

MAKING MAPS WITH GOOGLE FUSION TABLES

(Data for this tutorial at www.peteraldhous.com/Data)

Thanks to Google Fusion Tables, creating maps from data and embedding them on a web page is now easy.

We're going to make [this map](#), illustrating the number of globally threatened amphibian species by freshwater ecoregion, superimposed with the location of sites deemed important for amphibians, designated under the international [Ramsar Convention](#) on wetlands conservation.

First we need to be logged in at Google Drive (<https://drive.google.com/>) with a Google account.

Make the thematic map of threatened species by ecoregion

When mapping to commonly-used boundaries, such as US states, Fusion Tables will recognize the names and match them to the correct area. But in other cases, such as this, you first need a map defining the boundaries.

Geographical data exists in two common formats: [Shapefiles](#) and [KML](#).

Shapefiles are a format used in Geographic Information Systems (GIS) software. They consist of a series of files, one of which (with the extension .dbf) is a table of data. Shapefiles can be obtained from various sources; here's a good general library:

<http://www.naturalearthdata.com/downloads/>. They are usually available online as compressed (zipped) folders.

KML is the data format used by [Google Earth](#).

TIP! When searching for shapefiles, try adding “shapefile” or “GIS data” to your search terms. To find KML, use [Google's Advanced Search](#), and select .kmz (the compressed form of KML) or .kml (try both).

If you need to upload a shapefile to Fusion Tables, go to <http://shpescape.com/> and upload the zipped folder. KML will upload to

Fusion Tables directly. If your download was a KMZ file, first open it in Google Earth, right click on the file in **Places**, and save as KML.

We don't need to upload boundary data, however, because that's already been done by The Nature Conservancy, when it used Fusion Tables to create [this series of maps](#). In fact, a version of the map we're going to make is already at this site – but we're going to go through the steps needed to join data on threatened amphibians to the boundaries.

Open the freshwater ecoregion boundary data (at https://www.google.com/fusiontables/data?docid=1gjGiTQAH2gFwQmbL2SfXMSKNXx_wVYImodurLg). You should see a screen like this:

Freshwater Ecoregions Table for Merges

Click File | About for Metadata. Share

File Edit Tools Help Rows 1 Cards 1 Map of geometry

Filter No filters applied Not saving

1-100 of 12,176

eco_id	geometry	ge...	ECO_ID	ECOREGION	MHT_TXT	MHT_NO	OLD_ID	ECO_ID_U	Shape_Leng	Shape_Area	OR...	MH...	im...
101	kml...	32	101.000000	Alaskan Coastal	polar freshwaters	11	55.000000	30101	347.666789	188.543459	44	5	
101	kml...	33	101.000000	Alaskan Coastal	polar freshwaters	11	55.000000	30101	347.666789	188.543459	44	5	
101	kml...	10	101.000000	Alaskan Coastal	polar freshwaters	11	55.000000	30101	347.666789	188.543459	44	5	
101	kml...	24	101.000000	Alaskan Coastal	polar freshwaters	11	55.000000	30101	347.666789	188.543459	44	5	
101	kml...	8	101.000000	Alaskan Coastal	polar freshwaters	11	55.000000	30101	347.666789	188.543459	44	5	
101	kml...	10	101.000000	Alaskan Coastal	polar freshwaters	11	55.000000	30101	347.666789	188.543459	44	5	
101	kml...	21	101.000000	Alaskan Coastal	polar freshwaters	11	55.000000	30101	347.666789	188.543459	44	5	
101	kml...	208	101.000000	Alaskan Coastal	polar freshwaters	11	55.000000	30101	347.666789	188.543459	44	5	
101	kml...	8	101.000000	Alaskan Coastal	polar freshwaters	11	55.000000	30101	347.666789	188.543459	44	5	

You can click on the arrows on the blue circles above the table at top left to scroll across to see the other columns in the table, most of which we don't need.

