WorldMap Help

Center for Geographic Analysis, Harvard

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1.0 Overview

This documentation refers to WorldMap Version 1.5. The system continues to be under rapid development with improvements planned to remote and local Layer search, temporal place name (gazetteer) capabilities, integration with the Dataverse platform, integration with the BOP (Billion Object Platform) and to overall performance. Please send any comments or suggestions you might have to worldmap@harvard.edu.

There are a number of known issues with the new search which we are currently addressing:

- There are some layers which do not display.
- There are a number of layers which have incorrect bounding boxes resulting in a cluster at lat/long 0,0 and other anomalies.
- There are some layers which are not formatted correctly in the results list.
- Search results ranking must to be improved.
- The number of layers in the map tooltip readout does not include regional or global layers.

- Duplicate layers should be eliminated

WorldMap is currently running on an old version of GeoNode but is in the process of migrating to the latest GeoNode. During this process the WorldMap team will be contributing a number of new capabilities to GeoNode.

WorldMap has been tested more thoroughly on Firefox and Chrome than on Internet Explorer, though it should work reasonably well with IE. There are known problems with Internet Explorer 6.

There are several areas of functionality that require you leave the main Map page. When that happens, you will be asked whether you want to navigate away from the page. Click cancel, then save your Map if desired, then proceed again. We hope to get this better implemented before long.

When you are away from the Map page you have saved you can use the back button to get back to it.

Open System Access
The system is currently open to anyone in the world to use and is hosted by Harvard on Amazon's cloud infrastructure. We are allowing anyone to upload fairly large files to the system (up to 100 meg). The combination of open access and large file sizes means that the system could be slow at times.

Open Source
The platform is Open Source and can be deployed on Linux or Windows environments. WorldMap is currently being developed and deployed on Ubuntu Linux. Because it is Open Source, all code in the system can be examined and improved on by others. Source code for WorldMap is available at: https://github.com/cga-harvard/cga-worldmap.

Open Map Services Registry
When searching for Map Layers in WorldMap you will find both Layers which have been uploaded to the WorldMap system as well as Layers which reside on other systems. We are attempting to build a complete registry of public web map services, (both OGC and Esri REST) a task which will take time and the contributions of many, and like all registries of fast growing distributed data sources, (registries of web pages for example) it will never be 100% finished. Nevertheless even a public, mostly complete, and easy to use registry will be an improvement over the current state of affairs in which most map services are undiscoverable.

1.1 WorldMap Terms and Conditions

All users contributing content to WorldMap must agree to the WorldMap Terms and Conditions http://about.worldmap.harvard.edu/icb/icb.do?keyword=k28501&pageid=icb.page742379.

1.2 Getting Support

About WorldMap: http://about.worldmap.harvard.edu

Getting started video: available http://www.youtube.com/watch?v=Ajctx6h1t5s

This Document: http://worldmap.harvard.edu/site_media/docs/WorldMap_Help.pdf

User Group:
If you have a question that is not answered in this document, please check the Google Groups WorldMap users site http://groups.google.com/group/worldmap-users and see if it has been answered there. If not please put your question to the WorldMap Users group.

Contact:
You can contact us at: worldmap@harvard.edu.

1.3 Terminology

Layers

In WorldMap you can upload map data (currently Shapefiles or GeoTIFFs) to the system. Each data file you upload is called a "Layer" in WorldMap. You can control the way in which other people access to your Layers by setting permissions for your Layers. When we refer to the WorldMap definition of Layers we capitalize it: *Layers.*

Maps

WorldMap allows you to organize your Layers and other people's Layers together into collections, which you can configure and save. We call these collections of Layers that you manage "Maps". You can control permissions at both the Layer and the Map level. When we refer to the WorldMap definition of maps we capitalize it: *Maps.*

2.0 Viewing a Map

WorldMap supports two basic uses of the system: 1) viewing (and if you are allowed, editing of Maps others have created, and 2) creating your own Maps. We will start with viewing Maps others have created.

2.1 Find a Map to View

To start searching existing Maps, click "Viewing a Map" on the front page. Here you will see a list of Maps others have created, listed in the order in which they were created. Use the search box to filter Maps by their title and abstract. Use the map to the right to refine your search geographically.

Next to the name is the name of the person who created it so you can contact them. WorldMap allows you to find out who added a particular Layer or created a Map and view their profile.

For example, click on Lex's profile. Lex is building a Map called ChinaMap. Lex has added a custom banner, which you can do too; just email one to us and we will add it to your Map. Eventually you will be able to add it yourself.

2.2 Note on Permissions

Without being registered you can make changes to this Map but you can't save the changes without permission to edit the Map. You cannot be given permission to edit a Map if you are not registered.

Currently this Map (image below) is set to be viewable by anyone in the world. If you have permission to manage permissions for a Map, a "Share Map" link will be visible at the upper right corner of the Map view.

The "Share Map" link brings up Map permission controls

Permission Level	Can View a Map	Can Download a Layer	Can Edit a Style	Can Add/Remove a Layer	Can Change Permissions
None	No	No	No	No	No
View	Yes	Yes	No	No	No
Edit	Yes	Yes	Yes	Yes	No
Manage	Yes	Yes	Yes	Yes	Yes

Overview of Map level permissions

2.3 Choice of Basemaps

A number of preset basemap Layers are available, including Google Satellite, Hybrid, Roads, Physical, and Open Street Maps. Other commercial and noncommercial base maps will be added soon.

2.4 Ways to Zoom

There are several ways you can zoom (change scales) in WorldMap:

- Map navigation tools include the standard zoom bar and map drag.
- Roll your mouse wheel.
- Choose a scale from the scale bar readout.
- Zoom and pan simultaneously by defining a box on the map (shift-drag box) which upon release zooms you to the area you defined with the box.
- You can right-click on a Layer name and select “Zoom to Layer Extent” to zoom to that Layer.

We highly recommend the shift-drag box approach as it is the most powerful way to navigate once you get the hang of it.

2.5 Finding Places Using the Gazetteer Tool

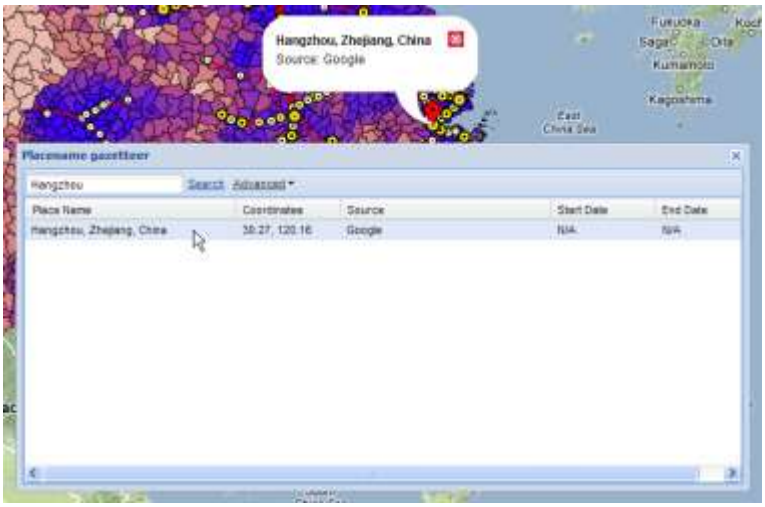
This tool allows one to find a location for many named places around the world. An optional temporal search parameter also allows one to find locations for historical place names.

Since no gazetteer (place name database) is complete, this tool is configurable to search multiple gazetteers. The default gazetteer is Google Places but GeoNames, Yahoo, and WorldMap’s own gazetteer (*which you can contribute to!*) can be designated to be searched simultaneously.

To use the gazetteer tool:

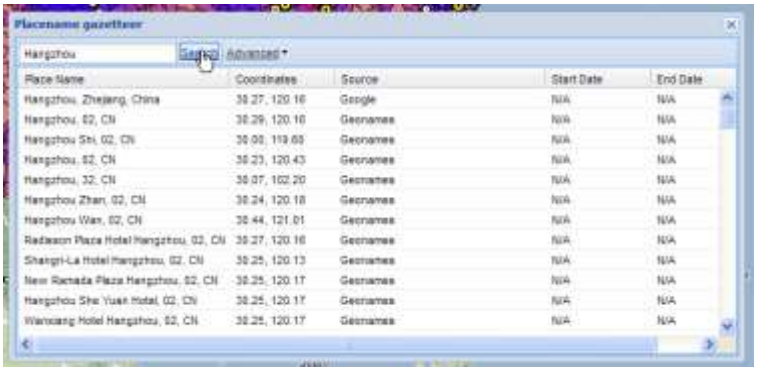
1) Click on the Gazetteer button above the map.

2) Type in the desired place name and click “Search”. Select a result to see its location on the map.



3) Use the “Advanced” pulldown to select additional geocoders or gazetteers to search from.

4) With an additional gazetteer (in this case Geonames), try your search again. Geonames often returns many features which contain the name but represent different places, some of which may be close to one to one another geographically.



Adding Places to the WorldMap Gazetteer

See Section 5 below for details on adding your places to the WorldMap gazetteer and to your own custom gazetteer.

Gazetteer API

See Section 5 below for details on using the WorldMap gazetteer API.

2.6 Layer on/off, Layer Order, Transparency

You can turn Layers on and off and drag them around to control which Layers are displayed on top in the map.

The drawing order of Layers across different folders can become incorrect based on the creation of new folders. When that happens, one can drag the folders up and down to "re-enforce" their relative position, and the drawing order will be corrected.

The topic category, which must be defined when data is added to the system, provides the default name for the folder it is placed in when a Layer is added to a Map. Folder and Layer names can be changed – see below.

2.7 Layer Renaming, Category renaming

You can rename Layers by right-clicking a Layer, selecting "Layer Properties", then "About". You can rename a category by right-clicking it and selecting "Rename Category".

2.8 Transparency Control

Right click on any Layer (command-click on a Mac), then click the "Properties" tab, and adjust the transparency slider bar.

2.9 Bookmark and Embed Your Map in Another Web Page

In addition to being able to save changes to your Map, it is also possible to save sub-views of your Map using the "Link" button. These views can take the form of a bookmark URL or the form of an embeddable code snippet. The code snippet can be pasted into any web page to provide a live view of your Map within a blog or any web page.

Create a view that you like and want to show to someone else. Then click the "Link" button at the upper left.

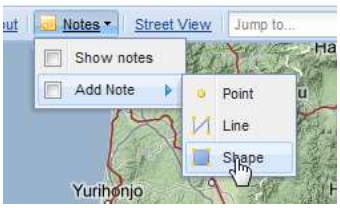
Now you have a bookmark URL for the view as well as an embed tag that you can paste into a blog or an HTML page.

Open a blog or page if you have one. If you don't have one and would like to try this, go to http://blogspot.com and create a blog.

You can change the size of the embedded Map by using the pulldown to change the height and width of the embedded Map (measured in pixels), or by editing the height and width parameters in the code snippet manually.

2.10 Annotate a Map

WorldMap supports the creation of annotation in the form of point, line, or polygon for "marking up" a Map with comments. Comments are public can be responded to by others. Note are turned off by default when a user opens a Map by toggling "Show notes".



2.11 Map Click for Details

You can click on a Map with multiple Layers turned on and return attributes, by in effect "drilling" down at the point you clicked the Map, through multiple Layers and displaying the attributes on the right.
NOTE: *Remote layers will not (currently) return attribute information using the Identify command.*

WorldMap will return attributes for as many (vector) Layers as you have turned on. The Layers will be listed at the upper right and the individual records will be listed in the panel below. You can select records grouped by Layer in the upper panel and see the record highlighted on the Map and attributes displayed in the panel below.

Each set of attributes will be presented with the Layer it is from. Click the value for the Layer and the feature will highlight on the Map.

Sometimes when using the Identify command the feature for the wrong Layer highlights when you click on it.

You need to have the Layer that you want to highlight on top in the Layer list on the left. You can change order by dragging Layers up or down in the left panel. Layers which are on top on the left will display on top on the Map. Put your points on top of your polygons if you want them to highlight. Then save your Map. Then the points will highlight when using the Identify command. If polys are on top in the list on the left they will highlight. Attribute data will be returned for all turned-on Layers and will be listed, but only the feature in the top Layer will be highlighted. Remember any Layer order change must be saved to take effect for the Identify command feature highlight to work.

For each attribute, the data value presented below the name of the Layer it is in, is the value which is set as the first to display. The setting attribute display order is handled by the Layer owner from the Layer page under "update description of this data". You can get to this location by right-clicking on the Layer, then -> About tab –> Share Layer link –> "Update Description of this Layer" -> go to bottom of form. We hope to make this easier to set in the future.

2.12 Searching within a Layer

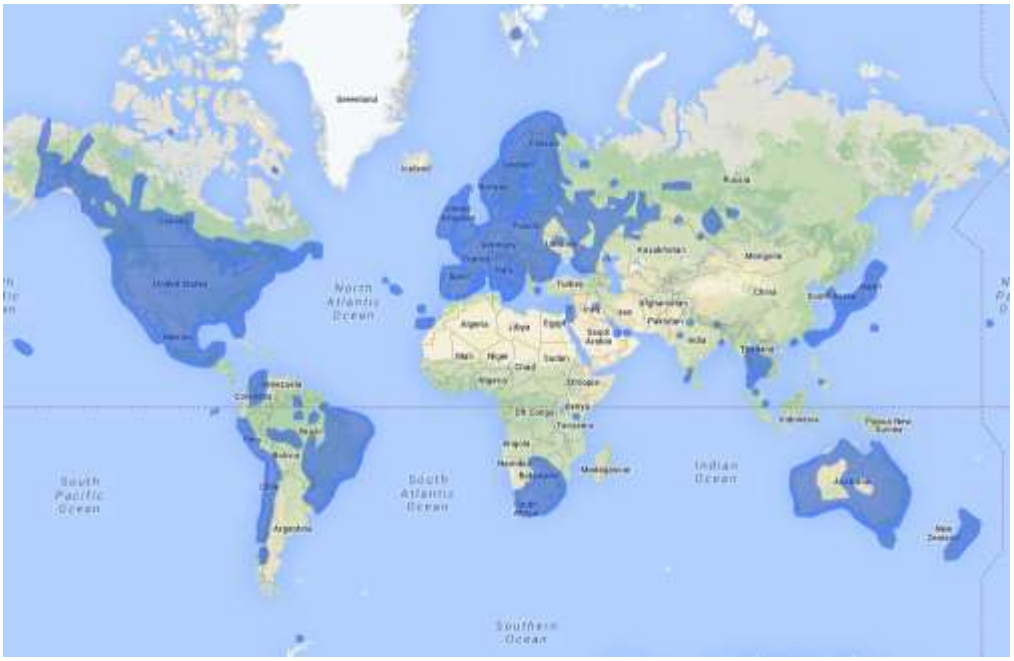
Any local vector Layer can be search and matching features highlighted. To do this, use the search box at the bottom left, under the Layer list. The search only works for text fields currently and wills search against all searchable text fields in the Layer. If multiple Layers are turned on, search will be done on the one that is displayed on top.

Defining which fields are searchable can be done by the Layer owner by right clicking on the Layer, then -> About tab –> Share Layer link –> "Update Description of this Layer" -> go to bottom of form. This are provides several ways to control how attributes are displayed and handled including whether attributes are searchable, field name aliasing (for Identify display), attribute display order, and whether attributes are displayed at all.

2.13 Street View

For many urban areas in the U.S. and increasingly around the world street level views are available from Google. For those areas along streets that Google has photography, street view allows the use to see what an actual ground level view looks like for a particular area in a Map Layer. This is information is particularly useful with data Layers like the US Census data which covers large areas where street view photography is available and for which it can be useful to see what the landscape looks like at particular map feature locations.

Here are the parts of the world for which street view is currently available:



Select the "Street View" tool and then click on a street. If Street View is available for that location it will be displayed.

2.14 Google Earth View within Browser

Select the Google Earth tool and the 2D map will be replaced with the Google Earth globe with your Layer draped on top of it. It may take a little while to load, especially the first time because you must load the Google Earth plugin. Each time you pan you must wait a couple seconds for your Layers to redraw as this implementation does not use pre-cached tiles yet. Transparency is not supported yet, so it will often be best to view your Layers one at a time. This is an abbreviated version of Google Earth without many of the features available in the full Google Earth application.

You can also view your Layer using the full Google Earth application assuming you have Google Earth installed on your machine. This approach involves downloading the Google Earth version of your Layer. To access downloads for a Layer, right click on the Layer name -> Layer Properties -> About -> Share Layer. In the upper right hand corner of the page you will see download options "KML" brings a KML Google Earth version of the file into your browser. "View in Google Earth" bring the Layer in as a map service.

2.15 Legend, Scale Bar

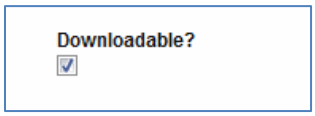
WorldMap generates legends automatically based on the SLD (Styled Layer Descriptor) symbolization. Legends for any vector Layers being displayed are in the Legend tab next to the Data tab at the upper left. The scale bar changes with zoom level and the exact scale ratio is displayed.

2.16 Downloads

Maps may be downloaded in a number of file formats including: ESRI Shapefile, Google Earth KML, Adobe PDF, Microsoft Excel, CSV (comma delimited text), GML (geographic markup language), PNG (image), JPEG (image).

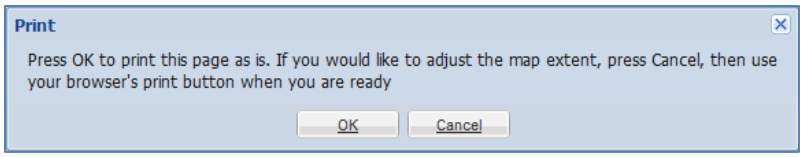
To access downloads for a Layer, right click on the Layer name -> Layer Properties -> About -> Share Layer. In the upper right hand corner of the page you will see download options.

If you own or have edit access to a Layer you can control whether downloads are enabled for a Layer within the metadata edit form. To get to this form from the Map, right click on the Layer and select “Share Layer”, then on the lower right portion of the Layer page, under Manage Layer, click on “Update the description of this data”. Toward the bottom of the metadata edit form you will see a check box which determines whether people will be able to download the Layer.



2.17 Printing

Click the “Print button. You will see this prompt:



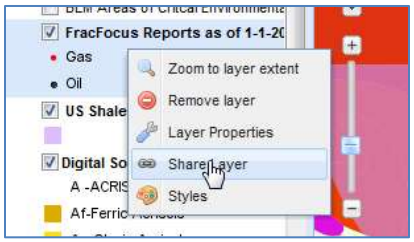
If you want to print a simple map with the current map extent, click “OK”.

If you want to adjust the map extent, click “Cancel”, adjust map extent, and the print using your browser’s print button.

2.18 Downloading

Map Layer data may be downloaded from the Layer page in a number of file formats including: Zipped ESRI Shapefile, Google Earth KML, Image service in Google Earth, Adobe PDF, Microsoft Excel, CSV (comma delimited text), GML (geographic markup language), PNG (image), JPEG (image).

To get to downloads, right click on Layer and select “Share Layer”.



See download links at upper right corner of Layer page:

2.19 Revision History

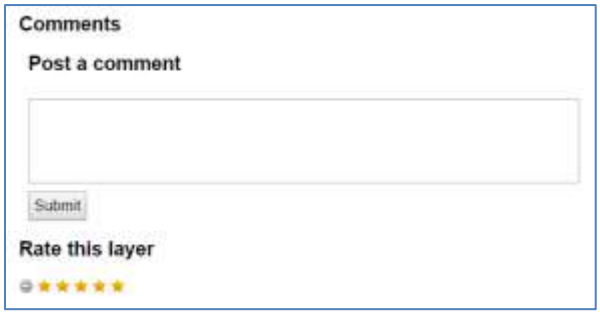
At the upper right corner of the map is a “Revisions” link which brings up a list of snapshots of your map created every time you save. Use this tool if you want to go back to an earlier version of your map. This link will only show up if you have Manager level permissions to the Map you are viewing.

2.20 Certifying a Map

At the upper right corner of any Map you will see a “Share Map” link. This is the control panel for the Map. Here even if one doesn’t own a Map, one may Certify it. A certification tool makes it possible for a user or an organization to give its blessing to layers owned and controlled by other users or organizations. To certify a Layer go to the Layer page and look to the lower right of the page:

2.21 Rate and Comment on a Map

At the upper right corner of any Map you will see a “Share Map” link. Here you can also rate a layer for quality and provide comments on it.



