are well suited for in-progress work or figures; however, published maps will likely require additional editing. And while exporting labels as graphics to editing programs like Adobe Illustrator will continue to be the preferred finishing method for some mappers, [annotation](#) feature classes can be edited in a similar manner and are saved as vector data within the geodatabase.

To [convert labels to annotation](#), ensure the unit labels are turned on, right-click on the layer in the table of contents, and select Convert Labels to Annotation. In the next window, choose to store annotation “In a database”, for “All features”, then uncheck the boxes for “Feature Linked” and “Append” – this creates a separate annotation feature class (Figure 11).

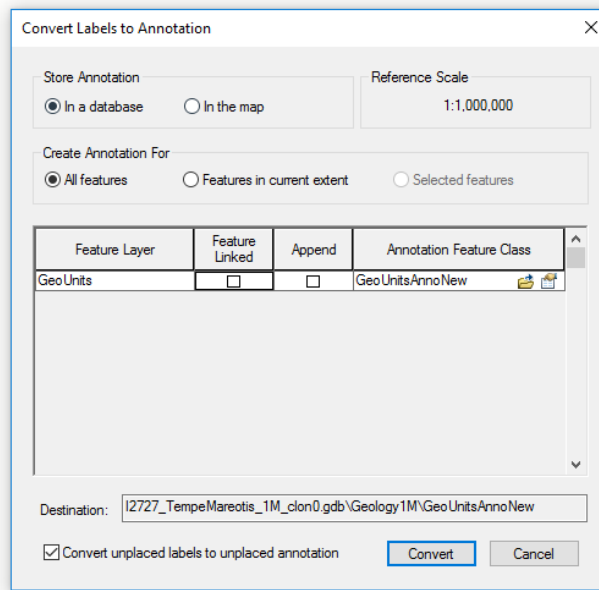


Figure 11.

The process of editing annotation is the same as with points, lines and polygons, but there is a separate tool for selecting annotation (Figure 12). The Edit Annotation Tool allows access to unique properties of annotation, including leaders and positioning (Figure 13).



Figure 12.

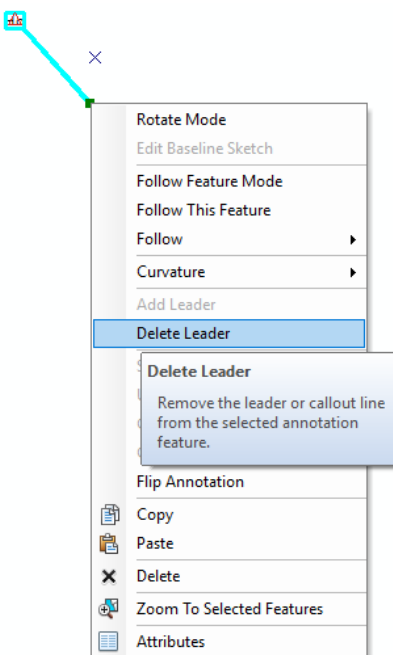


Figure 13.

If further editing is required annotation may be exported with the rest of the map in a number of formats. For a recent example of annotation within a geodatabase see USGS [SIM 3389](#).

Please direct any questions, comments or improvements to:

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