Notice the columns **ECOREGION**, which gives the name of each, **MHT_TXT**, which is a description of the ecoregion type, **geometry**, which is the column the map will be drawn from, and **eco_id**, which is an identifying number for each region. We'll use these later.

The data giving the number of globally threatened amphibians in each ecoregion is in the spreadsheet **threatened amphibians.xlsx**.

Open this spreadsheet in Excel, and note that the first three columns match up with those we saw in the boundary data table. Now **Sort** on the column **thtrtd_amph** from largest to smallest.

	A	B	C	D	E	F
1	eco_id	ECOREGION	MHT_TXT	MHT_NO	thtrtd_amph	
2	312	Amazonas High Andes	montane freshwaters	3	95	
3	301	North Andean Pacific Slopes - Rio	tropical and subtropical coastal rivers	8	94	
4	302	Magdalena - Sinu	tropical and subtropical upland rivers	9	68	
5	765	Middle Yangtze	temperate upland rivers	6	43	
6	715	Western Ghats	tropical and subtropical coastal rivers	8	37	
7	518	Southern Gulf of Guinea Drainages	tropical and subtropical coastal rivers	8	37	
8	201	Chiapas - Fonseca	tropical and subtropical coastal rivers	8	35	
9	203	Mosquitia	tropical and subtropical coastal rivers	8	33	
10	305	Orinoco High Andes	montane freshwaters	3	33	
11	519	Western Equatorial Crater Lakes	montane freshwaters	3	33	
12	202	Quintana Roo - Motagua	tropical and subtropical coastal rivers	8	32	
13	171	Papaloapan	tropical and subtropical coastal rivers	8	29	
14	304	South America Caribbean Drainage	tropical and subtropical coastal rivers	8	29	
15	807	Eastern Coastal Australia	temperate coastal rivers	5	29	
16	505	Lower Niger - Benue	tropical and subtropical floodplain rivers and wetland complexes	10	28	
17	173	Grijalva - Usumacinta	tropical and subtropical coastal rivers	8	26	
18	206	Chiriqui	tropical and subtropical coastal rivers	8	26	
19	205	San Juan (Nicaragua/Costa Rica)	tropical and subtropical coastal rivers	8	25	
20	581	Madagascar Eastern Highlands	montane freshwaters	3	25	
21	204	Estero Real - Tempisque	tropical and subtropical coastal rivers	8	23	
22	174	Upper Usumacinta	tropical and subtropical upland rivers	9	23	
23	763	Xi Yiang	tropical and subtropical floodplain rivers and wetland complexes	10	23	
24	165	Lerma - Chapala	xeric freshwaters and endorheic (closed) basins	4	22	
25	766	Lower Yangtze	temperate floodplain rivers and wetlands	7	22	

Note that the maximum value is 95. Scroll down to the bottom, and you'll also see that some of the regions with 0 threatened amphibians are those for which there is No Data. Indeed, if you look at TNC's map, you'll see that 0 in the **thtrtd_amph** column actually means "None or insufficient data."

Tip! Always examine your data, and do background research so you're aware of its quirks and limitations.

We will later use the column **eco_id**, with the identifying numbers for the ecoregions, to join the data in the spreadsheet to the ecoregion boundaries.

Back in your Google Drive account, import the spreadsheet by selecting **Create>Fusion Table (experimental)**.

At the first dialog box, select **From this computer**, and hit **Choose File**:

Import new table ×

 From this computer

 Google Spreadsheets

 Create empty table

No file chosen

You can upload spreadsheets, delimited text files (.csv, .tsv, or .txt), and Keyhole Markup Language files (.kml) [Learn more](#)

Or search public data tables

New to Fusion Tables?

Take a peek! [Play with a data set](#) or [try a tutorial](#).

