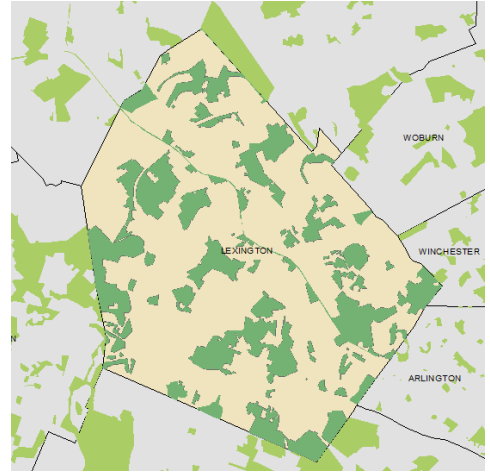


Creating a Smaller Data Set from a Larger Data Set – Vector Data



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How to Create a Smaller Subset Data Set from a Larger Data Set

This tip sheet covers how to create a smaller subset data set of a larger data set for vector data formats (point, line, and polygon). If you need to clip a raster data set, please see **Creating a Smaller Data Set from a Larger Data Set – Raster Data**.

There are two methods you can use to limit vector data.

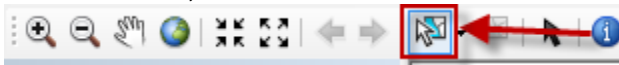
- One is to **select** a portion of an existing shapefile and create a new layer file from it (or export that to a new shapefile).
- The other is to **clip** an existing shapefile by using another polygon shapefile (like using a cookie cutter) to create a new clipped version of the original shapefile.

If you use the **selection method**, you will come out with entire features, e.g., entire parcels, or entire road segments, so some of these may extend beyond the area you want. If you use the **clip method**, all features are clipped at the border of the cookie cutter. This has the advantage of not including anything outside your area of interest but the disadvantage of chopping some features in half, which perhaps should not be chopped (e.g., parcels census tracts, etc.).

Selection Method – Quick Method by Creating a Layer File

Let's say you want to display the city boundary for Lexington and you also want to display open space, but only the open space within Lexington. You don't have a separate Lexington city boundary shape file, but you DO have a TOWNS polygon layer from MassGIS with all the town boundaries in Massachusetts. You also have the MassGIS Open Space data set.

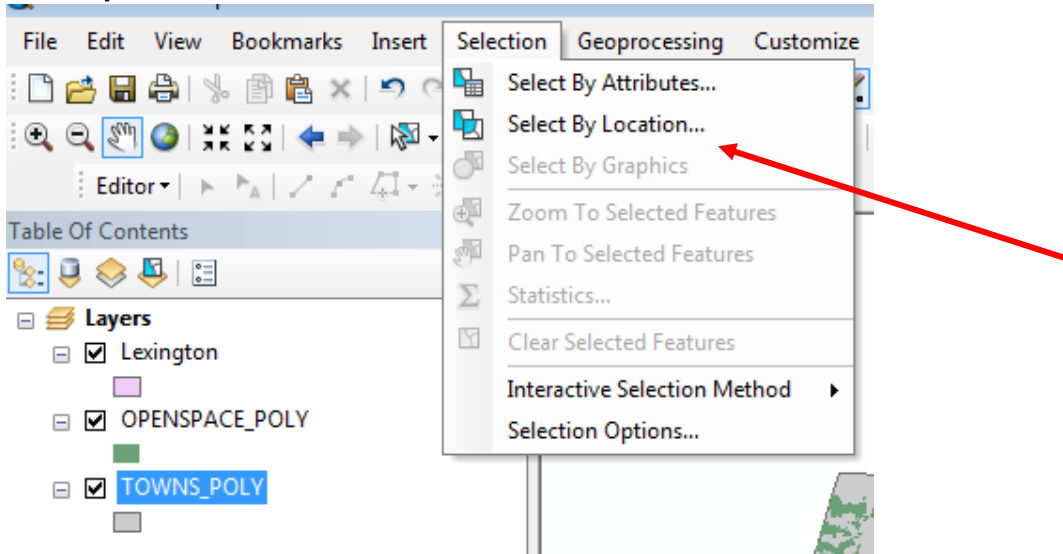
1. Add the MassGIS TOWNS_POLY layer to ArcMap (<http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/towns.html>).
2. Add the OPENSOURCE_POLY data set (<http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/osp.html>).
3. Locate Lexington by using the **Find** tool. It is just north-west of Boston.
4. In the *Tools* bar, click on the **Select Features** icon.