2.22 Map Statistics

At the upper right corner of any Map you will see a “Share Map” link. Here you can see how many times a Map has been viewed:

3.0 Create Your Own Map

3.1 Registering

All users contributing content to WorldMap must agree to the WorldMap Terms and Conditions http://about.worldmap.harvard.edu/terms-and-conditions.

To register click "Sign In" on the front page, then click "Register". Fill out your username, email address, password, and if you are Harvard check that. If so you will be sent to a page to verify your Harvard ID. (There is no difference in functionality between Harvard and non-Harvard. We are starting to allow access control by group and Harvard is the first group we have enabled.) You will then receive an email with a validation link that you must click to be registered. Now you have an account and a profile and you can log in on the front page.

NOTE: *Unregistered users may view all public content on the system and make temporary changes to Maps created by others. Registered users can create their own Maps, upload materials, change symbolization, and save changes. In addition registered users can control access to Layers they own and can access any private content that has been made accessible to them by others.*

3.2 Filling in Your Profile

Profiles allow people to find out about other users of the system. A user's profile name is associated with any Layer or map they create. Once you are logged in you can go into your profile and add information about yourself. As you add materials to WorldMap, those materials will be listed here.

NOTE: *The user profile contains at a minimum the user's name and email address. Other optional items include organization, position, phone, fax, address, city, state, zip, country.*

3.3 Create a Map

Click "Create a Map" link at the top of the WorldMap home page at http://worldmap.harvard.edu. A blank map template displaying the Google Terrain base map appears. Zoom to some part of the world and start to build your map. Try Zooming using the shift-drag approach.

3.4 Saving your Map

Save the map. Click "Save" and here we have several items we can define as we save the map.

- **Name -** This is the name as it will show up in the map search tool. The name is also displayed on the header at the top of the page.
- **URL** – You decide what is displayed at the end of the URL. Example: http://worldmap.harvard.edu/alpha/maps/mytest
- **Abstract** – A short description of the Map. This and the title are used by map search.
- **Keywords** – Words that are used to filter feeds Picasa and HGL. Separate keywords with a space. A space acts as an "or" operator to make your filter more general.
- **Description (About page)** – Formatted text which appears in an introduction box when the site is first opened by a user. This content also appears when you click on the "About" link at the upper

left. Within the text editing area it is possible to insert photos of videos by clicking the "Upload Images" button. By clicking within the text editing box and then clicking on the HTML button, it is possible to insert HTML such as embed snippets to videos here.

- **Banner** – Currently it is not possible to add a banner to your Map yourself but you can send us one and if time allows we will add it. Banners should be 50 pixels high and if the width is less than ~2000 pixels then it should have a solid background color or fade to a solid background color on the right side, so it can be blended in with the page header area if/when the browser window is wider than the banner.

3.5 Permissions, Map Name, Profile

Once you have created and saved a map, you can control who else in the world can see it. Click on "Share Map" link at the upper right and you can make your map private or share with just a couple people or open it to the world. If you want, you can choose to only allow certain people to make changes to your map.

Permission Level	Can View a Map	Can Download a Layer	Can Edit a Style	Can Add/Remove a Layer	Can Change Permissions
None	No	No	No	No	No
View	Yes	Yes	No	No	No
Edit	Yes	Yes	Yes	Yes	No
Manage	Yes	Yes	Yes	Yes	Yes

Overview of Map level permissions

NOTE: *You can also control permissions on Layers in your Map. It is possible to create a map which is public and includes some public and some private Layers.*

Once you have created a Map or loaded new Layer data to WorldMap, a link to that material shows up in your profile where others can see what you have created. If a map or Layer is not public for viewing, the name of it will still show up here.

4.0 Adding Layers to your Map

There a several ways to add Layers to your map. Once you have created a map (or while you are within someone else's map, though you won't be able to save your changes) click on "Add Layers" link at the upper left. You will see 5 tabs:

1. **Search** – this lets you search for data which others have uploaded to the system as well as many Layers which reside on systems around the world, outside WorldMap.
2. **Upload Layer** – this lets you upload your own Shape or GeoTIFF file from your own hard drive.
3. **Create Layer** – this lets you define a point, line, or polygon Layer and start creating it and editing it directly in the browser.
4. **Rectify Layer** – this points you to a sister WorldMap system called WorldMap WARP (which is based on the NYPL Map Warper developed by Entropy Free) where you can upload scanned maps and georeference them directly online, then bring them into WorldMap.
5. **Contribute Map Service URL** – Use this form https://worldmap.harvard.edu/maps/add_endpoint to submit services to CGA for harvesting. Currently URLs submitted will be loaded by hand for quality assurance. It is hoped that this process can eventually be automated.

   NOTE: *Please provide as much information as you have about the services you submit, the kind of maps they contain, the organization providing it. Also please provide your best estimate for the dates for layers in that service in terms of the year or year range of depiction.*

4.1 Search

This new search interface allows one to search for Layers in WorldMap as well as Layers on (potentially) any other public map server in the world. The database of Layers behind the scenes is called the Registry and the system which maintains the Registry and makes the contents available to WorldMap and other system is called HHypermap.

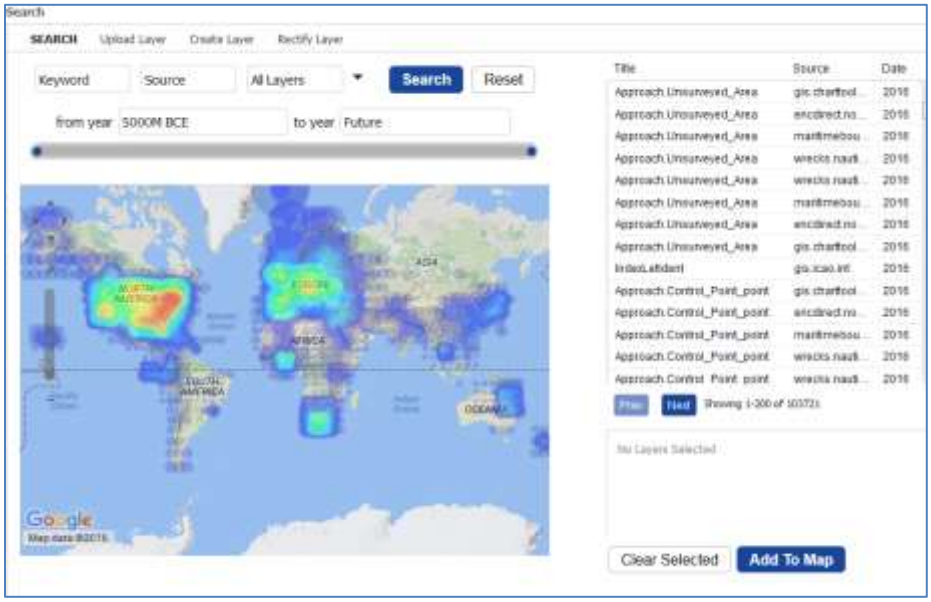
There are two main types of map Layers available for discovery in WorldMap: local Worldmap Layers and remote Layers which are hosted by other servers around the world. Local Layers are geographic datasets that have been uploaded to the WorldMap system. The actual data is stored on the WorldMap server. Because these Layers are local, they have more capabilities than remote Layers do. It is possible for example to change the symbology of local Layers, edit the data and metadata for them, and download them in a variety of formats. Remote Layers on the other hand are not (currently) editable, and symbology cannot be changed. Remote Layers can however be overlayed with other Layers, their transparency controlled, and they can be saved in maps and shared.

The Layer page for remote Layer is now not the same as the Layer page for WorldMap Layers. Currently remote Layers display the page from HHypermap which summarizes what is known about the Layer. The page for WorldMap Layers has not changed.

To use the new search capabilities, from a Map, click the "Add Layers" button.

If you don't yet have a Map and would like to create a new one, click "Create a Map" from the WorldMap front page at http://worldmap.harvard.edu.

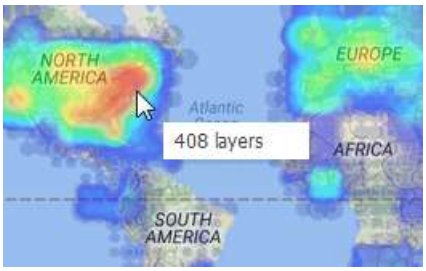
Once you click "Add Layers" in your Map you will see:



Note: *The heatmap represents the distribution of the all local and remote Layers currently in the system. The number is expected to grow over time as more map servers are added, but could shrink as quality control*

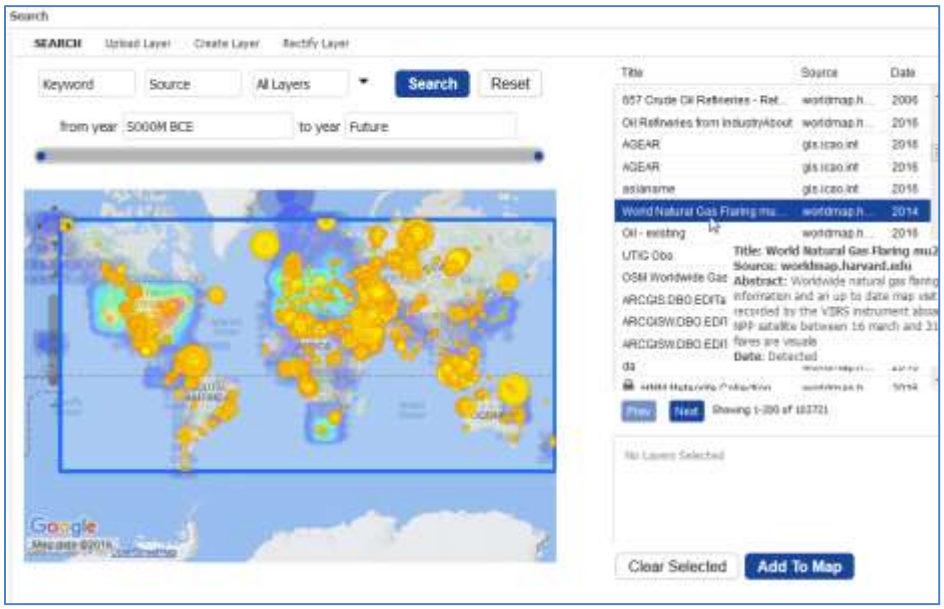
procedures become more refined. The heatmap displays the relative distribution of Layers for any query. Warmer colors mean more Layers with red the highest, and cooler colors means fewer Layers with blue the lowest. This is to alert the user to the regions where data is concentrated given a particular query.

Mouse over the map and you will see the number of Layers for any location:



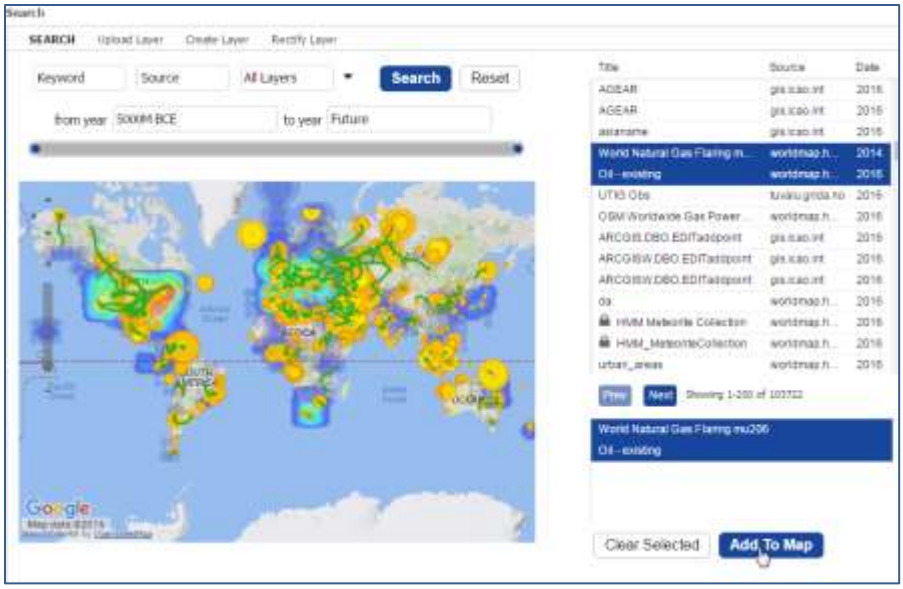
Note: *There is a bug in the count readout which we are addressing. The count does not currently include Layers which cover very large areas relative to the current view. For example in the current view, Layers which cover the entire globe are not included in the count.*

When the user mouse's over items in the results list on the right, she will see map previews and metadata for each Layer:

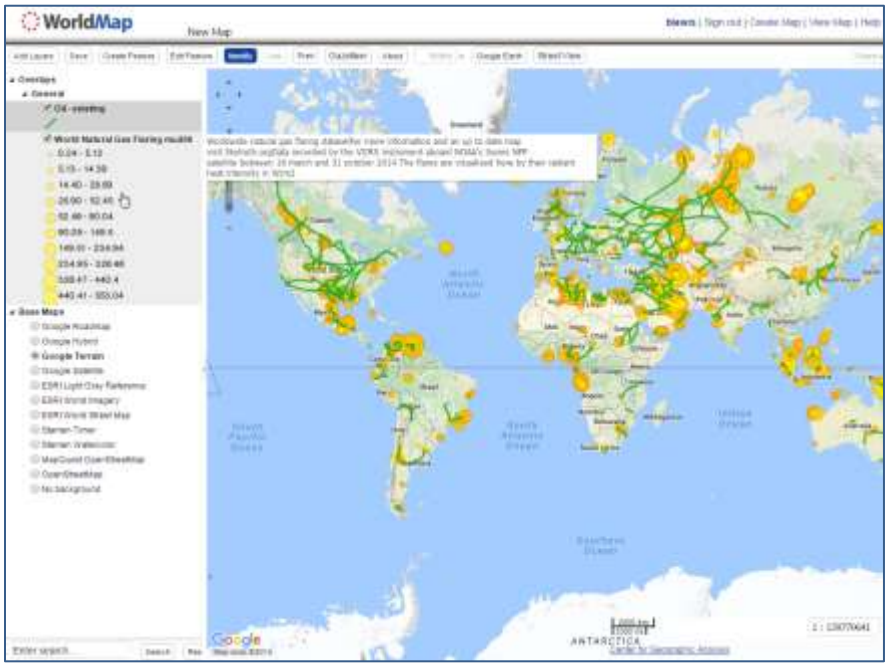


Note: *All Layers should return a Layer preview but you may find some which do not. Please let us know about any problems you see: worldmap@harvard.edu.*

Click on a Layer in the list to add it to the cart. From there it can be added to the Map. Click again on the Layer name to remove it from the cart:

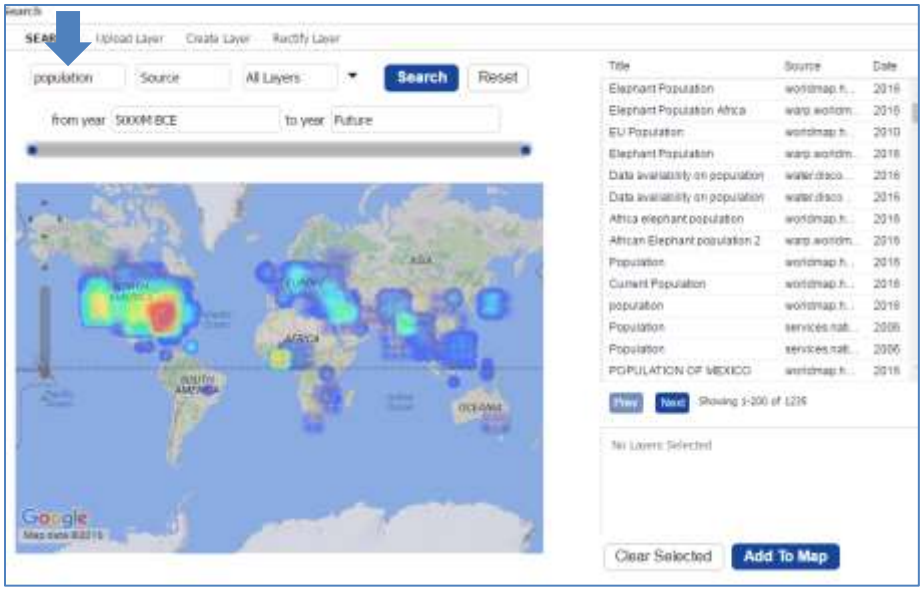


Once the Layers you are interested in are in the cart, click “Add to Map” to load the Layers to your Map:

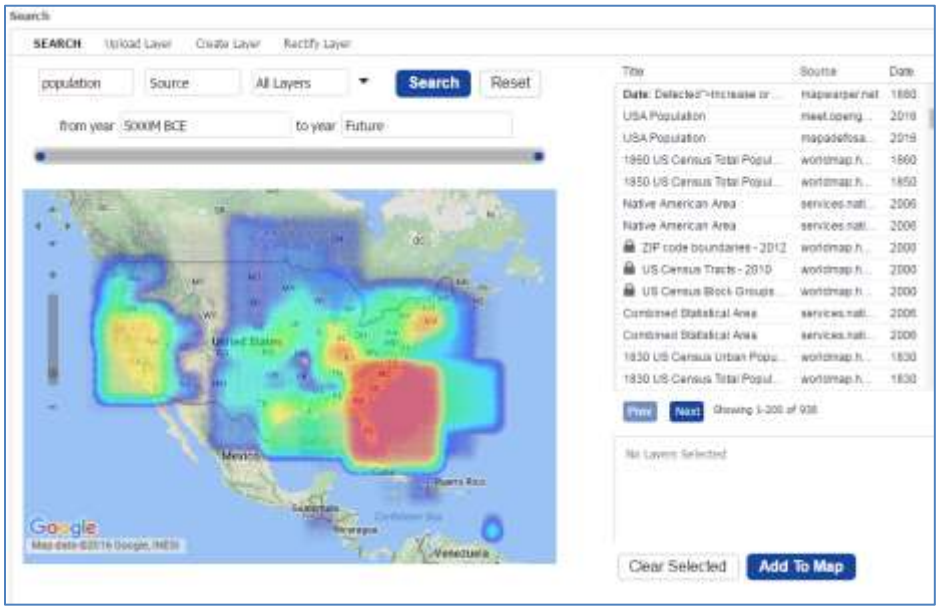


To get back to search click “Add Layers” again.

One can filter in several ways. Here is a filter by “population” which returns 1,235 results.

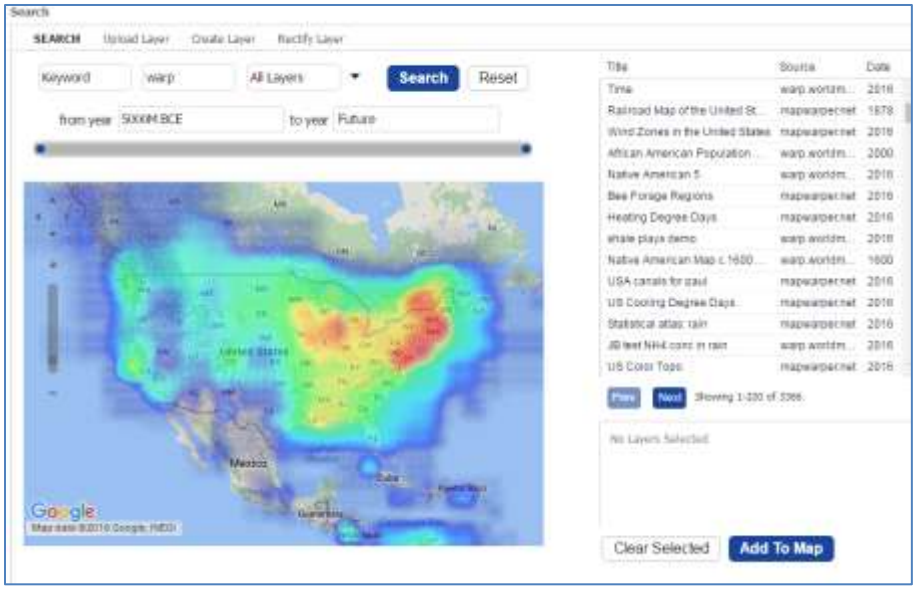


One can filter on geographic area by extent by zooming in on the map:



Here zooming in to the U.S. reduces the number of Layers selected to 938.