Select the spreadsheet, click **Next**, and again at the second dialog box:

Import new table



Column names are in row

1	eco_id	ECOREGION	MHT_TXT	MHT_NO	thrted_amph
2	312	Amazonas High Andes	montane freshwaters	3	95
3	301	North Andean Pacific Slopes - Rio Atrato	tropical and subtropical coastal rivers	8	94
4	302	Magdalena - Sinu	tropical and subtropical upland rivers	9	68
5	765	Middle Yangtze	temperate upland rivers	6	43
6	715	Western Ghats	tropical and subtropical coastal rivers	8	37
7	518	Southern Gulf of Guinea	tropical and subtropical coastal rivers	8	37

Rows before the header row will be ignored.

New to Fusion Tables?

Cancel

« Back

Next »

Take a peek! [Play with a data set](#) or [try a tutorial](#).

If you wish, you can edit the table name and add more information at the third dialog box, then click **Finish** and it should load.

Now we will join our spreadsheet to the ecoregion boundaries. Still in the uploaded spreadsheet, select **File>Merge** from the top menu. In the **Merge: Select a Table** dialog box, paste the url for the freshwater ecoregion boundaries table into the box labeled **Or paste a web address here** and hit the **Next** button.

Fusion Tables may recognize that we want to join using the **eco_id** columns, but you can change the columns selected if necessary:

✕

Merge: Confirm source of match

This table	Freshwater Ecoregions Tabl...
eco_id ▾	eco_id ▾
312	101
301	101
302	101
765	101
715	101
518	101
201	101
203	101
305	101
519	101

Matching values in these two columns will create the merged table. [Learn more](#)

Click **Next**.

We don't need all of the data across the two tables, so at the next dialog box we'll select the columns we need. First click on **none** to remove all the check marks, and then recheck just the columns we need, shown below. In this view columns from the threatened amphibians spreadsheet are on a white background, while those from the freshwater ecoregions boundary data are shaded yellow:

Merge: Choose columns ×

All ▾

18 columns

Select [all](#) [none](#)

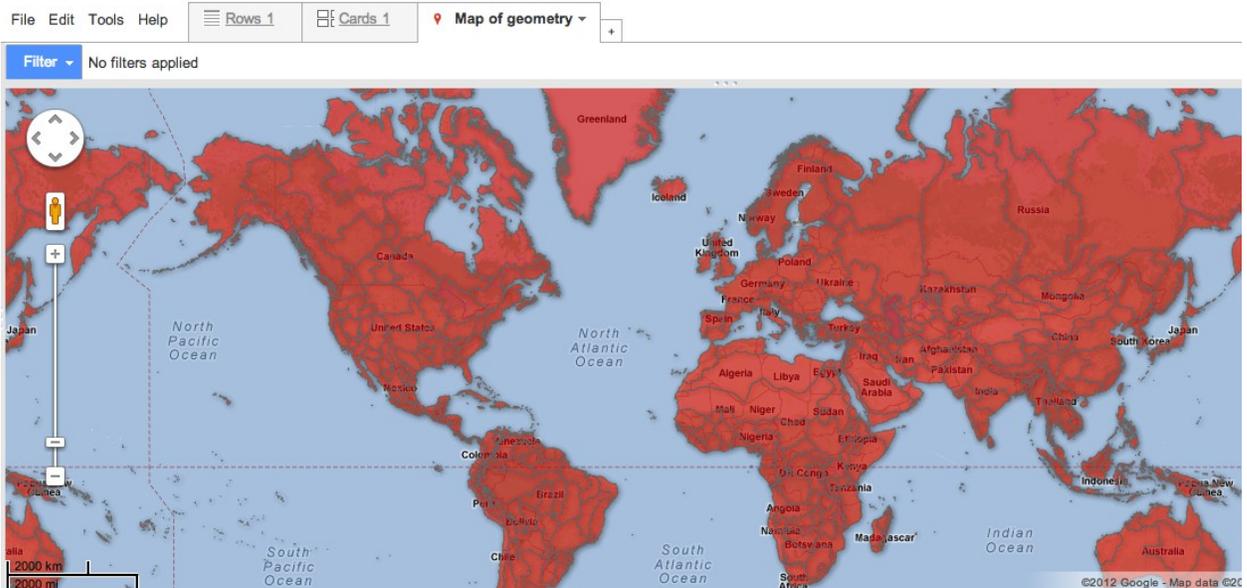
<input checked="" type="checkbox"/>	eco_id
<input type="checkbox"/>	ECOREGION
<input type="checkbox"/>	MHT_TXT
<input type="checkbox"/>	MHT_NO
<input checked="" type="checkbox"/>	thrted_amph
<input checked="" type="checkbox"/>	geometry
<input type="checkbox"/>	geometry_vertex_count
<input type="checkbox"/>	ECO_ID
<input checked="" type="checkbox"/>	ECOREGION
<input checked="" type="checkbox"/>	MHT_TXT

