

# Diversity GIS Editor –

a GFBio compliant tool for processing  
geographical object information  
in biodiversity research and citizen science projects

Wolfgang Reichert, Markus Weiss, Wolfgang Ahlmer,  
Iris Leininger, Dagmar Triebel

## The Diversity GIS Editor

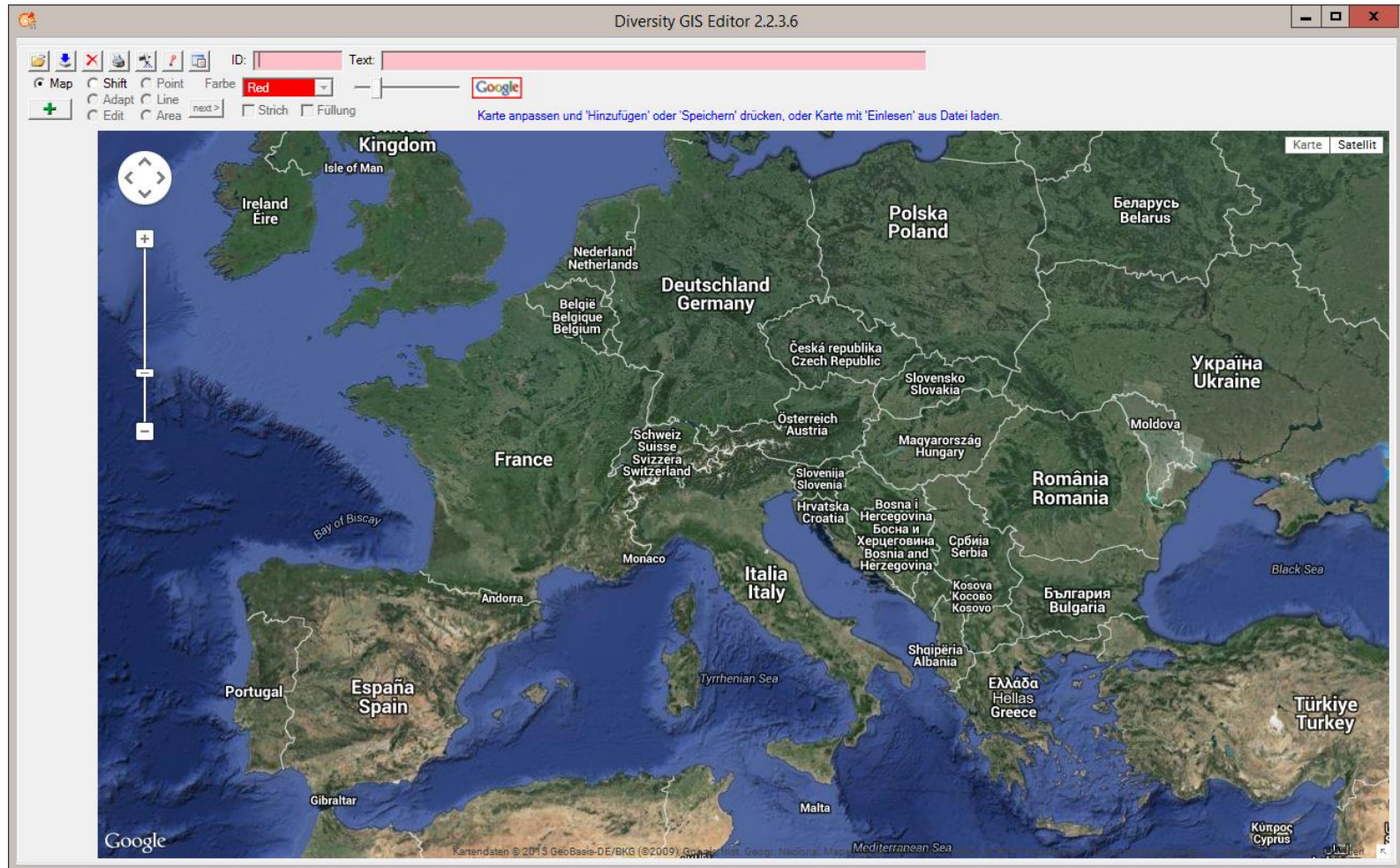
- A tool to create, visualize, edit and archive samples within a geographical environment
- An integrated component in Diversity Workbench (DWB) client-server applications (e.g. DiversityCollection, DiversitySamplingPlots...)
- DWB network installations for biodiversity data management are compliant to the GFBio infrastructure (“German Federation for Biological Data”)
- The Diversity GIS Editor might be well used as a stand-alone application
- The use is free of charge.

Download: <http://diversityworkbench.net/Portal/DiversityGisEditor>

Because of its user-oriented functionality and ease of operation the Diversity GIS Editor is especially appropriate for biodiversity monitoring research and citizen science projects with restricted access to advanced institutional IT infrastructure

The GIS-Editor surface has 3 regions: The control panel at the top, the working area in the middle and the sample list at the left.

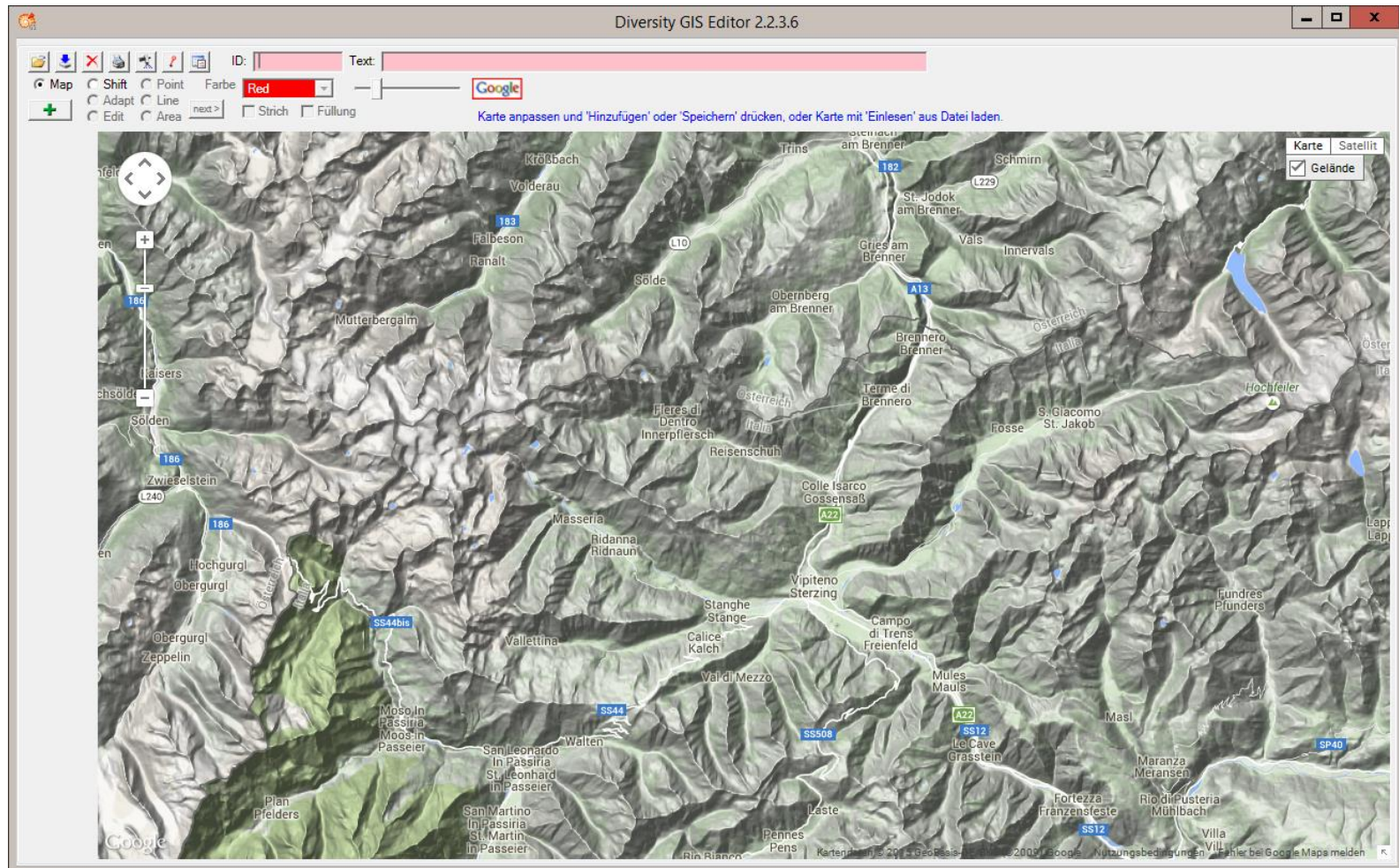
The first thing what is needed to deal with geographical objects is a georeferenced background map.





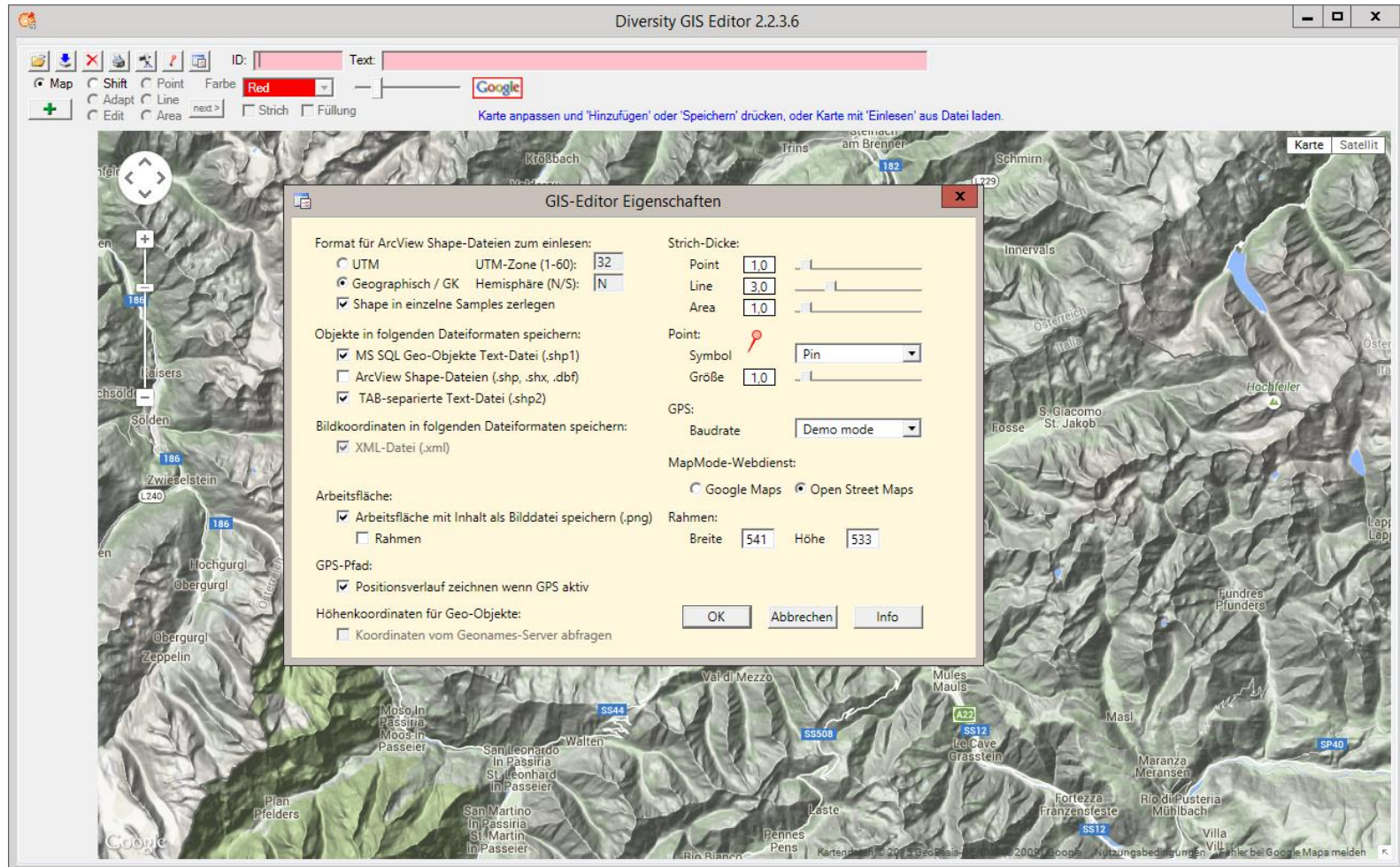
If there is an internet connection, such a map can be created with the Map mode of the GIS Editor.