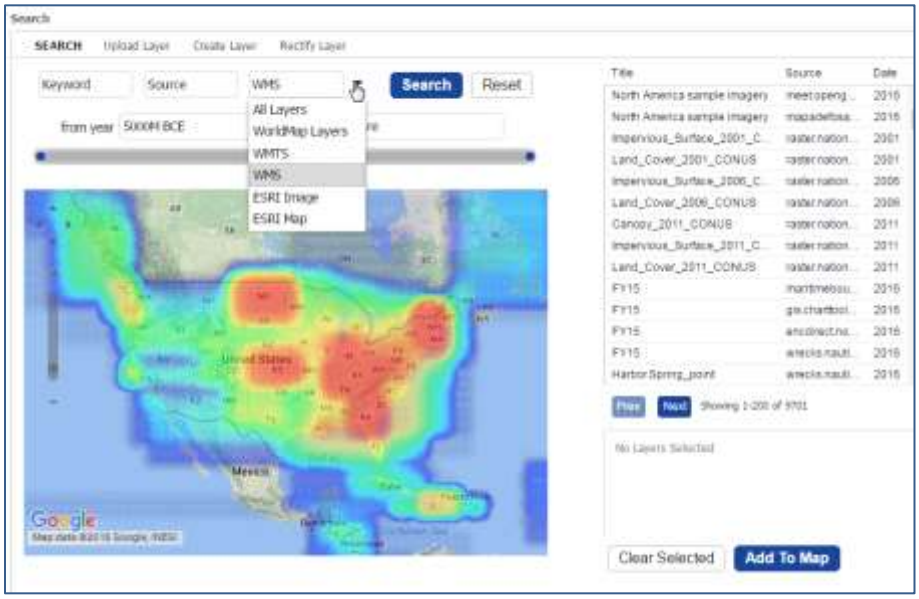
One can also filter by Source which queries against the domain name of the remote map server. For example, using “warp” in Source returns historic map Layers in the “mapwarper.net” and “warp.worldmap.harvard.edu” systems. Searching Source by “NYPL” will return historic Layers from the New York Public Library historic map georeferencing system at “maps.nypl.org”.



One can also search by service type (use the “All Layers” pulldown menu). “WorldMap Layers” are local Layers. “WMS” is a service format defined by the Open Geospatial Consortium or OGC. “ESRI Image” and “ESRI Map” are service formats defined by the Esri mapping software company.

You don’t need to know about map service types to use them effectively so the best setting will most often be “All Layers”.

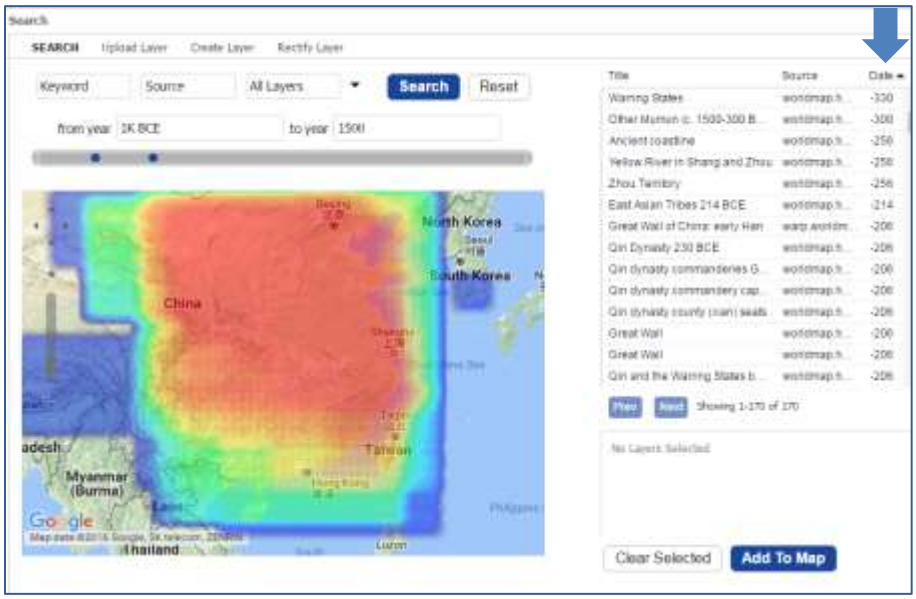
If you need to be able to download data however, choose “WorldMap Layers”, most of which are downloadable. All Layers not designated WorldMap Layers are remote layers and currently cannot be edited, changed symbolically, or downloaded.



One may also filter by depict date. Here is an example, focused on East Asia, filtered by date range 1000BCE to 1500CE. Hovering over a Layer from the Song dynasty, it is displayed in the map:

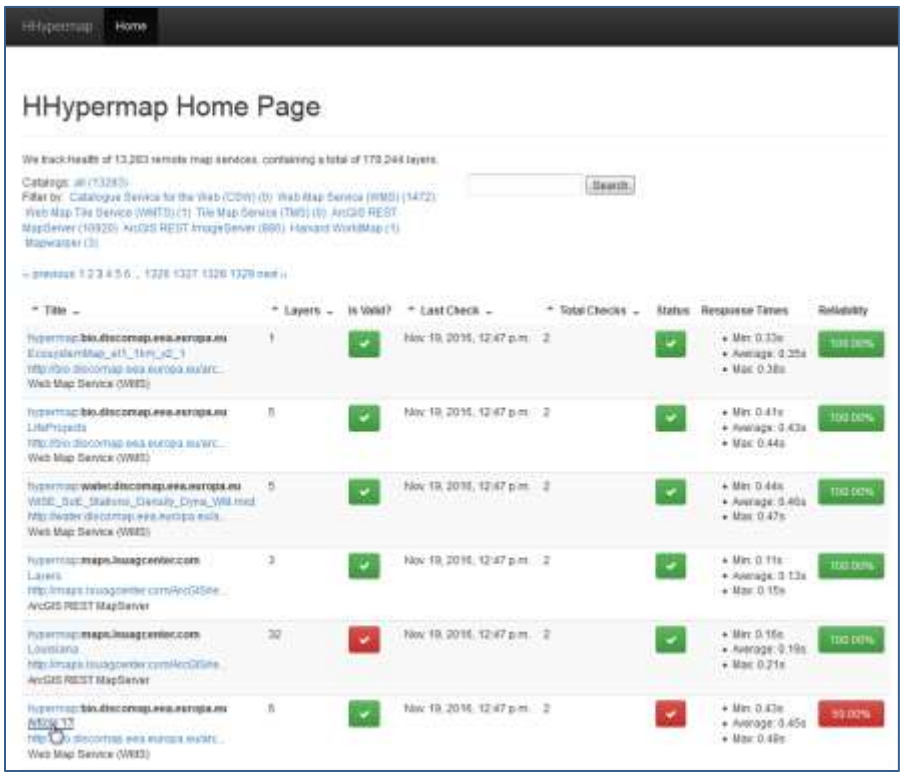
Note: *Notice in the metadata for the Layer displayed it says "Date: From Metadata". This means the depict date for the Layer was input explicitly by a person. Some Layers have instead the designation "Date: Detected". This means the date was automatically recognized (using Time Miner software developed by Harvard CGA) within the Layer name or abstract. Most auto-detected dates are correct, but some are not. Please let us know of errors you find worldmap@harvard.edu.*

One may sort results by any of the columns in the results list. Click on the column heading to sort. Here is the current view sorted by time:

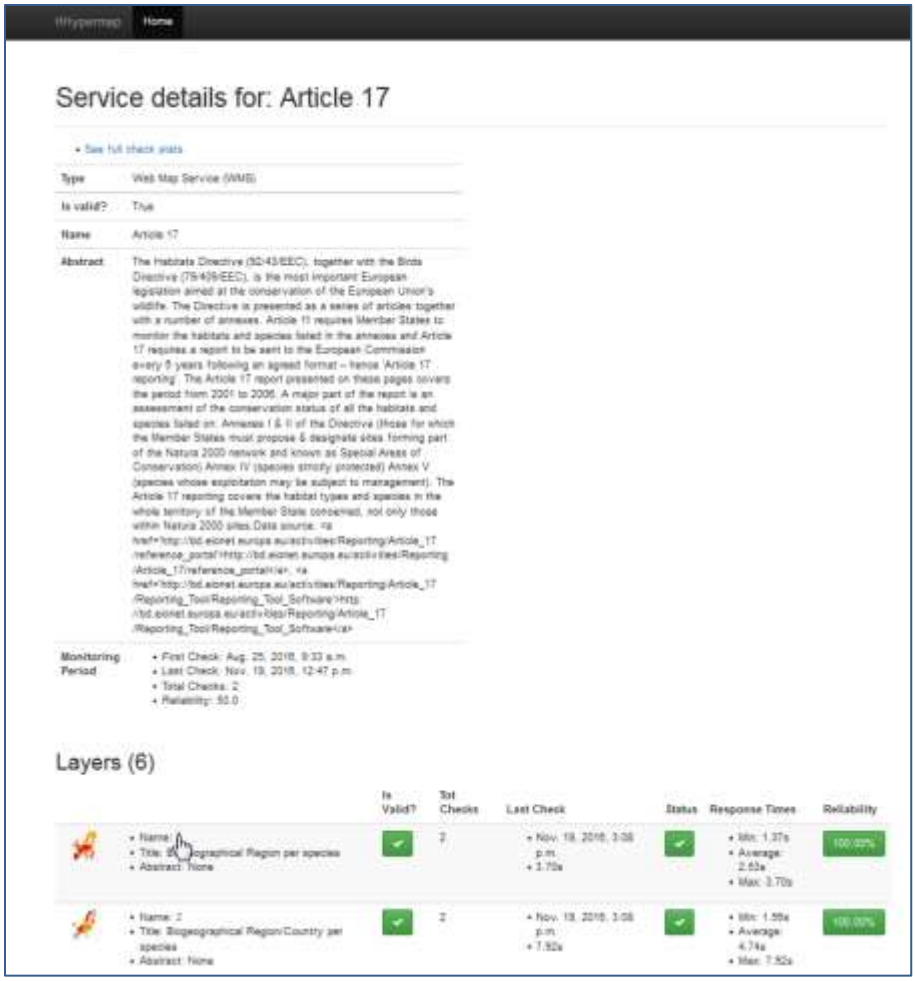


Behind the scenes the HHypermap backend http://hh.worldmap.harvard.edu maintains information on remote services so it can provide access to them via WorldMap and other systems. (HHypermap is a software platform developed by Harvard CGA with a grant from NEH to manage remote map services and

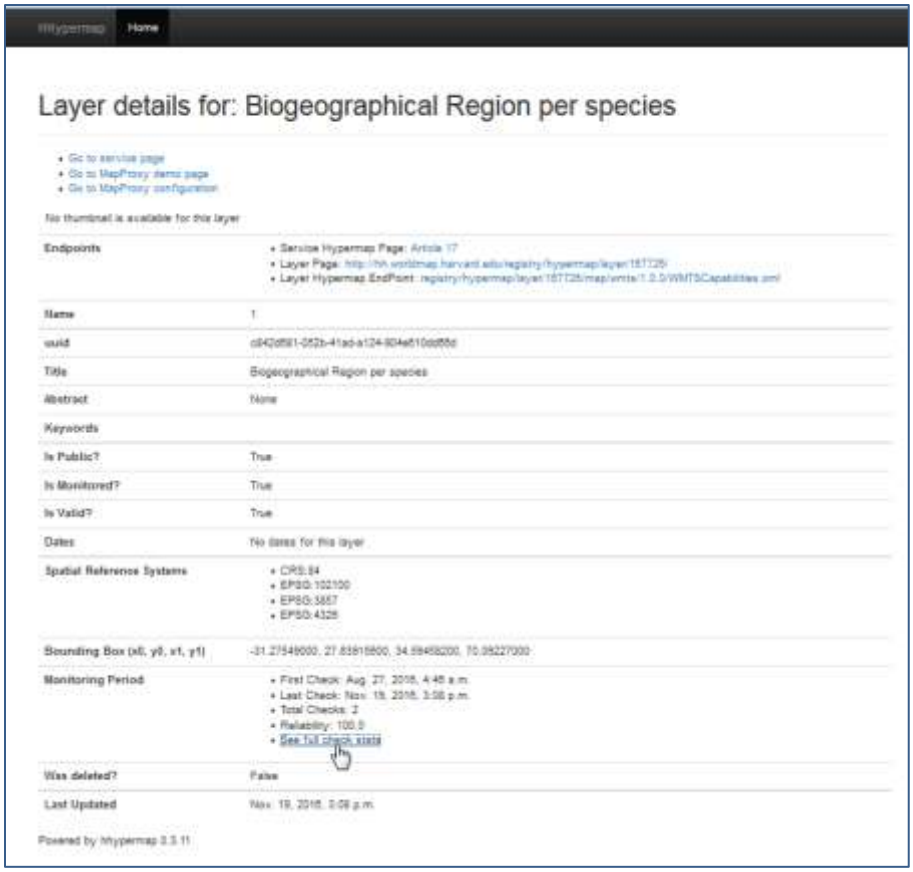
make them useful within mapping systems.) In this view we can see HHypermap is tracking more than 13 thousand remote map services which contain more than 170 thousand map Layers. All of these Layers are not yet available within search, due mostly to display issues relating to the great variety of map server configurations. As software improves over time, we expect the rest of these servers and others to become available for discovery in HHypermap.



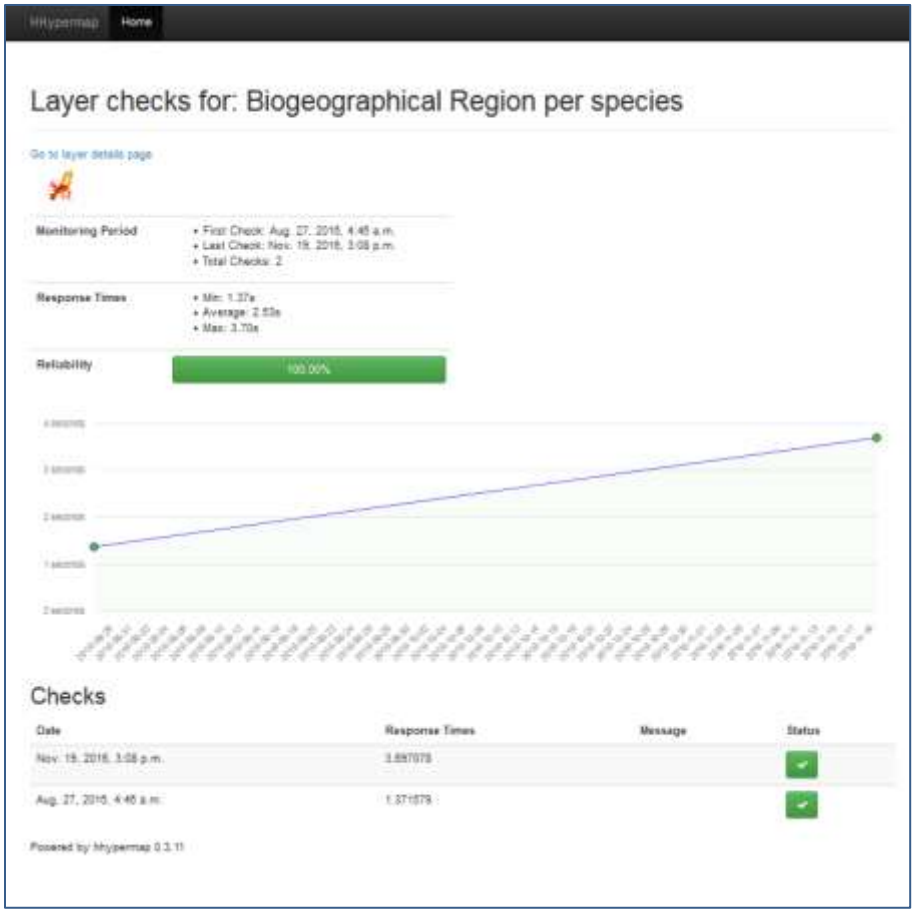
Clicking on a service, brings the user to the Layers within that service:



Clicking on a Layer brings one into the metadata for that Layer.



Clicking on “See full check stats” displays the results of any checks which have been made on this Layer. Uptime statistics are gathered for each Layer and service and these are being used to ensure that the Layers in the system are dependable. Once the system has been in production for some time these charts will become more useful.



4.2 Upload Layer

All users contributing content to WorldMap must agree to the WorldMap Terms and Conditions: http://about.worldmap.harvard.edu/terms-and-conditions.

To upload a shapefile to WorldMap, click “Add Layer” and select “Upload Layer”.

WARNING: Currently any uploaded Layer which can be viewed by the public is also technically downloadable even though it may appear not to be. *There do exist custom Layers in WorldMap which reside on a separate server and can be viewed but not downloaded, but the ability to make Layers viewable but truly not downloadable is not yet enabled in the WorldMap interface.*

Now choose the required parts of the shapefile starting with the “.shp” part and continuing with .dbf, .shx, and .prj parts. You can optionally include an SLD for styling. You can also optionally define the text encoding if you know what it is, though for this Layer the default is appropriate, Latin 1. For example, if you knew you had Japanese or Arabic characters in your file, you might choose UTF8 instead of Latin 1, or for Chinese you might choose GBK. UTF8 is a sunset of the Unicode standard compatible with ASCII and can handle almost all symbols in all languages.

Items with an asterix (*) are required.

***Title:** Give your Layer a title.

***Data:** Choose a Shapefile (.shp part) or zip compressed shapefile or GeoTIFF as your data to load. If you use a zip compressed shapefile, be sure the zip file contains the .shp, dbf, shx, and prj parts of the shapefile.

HINT: You will increase your chances of a successful upload by having your shapefile or GeoTIFF file be in the "plain vanilla" projection space, Geographic WGS 84, also known as EPSG:4326. To know whether your shapefile is in this space, the contents of your .prj file will look like this in a text editor:

GEOGCS["GCS_WGS_1984",DATUM["D_WGS_1984",SPHEROID["WGS_1984",6378137.0,298.257223563]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]]

You may not have a .prj file for your GeoTIFF as it is not needed since the projection information for a GeoTIFF is stored in the header of the GeoTIFF.

If your .prj file does not look like this, the upload may still work fine. If it doesn't, the most likely culprit is the projection space. The best way to fix that is to use an application like ArcGIS or QGIS and reproject your file to Geographic WGS 84. This can be done for shapefiles or GeoTIFF files. Check with us on how to do a reprojection if you need help.

SLD: Optionally provide an SLD. This is an XML document that you would have created using the ArcMap2SLD or QGIS tools (see Section 5 below).

***Abstract:** Provide a description of your data. More information is better. At the very least when you add real data, please include a brief description of the data, who created it, for what purpose, and when. Please also include source materials used to create the data Layer. This information is important both for you to remember what the data is about, and to allow someone else a chance to benefit from your work (assuming you want to make the data available for others to use at some point).

Permissions: Default permissions are set such that the world can view it but only you can change it. Add individual users to define who can edit (modify the style), or manage (delete Layer, change permission settings).

Permission Level	Can View a Layer	Can Download a Layer	Can Edit a Style	Can Add/Remove a Layer	Can Change Permissions
None	No	No	No	No	No
View	Yes	Yes	No	No	No
Edit	Yes	Yes	Yes	Yes	No
Manage	Yes	Yes	Yes	Yes	Yes

Overview of Layer permission settings

If you select a GeoTIFF file for the **Data** item above, the view will remain the same. If you choose a shapefile, (the part of the shapefile with the ".shp" ending), the view will change to handle the additional parts of the shapefile as shown below as well as an optional encoding selection:

***Data:** Choose the .shp portion of the shapefile
***DBF:** Choose the .dbf portion of the shapefile
***SHX:** Choose the .shx portion of the shapefile
***PRJ:** Choose the .prj portion of the shapefile
Encoding: Choose an optional encoding. The default is Latin1.

NOTE: *A number of character encodings are supported including UTF8/Unicode, GBK, and Latin1/ISO-8859-1 to Latin15/ISO-8859-15, and in addition various Windows encodings. Specific encodings can be set when a Layer is being uploaded. The default encoding is Latin1.*

You must read and agree to the Terms and Conditions.

Click "Upload" and once uploaded you will be presented with a metadata form (see below).

4.2.1.1 Metadata

NOTE: *Users uploading new Layers are prompted to fill in both optional and required descriptive information about the Layer. Required items include: Title, Abstract, Keyword, thematic category (ISO 19115 format). Eventually Author, Source, and Date will be included as options in the metadata editor.*

Once the file has been uploaded, the only additional required items are Keyword and Category, though there are useful metadata fields here which we strongly encourage you to make use of. Items with an asterix are required.

***Title** Provide a title for your dataset. We recommend using the following naming convention:

<geography - continent, country, state, or city>_<what it is>_<date data represents>_<optional version>_<optional tmp if it is for testing purposes and can be removed after a week>

Example:
africa_ethnographic_1959_2_tmp

Date This date is filled in automatically with the date of upload, but can be changed.

Date Type (creation/publication/revision) Choose type of date you want to describe. The default type is "creation".

Edition Use this field to describe the edition.