Click **Merge** and at the next dialog box then click **View table**.

Now we can start mapping. Click on the **Map of geometry** tab. If you get a blank gray screen, click and drag it down until the map appears. Initially, you'll see a series of points, but zoom in a little and the boundaries will appear:

Merge of threatened amphibians and Freshwater Ecoregions Table for Merges

[Click File](#) | [About for Metadata](#)



Click the **Change info window ...** button from the panel at the left. This is where we will define what appears when the map is clicked. Here's what it looks like without editing:



In the **Automatic** tab, uncheck **eco_id**, as we don't want this field to appear. Then select the **Custom** tab and edit the html code. For example, here we've changed the order of the entries, tidied up the field names, and added some line breaks using html **
** tags:

Change info window layout ×

[Automatic](#) **Custom**

Write the HTML for your info window with column placeholders like {column name}. [Learn more](#)

eco_id thrted_amph geometry ECOREGION MHT_TXT	<pre><div class='googft-info-window' style='font-family: sans-serif'> Ecoregion: {ECOREGION}

 Type: {MHT_TXT}

 Globally threatened amphibian species: {thrted_amph}
 </div></pre>
---	---

Hit the **Save** button.

Now we'll color the regions according to the number of threatened species. Click the **Change feature styles ...** button, select **Polygons>Fill color**, and select the **Buckets** tab.

In this tab, **Divide into 6 buckets** and select **thrtd_amph** as the **Column** to map. It's worth experimenting with the number of buckets and the splits between them to give the best display for your data. In this case we'll follow TNC's example, and edit the dialog box as follows:

Change map styles ×

Points
Marker icon

Polygons
Fill color
Border color
Border width

Lines
Line color
Line width

Polygon background colors
[Fixed](#) [Column](#) **Buckets** [Gradient](#)

Divide into buckets

Column

<input type="button" value="+"/> <input type="button" value="-"/>	<input type="text" value="0.0"/>	up to 1.0	<input type="text" value="Red"/>
<input type="button" value="+"/> <input type="button" value="-"/>	<input type="text" value="1.0"/>	up to 3.0	<input type="text" value="Orange"/>
<input type="button" value="+"/> <input type="button" value="-"/>	<input type="text" value="3.0"/>	up to 8.0	<input type="text" value="Green"/>
<input type="button" value="+"/> <input type="button" value="-"/>	<input type="text" value="8.0"/>	up to 16.0	<input type="text" value="Cyan"/>
<input type="button" value="+"/> <input type="button" value="-"/>	<input type="text" value="16.0"/>	up to 31.0	<input type="text" value="Blue"/>
<input type="button" value="+"/> <input type="button" value="-"/>	<input type="text" value="31.0"/>	up to 95.0	<input type="text" value="Purple"/>
	<input type="text" value="95.0"/>		

Then we can select a color scheme. In this case, we'll select a neutral gray for the first bucket, because zero can also mean "insufficient data," then use one of Google's suggested color schemes for the other buckets. Select **75%** for opacity so the colors stand out nicely from the Google map.

