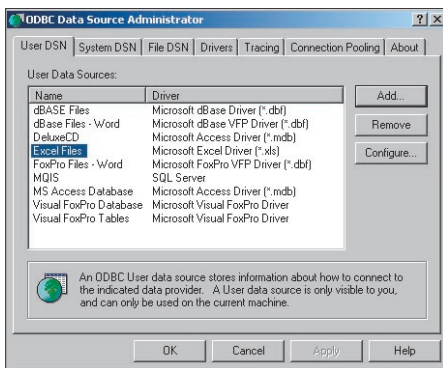


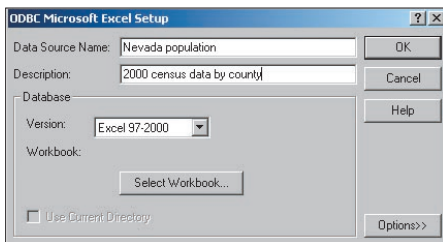
Working With Excel in ArcGIS

By Monica Pratt, ArcUser Editor

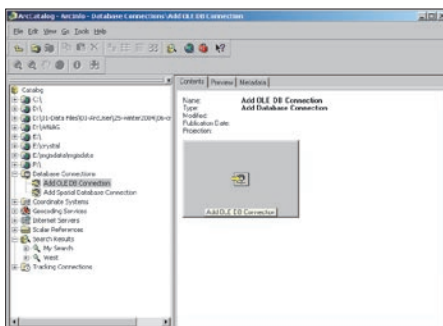
ArcGIS works well with Microsoft Excel, the spreadsheet component of Microsoft Office. Data can be shared back and forth between these two programs in a variety of ways. Data that has been created or is being maintained in Excel can be directly accessed by ArcGIS through a connection created in ArcCatalog. Joining or relating Excel tables with attribute tables for spatial data provides additional information. Excel can be used as a tool for quickly editing attribute tables.



In the ODBC Data Source Administrator dialog box, click the User DSN tab and click the Add button.



In the ODBC Microsoft Excel Setup dialog box, type a name and description for the data source. Click the Select Workbook button and navigate to the location of the Excel data file and select it.



Start ArcCatalog. Expand Database Connections and click Add OLE DB Connection.

GIS users also take advantage of the extensive table functionality and many formulas that are built into Excel. Finally, existing charts and tables can also be inserted into ArcMap layouts without reformatting.

Connect to an Excel Spreadsheet in ArcCatalog

ArcGIS can directly access data in Excel files. A simple, three-step procedure sets up this connection. First, create an Open Database Connectivity (ODBC) data source in Windows, then reformat the data in Excel, and finally connect to the Excel file in ArcCatalog.

Create an ODBC Data Source

1. In Windows 2000, choose Start > Programs > Administrative Tools > Data Sources. (For other Windows versions, consult Windows online help for creating an ODBC data source.)
2. In the ODBC Data Source Administrator dialog box, click the User DSN tab and click the Add button.
3. Select Microsoft Excel Driver (*.xls) and click the Finish button.
4. In the ODBC Microsoft Excel Setup dialog box, type a name and description for the data source. Click the Select Workbook button and navigate to the location of the Excel data file and select it.
5. Click OK twice to exit the dialog boxes.

Reformat Data

1. Start Excel and open the desired spreadsheet (.xls) file.
2. Select the data in the spreadsheet that will be displayed in ArcGIS.
3. Choose Insert > Name > Define and type a name for the selected cells. This name will appear in the tables list when the OLE DB Connection is expanded in ArcCatalog or ArcMap.
4. Save the file and quit Excel.

Connect to the Excel File From ArcCatalog

1. Start ArcCatalog. Expand Database Connections, and click Add OLE DB Connection.
2. Select Microsoft OLE DB Provider for ODBC Drivers.
3. Click the User Data Source Name button and select the .xls file just named in the previous step from the drop-down list. It may be necessary to use the Refresh button.
4. Click the Test Connection button to verify the connection works. A message box should confirm the connection has succeeded. Click OK.

Now the Excel table can be accessed and previewed in ArcCatalog and added directly to a

map document in ArcMap by choosing OLE DB Connection.odc.

Using Excel With Shapefile Attribute Tables

In addition to serving as a direct data source, Excel tables can be joined to attribute tables to enhance the information available for map features. Exporting an attribute file and opening it in Excel makes Excel's wide array of formulas, functions, and formatting tools available for quickly editing the table. The file can be saved and rejoined to the spatial file.

Enhancing Spatial Data

A nonspatial table created in Excel can be joined or related to a layer's attribute table if a common field exists or can be created. Use join when the relationship between items in the two tables is one-to-one or many-to-one. Use relate for relationships that are one-to-many and many-to-many. Note that if a relate is used instead of a join, although these new attributes can be queried, they cannot be used to set layer properties (i.e., symbolize the data).

ArcGIS uses the Microsoft ODBC Text driver for text files. This driver stores a data description of the text file's schema in a file called schema.ini. This file is automatically generated when a text file is opened in ArcGIS and resides in the same directory as the text file.