Abstract Give an overview of the dataset. What does the data represent? Who created it and when? What sources were used?

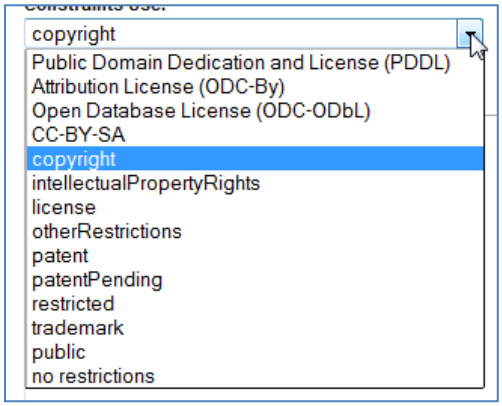
Purpose Describe briefly how the data can be used.

Maintenance Frequency How often is the data updated?

***Keywords** Add keywords that will be useful handles others can use to find the dataset. Separate keywords with a space.

Keywords Region (under construction) Select a major region of the world. Other regions in addition to countries will be added.

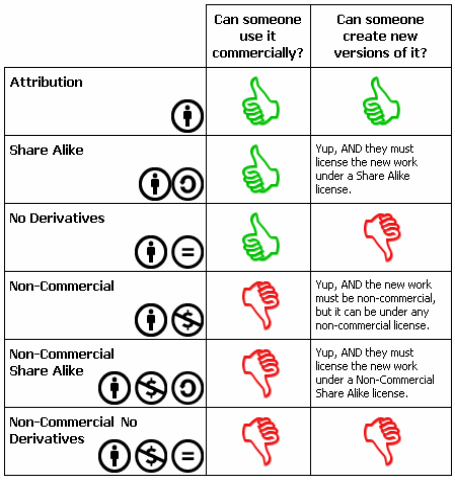
Constraints Use



How do you want to define the rules governing the use of this data? We encourage users to adopt an appropriate Creative Commons (http://creativecommons.org/) license to define the type of attribution the data requires. The license should specify whether the data can be used commercially and under what conditions modified versions can be redistributed.

For example if you would like to restrict use of your data to non-commercial uses and don't mind others using as long as they provide proper attribution and don't mind others modifying your work and

redistributing modifications as long as this license is attached, we would suggest a non-commercial share alike license such as this one: http://creativecommons.org/licenses/by-nc-sa/3.0/. Or feel free to create your own license. If you do, include the URL to the license here in the Constraints Use section.



List of common Creative Commons License schemes

Below are links to further information for each type of constraint listed:

- Public Domain Dedication and License
  http://opendatacommons.org/licenses/pddl/
- Attribution License (ODC-By)
  http://opendatacommons.org/licenses/by/
- Open Database License (ODC-ODbL)
  http://opendatacommons.org/licenses/odbl/
- CC-BY-SA
  http://creativecommons.org/licenses/by-sa/2.0/
- Copyright
  http://en.wikipedia.org/wiki/Copyright
- IntellectualPropertyRights
  http://en.wikipedia.org/wiki/Intellectual_property
- License
  http://en.wikipedia.org/wiki/License
- patent
  http://en.wikipedia.org/wiki/Patent
- patentPending
  http://en.wikipedia.org/wiki/Patent_pending
- trademark
  https://en.wikipedia.org/wiki/Trademark

Constraints Other Include any additional constraints.

Spatial Representation Type

- **grid** – raster dataset such as georeferenced satellite image or scanned georeferenced map in GeoTIFF format.
- **steroModel** – currently not supported unless stored in a GeoTIFF or Shapefile format
- **textTable** - currently not supported unless stored in a GeoTIFF or Shapefile format
- **tin** - currently not supported unless stored in a GeoTIFF or Shapefile format
- **vector** – point, line, or polygon dataset in ESRI Shapefile format.

Language Please choose the language closest to the language used in the attribute table if the dataset is a Shapefile and for the language used on the map if the dataset is a GeoTIFF.

Temporal Extent Start Date (Under construction) Use only a start date if a date range does not make sense for your data. This date should describe the "temporal footprint" of the data. What time period does it describe? This is generally not the date the data was published.

Temporal Extent End (Under construction) Use an end date if the data in your Layer is best presented by a date range.

Geographic Bounding Box This describes the theoretical box necessary to enclose the data geographically and is automatically calculated by the system. It can also be modified here. The projection system used to define the bounding box is also defined here.

Supplemental Information Additional information about your data.

Distribution URL This URL is calculated by the system. This URL displays this data Layer along with information about it and is a possible form of citation.

Distribution Description (Under construction)

Data Quality Statement Add any information you have describing data quality.

Point of Contact Person who should be contacted with questions about the data.

Metadata Author Name of the person who created the metadata.

***Category** These are ISO 19115 categories and help make it possible for queries from other system to return meaningful results.

Attributes

- ☑ **Include in Gazetteer** (See section 5 below for details on creating a custom gazetteer.)

For Shapefile datasets an attribute control table is automatically generated with the following columns. These controls let the user control how attributes are displayed when using the Identify tool and clicking on a feature to return attributes in the right-hand panel:

- **Attribute** Lists the fields in the database.
- **Display Title** Is used to control how the fields are displayed when a user clicks on the Layer on the map and returns attribute information in the panel to the right.
- **Display Order** This is the order in which the attribute information is listed when returned in the panel to the right after a click on a map. **NOTE**: The field which is displayed first is used in the summary table in the upper part of the panel to the right. It is best to designate a field to be first which provides meaningful information at the record level.
- **Visible?** This toggle determines whether a given field is displayed at all when one clicks on the map using the Identify tool.
- **Searchable?** This toggle determines whether the field will be searchable from the text search box to the lower left of the map.

4.2.1.2 Troubleshooting Shapefile Uploading

If the Layer does not upload there are several possible reasons:

1) The projection is not being read properly. If the Layer is not already in Geographic WGS 84 space, also known as EPSG 4326, project the shapefile to that space and try again.
2) The SLD file is not correct. Check and make sure that you have made the required changes to the file as defined above.
3) Check to see that the XML is valid: http://validator.w3.org/#validate_by_input
4) Check to see that the SLD file was created for this shapefile and not another shapefile. The fields described in the SLD should match the fields in the shapefile.

If all else fails, project your file to Geographic WGS 84 (we can help) and don't include any SLD.

4.2.2 Upload GeoTIFF

Raster files are images and can be satellite imagery or scanned maps which have been georeferenced. GeoTIFF files are rasters and have all the necessary information for display and georeferencing in one file.

Click "Add Layers" and "Upload Data". Now give it a title. Choose the elevation.tif file to upload. Provide abstract information and click "Upload". Fill in a keyword and category. Notice that there are no fields for raster Layers. This means there will not be information returned when the Layer is clicked on, unlike shapefiles which contain attributes.

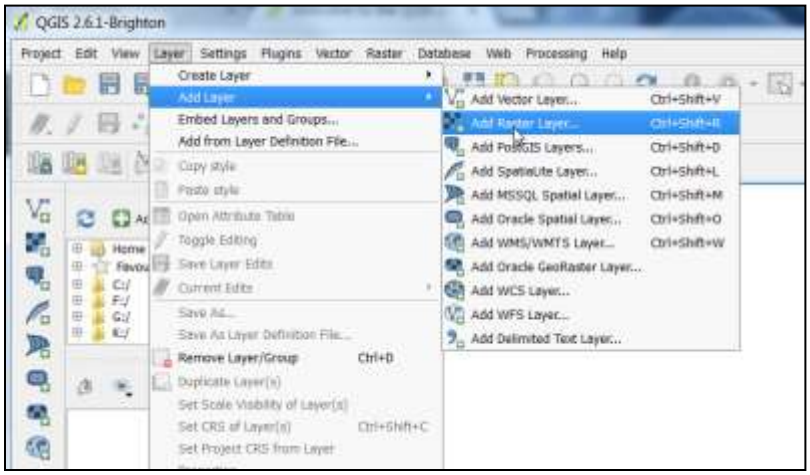
Raster (GeoTIFF) images do not have the same type of styling options as vector (shapefile) Layers do.

4.2.1 Uploading a TIFF Created with ArcGIS

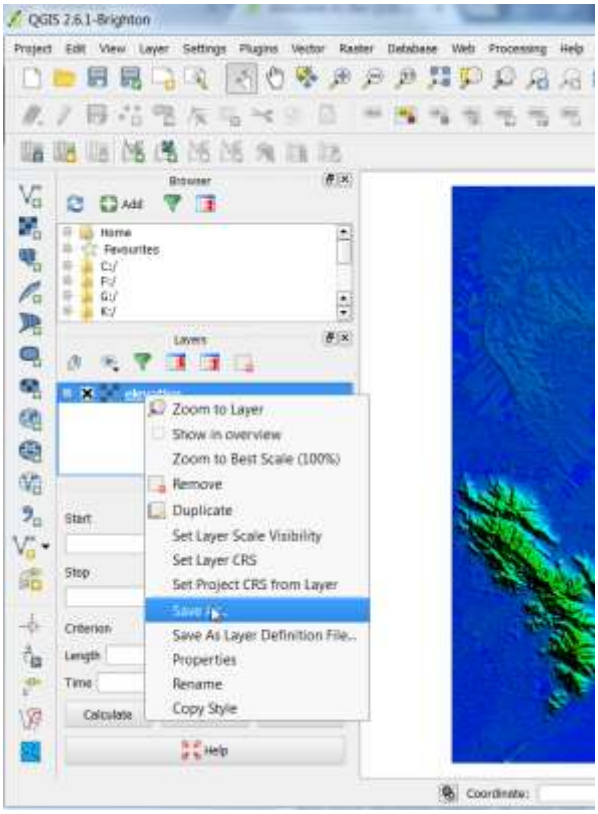
ArcGIS allows one to save out a TIFF file version of a raster dataset generated. This is not a GeoTIFF. Though not a GeoTIFF and not directly uploadable to WorldMap, it can be easily converted using open source QGIS package http://www.qgis.org/en/site/. QGIS is a full featured desktop GIS package that you may find useful for many other needs as well.

To convert your Esri generated TIFF to a GeoTIFF:

1) Open the QGIS application
2) Go to Layer -> Add Layer -> Add Raster Layer

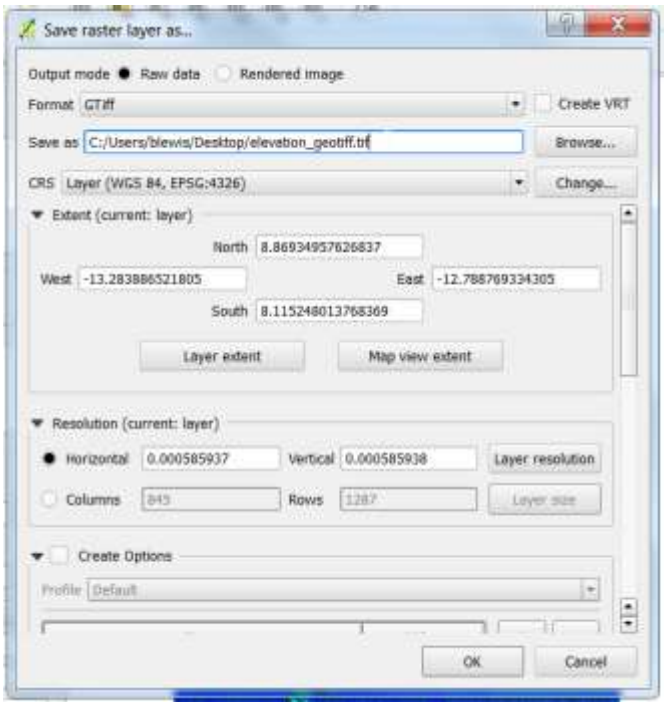


3) Right click on layer name -> Save As



The default format will be GeoTIFF (GTiff)

4) Provide a name and location for your new GeoTIFF file
5) Click OK



4.2.2 Permissions

Users can control whether others can see and/or modify the Layers they load to their Map. Layer permissions are added using email addresses, as with a Google Doc. Layer permissions can be set at the time of upload and can be modified as needed later. Currently the only group authentication control is for Harvard and uses Pin authentication via an Isites page.

WARNING: Currently any uploaded Layer which can be viewed by the public is also technically downloadable even though it may appear not to be. *There do exist custom Layers in WorldMap which reside on a separate server and can be viewed but not downloaded, but the ability to make Layers viewable but truly not downloadable is not yet enabled in the WorldMap interface.*

4.3 Edit Existing Layers

Users can edit any vector features that are within Layers they have edit rights for. To edit a given feature:

1) Highlight the Layer it is in by clicking on the Layer name in the list to the left of the map.
2) Select the "Edit Feature" button from above the map.
3) Click on the feature on the map you wish to edit.
4) A small pop-up displaying the attributes of the feature will appear. Click "Edit" on the pop-up and you will be able to edit attributes or the actual map geometry of the feature.
5) Click save when you are finished.

Editing a Layer can cause the Layer's map extent to change. It can take up to 10 minutes for a recently edited Layer's map extent to be updated.

4.4 Creating a Layer using desktop software

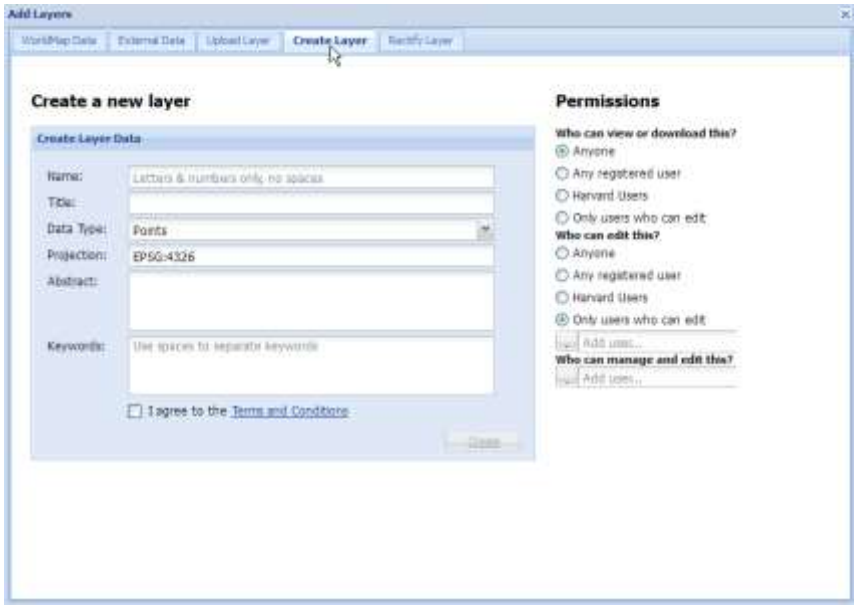
You can use QGIS or ArcGIS as well as many other desktop packages to create shape files. Here is a tutorial by Lex Berman which uses the open source QGIS platform.

http://maps.cga.harvard.edu/qgis/

This tutorial covers creating and editing shape files. For uploading to WorldMap it is best to use the Geographic WGS84 projection space. Also, if you use special character encodings to handle particular languages in your attribute table, be sure to define the encoding you use when you upload to WorldMap.

4.5 Create Layer

Go to "Create Layer" tab in Add Layers form.



1. Define Layer by giving a Name, Title, **choose Data Type (point, line, or polygon)**, leave Projection alone, Add short Abstract, add Keyword, agree to Terms and Conditions. Then click "Create".
2. The only additional metadata you must add is the Category designation at the bottom. AT A MINIMUM, PLEASE PROVIDE BASIC INFORMATION ABOUT YOUR DATA: DESCRIBE WHAT THE DATA IS AND WHAT SOURCES IT IS BASED ON. DESCRIBE THE PURPOSE FOR THE DATA.
3. Click Submit.
4. Your empty Layer will be loaded to your map ready to digitize into.

4.6 Create Features and Embed Media in Them

After completing the Section above and creating a new Layer, you are ready to start adding content to your Layer.

1. With your new Layer highlighted, click the "Create Feature" link above the Map.
2. Now zoom to the area of the Map where you want to create your new feature.
3. As you click on the map you will be starting to draw your feature. If you are creating a point Layer, a single click will generate a new feature and an attribute form will come up to allow you to add in attributes. If you are creating a line, two points will suffice. For an area or polygon, you can keep clicking points as long as you want. Double click to close the polygon.
4. After you create a feature a form will come up to allow you to add attribute information for the feature. You can add values for Name, Description, Start date, End Date, String Value 1, String Value 2, Number Value 1, Number Value 2.

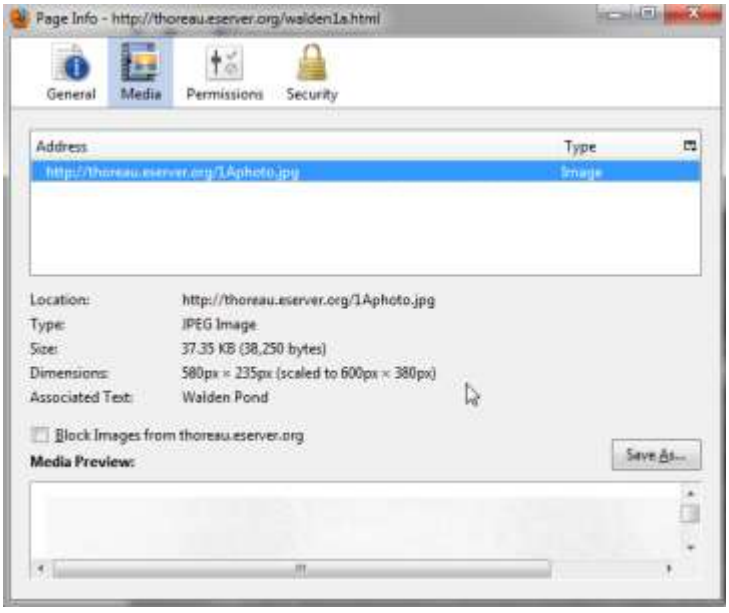
   NOTE: Description is a special field which supports HTML. This means one can include media such as video, photos, sound, etc. which will display when users use the "Identify" tool with these features.

There are two ways to embed media within the Description field. One can click on the "Upload Images" button and insert media directly in line with the text, or one can use the HTML button to add HTML embed code to the Description field.

5. To add HTML to the Description field:
    a. Click on the empty Description box to add content. A rich text editor will appear.
    b. Type any text you want to display and format it with the tools provided.
    c. If you want to include video or any other media via an "embed snippet of HTML", first click in the description box then click on the blue HTML box (the last icon on the right).
    d. A new "Edit HTML" view will open. Paste your embed snippet in the line below the HTML "<br>" text displayed.
    e. Here is an example of an HTML snippet for an image to add:

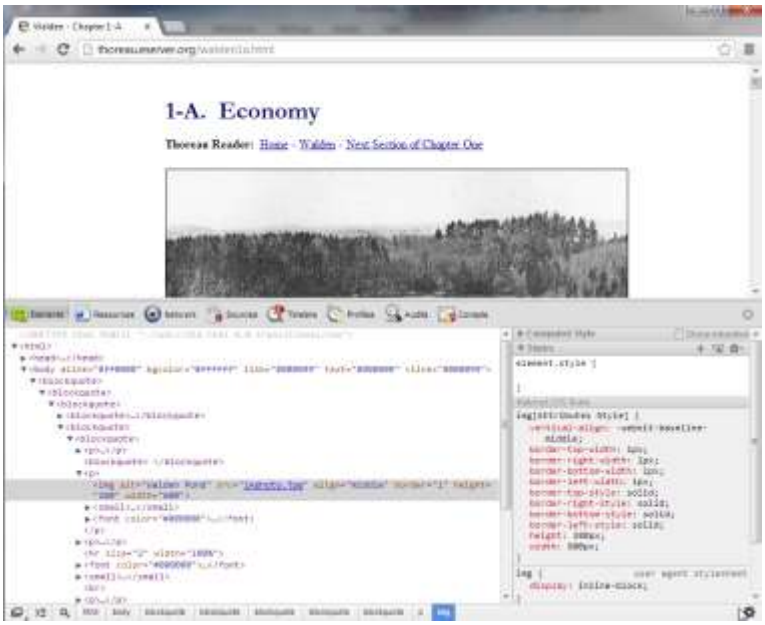
```
<img src=" http://thoreau.eserver.org/1Aphoto.jpg" width="580" height="235">
```

This snippet was created for an image by gathering the URL and image size for that image by (in a Firefox browser - other browsers will be slightly different) right clicking on the image in question and then clicking "view image info", then inserting those pieces of information into the format shown above to create the HTML snippet. Below is the "view image info" display that you get your URL and size information from.