Change map styles ×

Points
Marker icon

Polygons
Fill color
Border color
Border width

Lines
Line color
Line width

Polygon background colors

[Fixed](#) [Column](#) **Buckets** [Gradient](#)

Divide into Custom ▾ buckets

Column thrd_amph ▾

<input style="border: none; background: none; padding: 2px 5px;" type="button" value="+"/>	<input style="width: 60px;" type="text" value="0.0"/>	up to 1.0	<input style="width: 40px; height: 20px;" type="color"/>
<input style="border: none; background: none; padding: 2px 5px;" type="button" value="+"/>	<input style="width: 60px;" type="text" value="1.0"/>	up to 3.0	<input style="width: 40px; height: 20px;" type="color"/>
<input style="border: none; background: none; padding: 2px 5px;" type="button" value="+"/>	<input style="width: 60px;" type="text" value="3.0"/>	up to 8.0	<input style="width: 40px; height: 20px;" type="color"/>
<input style="border: none; background: none; padding: 2px 5px;" type="button" value="+"/>	<input style="width: 60px;" type="text" value="8.0"/>	up to 16.0	<input style="width: 40px; height: 20px;" type="color"/>
<input style="border: none; background: none; padding: 2px 5px;" type="button" value="+"/>	<input style="width: 60px;" type="text" value="16.0"/>	up to 31.0	<input style="width: 40px; height: 20px;" type="color"/>
<input style="border: none; background: none; padding: 2px 5px;" type="button" value="+"/>	<input style="width: 60px;" type="text" value="31.0"/>	up to 95.0	<input style="width: 40px; height: 20px;" type="color"/>
	<input style="width: 60px;" type="text" value="95.0"/>		

#76a5af

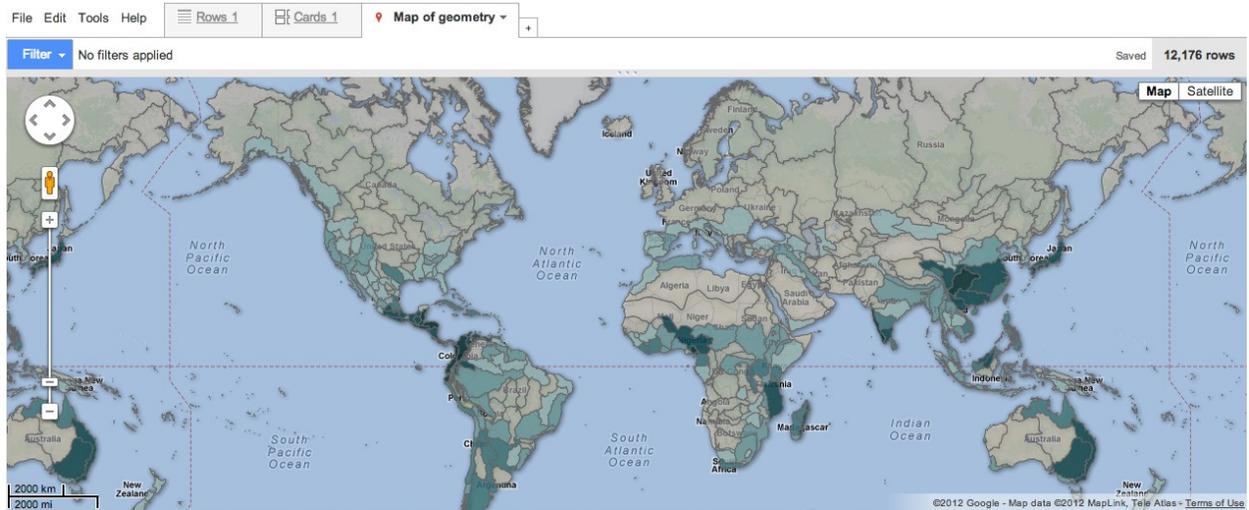
%

Hit the **Save** button, and here is the thematic map:

Merge of threatened amphibians and Freshwater Ecoregions Table for Merges

[Click File | About for Metadata.](#)

[Share](#)



Before we can embed the map on a website, we need to make it visible to the wider world by clicking the **Share** button at top right. At the dialog box click on the **Change** link, select **Public on the web** and click **Save** and then **Done**.