It shows a webbrowser in the working area which uses the Google maps service of the SNSB in Munich and you may select a map which fits to your needs.



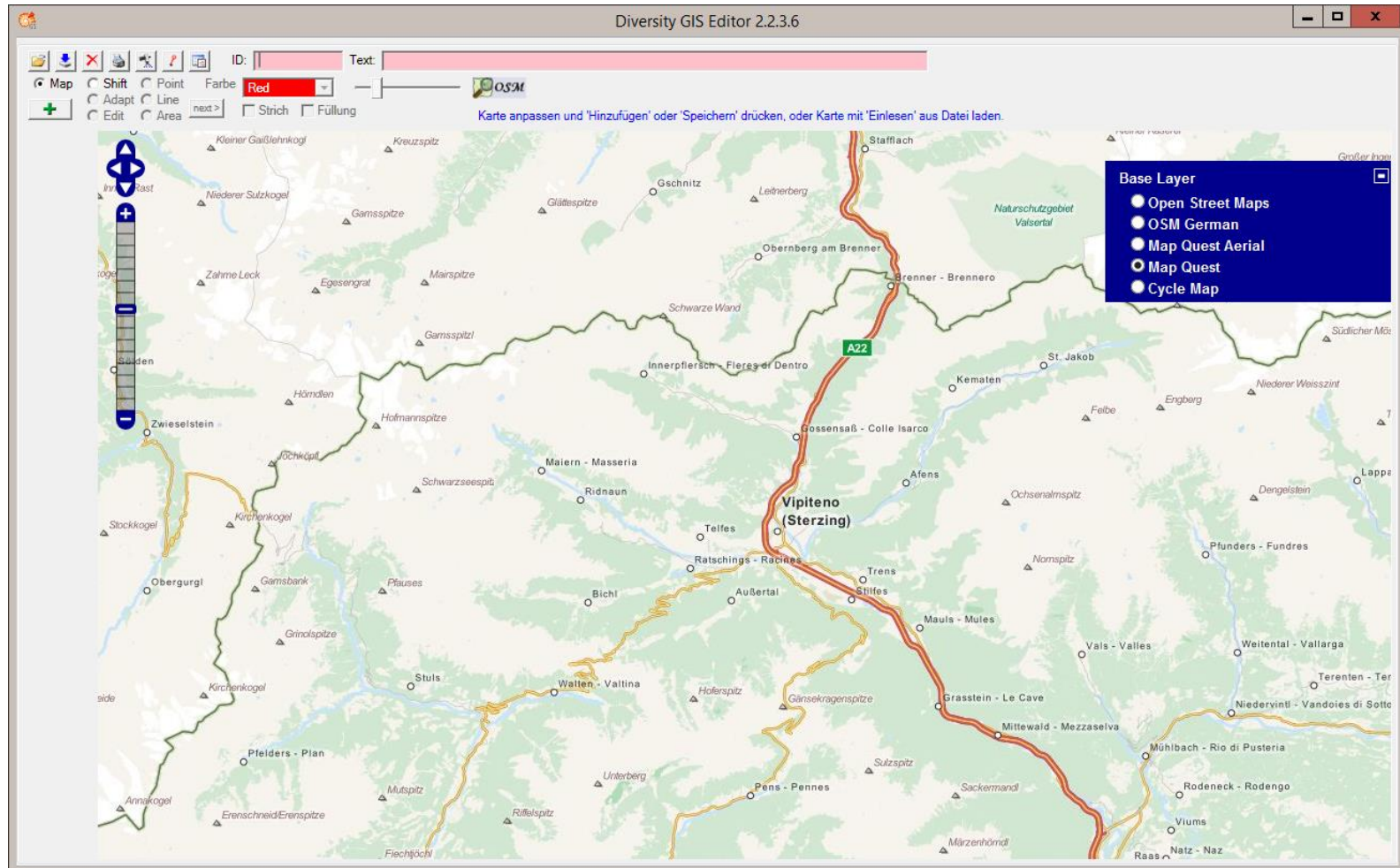
If you want to publish the map offline, you might get licensing problems with Google.

So another map service is provided which uses Open Street Map. It can be selected in the Settings window.



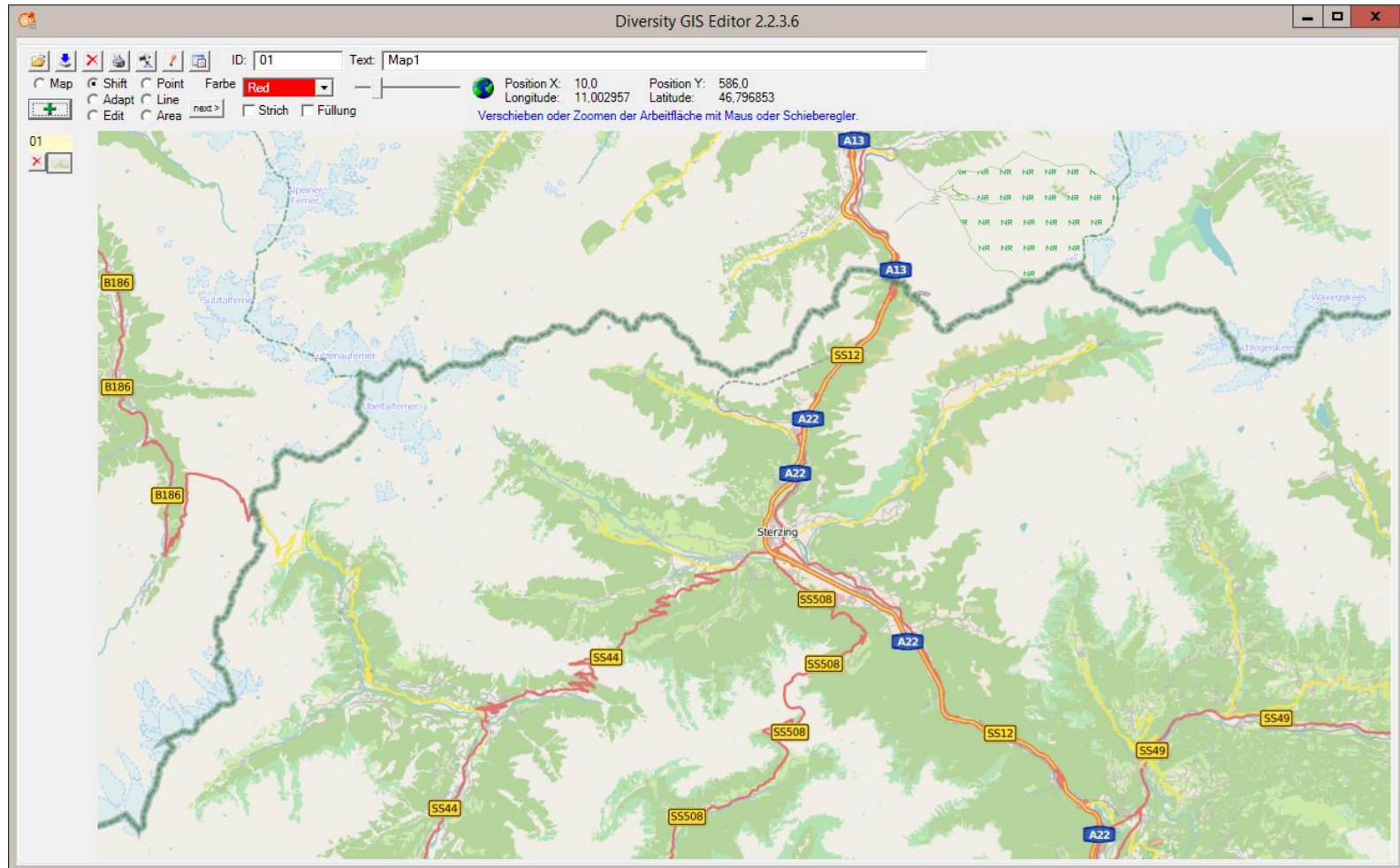


The services offer a couple of layers which can be chosen using the map controls.