5. Click somewhere in Lexington – it will now be selected and highlighted in a cyan color (alternatively, you could use select by attributes).
6. *Right-click* on the **TOWNS_POLY** layer in the *Table of Contents*, and choose **Selection – Create Layer from Selected Features**.
7. You'll see at the top of your *Table of Contents* a new layer called **TOWNS_POLY selection**. Change the name of this layer to **Lexington** and right click - **zoom to layer**.
8. Remove the selection by clicking on the **Clear Selected Features** icon.

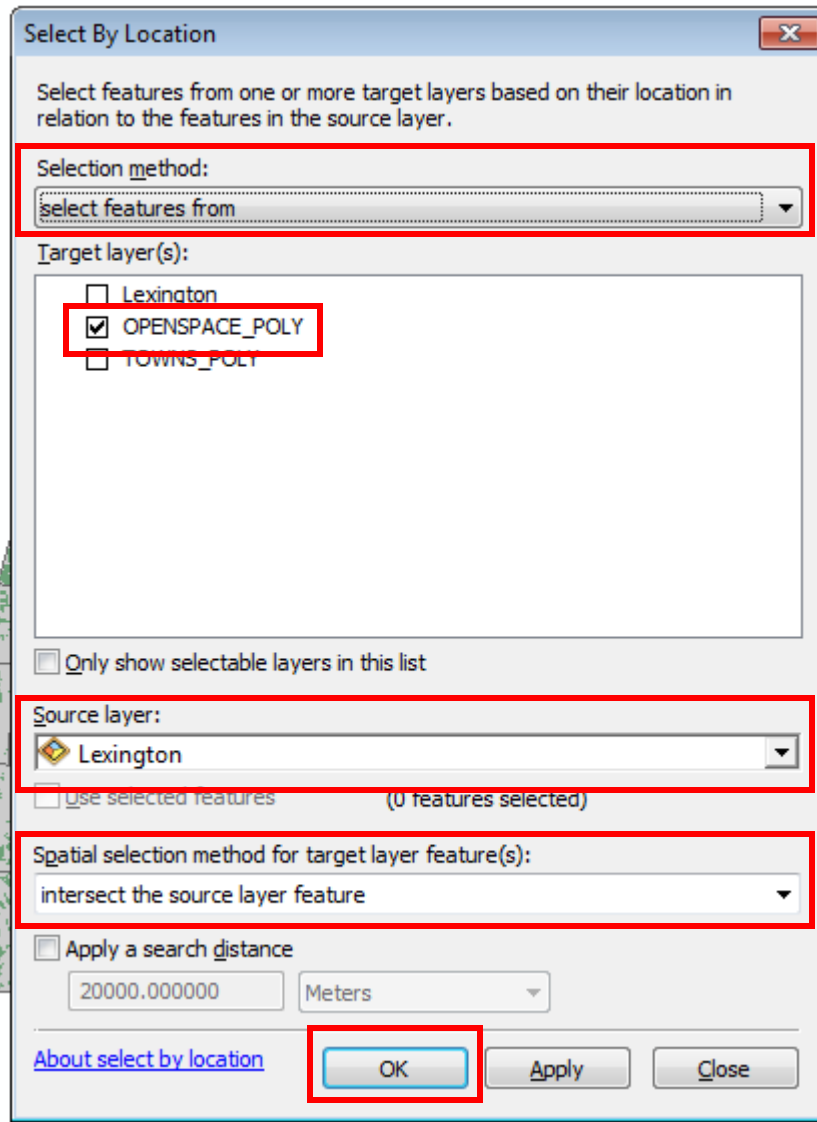


9. If you want to select the open space in Lexington in order to create a layer of just those areas, click **Selection - Select by Location**.




10. Fill out the dialog box as follows:

- **Selection method** = select features from
- **Target layer(s)** = The layer that has the features you want selected. In this case **OPENSOURCE_POLY**.
- **Source Layer:** The bounding layer - Lexington.
- **Spatial selection method** = intersect the Source layer feature.
- Click OK and then close.