Next select **File>About this table** and cut and paste the table's **Id** into a word processing document or text file – we'll consider the significance of this later.

Make the map of points showing Ramsar Convention sites

The data is in the file **ramsar amphibian sites.csv**. (It was downloaded from the [Ramsar Sites Database](#).)

Upload the file to Fusion Tables as before, filling the first dialog box as follows (setting **Character encoding** to **auto-detect** should ensure that accents and other unusual characters will appear correctly):

✕

Import new table

 From this computer

 Google Spreadsheets

 Create empty table

ramsar amphi...n sites.csv

Separator character Comma Tab Colon Other

Character encoding

You can upload spreadsheets, delimited text files (.csv, .tsv, or .txt), and Keyhole Markup Language files (.kml) [Learn more](#)

Or search public data tables

New to Fusion Tables?

Take a peek! [Play with a data set](#) or [try a tutorial](#).

The uploaded table should look like this:

ramsar amphibian sites

File Edit Tools Help Rows 1 Cards 1 Map of Latitude +

Filter No filters applied

1-100 of 315

Site name	Designation date	Latitude	Longitude	Total...
Réserve Intégrale du Lac Tonga	11/4/1983	36.88333333	8.516666667	2700
Marais de la Macta	2/2/2001	35.68333333	-0.166666667	44500
Oasis de Tamantit et Sid Ahmed Timmi	2/2/2001	27.75	0.25	95700
Petit Loango	30-12-1986	-2.3	9.616666667	480000
Setté Cama	30-12-1986	-2.716666667	10.08333333	220000
Ain Elshakika	5/4/2000	32.76666667	21.35	33
Ain Elzarga	5/4/2000	32.78333333	22.35	50
Merja Zerga	20-06-1980	34.85	-6.266666667	7300
Baie de Khnifiss	20-06-1980	28.05	-12.25	20000
Parc national du W	30-04-1987	12.25	2.416666667	220000
Nylsvley Nature Reserve	7/7/1998	-24.65	28.7	3970
Parc national des Mangroves	18-01-1996	-5.75	12.75	66000

Unfortunately, the format in the **Designation date** column is not consistent, but we can fix that. Select **Edit>Change columns**, and change the format:

Change columns ✕

Table Columns

Site name	Text
Designation date	↑ ↓ ✕
Latitude	Location
Longitude	Number
Total site area (ha)	Number

Column Details

Column name:

Type:

Format:

The points will be mapped by their Latitude and Longitude, so we'll also check that Fusion Tables has recognized that location is specified by these columns. If not, change to the following:

✕

Change columns

Table Columns		Column Details
Site name	Text	Column name: <input type="text" value="Latitude"/>
Designation date	Date/Time	Type: <input type="text" value="Location"/>
Latitude	↑↓✕	Format: <input type="text" value="None"/>
Longitude	Number	<input checked="" type="checkbox"/> Two column location: Latitude: <input type="text" value="Latitude"/>
Total site area (ha)	Number	Longitude: <input type="text" value="Longitude"/>

Finally, change the number format for the site area so that thousands are separated by a comma, which will make large numbers easier to read:

Change columns ×

Table Columns		Column Details
Site name	Text	Column name: <input type="text" value="Total site area (ha)"/>
Designation date	Date/Time	Type: <input type="text" value="Number"/>
Latitude	Location	Format: <input type="text" value="1,234.56"/>
Longitude	Number	
Total site area (ha)	↑ ↓ ×	

Hit **Save**, and then **Map of latitude** from the top menu. The points should appear on the map.