By default, ArcGIS treats files with .txt, .asc, or .csv extensions as comma-delimited text files. Files with a .tab extension are treated as tab-delimited text files. If a .txt or .asc file uses a delimiter other than a comma, the data will not be interpreted correctly. Although the schema.ini file can be manually edited to use a delimiter other than a comma, it is usually less trouble to use a comma-delimited format with the .csv extension for importing tables from Excel.

Even though Excel can save files in dBASE (.dbf) format, .csv can often be the best choice owing to some idiosyncrasies in the way different versions of Excel save to the DBF format. When saving data from Excel, numeric fields will be truncated to integers unless the format for that column has been set to include the correct number of decimal places. If a range of cells in the spreadsheet is selected, only that range will be exported.

Make sure that the first row in the spreadsheet joined contains field headings. These headings can be no longer than 10 characters; can contain letters and numbers but must begin with a letter; and should not incorporate dashes, spaces, or brackets. Replace dashes with underscores,

Examine both the Excel table to be joined and the target spatial data to determine that they share a common field.

and otherwise edit field names so they conform to these guidelines. Each field can contain only one type of data. Consequently, a numeric field should never contain the word NONE or another text string. Use the following procedure to join Excel data with attribute data already in an ArcMap document.

1. Examine both the Excel table to be joined and the target spatial data to determine that they share a common field. This field could be a text field such as a county name or a coded numeric field such as a FIPS field (i.e., Federal Information Processing Standards code). Sometimes a common field can be created through concatenating two fields into a new field.

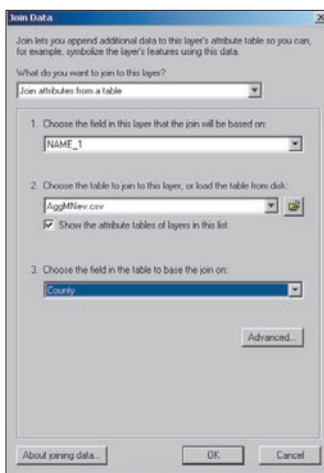
2. In Excel, verify that the field (column) headings conform to naming guidelines required by ArcGIS as described previously. Choose File > Save As and scroll down to CSV (comma-delimited) (*.csv) and name and save the file. Click Yes twice to save only the active worksheet and reaffirm the CSV format. Close the file and close Excel.

3. Activate or open ArcMap. Click the Add Data button and navigate to the location of the CSV file and select it. ArcMap will display the new table on the Source Tab of the Table of Contents.

4. In the Table of Contents, right-click on the spatial layer that will be joined with the Excel data and select Join from the context menu.

5. In the Join Data dialog box, choose Join Attributes from a Table. In the first section, click the drop-down box and choose the field from the attribute table that will be used for the join. In the second section, click on the Browse button and navigate to the location of the table to be joined and select it. In the third section, click on the drop-down box and select the field on which the join will be based. Click OK.

Right-click on the spatial layer and choose Open Attribute Table from the context menu. The attributes of the table will be appended to this layer's attribute table. Joins can be removed



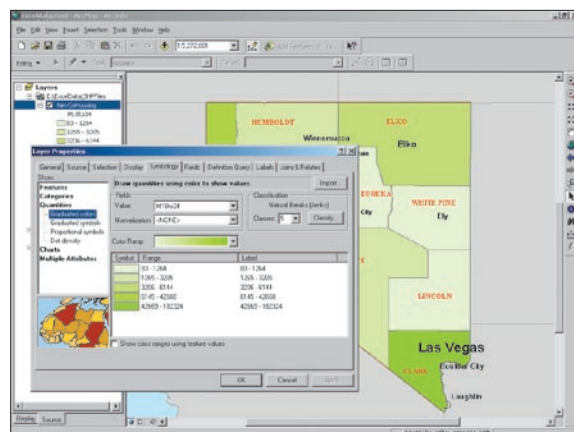
Use Join functionality in ArcMap to append the Excel data to the attribute data.

simply by right-clicking on the spatial layer and choosing Joins > Remove Joins. Joined columns cannot be edited directly, but editing the columns in the original table will change the joined columns.

Data in individual joined columns can't be edited directly. However, editing data in the original table (if it has been added to the map) will effect the same changes in the joined columns. To eliminate this problem, make the join permanent by exporting the data to a new dataset. Right-click on the layer and choose Data > Export Data.

Quickly Editing Tables

ArcGIS will not allow changes to the type or name of an existing column in an attribute table. However, because attribute tables can be traded back and forth between Excel and ArcGIS with relative ease, attribute tables can be exported out of ArcGIS; brought into Excel; and quickly edited to change data types, aggregate fields, or perform other tasks; then joined with the original table.



The demographic data joined from the Excel table can now be used for analysis and symbolization.

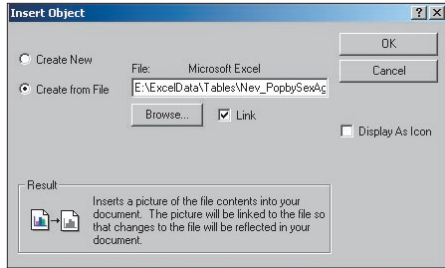
Note that a shapefile's FID and Shape columns and a dBASE table's OID column can't be deleted. Do not edit these fields. When accessing a table's contents, ArcGIS creates a virtual column, the OID column, to ensure that each record has at least one unique value. Every table needs one column in addition to the Shape and FID or OID columns. Use the following procedure to export an attribute table, edit the table, and join it back to the original attribute file.