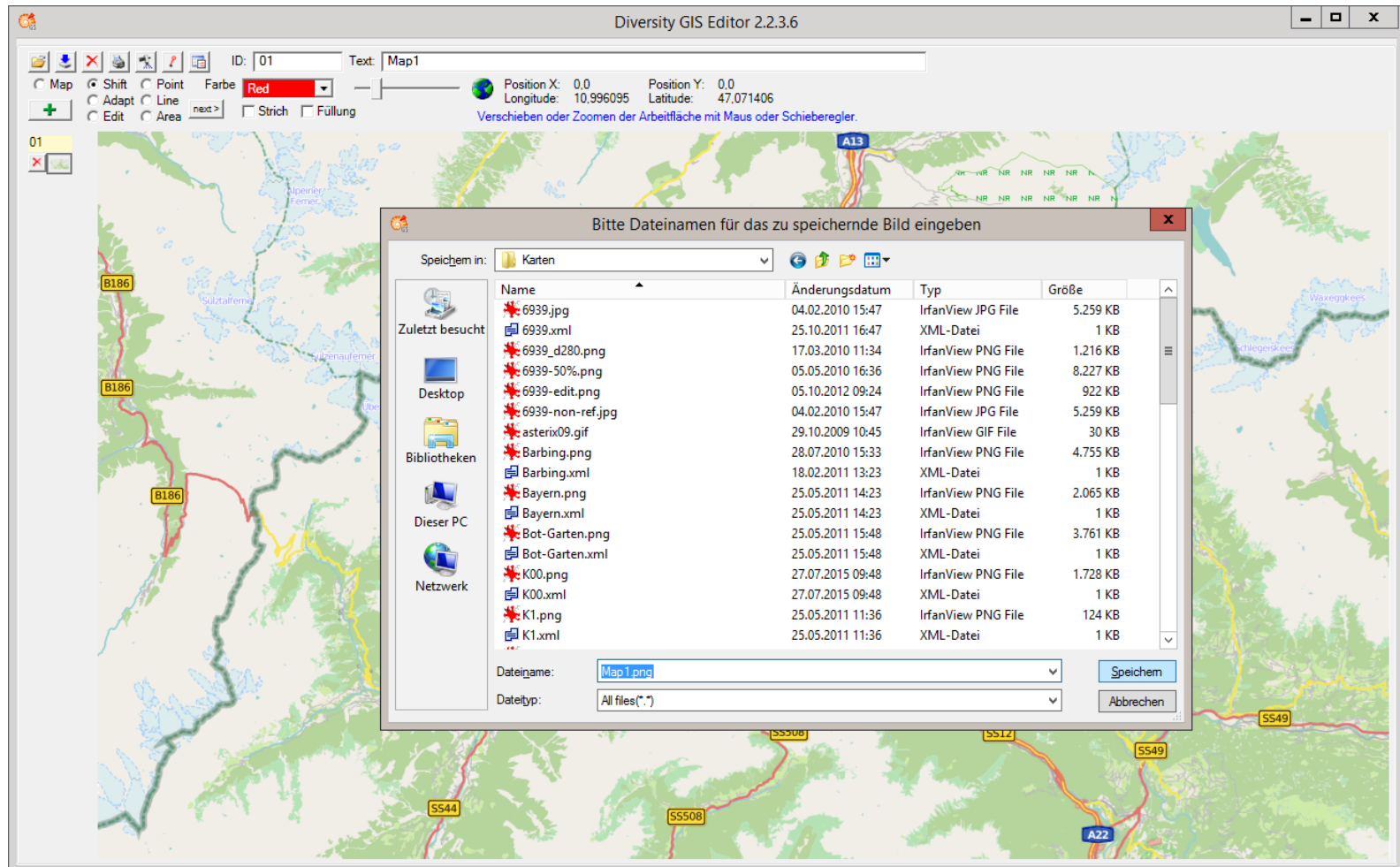


Finally the controls could be switched off, an ID and a description could be set, if desired, and then press the Add button to put the map as a first sample to the list.

Now the map is frozen as a georeferenced local image on the computer.

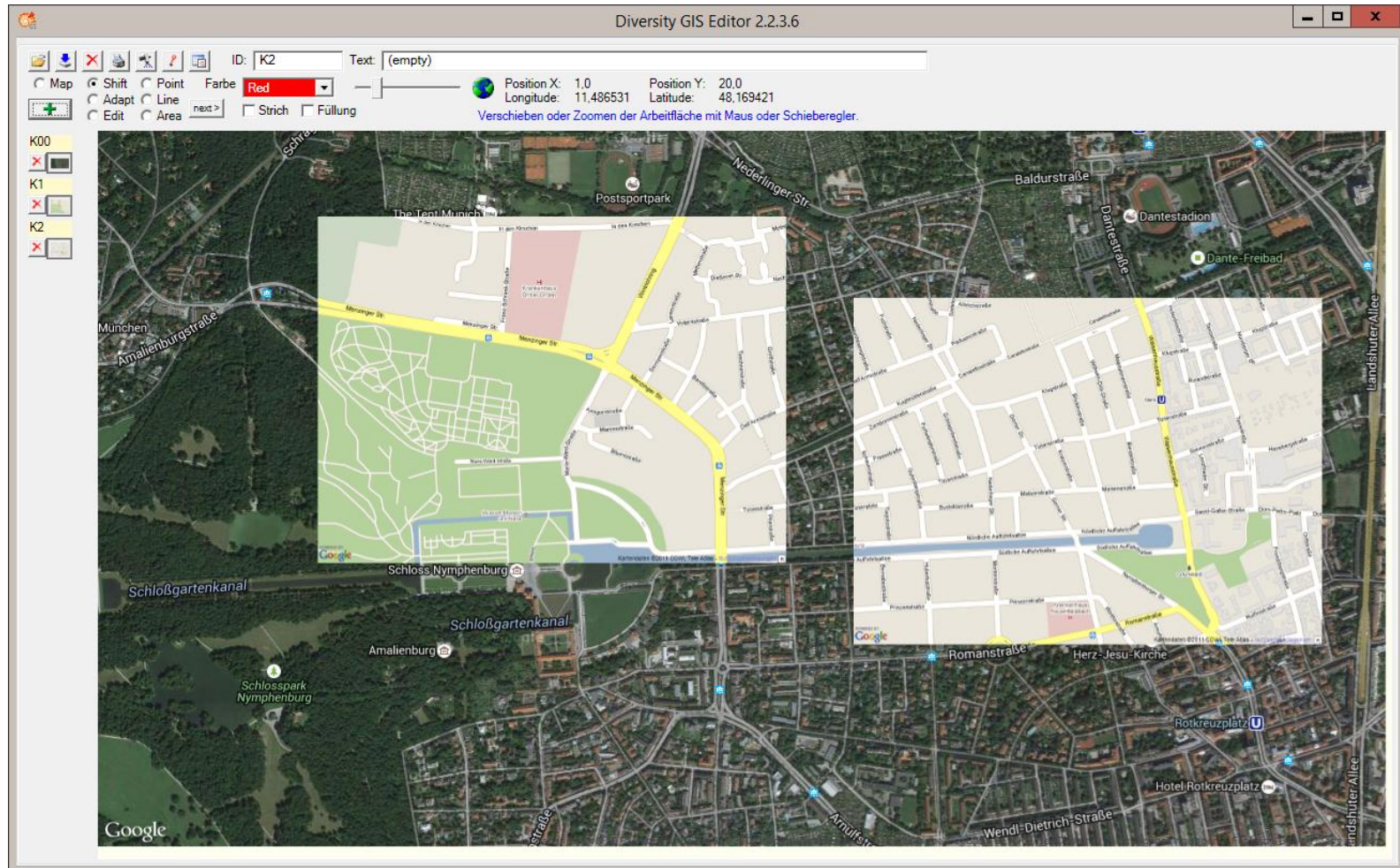


To keep the map for future use, press the Save button instead of Add and it will be stored on a memory device.  
So you may create a collection of maps which can be used offline and read from disk by clicking the Load button.



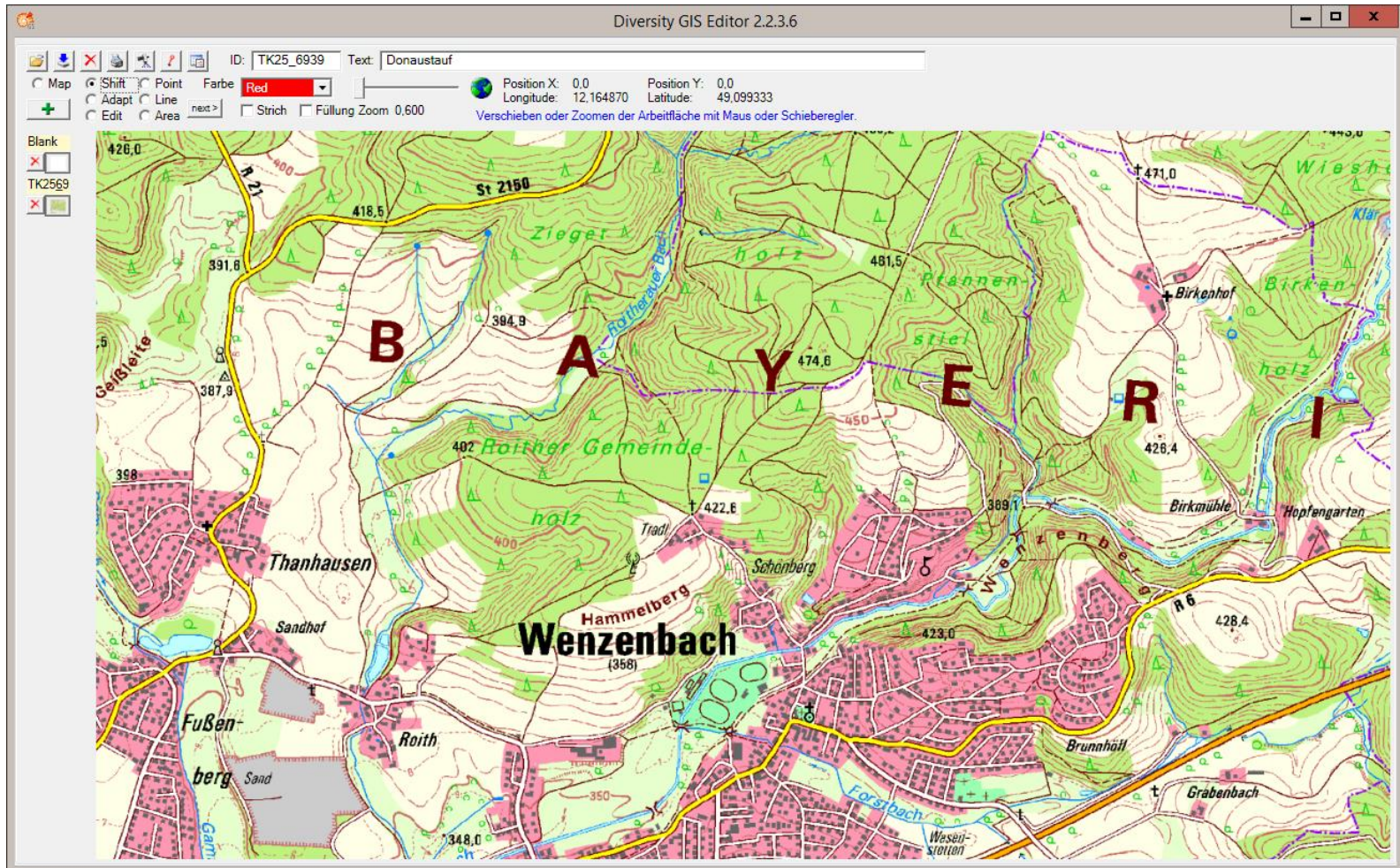


The first loaded map is always the reference map. Any further map will be adapted automatically to this background map according to its coordinates.





There are also external maps provided, which collectors are permitted to use, e.g. the TK25 topographical maps of Bavaria. If the loaded map is bigger than the working area, it can be shifted to the region of interest. You may zoom in and out on the map with the slider.