Click **Change info window ...** Under the **Automatic** tab, uncheck Latitude and Longitude, then under the **Custom** tab we can again edit the html as desired:

Change info window layout ×

Automatic Custom

Write the HTML for your info window with column placeholders like {column name}. [Learn more](#)

Site name	<pre><div class='googft-info-window' style='font-family: sans-serif'> Site name: {Site name}

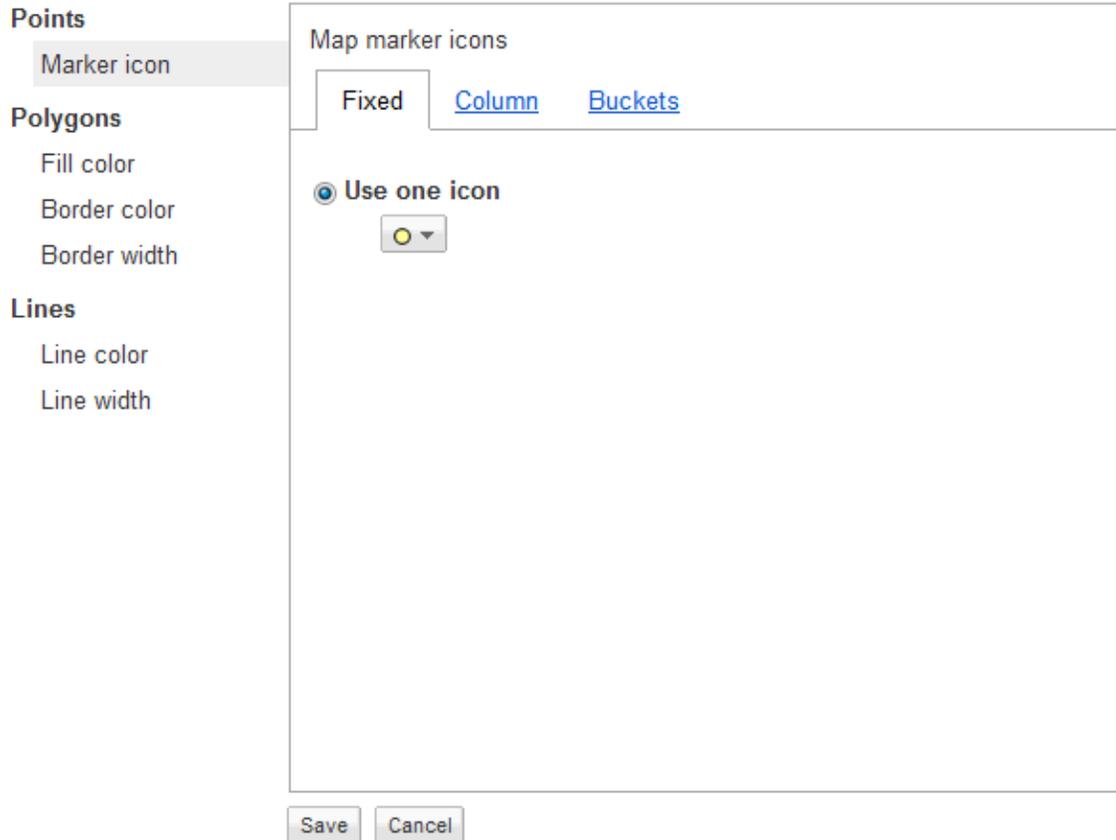
 Designation date: {Designation date}

 Total site area: {Total site area (ha)} heactares </div></pre>
Designation date	
Latitude	
Longitude	
Total site area (ha)	

Hit the **Save** button.

Click **Change feature styles ...**, and under **Points>Marker icon**, select the small yellow dot, for a good contrast with the previous map:

Change map styles



Hit the **Save** button.

As before, click **Share** button at top right. At the dialog box click on the **Change** link, select **Public on the web** and click **Save** and then **Done**.