11. Now *Right-click* on the OPENSOURCE_POLY layer in the *Table of Contents*, and choose **Selection – Create Layer from Selected Features**. You'll see the selected features in their own layer. Rename this layer **Openspace_Lex_Select**
12. Clear the selected features and turn off the original OPENSOURCE_POLY layer, so only the **Openspace_Lex_Select** and **Lexington** layers are visible.
13. Note that some of the open space areas extend beyond Lexington. That's because these areas don't end at the city line. You have other choices instead of INTERSECT in the Select by Location dialog box. Click on the **Clear Selected Features** box and try **Select by Location** again as you did above, but choose **are completely within the source layer feature** instead of intersect– it might be better, but you'll also see that some open spaces are now missing.

Note: You can also select features using the **Select Features** tool () by *dragging a box* around the open space polygons (click and hold the mouse key in the upper left corner of the area, drag down to the lower right corner and release, just like making a zoom-in box). If you need to add or remove from the selection, in the main menu, go to **Selection - Interactive Selection Method**, and make the appropriate choice. Then use the **Select Features**

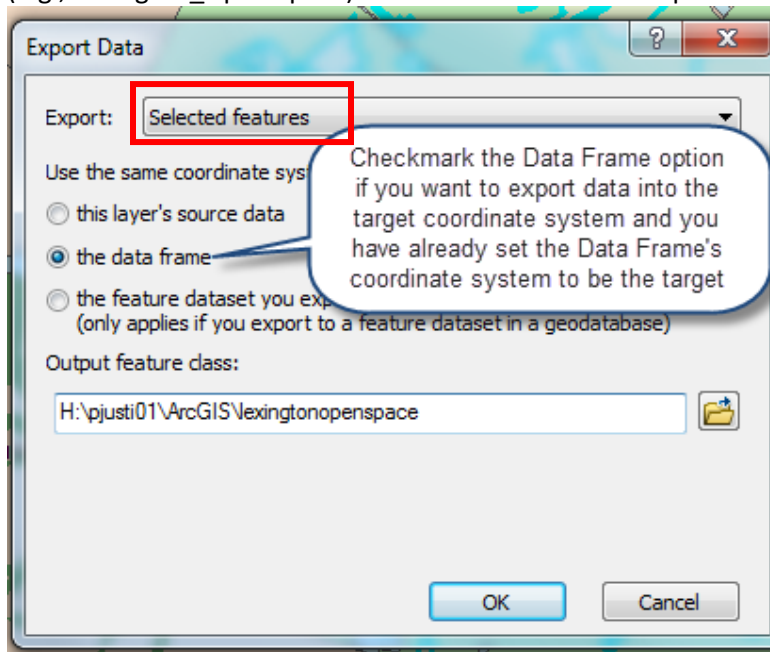
tool to add or remove as needed. There are a number of other ways to select features in a map, including **Select by Graphic**, **Select by Attribute**, and **Select by Location**.

If you really want to cut the open space areas off at the Lexington boundary, you can use the **CLIP** tool. See the instructions for using the **CLIP** method below for how to do this.

Creating a Permanent Shapefile from the Selected Features

If you want to create a permanent shapefile from the selected features (instead of a temporary layer file), follow these steps:


1. Select the features of interest and right-click the data layer containing those selected features. Choose **Data-Export Data**.
 - Under **Export**, make sure it says **Selected Features**.
 - Specify how you want a coordinate system defined for this new data file (**note**: This is a easy way to put data into a target coordinate system— before you do the Export, set the Data Frame’s coordinate system properties to the one you want all your data to be in).
 - Set the output location by navigating to your personal project folder and give the data set a new name (e.g., Lexington_Open Space). This will create a new shapefile with only the selected features.