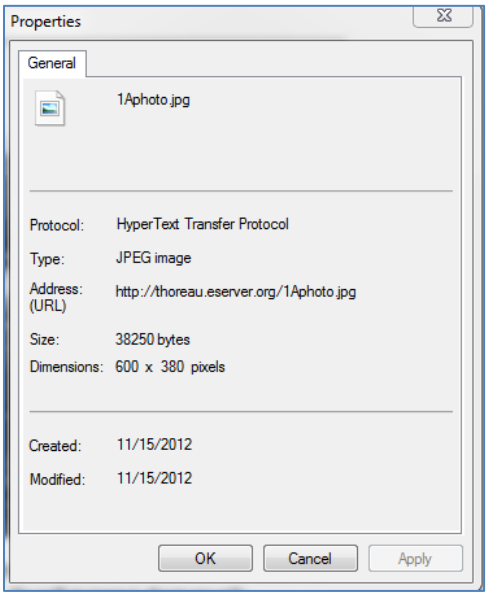


This is how it works in Firefox, other browsers will be slightly different.

In Chome, right click and click "Copy image URL" to get URL. Then right click again and click "Inspect Element" to get size.



In Internet Explorer, right click in image and click “Properties”.



f. Now that you have created your snippet if you haven’t already done so, click in the description box for the feature you want to add the image to, then click on the blue HTML box (the last icon on the right).
A new “Edit HTML” view will open. Paste your embed snippet in the line below the HTML “<br>” text displayed.

Save your feature edit form. Now select the Identify tool above the map and click on your feature. Your image should appear along with other information you added about your feature.

You can resize the way you image appears by changing the size values but to avoid distorting you image you must keep the ration between the width and height values the same.

g. To add a YouTube vide, go to YouTube, find your video on the YouTube site then click "Share" at the bottom. Then click on "Embed". Copy the embed snippet code (with URL) that is highlighted. Paste this embed snipped in the HTML box described above on the line beneath the "<br>" just as you would do with images as described above except the snippet in this case is already created for you.
h. Click "Submit Query".
i. You should now see the Video loaded to your Description section. Click "Save".
j. Now you will see the attribute form. Click "Save" on the bottom of the form.
k. To see how others will see the attributes you have added for this feature, click "Identify" tool above the Map, then click on the feature you have just edited. Your video should appear, ready to be played along with anything else you added.

6. Uploading a file which has an HTML field

One can upload a shapefile to WorldMap which has an HTML field. Here is how to do it:

a. The field which contains the HTML must be called "descriptio" (no final 'n') or "Description" (caps sensitive).
b. There can be no more than 255 characters in the field or it will fail to save. This is only a limitation when uploading a shapefile, not when creating the HTML content online using the "Edit Feature" tool.

7. To edit the geometry or attributes of any vector Layer you have edit permissions for:
   a. Highlight the Layer you wish to edit.
   b. Click the "Edit Feature" link above the Map.
   c. Click on the feature you wish to edit to select it.
   d. Click "Edit" at the bottom of the attribute form. Now you can edit the geometry of the feature or the attributes of the feature. To edit the geometry, click on a vertex (white box) on the feature and drag it. To add a new vertex, click on the faded vertex between two existing vertices and drag. To edit attributes, click in the attribute form for the attribute you want to edit and make any changes.
   e. When you are finished editing geometry and attributes, click "Save" at the bottom of the attribute form. Then close the form by clicking on the 'X' in the upper right corner of the attribute form.

4.7 Rectify Layer

To georeferenced your scanned maps online, go to Add Layers, click on the "Rectify Layer" tab, the click on "WorldMap WARP" or go to http://warp.worldmap.harvard.edu.

A video demonstrating how to use WorldMap WARP is here.

Create an account in WorldMap WARP. Eventually you will not need two accounts, but now you do. Upload any scanned map you would like to georeference: click "Upload Map" tab, then fill in metadata, then browse to the image file you want to upload, choose whether you want the map to be public or not, and click "Create".

The map should now be displayed un georeferenced. Click on "Rectify" to define corresponding points between your scanned map and the Open Street Maps global base map. The link just below the map, called "Advanced Options" allows the user to choose the rectification method and the sampling method, should they choose to override the automatic settings.

4.7.1 Adding georeferenced maps to WorldMap

Once the scanned map is georeferenced it can will be discoverable within WorldMap search within 24 hours. We are working to reduce this delay.

4.7.2 Masking your map

Note: *The masking function is buggy. We hope to get this fixed but there is currently no funding for this.*

You can mask your map by drawing a line around only the area you want to display.
One you have uploaded and georeferenced (rectified) your map, go to the Crop tab.

1. Click the "Draw Polygon" tool to the right of the hand "Move Around Map" tool.
2. Click on the map to draw a polygon around the area you wish to keep.
3. Double click to close the polygon.
4. Click "Mask Map!" at the bottom of the page to apply your mask.
5. You can select your polygon and delete it using the "Delete Polygon" tool.
6. You can delete you mask by clicking the Delete Mask link at the bottom of the page.

5.0 Using Dataverse to Create and Upload WorldMap Content

Dataverse is now integrated with the WorldMap (http://worldmap.harvard.edu) platform, a general purpose online mapping platform. WorldMap provides a number of mapping services to Dataverse which are available from within dataverse.

1) Turn tables into maps with spatial join
2) Mapping of tables containing lat /lonmgs
3) Mapping of shapefiles

5.1 Turn Data Tables Into Maps with Spatial Joins

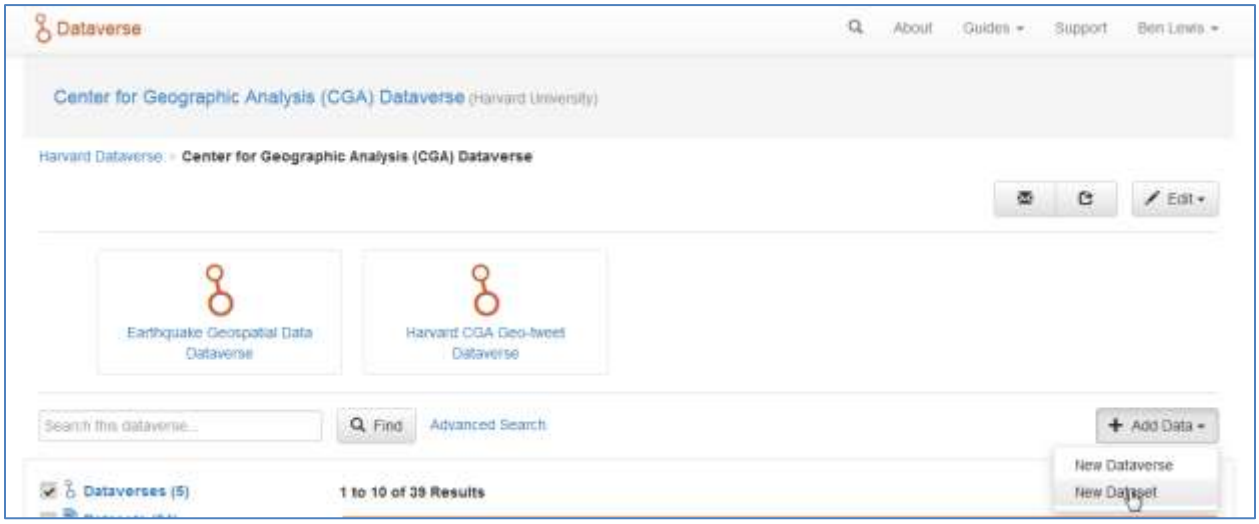
First upload a table which includes a column populated with spatial codes which relate to one of the spatial join types currently supported in WorldMap:

Type	Year	Join Field
Addresses, Boston	2015	LocationID
BRA Neighborhood Statistical Areas, Boston	2015	BOSNA_R_ID
BRA Planning Districts, Boston	2015	ID
Census Block Groups, Boston	2010	BG_ID_10
Census Blocks, Boston	2010	Blk_ID_10
Census Tracts, Boston (GEOID10: State+County+Tract)	2010	CT_ID_10
Election Precincts, Boston	2015	PRCNTS_ID
Election Wards, Boston	2015	WARD
Fire Districts, Boston	2015	DISTRICT
Intersections (Census), Boston	2015	ObjectID
Intersections (City), Boston	2015	propid
ISD Neighborhoods (Permits), Boston	2015	Name
Police Districts, Boston	2015	DISTRICT_
Public Works Districts, Boston	2015	PWD
Roads (left side), Boston	2015	TFIDL
Roads (right side), Boston	2015	TFIDR
Roads, Boston	2015	TLID
US Zip Code (5-digit), Boston	2015	ZIP5
US Zip Code 5-digit MA	2015	ZIPS

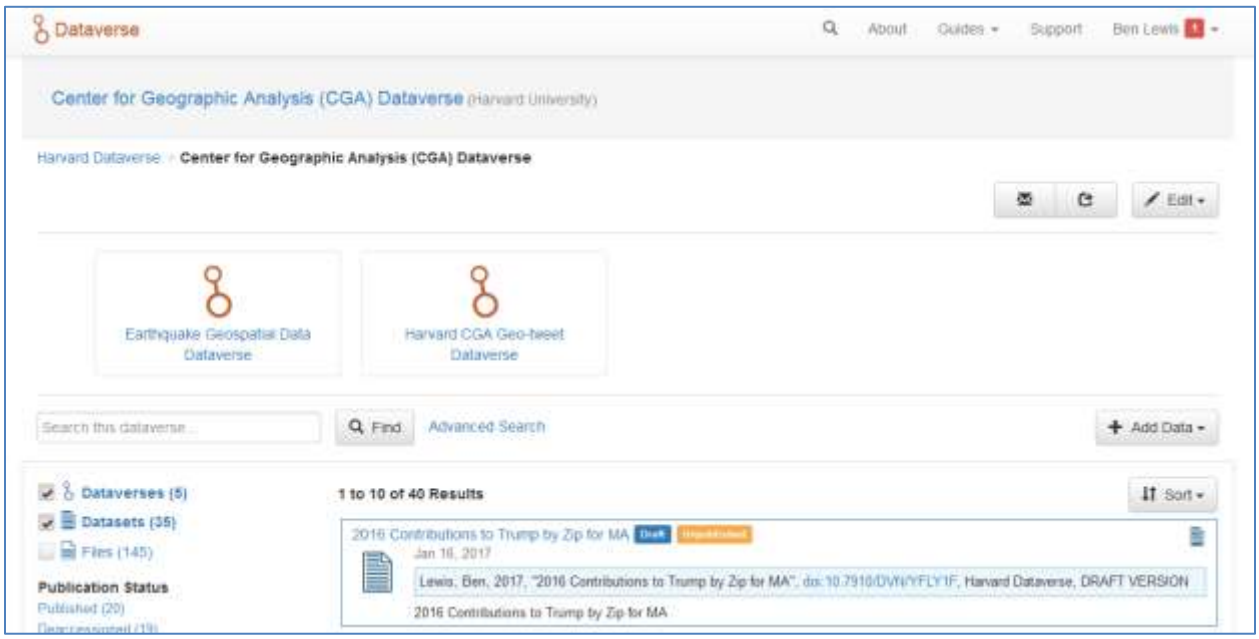
If you don't see the spatial join type you need in this table, don't worry. New join types can be easily added to the system as needed. Contact worldmap@harvard.edu and request the join type you need. If you have a copy of the join geometry data you can provide this to us which may speed up the process.

Steps to create a map from your table using table join:

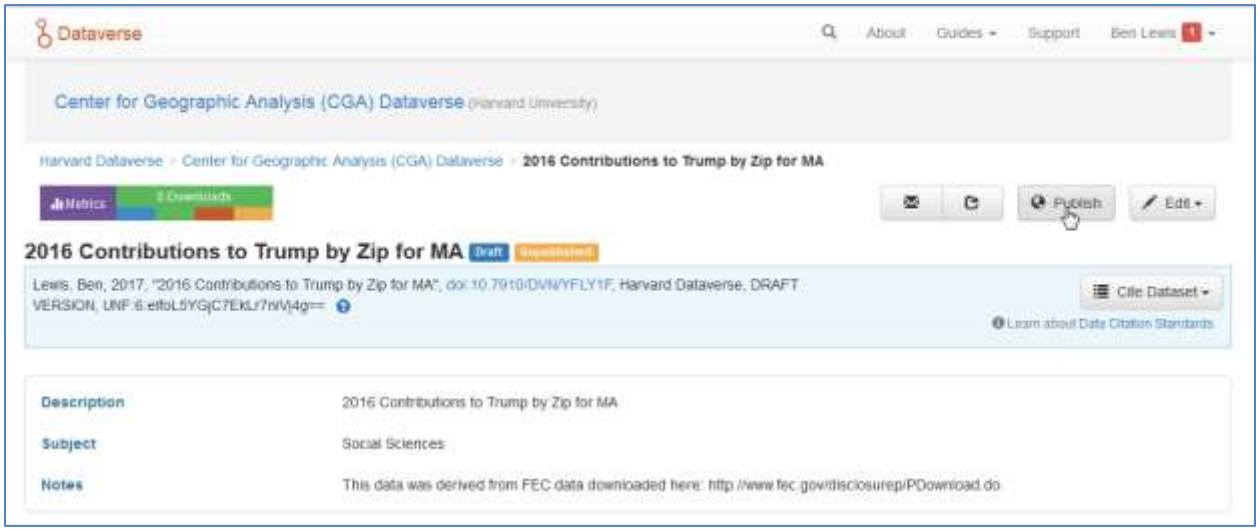
1) First create a Dataverse in the Dataverse system https://dataverse.harvard.edu/.
2) Go into your Dataverse and Create a Dataset.

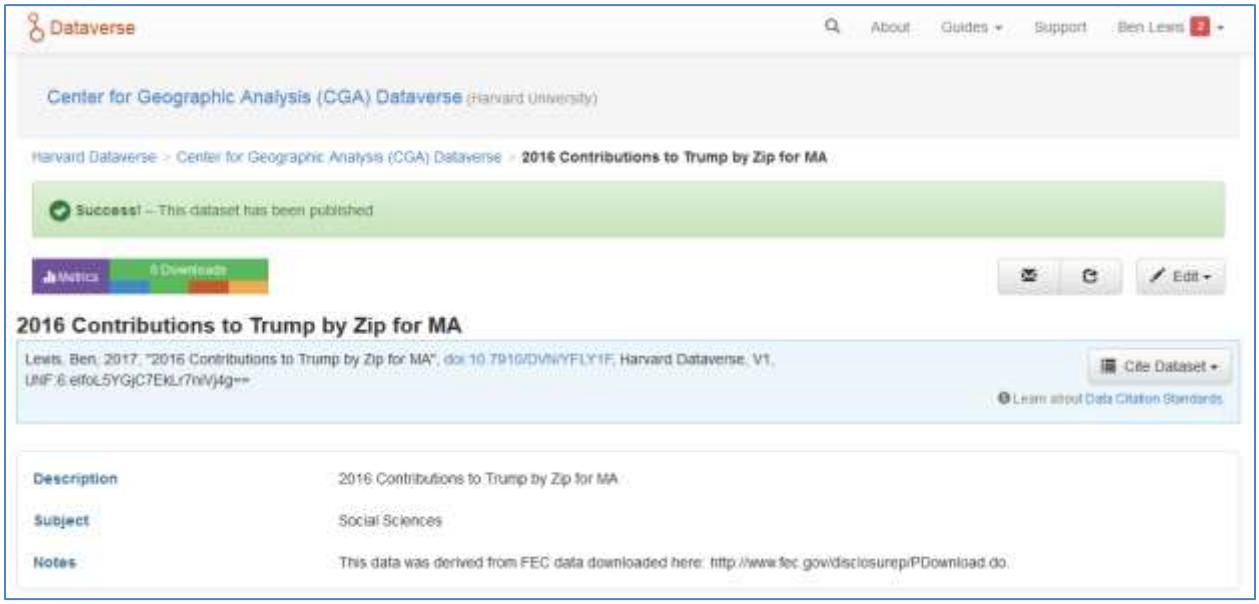


3) Upload your dataset (table), provide metadata, save dataset.

