Using Google Fusion Tables in Geomashups

Fusion Tables is a Google data visualization web application that allows you to upload large data tables with point, line, or polygon geometries and easily create custom thematic maps shown in Google Maps (http://www.google.com/fusiontables/Home/). You can include these Fusion Tables maps as overlays in the Google Maps geomashups you create in TNTmips using the Assemble Geomashups process. Fusion Tables maps can be combined with your standard web tilesets, KML files, and SVG and KML tilesets to create data-rich geomashups. You can make geomashups with Fusion Tables you have created, or include public Fusion Tables created by others.

In order to create and use your own Google Fusion Tables, you need to have one or more Google Drive accounts. You can sign up for free Google Drive accounts at https://drive.google.com. In order to use your Fusion Tables maps in a geomashup, you must also obtain a Google API Key through the Google API Console (see https://developers.google.com/console/help/ for instructions).

You can export TNT geometric objects with their attributes to Fusion Tables (see the TechGuide entitled *Create Google Fusion Tables from Vector, Shape, or CAD Objects*). Google's Fusion Tables controls allow you to set up simple map styles for the map elements and to select attributes to show in the info balloon when an element is clicked in the view. These
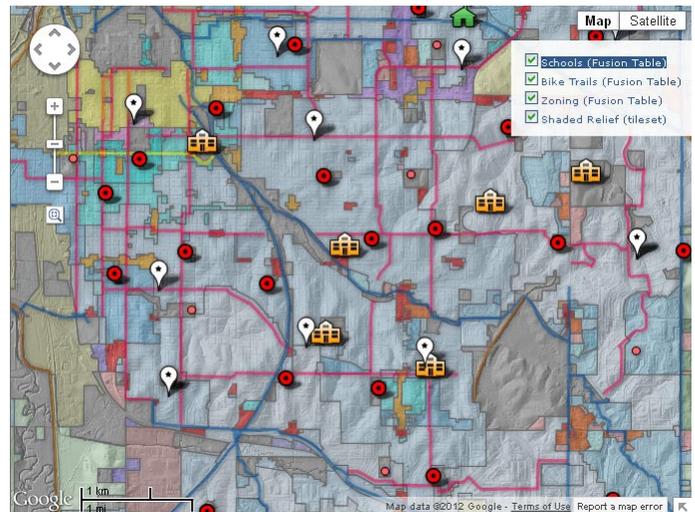
Google Maps geomashup (created in TNT Assemble Geomashup process) with three Google Fusion Table overlays (Schools, Bike Trails, and Zoning polygons) and a shaded relief raster tileset overlay.

settings are automatically incorporated in the Fusion Tables overlays you add to your geomashups.

Use the Add Fusion Table Overlay icon button on the Assemble Geomashup window's Overlay tabbed panel to add a Fusion Table layer to the geomashup. The illustrations below show the steps to select a Fusion Table from a Google account.

Add Fusion Table Overlay

1

The Select Objects window opened by the Add Fusion Table Overlay icon button defaults to the Web domain and shows a FusionTable folder.

2
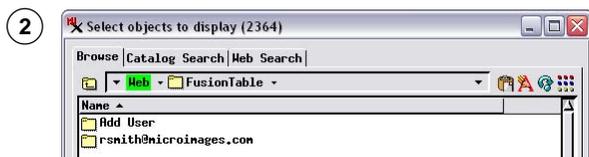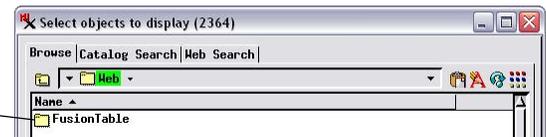
Navigate into the FusionTable folder. The browse list includes an Add User entry and a folder for any Google account from which a Fusion Table has already been selected.

3 If selecting a FusionTable from a listed Google account, navigate into the folder for that account.

or

If adding a new user account, double-click on Add User (or single-click on the icon). In the FusionTables window, enter the Email address and password for your Google account and press [OK].

TNTmips stores this login information and automatically uses it for subsequent selections from this account.