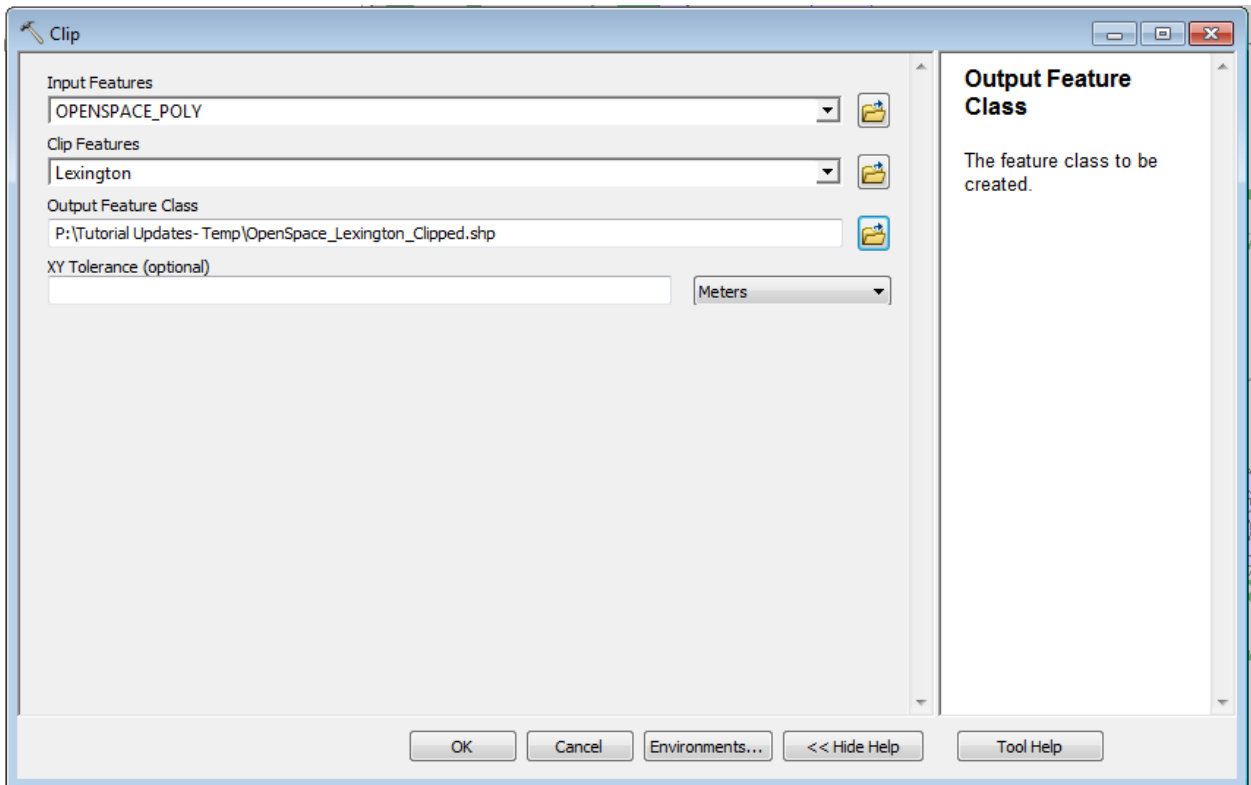
2. Click **Yes** to add this data set to the map.
3. Repeat this process for every data layer for which you want a smaller subset.
4. When finished, make sure that all your new data sets are working and viewable in ArcMap.

Using the Clip Tool to Create a Smaller Dataset from a Larger Dataset

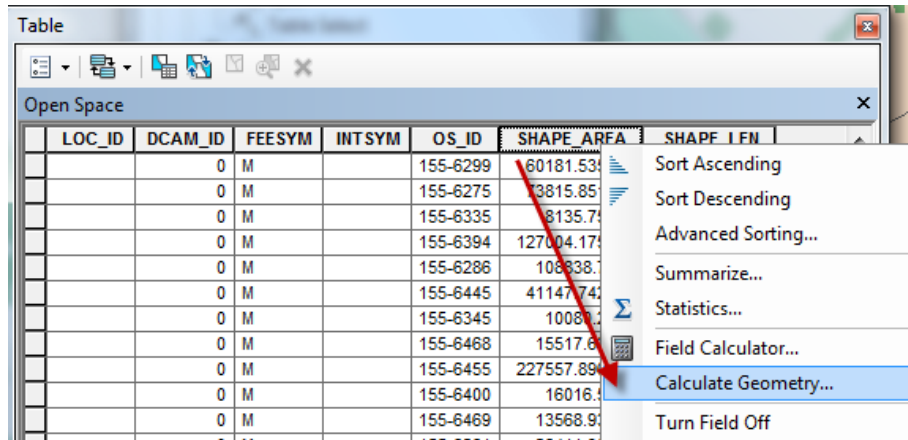
To use the **clip** tool, you will need to have a polygon shapefile which will act as the "clipper" (the boundary or the "cookie cutter") in addition to the "input" shapefiles (the data sets you want to cut down). The clip features can be an existing **polygon** file, like a watershed or a town boundary (you might need to create this layer first, like we did with the Lexington boundary above). If you want to create your own polygon area, e.g., a study site, see *Creating a new boundary feature* starting on p. 6.