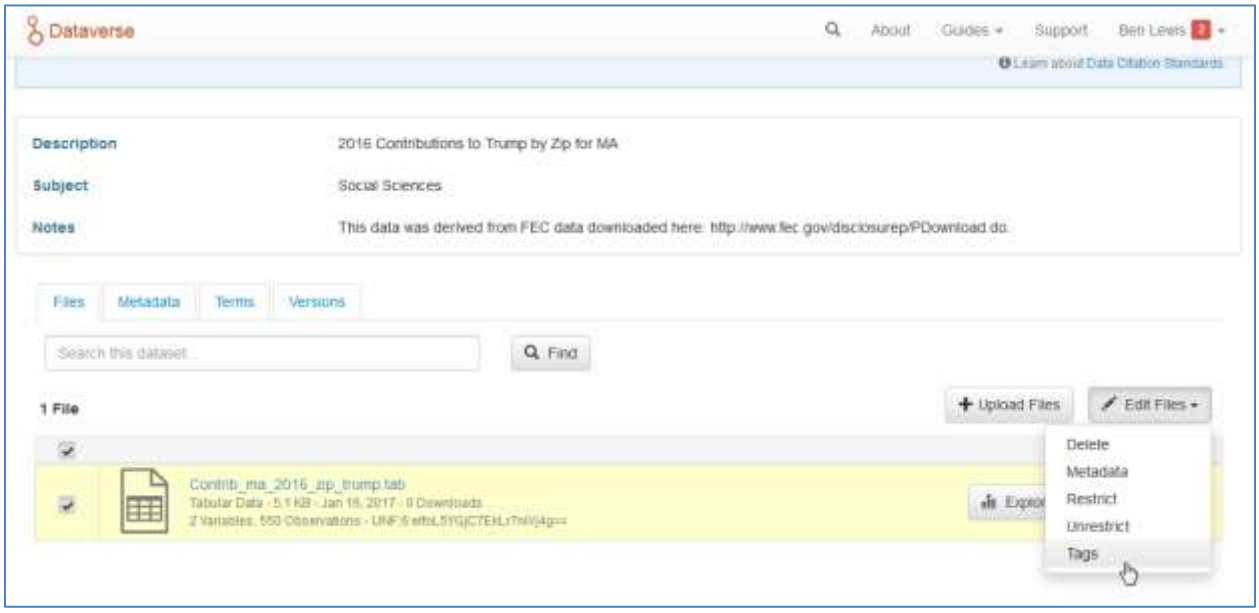


4) Publish dataset

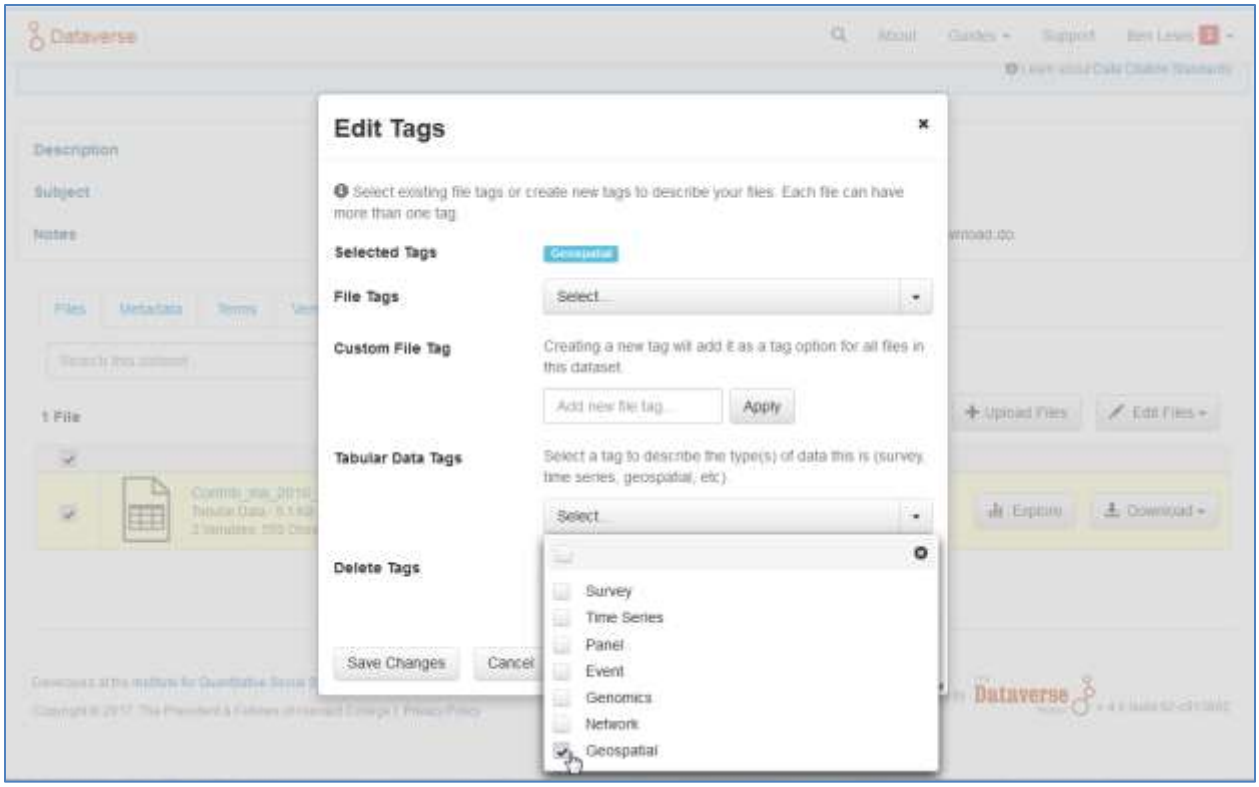




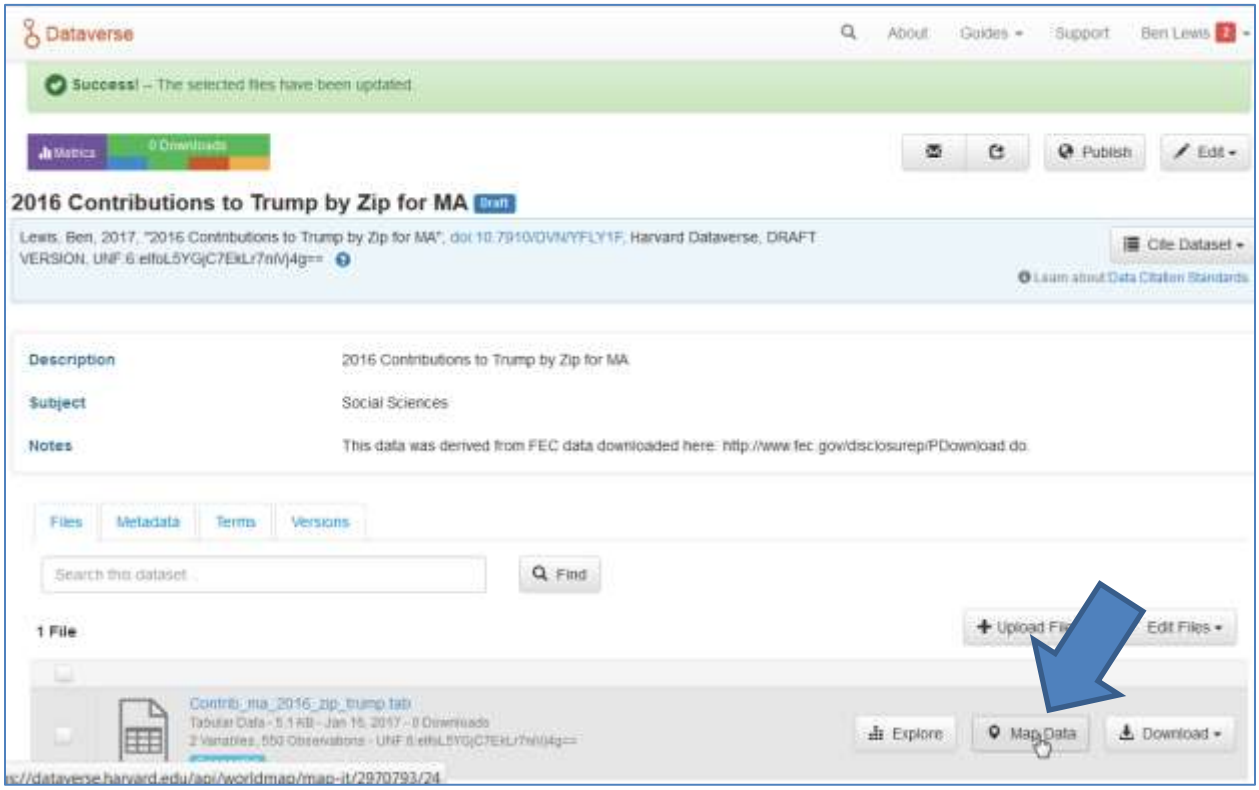
5) Define the dataset as Geospatial by giving it a Geospatial tag



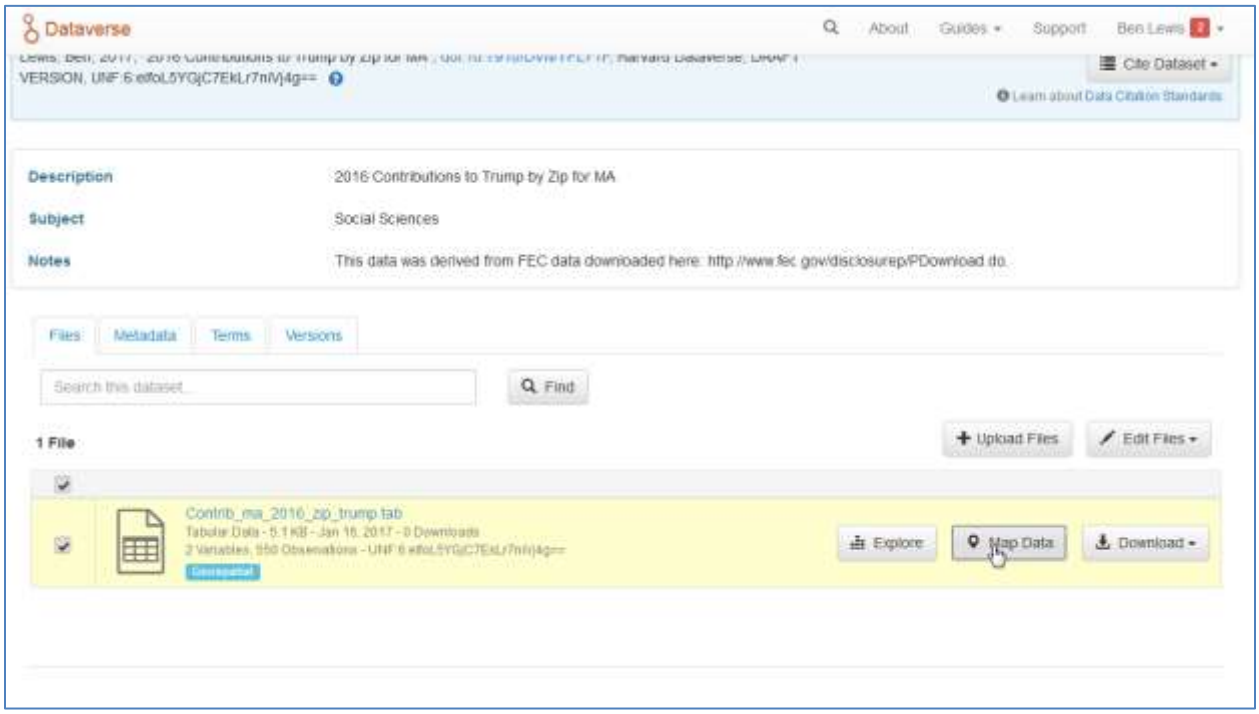
6) Set the tabular tag “geospatial”



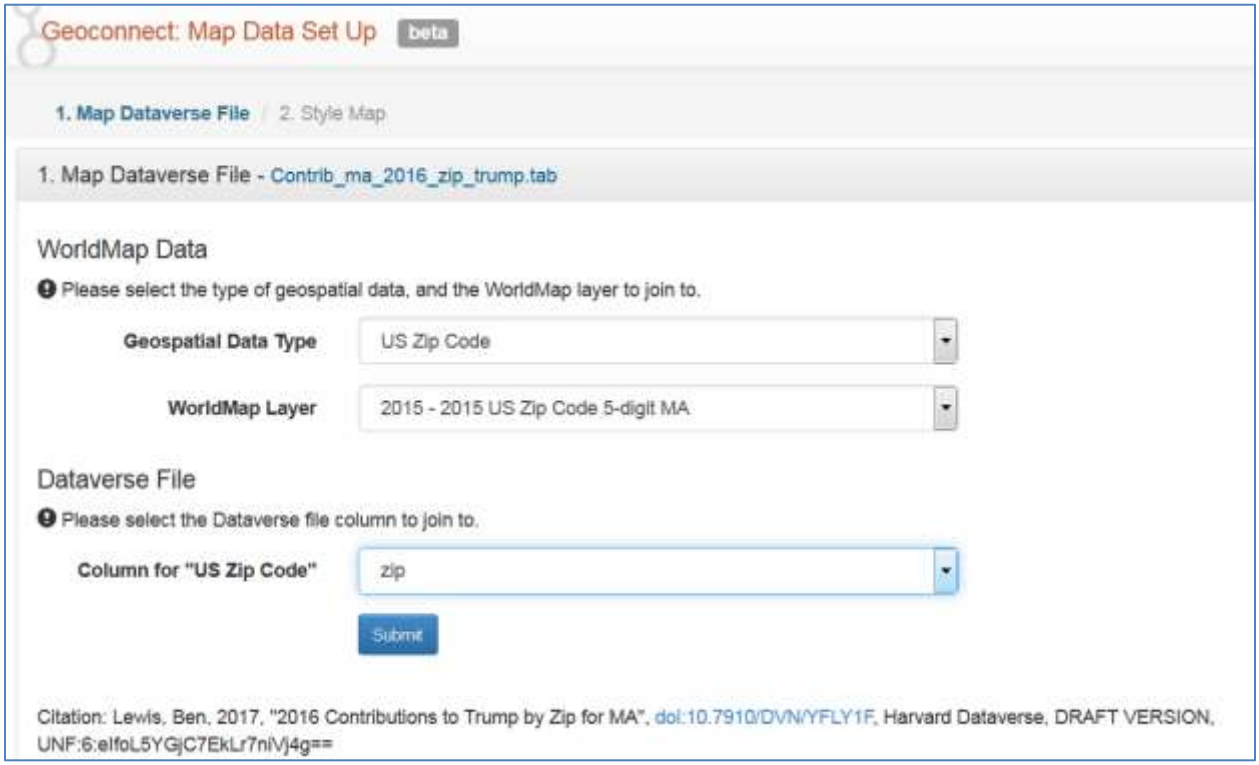
7) Now you will see a “Map Data” button next to your dataset.



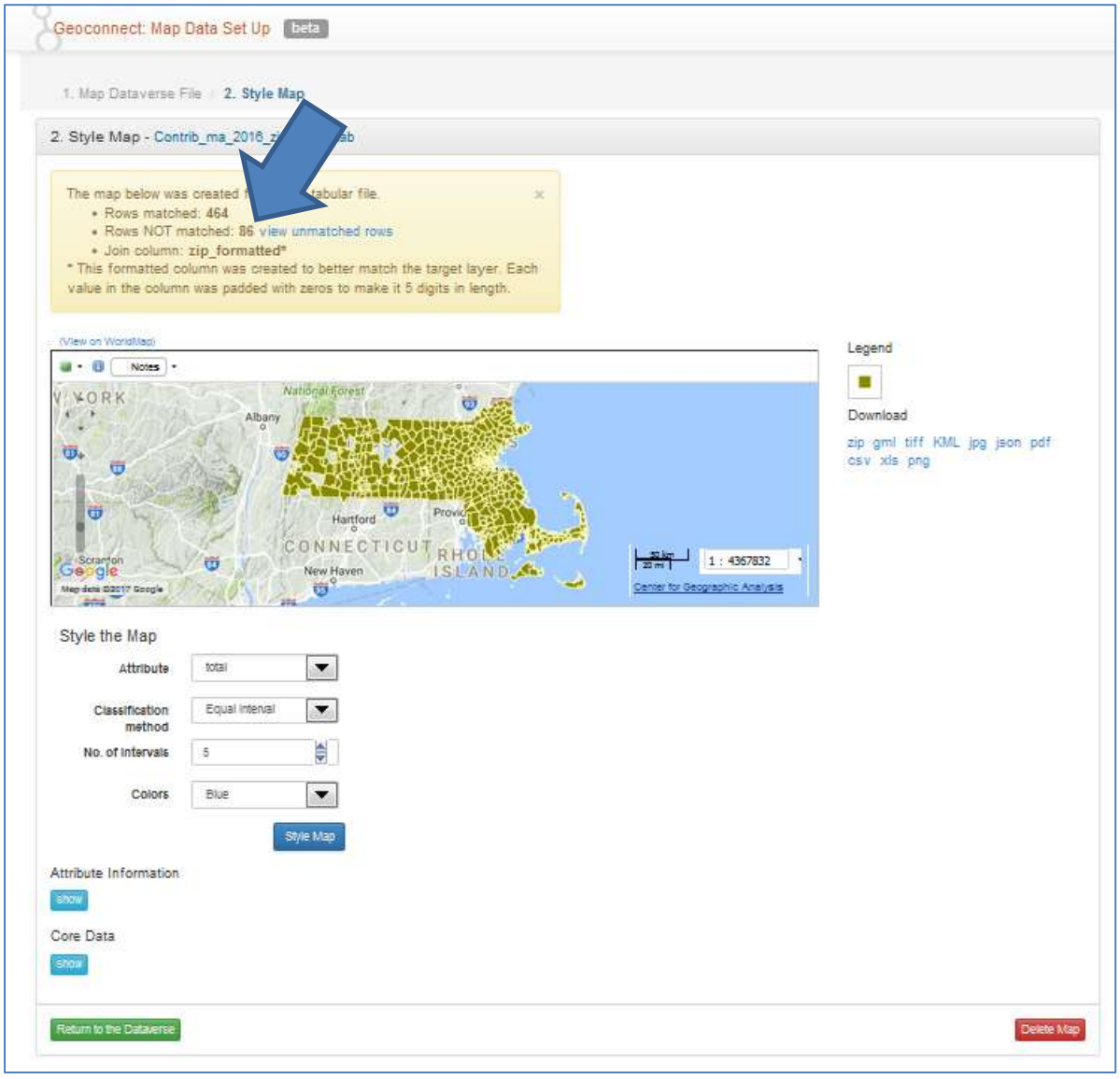
8) Click Map Data button



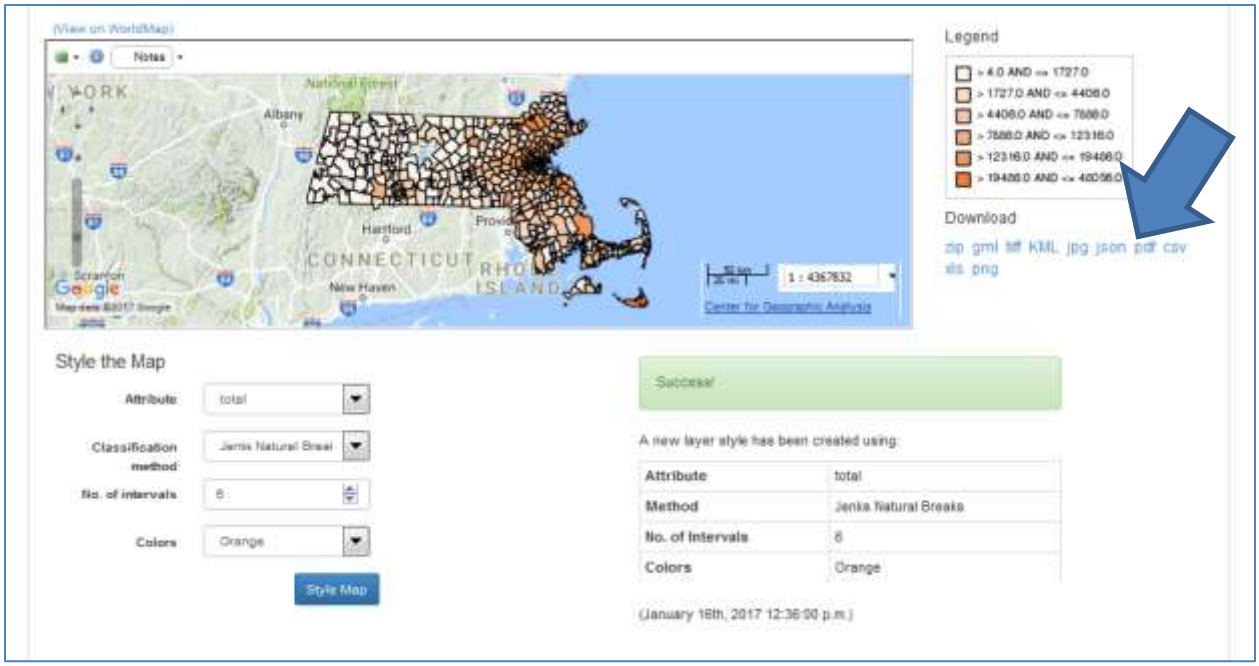
9) Now select the data type, the dataset, and the field in the target layer you want to join on.



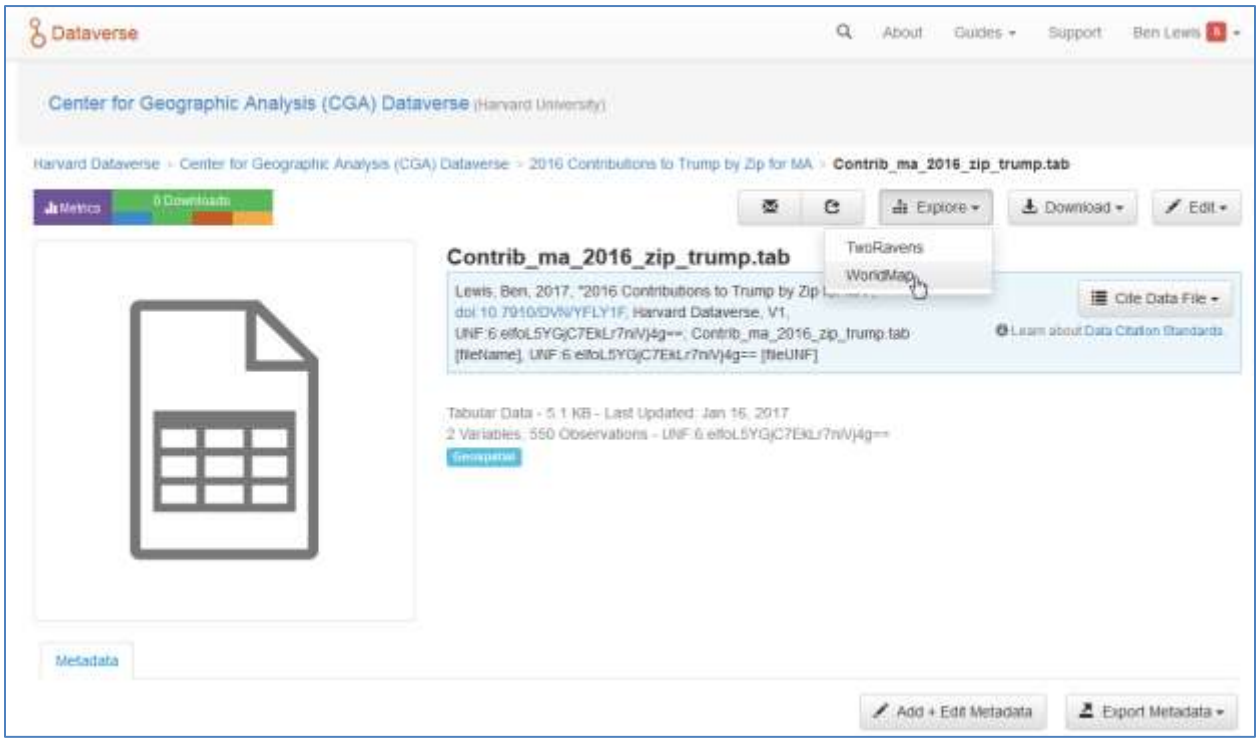
10) After clicking “Submit”, there will be a delay while Dataverse sends your table to WorldMap and WorldMap joins your data to Zip code geometry in order to create a map of your data. The map which is returned is not yet styled and you are now able to style your map.



11) Notice report which gives the number of rows matched by the join and the number not matched.
12) Choose attribute, Classification Method, Number of Intervals, and Colors to use for styling your map using a variable in your table. The system will automatically create your new map symbolization. At this point it is possible to download the mapped version of your data in a variety of spatial formats including GML, KML, and Shapefile (zip).



13) Save your map. Back in the dataset you can access the map which was created in WorldMap by selecting “Explore” and choosing “WorldMap” from the pulldown.