1. Right-click on the layer containing the table to be edited and choose Open Attribute Table.
2. In the table, click on the Options button and choose Export from the menu.
3. Navigate to a folder to save the table, name the table, and save it as a DBF file. Don't add it back to the map.
4. Start Excel and open the DBF file just exported. Make the desired changes such as calculating fields or changing field formats.
5. Delete all fields that were not modified except

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After selecting the chart or table cells in Excel and activate ArcMap. Choose **Insert > Object**, click on **Create from File**, and navigate to the location of the Excel file.

the field that will be used to join the table back to the attribute table.

6. Choose **File > Save** and save as a DBF file. Click **Yes** to keep out incapable features and confirm the DBF format. Close Excel.

7. Follow steps 3 through 5 in the previous section to join the modified DBF table to the layer's attribute table.

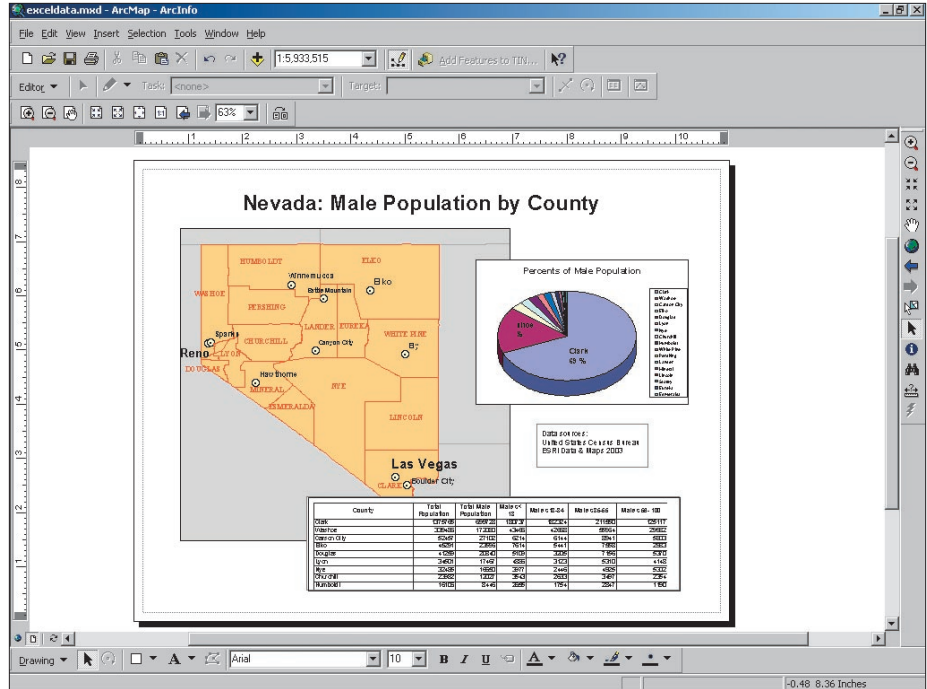
Insert Excel Table or Chart Into a Layout

ArcGIS can generate formatted tables and a variety of charts. However, the table or chart desired for a layout may already exist as an Excel file. In addition, Excel tables can use more descriptive field headings. Because ArcGIS supports interoperability, Excel tables and charts can be inserted directly into an ArcGIS layout, eliminating the need to re-create either.

Although tables and charts created in Excel can be pasted directly into an ArcMap layout, inserting them has the advantage of maintaining a dynamic link with Excel. With this link, edits made in Excel to a chart or table are reflected in ArcMap. Note that changes made in Excel should always be saved. Unsaved changes may disrupt the linkage between Excel and ArcGIS.

1. Open the Excel file containing the desired chart or table data.
2. Click on the chart area so that the handles (eight black resizing blocks) appear around the chart area, or select the cells in the worksheet page that will be used in the table. Leave the chart or worksheet area selected in Excel, but start ArcMap and choose the Layout View.
3. In ArcMap, choose **Insert > Object** and select **Create from File**. Click the **Browse** button and go to the location of the open Excel file and select it.
4. In the **Insert Object** dialog box, check the **Link** box and click **OK**.

Resize the chart or table appropriately using the frame handles. Tables will come in without a background, but this can be remedied by using the **Drawing** tools in ArcGIS to create a colored box and placing the box behind the table in the layout. Only one object per Excel file can be inserted in this way. However, objects from multiple Excel files may be inserted in the same layout.



Although only one object, either a table or chart, can be added per Excel file, multiple objects can be added to a layout if they originate from multiple Excel files.

Conclusion

ArcGIS offers flexible methods for working with non-GIS software applications. Take advantage of the interoperability of Excel and ArcGIS to

speed tasks, exploit the sophisticated table functionality in Excel, and avoid needless reformatting and/or data conversion.

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