1. First, it is important to make sure no data is selected before clipping- otherwise only the selected data will be clipped. Click the **Clear Selected Features** icon.
2. In the main menu, click **Geoprocessing – Clip**. You can also access the **Clip** tool through the **ArcToolbox** ().
3. Fill out the tool options as follows:
 - a. Choose the **input features** (the features to be clipped) using the dropdown menu. Select **OPENSOURCE_POLY** as the input features.
 - b. Identify a boundary file to use as the **clip features**. Select **Lexington**, the layer we made from the first part of this tutorial.
 - c. Set your output Feature Class to where you would like the shapefile saved and give it a descriptive name, such as **Openspace_Lexington_Clippped**.
 - d. Click **OK** when you are ready to clip.

Note: For extra help using this tool, click **show help**.



- Once the clip is complete, you should recalculate the area, perimeter, and length fields in the clipped data – clipping does not automatically recalculate these attribute fields.
- To recalculate these fields, open the attribute table for **Openspace_Lexington_Clipped**. Right-click on the name of the attribute in question (e.g., *Shape_Area*) and choose *Calculate Geometry*.



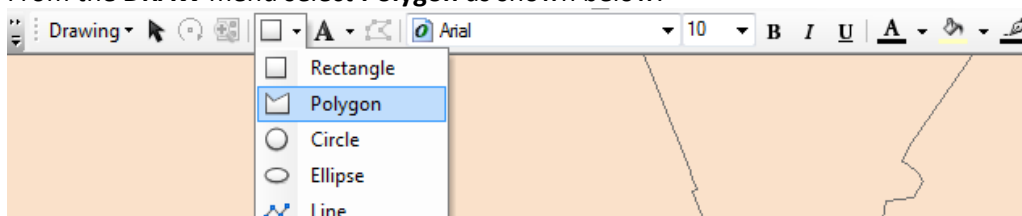
- Ignore the warning message and press **Yes**.
- Choose the **property** you want to calculate (e.g., *Area*), the **coordinate system**, and the **units** (e.g., square meters), and press **OK**.
- If a warning pops up, saying “You are about to do a calculate outside of an edit session...” press **Yes**. However be aware that the calculations results cannot be undone.
- Do the same for any other fields if necessary (length, perimeter).
- You now have a smaller shapefile with the geometry properties correctly calculated.

Creating a New Boundary Shapefile to Act as the “Clip Features”

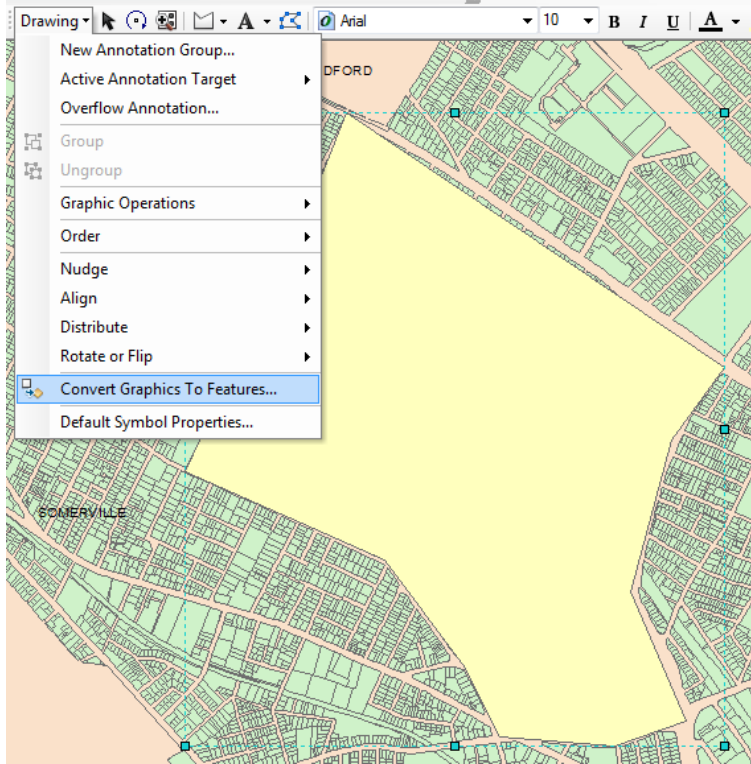
If you need to create a boundary GIS file to use as the “clip features” (e.g., a project area boundary), follow these directions – you will be creating a polygon to use when clipping data.