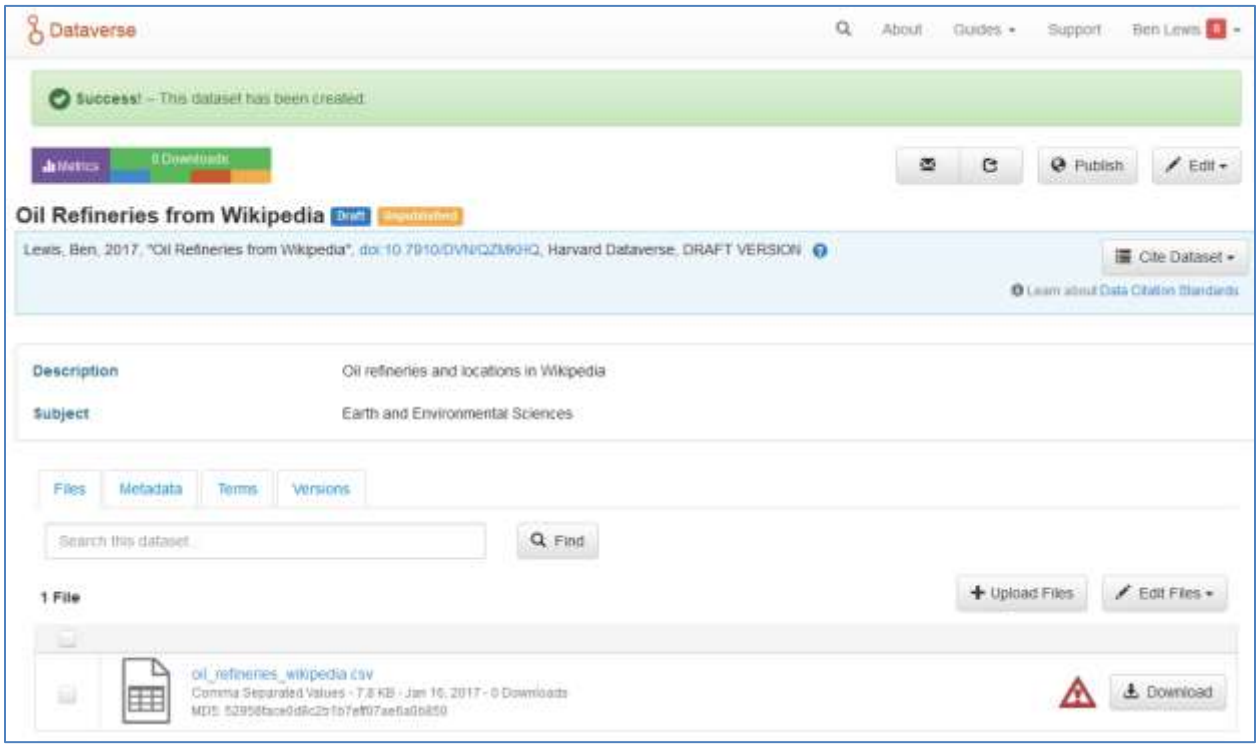
5.2 Mapping of Lat Long tables

It will be possible to create a map from a table containing lat/longs in decimal degrees, but there is currently a bug which does not allow it.

It is also possible to map tables which have columns for latitude/longitude for each record. WorldMap will read your table and create a point feature for each record which has a lat/long. For each point in the resulting map, the data in the row for the lat/long will be linked to the point created for the lat/long. This map can also be styled.

To map a table containing lat/longs:

1) Upload your table to Dataverse



5.3 Mapping Shapefile Data

1) Upload zipped Shapefile containing .shp, .shx, .dbf, .prj pieces only.

2) You will be automatically provided a “Map Data” button.

6.0 Creating a Custom Gazetteer

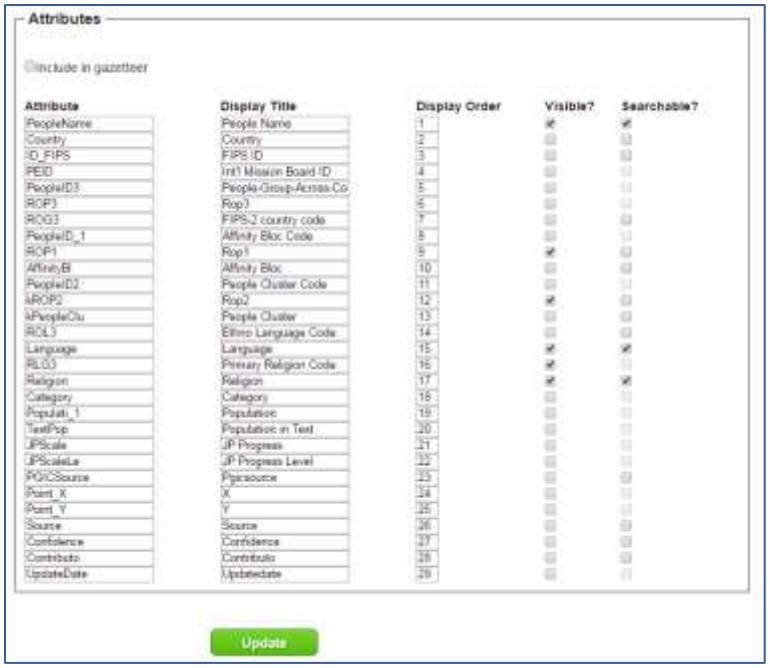
Gazetteers in WorldMap are accessible from within the Map page in WorldMap and are also accessible by applications outside WorldMap via a RESTful API.

6.1 Adding Content

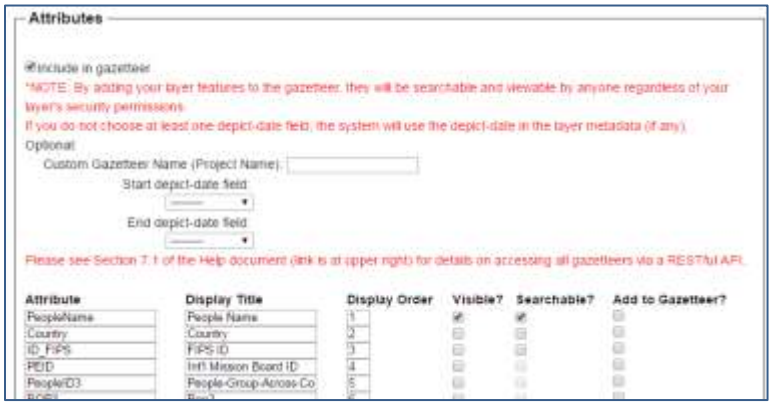
To add content to your own gazetteer you will choose a layer you have already uploaded to WorldMap containing the place name data you wish to add. To start, right click on the Layer in the Map and select "Share Layer". On the Layer page, look to the lower right part of the page where you will see the "Manage Layer".

Click on "Update the description of this data".

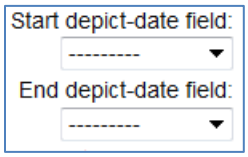
At the bottom of the metadata update page you will see an option for "Include in gazetteer".



Select “include in gazetteer” and you will see:



Input the name of the temporal gazetteer you would like to create for “Custom Gazetteer Name”. Enter the fields containing the start depict-date and the end depict-date.



NOTE: If you only have one date field that will be used. If you do not include any fields, the date within the Layer’s metadata above in the metadata form will be used.

A user may submit multiple Layers to the same custom gazetteer.

Each field value in the dataset submitted will get its own row in the gazetteer. For example, if a Layer has 'full_name' and 'abbreviation' fields that are both added to the gazetteer, then a feature with full_name="United States of America", abbreviation="USA" would result in two gazetteer rows.

When a Layer used to add records to a gazetteer is deleted from WorldMap, the records in the gazetteer will also be deleted.

If line or polygon features are used, only the centroid of the line or polygon will be included in the gazetteer.

All features added to a custom gazetteer will also be added to the general WorldMap gazetteer.

Negative dates are supported and are stored both as text and as integers (Julian dates).

NOTE: Any features added to a gazetteer will become public even if the Layer is private.

6.2 Gazetteer API

A RESTful API to the gazetteer which makes it possible for remote applications to use custom gazetteers and the WorldMap gazetteer.

Matching items and their attributes are returned in JSON format (add "/xml" at the end of the URL to get it in XML format). There is a limit of 500 records that the system can return at a time.

Below is the specification for making gazetteer requests:

URL's begin with http://worldmap.harvard.edu/gazetteer/<search_term> followed by any or all or none of the following:

- /<search term>/Service (Possible values include any/all of worldmap, google, nominatum, geonames)
  - Example: Example: http://worldmap.harvard.edu/gazetteer/Buena/Services/google,nominatum

- /<search term>/Project/<custom gazetteer name> (Only return results affiliated with a particular custom gazetteer name (bentest3) matching search string “plymouth”)
  - Example: http://worldmap.harvard.edu/gazetteer/plymouth/Project/bentest3

- /<search term>/Map/<map_id> (Only return results from Layers on a specific Map. Go to “Share Map” page to find the Map ID number)
  - Example: http://worldmap.harvard.edu/gazetteer/Roanoke/Map/238

- /<search term>/Layer/<Layer_typename> (Only return results from a specific Layer)
  - Example: http://worldmap.harvard.edu/gazetteer/Canary/Layer/ports_sale_confident_ggx

- /<search term>/StartDate/<date> (Only return results with a start date <= specified date (or null) and end date >= start date (or null))
  - Examples:
    - http://worldmap.harvard.edu/gazetteer/Xiangwu%20Xian/StartDate/500-01-01
    - http://worldmap.harvard.edu/gazetteer/Xiangwu%20Xian/StartDate/500%20AD
    - http://worldmap.harvard.edu/gazetteer/Xiangwu%20Xian/StartDate/100-01-01%20BC

- /<search term>/EndDate/<date> (Only return results with a start date <= specified date (or null) and end date <= start date (or null)
  - Examples:
    - http://worldmap.harvard.edu/gazetteer/Xiangwu%20Xian/EndDate/760%20AD
    - http://worldmap.harvard.edu/gazetteer/Xiangwu%20Xian/EndDate/765%20AD

Sample combination query:
http://worldmap.harvard.edu/gazetteer/Xiangwu%20Xian/Service/google/Map/79/StartDate/10%20BC/EndDate/1

Any use of multiple parameters must be in this order:
http://worldmap.harvard.edu/gazetteer/<search_string>/Service/Project/Map/Layer/StartDate/EndDate

Any space within in any value such as Search String (see "Xiangwu Xian" example above) must be replaced by "%20" to create a valid request URL.

There is currently an upper limit of 500 results.

7.0 Changing Map Cartography

In addition to controlled data sharing, one of the key benefits of WorldMap is cartographic expressiveness. The Style tool allows you to create SLDs or Styled Layer Descriptors which are XML documents that define the way a Layer looks.

To define the cartographic appearance of a Layer, the user can create Styles for that Layer. Styles can be created for both raster (image) and vector (point/line polygon) data types, but the options are richer for vectors. There are online tools for styling vector Layer, but one can also create styles using desktop tools like ArcGIS and QGIS, then upload them together with the Layer to be symbolized.

To create a Style for a Layer in WorldMap, (whether using online or desktop tools) one is creating a Styled Layer Descriptor(SLD) XML document which is stored in WorldMap. The SLD is used to control how the Layer is displayed. It is possible to define more than one style for a given dataset. One can then choose which style to use after the Layer has been loaded to the map. The Layer will at first appear using the default style, but other styles are available to be chosen instead.

7.1 Online Styles Creator

NOTE: *Users can modify the way a vector (point, line, or area) map is displayed, and control the color of lines or area fills as well as labels. Users can also use rules to support complex symbolization schemes based on database and scale conditions. WorldMap uses an open format for symbolization called SLD (Styled Layer Descriptor). SLDs created can be uploaded to WordMap and used to symbolize a given Layer.*

It is possible to edit map styles and create new styles in WorldMap. Styles are created using one or more rules. Each rule can have several parts, including a label, coloring, scale dependency, and one or more database conditions.

At the top of the tool you can choose between existing styles for a given Layer, copy an existing style, or edit an existing style, or create a new style from scratch.

Let's start by editing a rule from the currently chosen style. Select the rule and click Edit. There are three tabs containing options for defining the rule you are editing. Aspects of a rule that you set in the various tabs are cumulative for a rule so for example you create a rule by setting the color in the Basic tab and then a database condition to control when that color is displayed in the Advanced tab.

In the Basic tab it is possible to:

- change the name of the style
- change its fill and outline color (if it is a polygon)
- control opacity of line or fill
- control line width and line style

In the Labels tab it is possible to:

- Select a field to use as content for your labels
- Choose a font type and size and style for the Label
- Choose the color for the Label as well as the opacity
- Choose a halo (background color) for the Label, including its color, size, and opacity

In the Advanced tab it is possible to:

- Limit the display of whatever you have defined in Basic and Label tabs in terms of maximum display scale and minimum display scale.
- Limit the display of whatever you have defined in Basic and Label in terms of one or more database conditions. It is also possible to set multiple groups of conditions.

Explore how:

- Polygon styles can be changed.
- To modify simple style in terms of fill, outline, opacity.
- To set label and scale dependency (LandType)
- To set a database condition for a rule and combine it with another database rule. (Suitability > 50).
- Show how to create a new style from scratch or duplicate one.

7.2 Using Multiple Styles

WorldMap supports the association of multiple styles with a single data Layer. The user can choose the default style within the "Share Layer" page. After a Layer is added to a map, the style can be changed from the default style to another one. It is possible to load the same Layer to a map several times and have it displayed each time with a different style.

Currently users can upload one style at a time along with a Layer. There is no way yet for users to associate more than one style with a Layer, however a WorldMap administrator can do that – contact us at worldmap@harvard,edu.

7.3 Classify Tool - Creating Complex Styles Automatically

The Classify tool allows one to choose a variable (column in the database behind your point/line/polygon Layer) and use that to define the symbology for your map. (Styling can only be performed on Layers you have edit access to.)

In this example we have a census tract Layer for Boston.

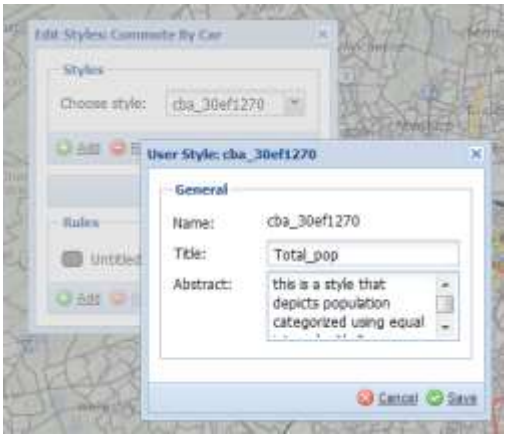
Each polygon in this Layer is linked to the following fields of information about it.

Feature Details	
LOGRECNO	0010683
F_MAST	0.111321
VL_MED_ON2	262300
INC_MED_H2	61250
PERIMETER	9453.5888
BLK_COUNT	16
PER_CTV	0.897473997028
CT_ID	25017368102
TRACT	368102
DRY_ACRES	566.48
the_geom	
DRY_SQMI	0.885
OBJECTID	2733
DRY_SQKM	2.29
SHAPE_AREA	3735794.48365
PER_BLA	0.00596125186289
KEYWORDS	theme:census_block_all
SAMP_POP	1319
BLOCKGROUP	4
AREA	3735784.0777
SHAPE_LEN	9453.60203126
DRY_PCT	0.6136
TOTAL_POP	1342
COUNTY	017
STATE	25
BG_ID	250173681024

Right click on the Layer listed to the left and choose “Edit Styles”:

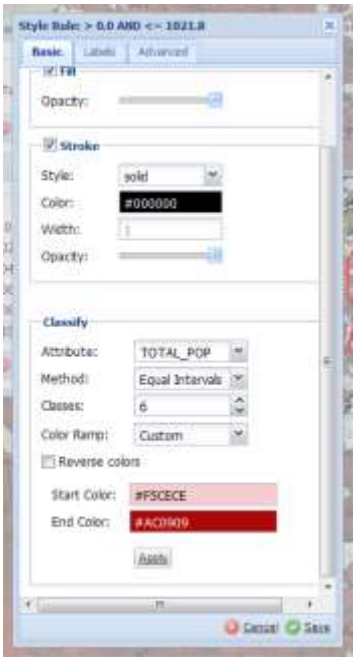
Create a new style:

Name your new style in a way that describes what it depicts:

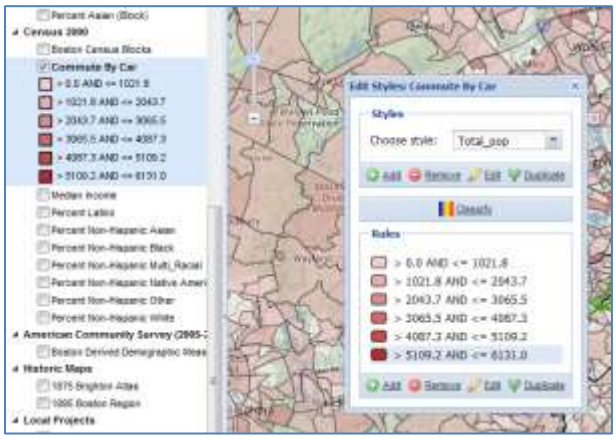


Click the “Classify” button:

Choose the attribute (variable or column for your data Layer) that you want to use to drive the symbology, then select the number of categories you want to create (in this case 6), then choose the way in which you want to divide your polygons into categories (in this case Equal Interval), then choose the color ramp you want to use (in this custom from light red to dark red).



Click “Apply” and “Save” if you want to keep it the new style.



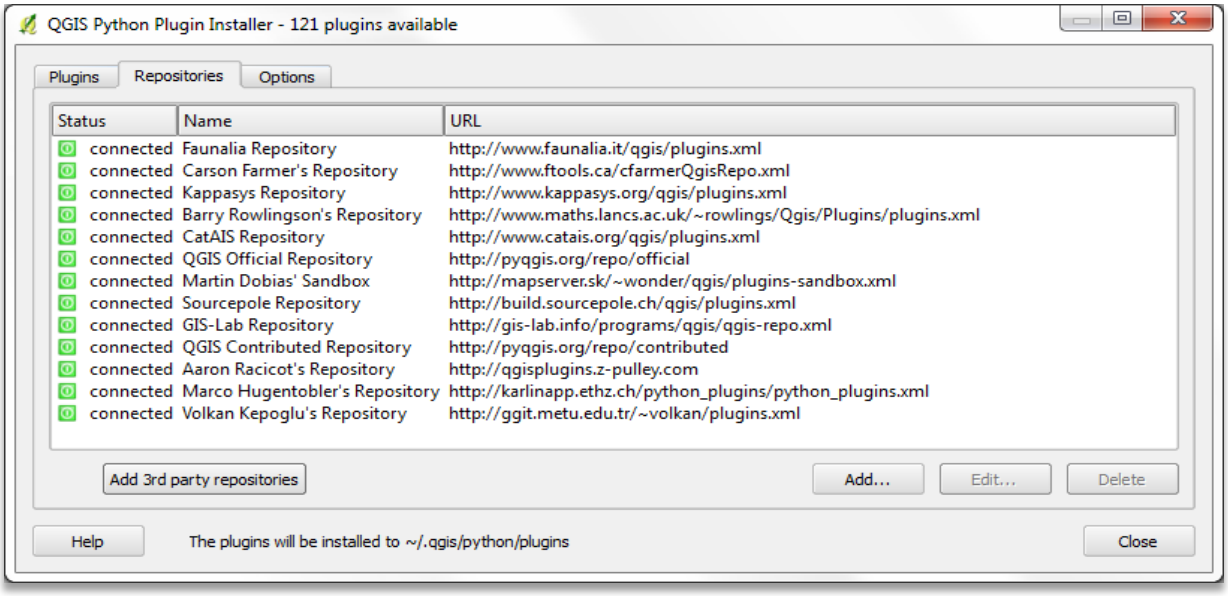
7.4 Desktop Styles Creation

We are hoping the tools below will become less necessary given the existence of the Classify tool implemented within WorldMap. For this reason we do not plan on updating these tools.