## **Map mode - Create, save and load a georeferenced background map**

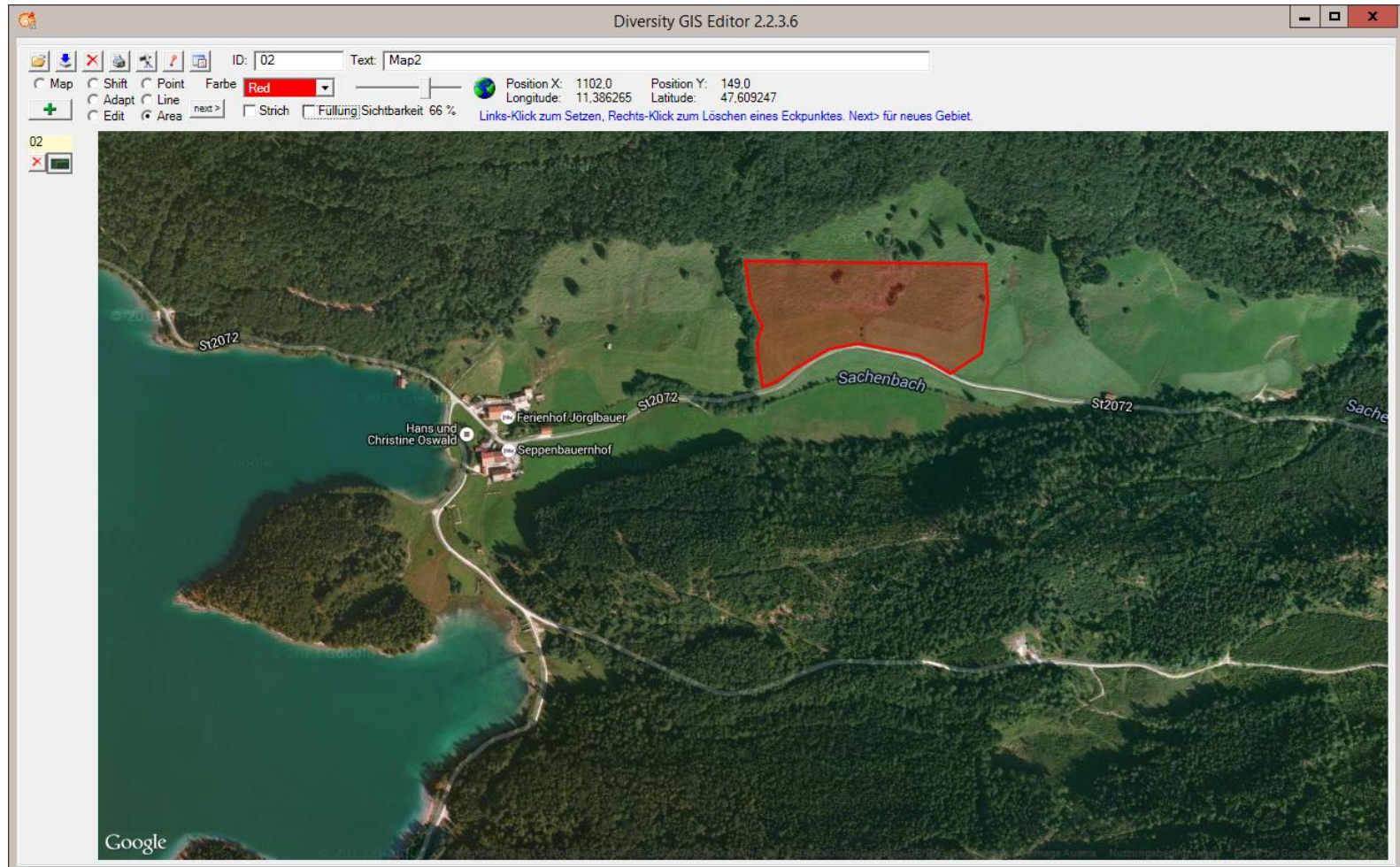
- Connection to the internet required
- Google maps and Open street map services provided
- Maps can be created and saved on disk for off line use
- External maps are provided, e.g. TK25 topographical maps of Bavaria
- First map is reference map, further maps are embedded according to their coordinates

## **Shift mode**

- Loaded maps in the working area can be shifted (useful for big maps)
- Maps can be zoomed in for details and out for overview

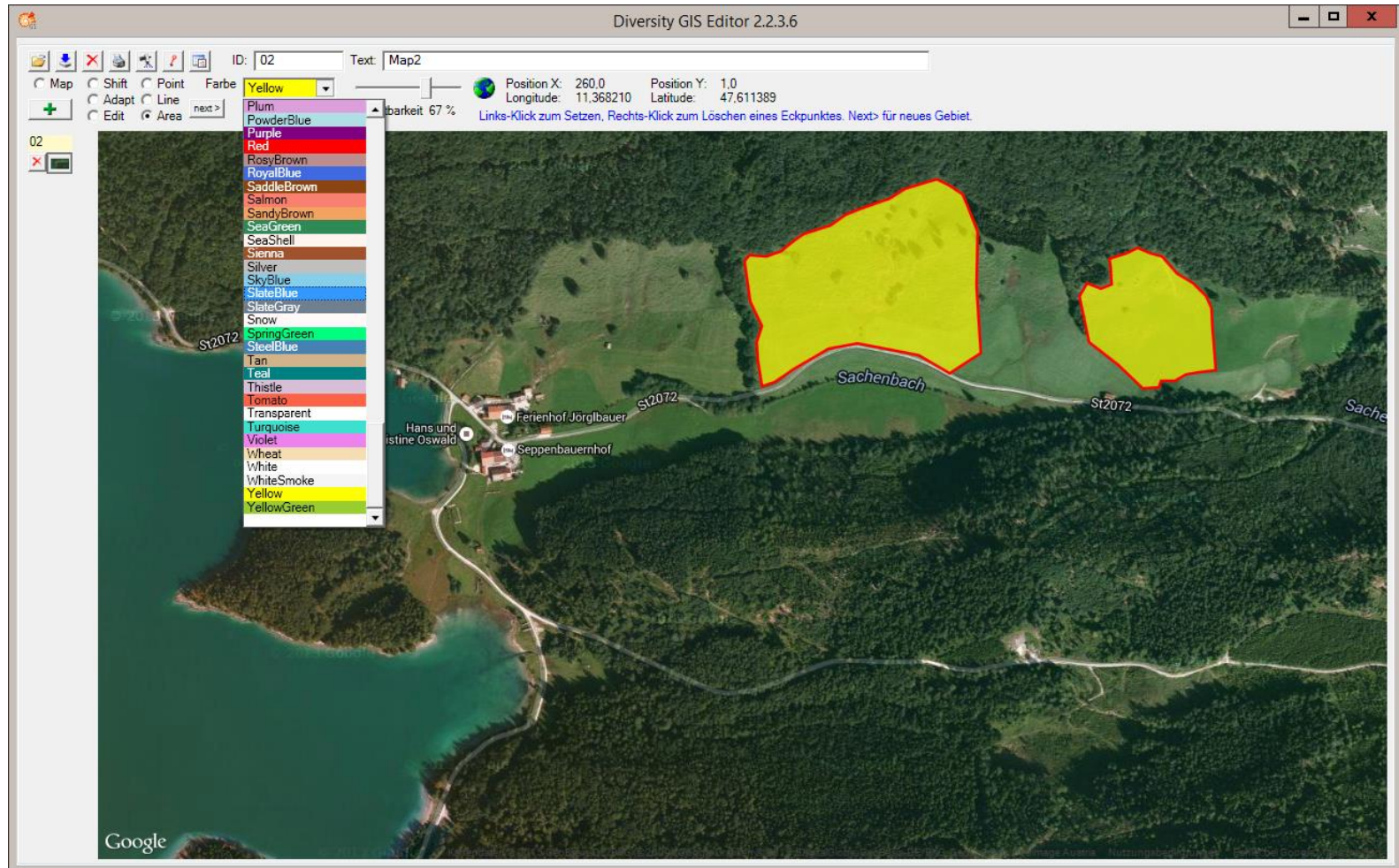


In Area mode you may create a region on the map by setting corner points just by clicking the left mouse button. Clicking the right mouse button will remove the latest point from the area again. A rubber band allows an exact positioning of the points.



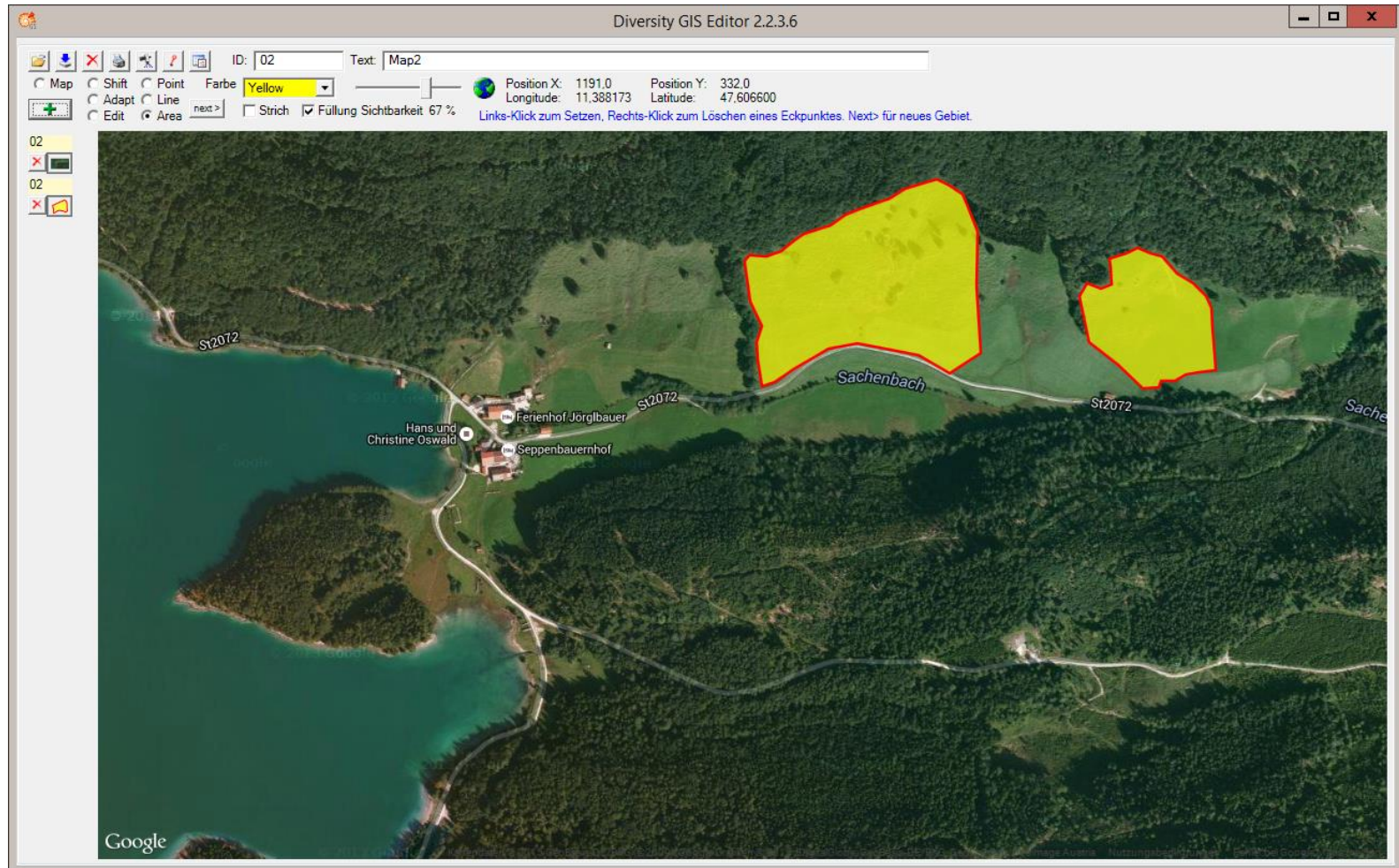
Multiple areas within one sample may be composed with the Next button.