Creating a New Geographic Feature in ArcMap:

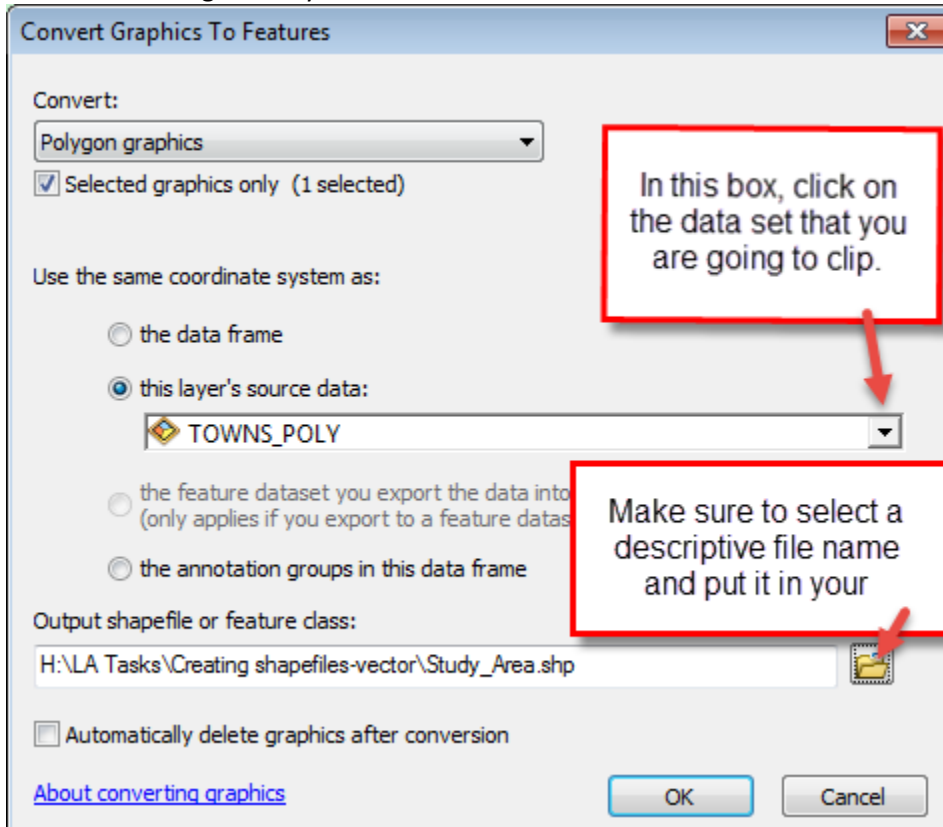
- Add the geographic data you want to clip (the data must be properly projected first).
- Add the **DRAW** toolbar by clicking on **Customize - Toolbars** –and check **Draw**.
- From the **DRAW** menu select **Polygon** as shown below:



- Use the **polygon** tool to draw a polygon for your project study area. To finish the polygon press enter or double click– if you mess up, just *right click-delete* and start again.
- When you have the area set the way you want, click on **DRAWING** and choose **Convert Graphics To Features...**



- Fill out the Dialog box as you see here:



7. Click on **OK** and choose **Yes** to add it as a layer.
8. If you're satisfied with this new study area, you can delete the graphic by right clicking on it and hitting *delete*.

You can now use this new data layer as your "clip features" file – go back to the instructions for clipping.

For more tips and tutorials, please visit our [website](#)

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