7.4.1 Using “Save as SLD” plugin in QGIS 1.7

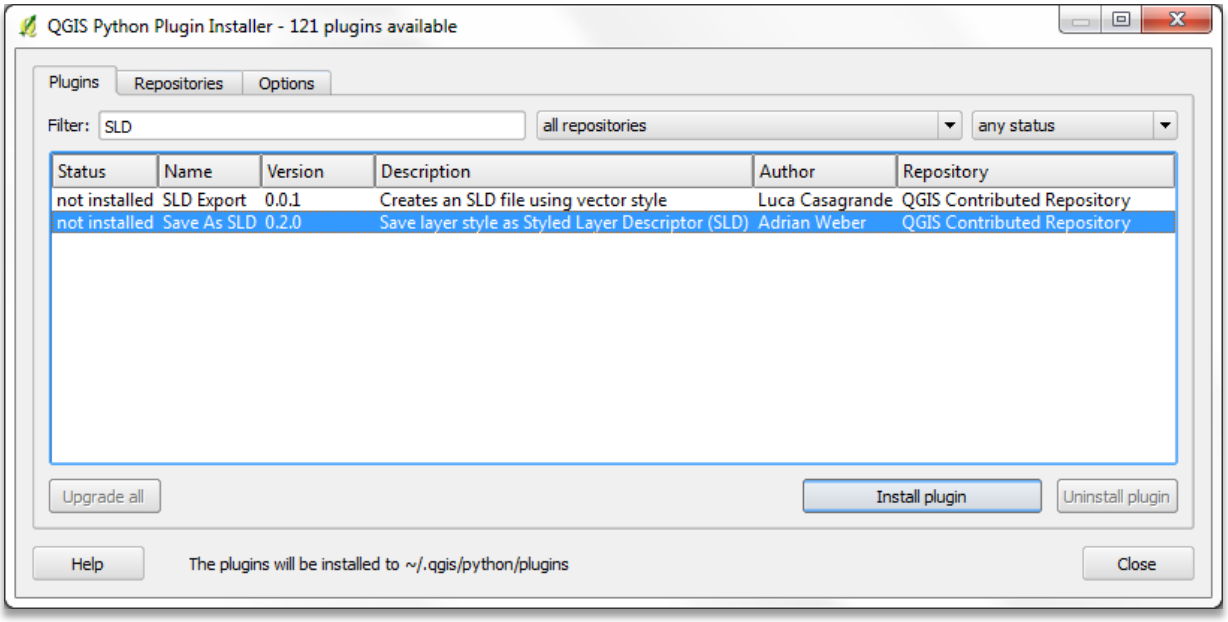
QGIS is an open source desktop GIS software application, available for free download at http://www.qgis.org. Use QGIS 1.7 desktop application to create your maps and symbolize your Layers, and “Save as SLD” plugin to export them to SLD styles.

To install “Save as SLD” plugin in QGIS, go to Plugins -> Fetch Python Plugins -> Repositories tab.

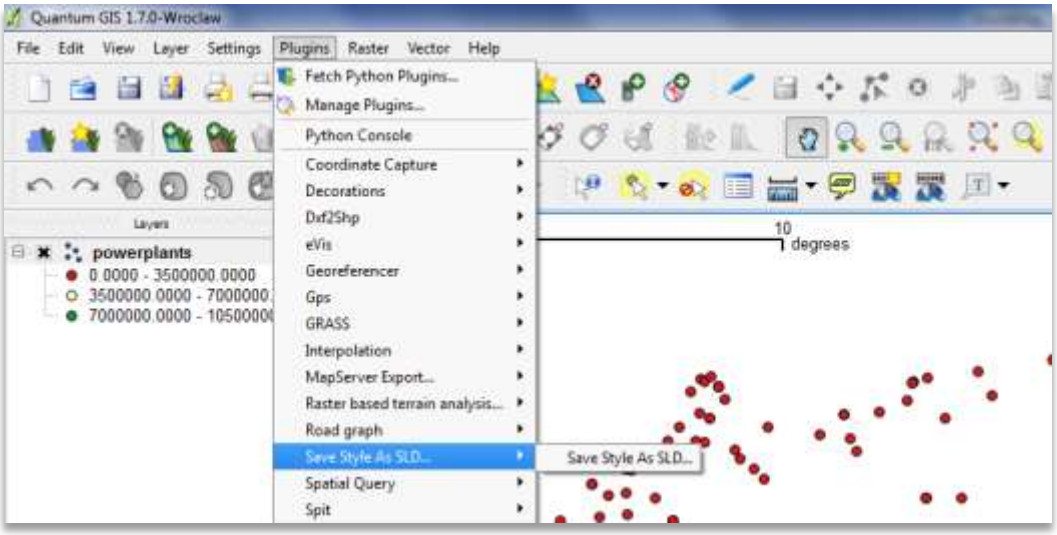


IMPORTANT: Click on “Add 3rd party repositories” and click OK to the message prompt.

Then click on “Plugins” tab and filter for "SLD", select “Save as SLD” and install plugin.



"Save as SLD" should then appear under the Plugin dropdown menu.



After styling your Layer, simply click on *Save Style as SLD* and specify the path for the Layer style.

Pros & Cons for Using "Save as SLD" plugin in QGIS 1.7 method

- Pros:
  - QGIS is an open source desktop GIS application, available for free download.
  - QGIS is easy to use and learn.
  - Runs on various OS, including Windows 7 64 bit OS as well as Macs.
  - SLD plugin is easy to install.
  - No additional changes in the SLD style code are required.
- Cons:
  - No option to export multiple SLDs, export one Layer at a time; hence, not good if you have large number of Layers.
  - No option for styling with proportional symbols by size. For example, styling Layers with point feature data to represent various sizes in points based on the quantity they represent is not an option in QGIS styles.
  - Does not work with charts, such as pie charts or bar charts.

7.5 Creating Raster Styles with Desktop Software (Advanced)

Raster (GeoTIFF) images do not have the same styling options as vector (shapefile) Layers do. However, you may still need to define transparency levels to selected areas in your image. For example, if you have an older scanned map that has been georeferenced (assume that the map has a white background), and you need to make the white areas transparent. In such case, you may find the next section helpful as it walks you through the steps for defining transparency to selected areas in your GeoTIFF. ***Note:*** in order to follow the instructions below and upload your raster image to the WorldMap, you need to make sure that it is a GeoTIFF image.

Steps for adding transparency to selected areas in GeoTIFF (advanced level):

1. Find out where your GDAL utilities are located. If you have QGIS installed on your computer it is likely to be here: C:\Program Files (x86)\Quantum GIS Wroclaw\bin

   Note: GDAL is a powerful tool for working with raster images such as GeoTIFF. Hence, if you don't have GDAL utilities installed, you can download it from http://www.gdal.org/.
2. Use *gdalinfo* utility to find out all the information about your raster data. First, in the Windows command line (cmd), change directory to your GDAL utility files directory by typing:

   cd C:\path to your GDAL utility files

   For example, in my case the path is the following:

   cd C:\Program Files (x86)\Quantum GIS Wroclaw\bin

   Then use gdalinfo to find out info about your raster data:

   gdalinfo C:\path_to_your_raster\your_raster.tif
3. Look into the results and find out what kind of raster data you have.
   a. If you have a *3 band raster* file with 8 bit pixels, and you want to make all white pixels in the image transparent, you would create an *alpha channel* using *gdalwarp*:

   To add alpha channel to a 3 band raster type in:

   gdalwarp -srcnodata "255 255 255" -dstalpha C:\your_raster.tif C:\your_raster_alpha.tif

   Note: "255 255 255" refers to the values in each R, G, B Layer that is a no-data value (appears as white in the original tiff). If the area that needed to be transparent was black, this would be "0 0 0" instead.

   As a result you should see something like this:

   Creating output file that is 3931P x 3762L. Processing input file C:\rasters\ming.tif.
   0...10...20...30...40...50...60...70...80...90...100 - done.

   This will create the alpha channel (4th band) and add transparency to your raster image areas that are white; thus, your new raster_alpha.tif file is ready for upload to WorldMap.
   Note: *this method does not allow retaining legends for your map as there is no style SLD file attached to it. This makes sense for those types of images which don't need data derived legends such as satellite imagery, and various types of scanned paper maps.*

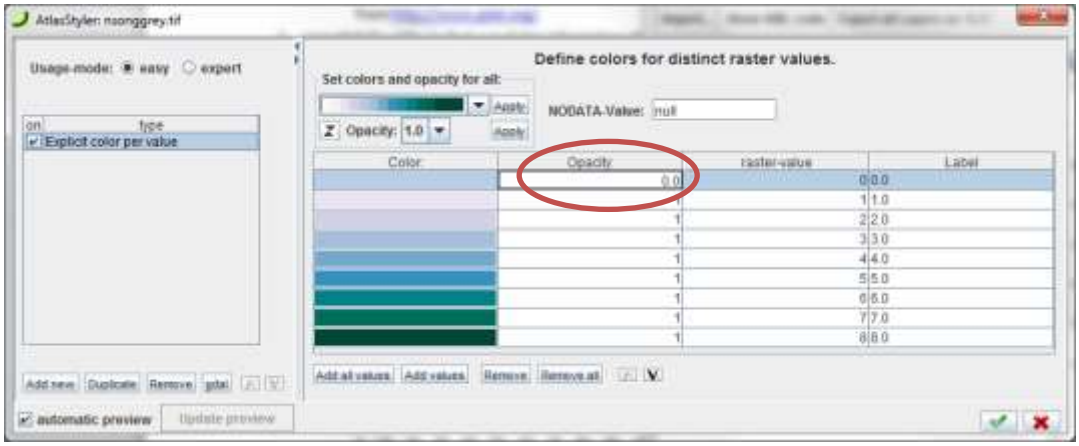
   b. If you have a *single band grey scale raster with 8 bit pixels*, your gdalinfo output with no color table should look like this:

```
Band 1 Block=128x128 Type=Byte, ColorInterp=Gray
  Min=0.000 Max=8.000
  Minimum=0.000, Maximum=8.000, Mean=0.034, StdDev=0.356
  Metadata:
    STATISTICS_MINIMUM=0
    STATISTICS_MAXIMUM=8
```

   Note: ColorInterp = Grey and there is no color table

   In this case you can simply import your raster image into the Atlas Styler and create the SLD style with transparency in the styles window. Follow the steps below:

- Open the AtlasStyler and import your raster
- Right click on your raster and go to “styles”
- Click on “add new” on the left hand side and chose either *“Explicit color per value”* or *"Colors for Value Ranges"* style option
- Select the color scheme and add all values/classes
- Change opacity of selected cell values to ‘0’ (e.g. in the image below white areas of the raster are defined to be 100% transparent)



You can also add labels for your legends here. After you finish defining the colors, opacity and labels, confirm your changes and save your file as an SLD style file. You can now upload your raster image and the SLD style file on the WorldMap.

Note: *this method does allow retaining legends in the style SLD file attached to it; you are uploading raster image together with the style SLD file created with AtlasStyler to the WorldMap environment. However, once you upload it to the WorldMap, you cannot edit your styles and/or legends. Not being able to edit raster legends is a bug.*

c. If you have a *single band raster with a built in color map*, your gdalinfo output window should look like this:

```
Band 1 Block=128x128 Type=Byte, ColorInterp=Palette
  Min=1.000 Max=163.000
  Minimum=1.000, Maximum=163.000, Mean=10.726, StdDev=18.098
  NoData Value=0
  Metadata:
    STATISTICS_MINIMUM=1
    STATISTICS_MAXIMUM=163
    STATISTICS_MEAN=10.725693751248
    STATISTICS_STDDEV=18.098143492813
  Color Table (RGB with 256 entries)
    0: 0,0,0,255
    1: 255,255,128,255
    2: 253,255,128,255
    3: 251,255,125,255
    4: 246,255,122,255
    5: 241,252,119,255
```

Note: ColorInterp = Palette and Color Table has RGB values defined

In this case, you can import your *color map* into the AtlasStyler and define opacity for the selected areas in your image by following the steps below:

- Open the AtlasStyler and import your raster
- Right click on your raster and go to "styles"
- In the styles window click on ***gdal*** button and copy paste the gdalinfo output including the color table with RGB values into this window, then click ok
- The color map classes will show up in the style window where you can change the opacity for selected cell values to '0' as well as define labels for your legends
- Confirm the changes and save your raster & SLD, then upload it to the WorldMap environment

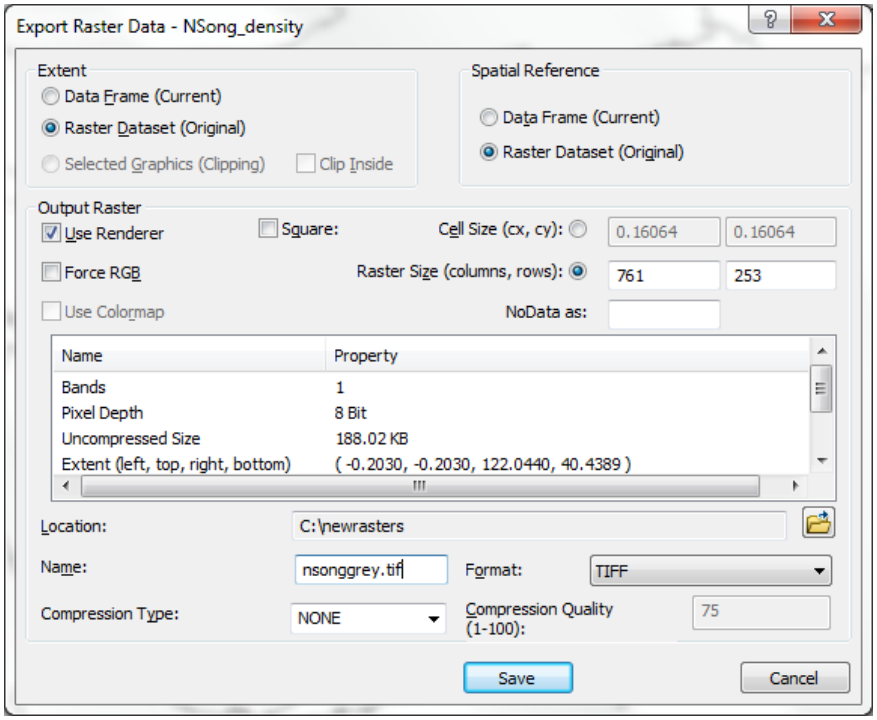
Note: *this method does allow retaining legends in the style SLD file attached to it; you are uploading the raster image together with the style SLD file created in the AtlasStyler to the WorldMap environment. However, once you upload it to the WorldMap, you cannot edit your styles and/or legends. Not being able to edit raster styles is a bug.*

d. If you have a single band raster with 24 bit pixels, the steps described in sections 3a, 3b, 3c will not work. You will first need to convert your raster data into a *3 band 8 bit pixel* image. You can do that using the open source *pct2rgb.py* gdal utility:

pct2rgb.py your_original.tif your_new_3band.tif

Once you convert your raster image, you can follow the steps in section 3.a to add transparency to selected areas on your image. You can read more about *gdal* utilities at http://www.gdal.org/gdal_utilities.html

Alternatively, you can use GIS software packages such as ArcGIS 10 to reformat your 3 band raster into a single band raster image. To convert your image into an 8 bit pixel single band raster in ArcGIS 10 simply copy or export your raster data with the following properties defined:



Important: make sure to check the "Use renderer" option for the pixel depth 8 bit to take place.

After you convert your image to single band 8 bit pixel raster file, first make sure that your new 8 bit raster is saved as GeoTIFF (use *gdalinfo* utility described in step2). Then you can follow the steps described in section 3.b. ***Note:*** if your image is saved as TIFF and NOT as GeoTIFF, you will first need to convert it to GeoTIFF in order to follow this tutorial. There are a number of commercial software packages available for this task, e.g. GlobalMapper or FME. If you have problems with converting your raster file to GeoTIFF, please contact CGA at contact@help.cga.harvard.edu and one of our GIS professionals will be available to help you.

4. Final step is to add your new raster file to the WorldMap and check it for transparency.

Summary notes:

- It is *important to understand the type of raster GeoTIFF image* you have. Use *gdalinfo* utility described in step 2 and study the gdalinfo output results first.
- If you have a *3 band raster image*, you will need to create an alpha channel to add transparency to selected areas in your image (see section 3.a for details).
- If you have a *single band 8 bit pixel raster (with a grey scale)*, the easiest method is using Atlas Styler open source software package to add styles and transparency to your raster image (see section 3.b for *grey scale* details).
- If you have a *single band 8 bit pixel raster (with a built in color map)*, you can use Atlas Styler open source software package to import the *color map* styles and add transparency to selected areas in your raster image (see section 3.c for *color map* details).
  If you have a *single band 24 bit pixel raster*, you will first need to convert your image to one of the formats mentioned above, and then add transparency (see section 3.d for details).

8.0 Curation – Registering Your Views on Map or Layer Quality

There are a number of ways to curate the maps and Layers in WorldMap.

8.1 Certification

Note: *Certification will be enabled on a case by case basis. Contact us if you would like Certification turned on for a user.*

Once certification has been enabled for you, if you go to any Layer page or map information page, on the right hand side there will be a "Certifications" section, just below the "Layer Styles" or "Map Views" section. This will display a list of links to users who have certified the map/Layer, as well as a link to certify (or uncertify) it yourself (assuming you are logged in, and it is not a map/Layer you own).

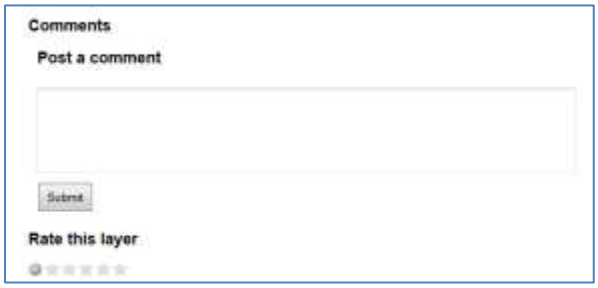
If you go to a profile page of a user who has certified anything, there will be a list of certified Layers/maps at the bottom of the page.

8.2 Annotate a Map (Notes)

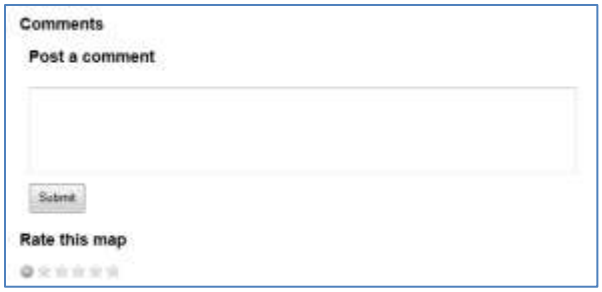
WorldMap supports the creation of annotation in the form of point, line, or polygon for “marking up” a map with comments. Comments are public can be responded to by others. Notes are turned off by default when a user opens a map.

8.3 Ranking and Commenting

Any Layer or Map may be commented on and ranked by anyone. Just go the Layer page or Map page for the Layer or Map you want to comment on. The Layer page may be accessed from the Map it is on by right clicking on the Layer and selecting “Share Layer”. Commenting and ranking capabilities are at the bottom left corner of the page.



To access the Map page for a Map, in the upper right corner of the Map, click “Share Map”. Again, commenting and ranking is at the bottom left of the page.


Comments
Post a comment
Submit
Rate this map

9.0 Appendices

9.1 Accessing OGC services from WorldMap without GetCapabilities

WorldMap has getcapabilities turned off for performance reasons, but if your client supports getmap you can still bring Layer services into your remote map client.

The bare minimum you need to make a GetMap request with OpenLayers (and most other mapping API's):

- Layer typename: on the Layer detail page, everything after the "/data/" part of the URL, for example:
  - geonode:POLICESTATIONS_PT_MEMA
- Geoserver URL's:
  - WMS: http://worldmap.harvard.edu/geoserver/wms
  - WFS: http://worldmap.harvard.edu/geoserver/wfs

You must include "TILED=true" in your GetMap requests.

If you are trying to access services via a pre-existing online/desktop application using WMS/WFS, there's a good chance that the app will try to make a GetCapabilities request when connecting, so the above information won't work.

If your client, such as most browser-based javascript mapping clients, can handle just loading a getmap request you are all set. See below:

Sample Javascript for adding a worldmap Layer to an OpenLayers client

```
new4 = new OpenLayers.Layer.WMS("MA Police Stations [WorldMap]",
"http://ec2-184-73-229-41.compute-1.amazonaws.com:80/geoserver-geonode-dev/geonode/wms",
{LAYERS: "geonode:POLICESTATIONS_PT_MEMA", transparent: "true", tiled: "true"});
map.addLayer(new4);
```

- or -

```
new5 = new OpenLayers.Layer.WMS("CA County Data [WorldMap]",
"http://ec2-184-73-229-41.compute-1.amazonaws.com:80/geoserver-geonode-dev/geonode/wms",
{LAYERS: "geonode:county_Bvu", transparent: "true", tiled: "true"});
map.addLayer(new5);
```

9.2 Software

Styling software no longer being listed here because new automated classification capabilities have been added within WorldMap in the styling tool. See Section 5.3 (Classify Tool) above.

Desktop tool for converting Excel, GPS, or Google Earth files to Shape for uploading to WorldMap:
Minnesota DNR Garmin

QGIS – Full featured Open Source GIS, great for creating the shape files WorldMap likes:
http://www.qgis.org