For stroke and filling of the area, the color can be adjusted with the drop down list in the control panel, and the opacity with the slider.



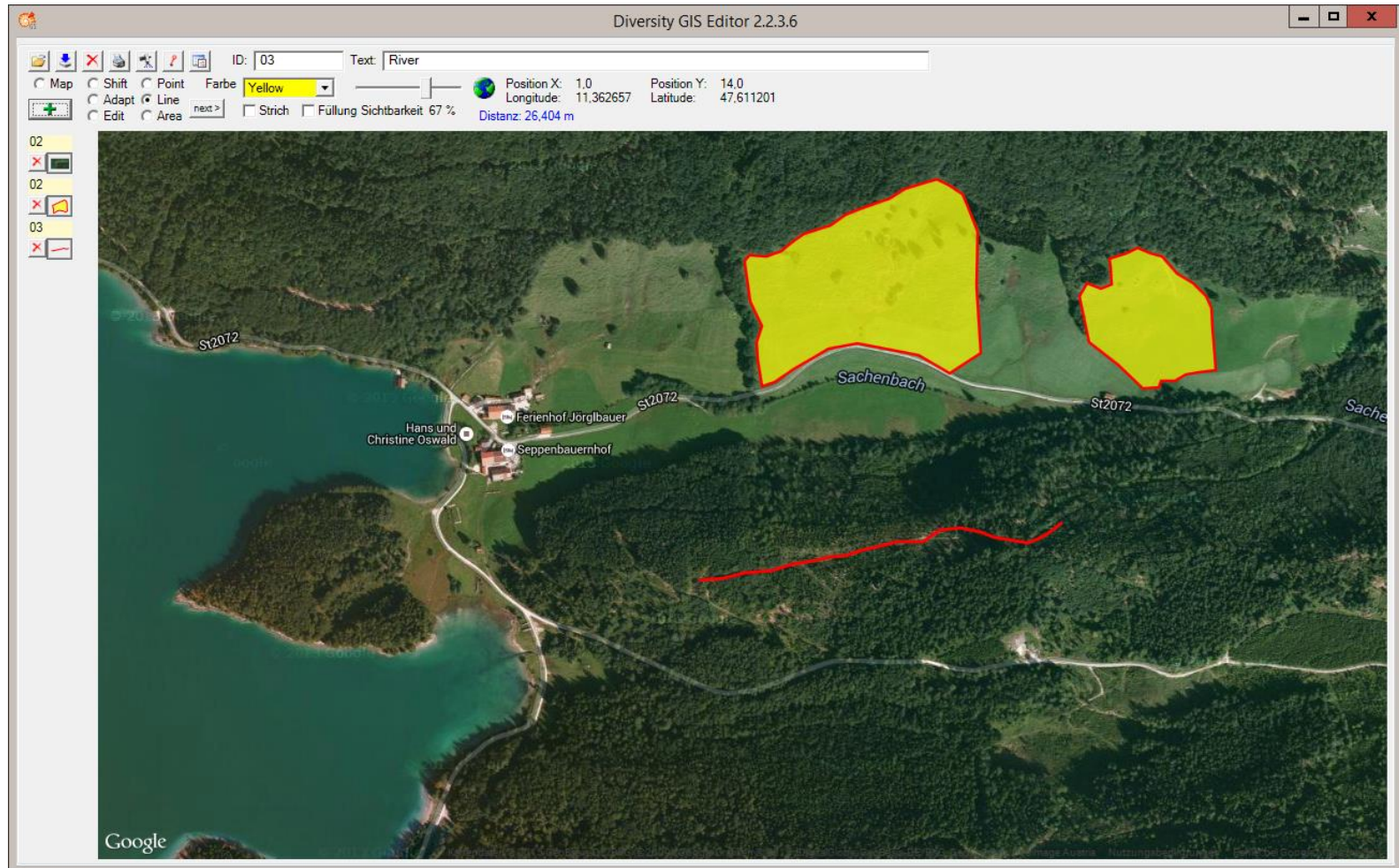


Clicking the Add button will put the shape to the sample list.





In a similar way you can create Linestrings, which might represent roads or rivers, and add them to the sample list. If you look at the status bar in the control panel, you see that the distance of the last line section is displayed there.



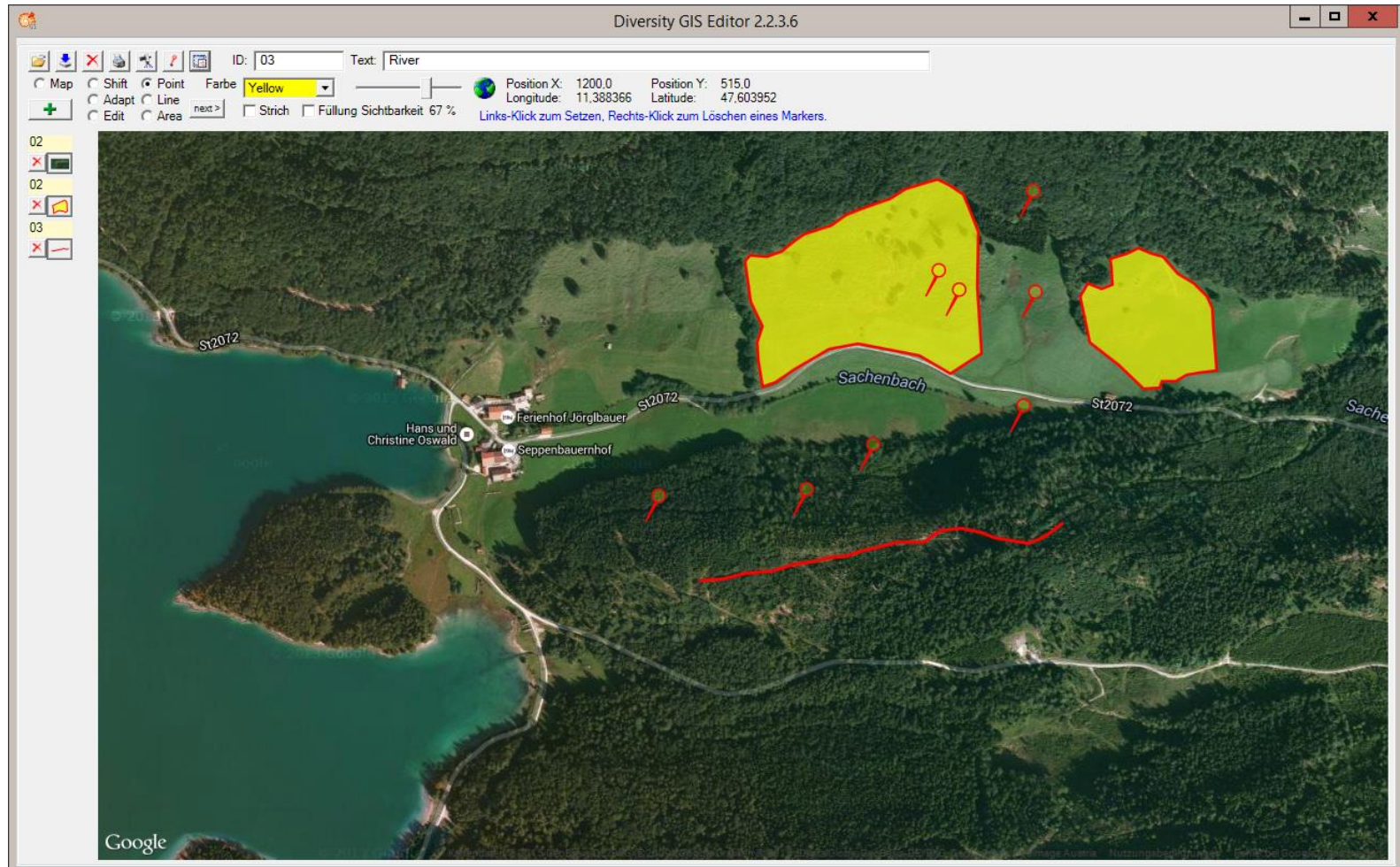
## **Area mode - Create a region**

- Set corner points by clicking the left mouse button
- Remove latest point by clicking the right mouse button
- Create multiple areas using the Next button
- Select color for filling and stroke from drop down list of the control panel
- Adjust opacity for filling and stroke with the slider
- Click add button to add to sample list

## **Line mode - Create a line string**

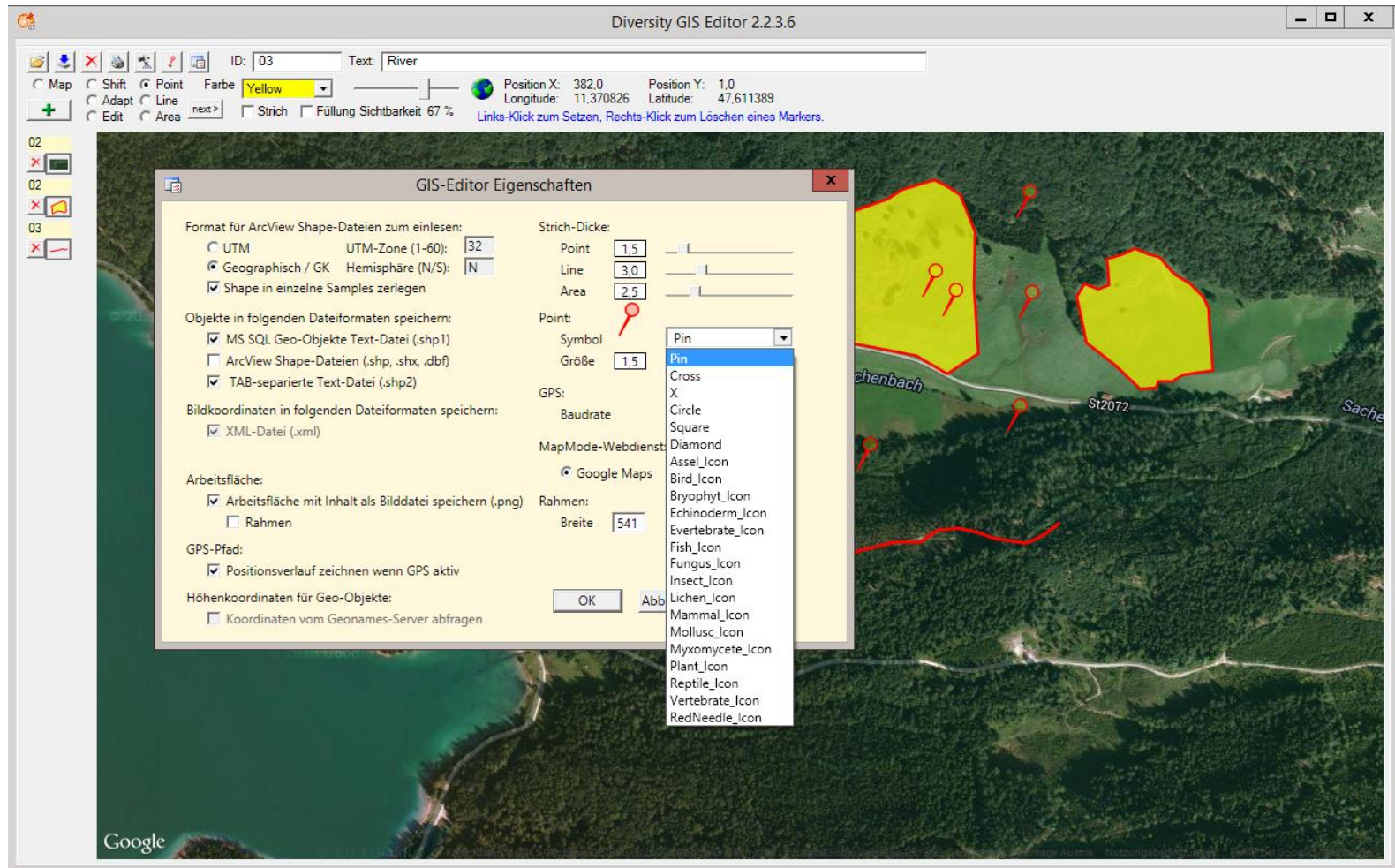
- Similar to Area mode
- No filling which could be adjusted
- Distance of the last line section is displayed in the Status line

Probably the most frequently used feature of the GIS Editor is setting object markers on a reference map. Select Point mode and just click at a place to create a point location.