4
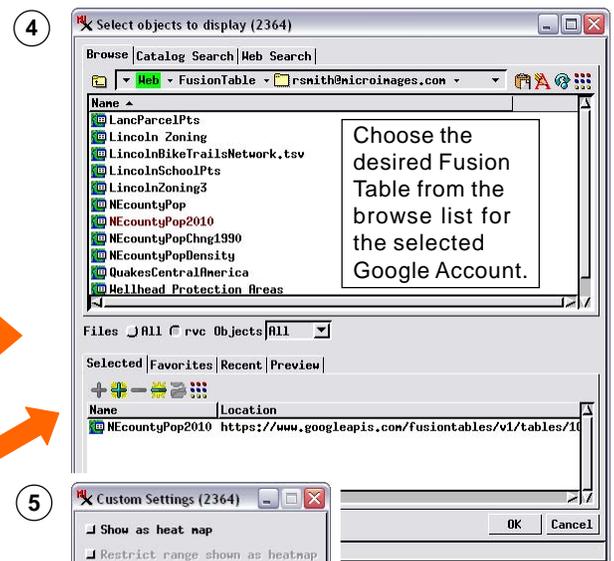
Choose the desired Fusion Table from the browse list for the selected Google Account.

5

Choose the desired settings on the Custom Settings dialog (see text).

The first time you select a Fusion Table from one of your Google accounts in Assemble Geomashup, you are prompted for the account name (the Email address you provided to Google) and the password. TNTmips stores this login information locally so that it can be used automatically each time you select from that account. The Fusion Table selection dialog presents a folder for each known account and gets a list of available Fusion Tables from Google when you navigate into the account folder. When you select a table, the table records are also examined in the background to determine the location and areal extents of the table's geometric elements. This information is used by the Assemble Geomashup process to establish the center coordinates and default initial zoom level for the geomashup.

You can also include in your geomashups Fusion Tables maps from other sources that have been shared for public use. Google provides a help page with a search tool for finding public data:

http://support.google.com/fusiontables/bin/
answer.py?hl=en&answer=2573812&topic=1652595&ctx=topic

Once you have located a public Fusion Table map you would like to use, view the map visualization in your browser, then copy the map's URL and paste it into the Fusion Table selection dialog in Assemble Geomashup (see the TechGuide entitled *Adding Custom Web Layers to Geomashups* for details on pasting URLs).

Heat Maps
Fusion Tables provide an option (most useful for point data) to display the data as a "heat map", which displays the spatial density of the data using a range of colors (no color, green, yellow, orange, and red in order of increasing density). Currently Google computes the "density" value strictly on the basis of overlap of the point symbols, which means that heat maps are most useful at low-numbered zoom levels (zoomed out).

The Custom Settings dialog for Fusion Table layers, which opens automatically when you add the layer, provides the op-

Your geomashups can also incorporate Fusion Tables from other sources that have been shared for public viewing. Simply view the map visualization of the table in your browser, then copy and paste the map's URL into the Fusion Table selection dialog.
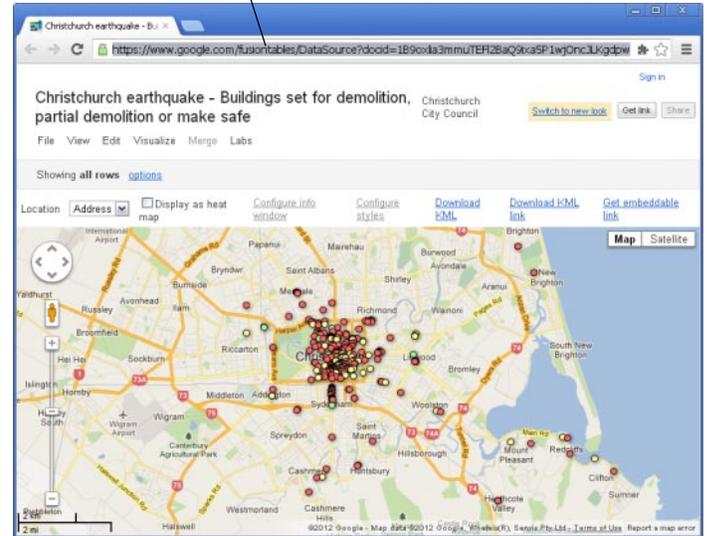
tion to show the layer as a heat map. In addition, you can choose to limit the range of zoom levels at which the heat map visualization will be used; outside that range, the standard map styling is shown. Thus you can set the geomashup to show a heat map of point data at low zoom levels in which the points would are tightly packed, and automatically switch to a display of the raw point data at higher zoom levels. An example using earthquake epicenter locations for Central America is illustrated at the bottom of this page.

The Custom Settings dialog for a Fusion Tables layer lets you choose to display the data as a heat map for a specified range of layers and use the normal map styling for the remainder of the zoom level range.

Geomashup of Central America region with a Fusion Table layer of earthquake epicenters and a KML layer showing tectonic plate boundaries (colored lines). The Fusion Table layer options were set to show a heatmap visualization of the earthquake locations from Google Maps zoom levels 3 through 6 (zoom level 5 shown above left) and the earthquake points at higher zoom levels (zoom level 7 shown above right).