Then select **File>About this table** and again cut and paste the table's Encrypted ID into your word processing document or text file.

Make a web page with both maps

To do this, we will use the [Fusion Tables Layer Wizard](#).

Go back to the finished map of the ecoregions, select **Tools>Publish** and copy the first of the two links that appears. Then paste that link into the **Embed link** box in the Wizard and click the **Put layer on Map** button. The map should appear in the **Preview**:

1. Add map layers

The table needs to be [accessible and exportable](#).

Embed link

Copy this from Tools > Publish.

[Or, do it the old-fashioned way](#)

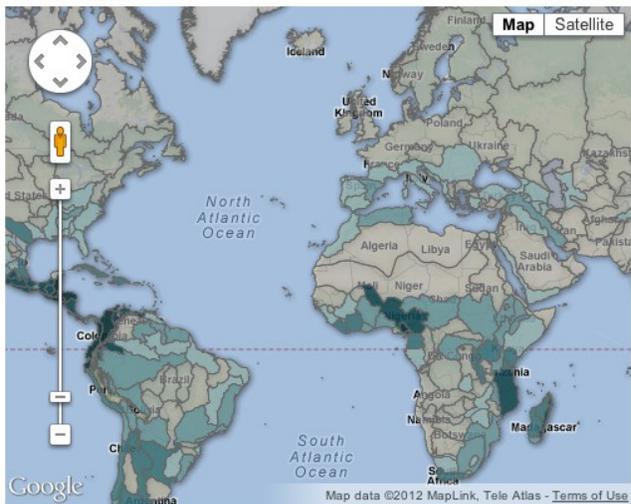
Add a search feature

2. Set map size and zoom

Zoom and pan the preview map as you'd like it to appear.

Dimensions: Width: px, Height: px

Preview



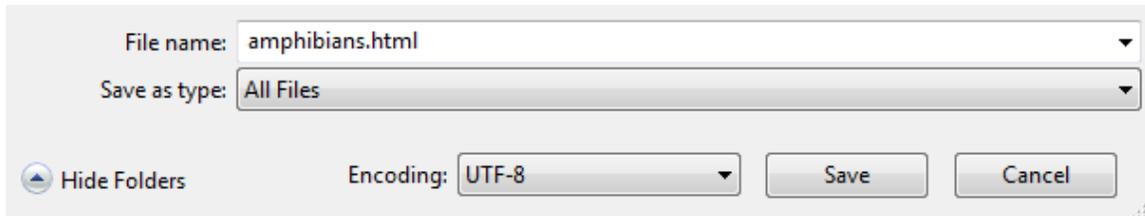
Then click the **Add Layer** button and repeat the process for the map of Ramsar Convention sites.

Under **Set map size and zoom**, change the **Dimensions** to fit your website, then click the **Update Map** button. Use the controls on the map to adjust the position and zoom of the map to the appearance you want:

Under **Style base map**, you can remove unwanted features from the Google Map.

When you are finished, you can copy the code in the box at the bottom of the wizard into the html for your webpage. To see how this works, click in the **Your HTML** box and **Ctrl-A**, **Ctrl-C** to select and copy the code. Open the **Notepad** text editor and **Ctrl-V** to paste in the code.

Save the file as type **All Files**, with the extension **.html** and **UTF-8** encoding.



Now open the file in a web browser to view the map.

Ready for more?

The Layer Builder can only add two layers, but you can make Fusion Table maps with up to five. To do this, you'll need to study the code and work out how to add more layers yourself – it's not so difficult.)

Tip! This is where the maps' Ids come in. Notice that they appear in the html code written by the Layer Wizard. If you are adding layers by writing the code yourself, you will need the tables' Ids.

You can also write code to include a legend. Study the html code for the [finished map](#) to see how this can be done.

More examples of Fusion Table maps:

For inspiration, see the gallery at:

<https://sites.google.com/site/fusiontablestalks/stories>