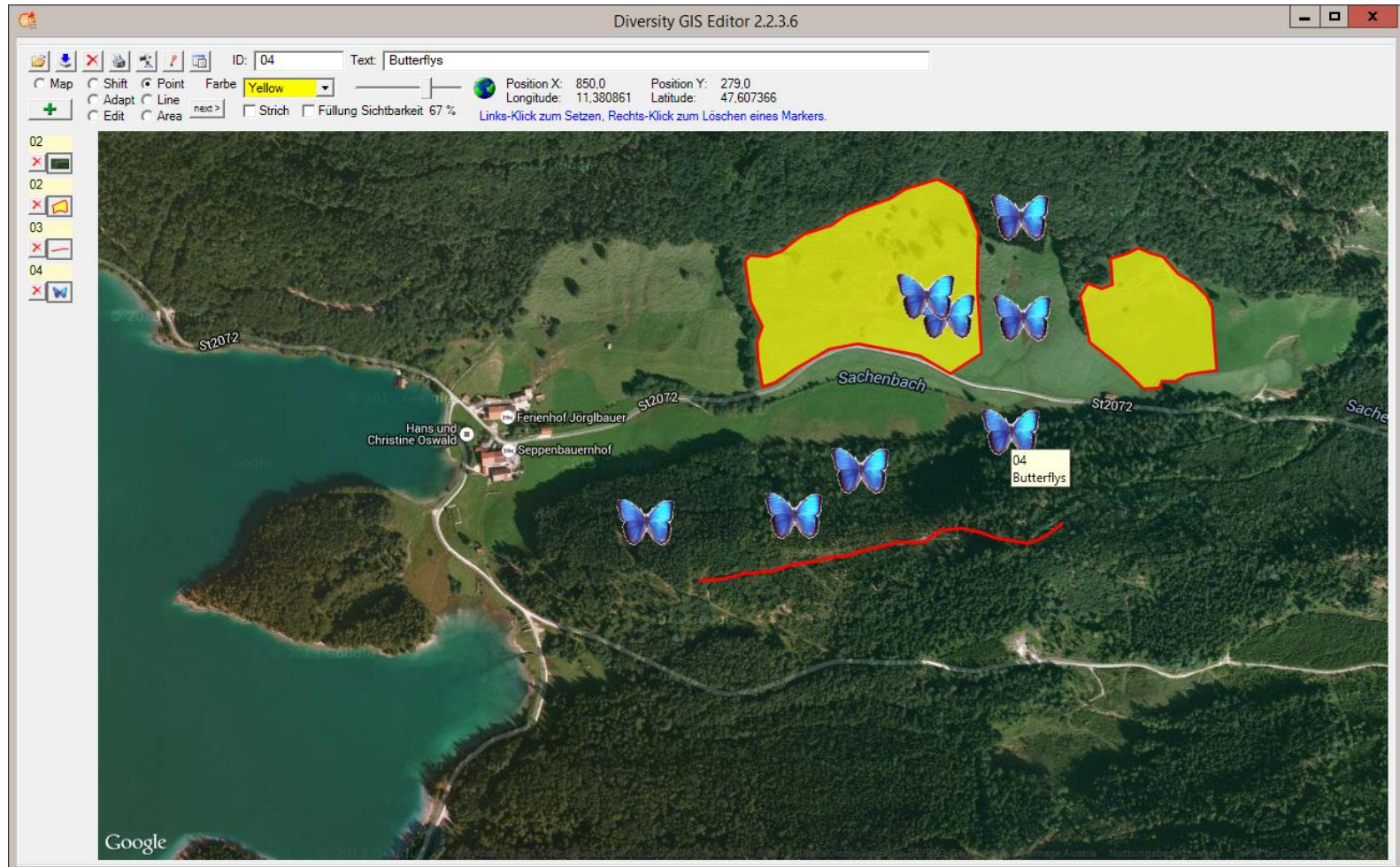


Open the Settings window to adjust stroke thickness, size or shape of the marker.  
You can also choose an icon from the point symbol list.



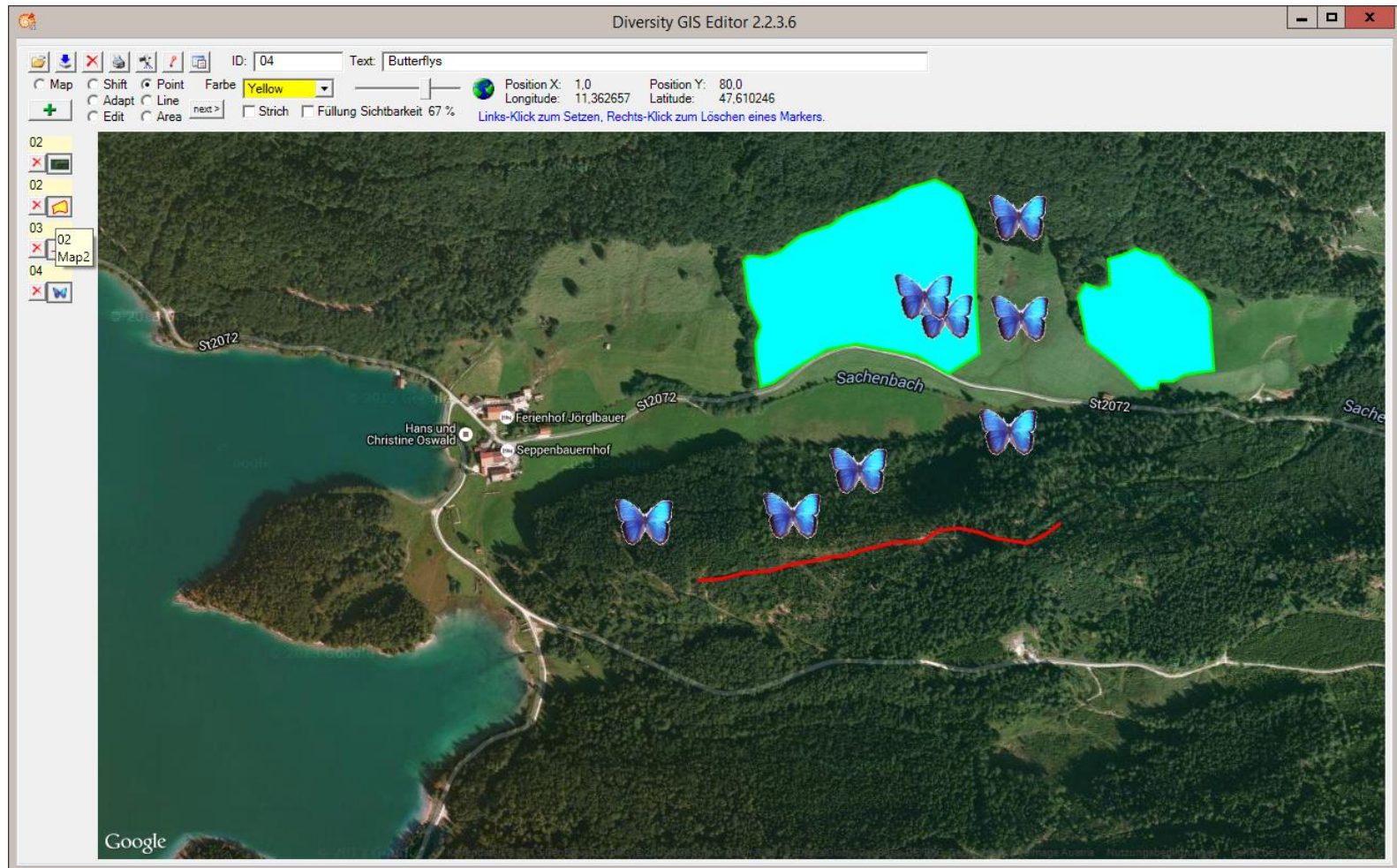
Again add the markers collection to the list with the Add button.

If you hover the mouse over a shape, ID and description will be shown as a tooltip.



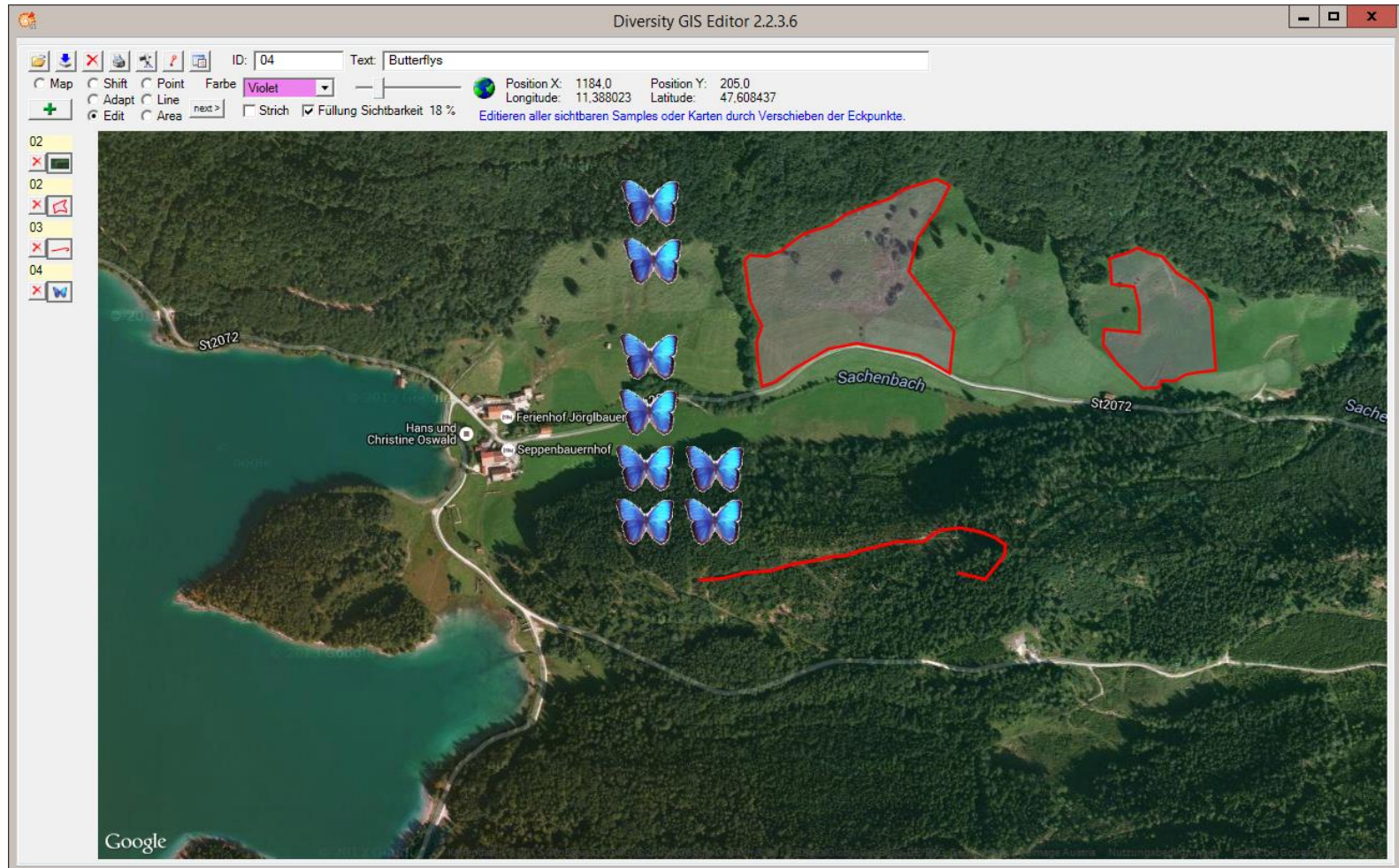


If you touch a button in the sample list, additionally the shape will be marked on the working area.  
The samples can be switched off and on by clicking the toggle buttons.



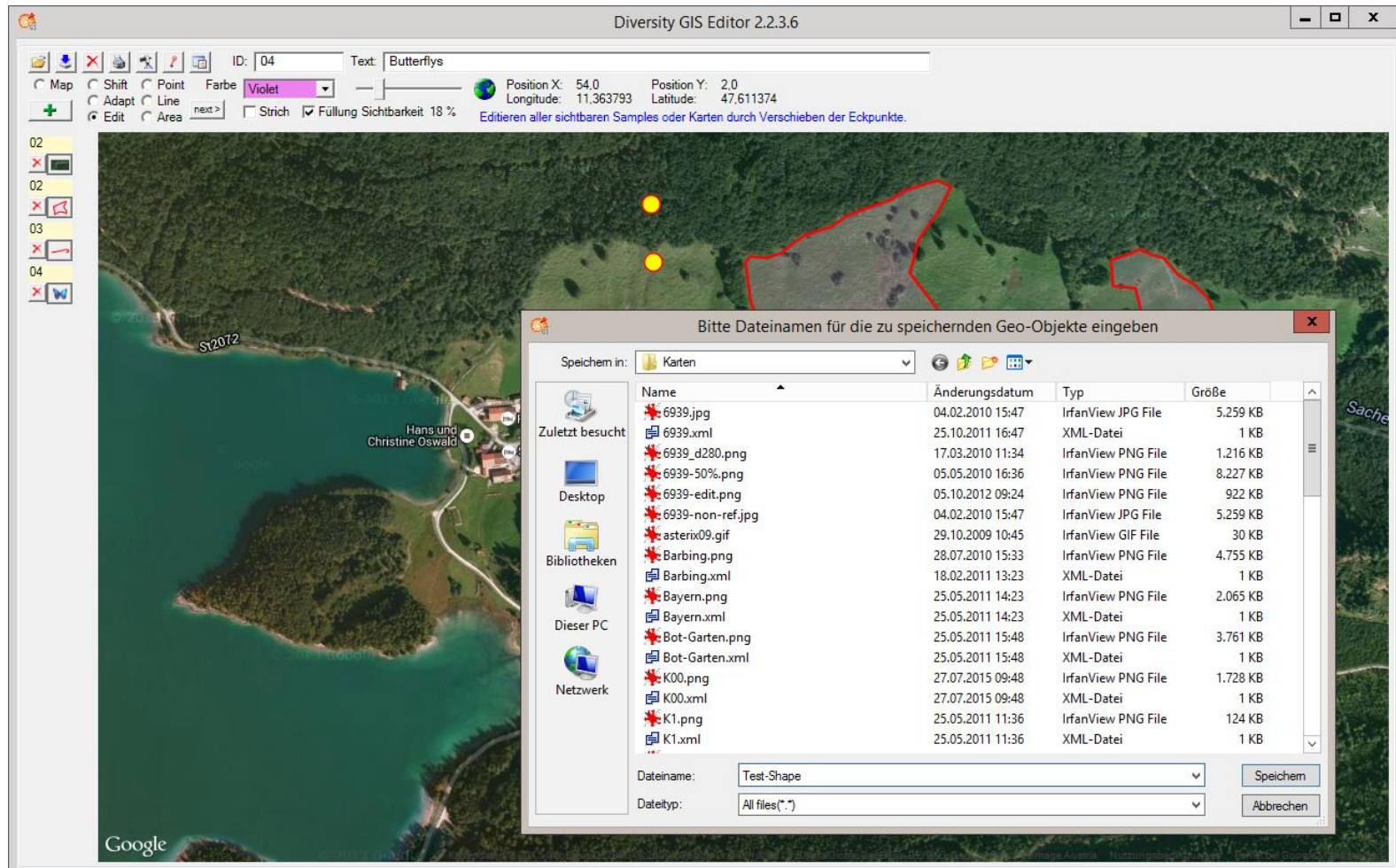


In Edit mode, all visible samples may be changed subsequently in shape, color and transparency.  
Just select a corner point of a shape and drag it with the mouse to a new position.  
Use the drop down list to change the colors and the slider to adjust the transparency.



Adjust stroke thickness, size or shape of the marker in the Settings windows.

Press the Save button to store the shapes on the harddisk.





## **Point mode - Create object markers**

- Setting object markers by clicking the left mouse button
- Remove latest marker by clicking the right mouse button
- Adjust stroke thickness, size or shape of the marker in the settings window
- Select icons for markers

## **Sample list**

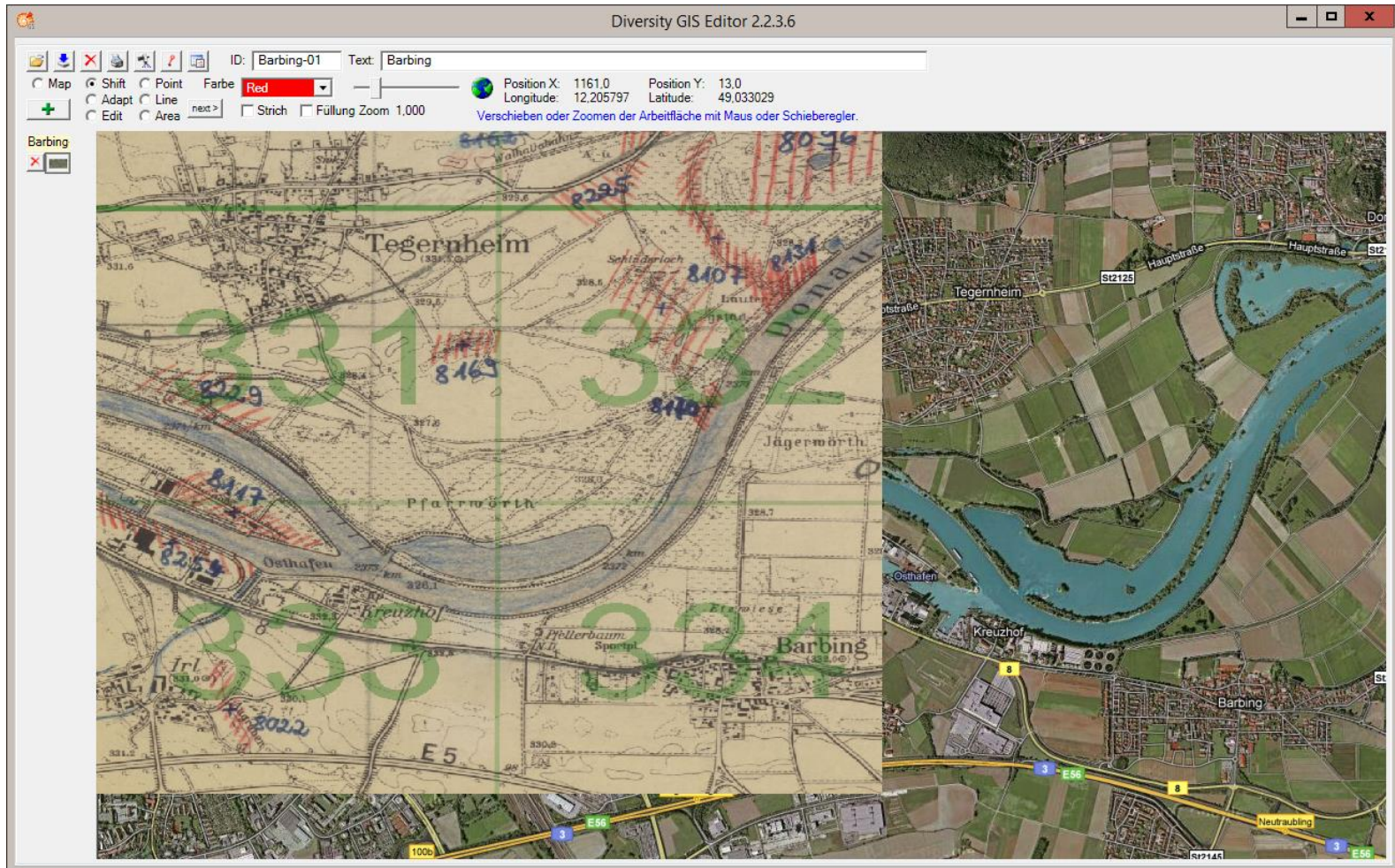
- Tooltips with ID and Description when touching Samples with the mouse
- Switching samples off and on with toggle buttons
- Store shapes on a memory device by pressing the save button

## **Edit mode - Change all visible samples in shape, color and transparency**

- Change shape by selecting a corner point and drag it with the mouse
- Change color by using the drop down list
- Change transparency of fill and stroke with the slider

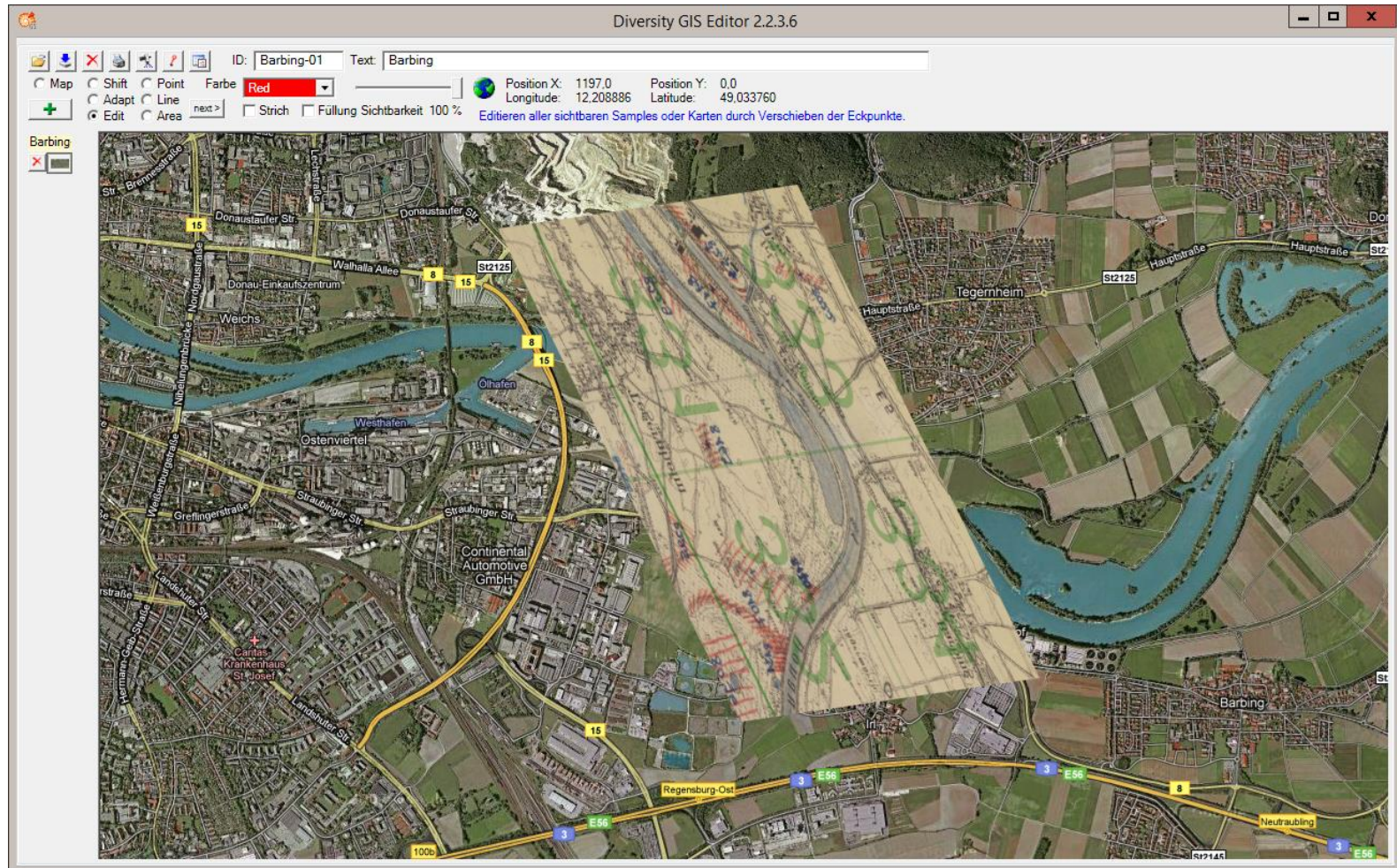
There are many historical paper maps containing written data from collectors, and it would be very useful to preserve these maps for the digital world. So they must be scanned and provided with coordinates.

To do so, select the Edit mode and load a map of the desired region, and then load the scanned image. It will not be adapted to the background map, because it has not yet coordinates.





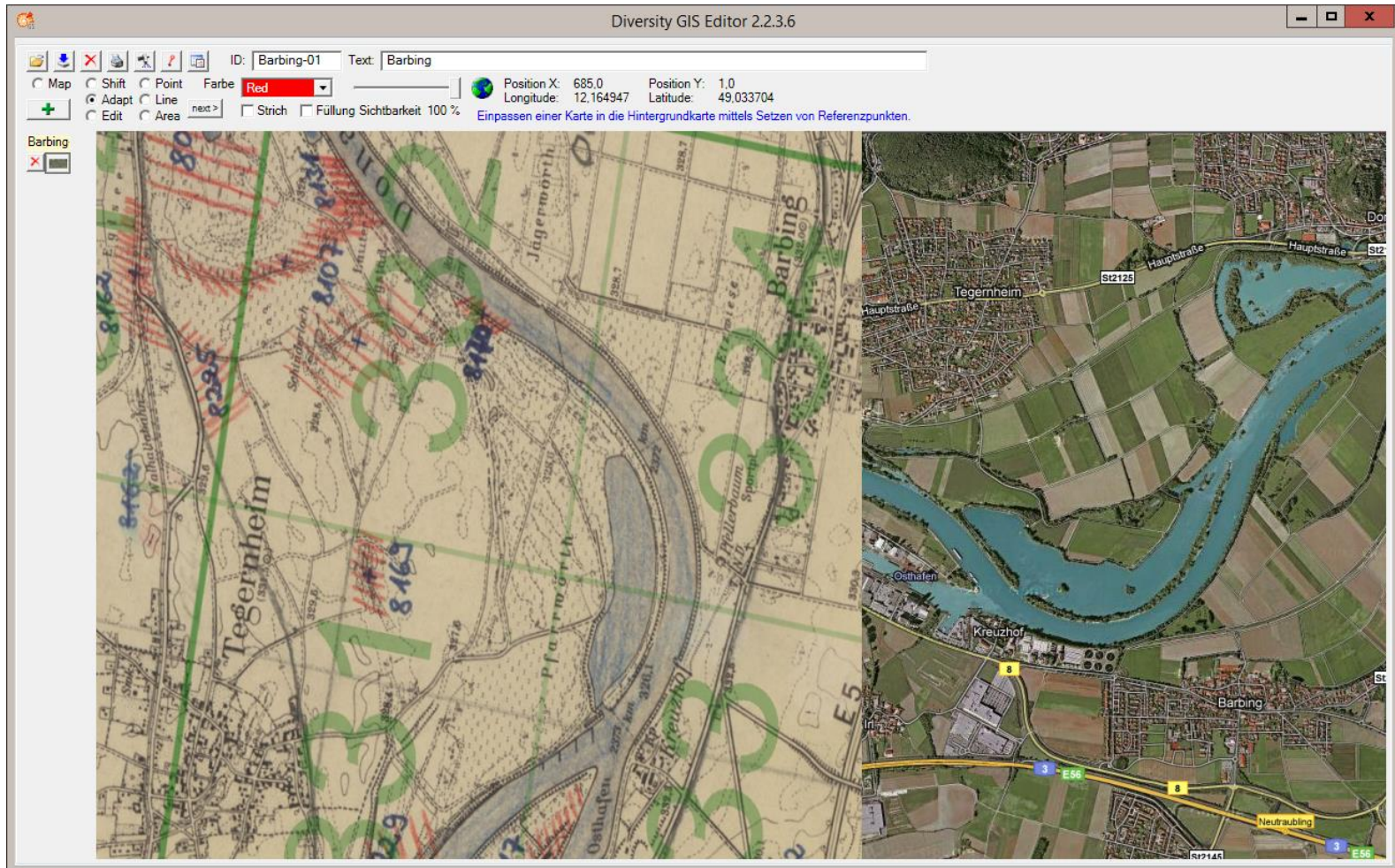
Now you may shift, scale or deform the picture depending on the corner point, which you grab with the mouse. When it finally matches the background map, save the adapted picture and coordinates will be assigned according to its position on the reference map.





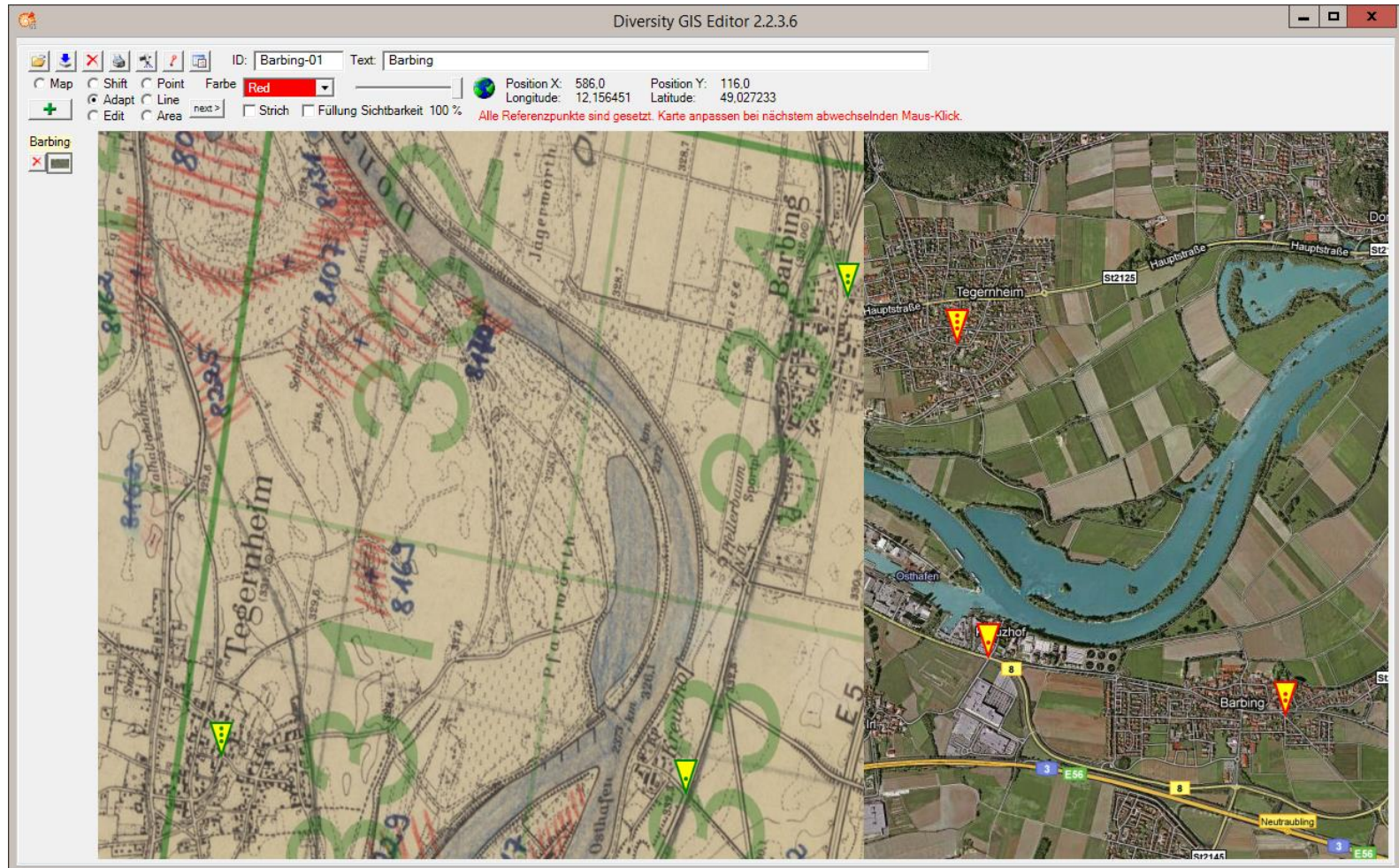
Much easier for georeferencing maps is the use of the Adapt mode.

Load the scanned image on an appropriate background map, even if it is rotated or distorted.



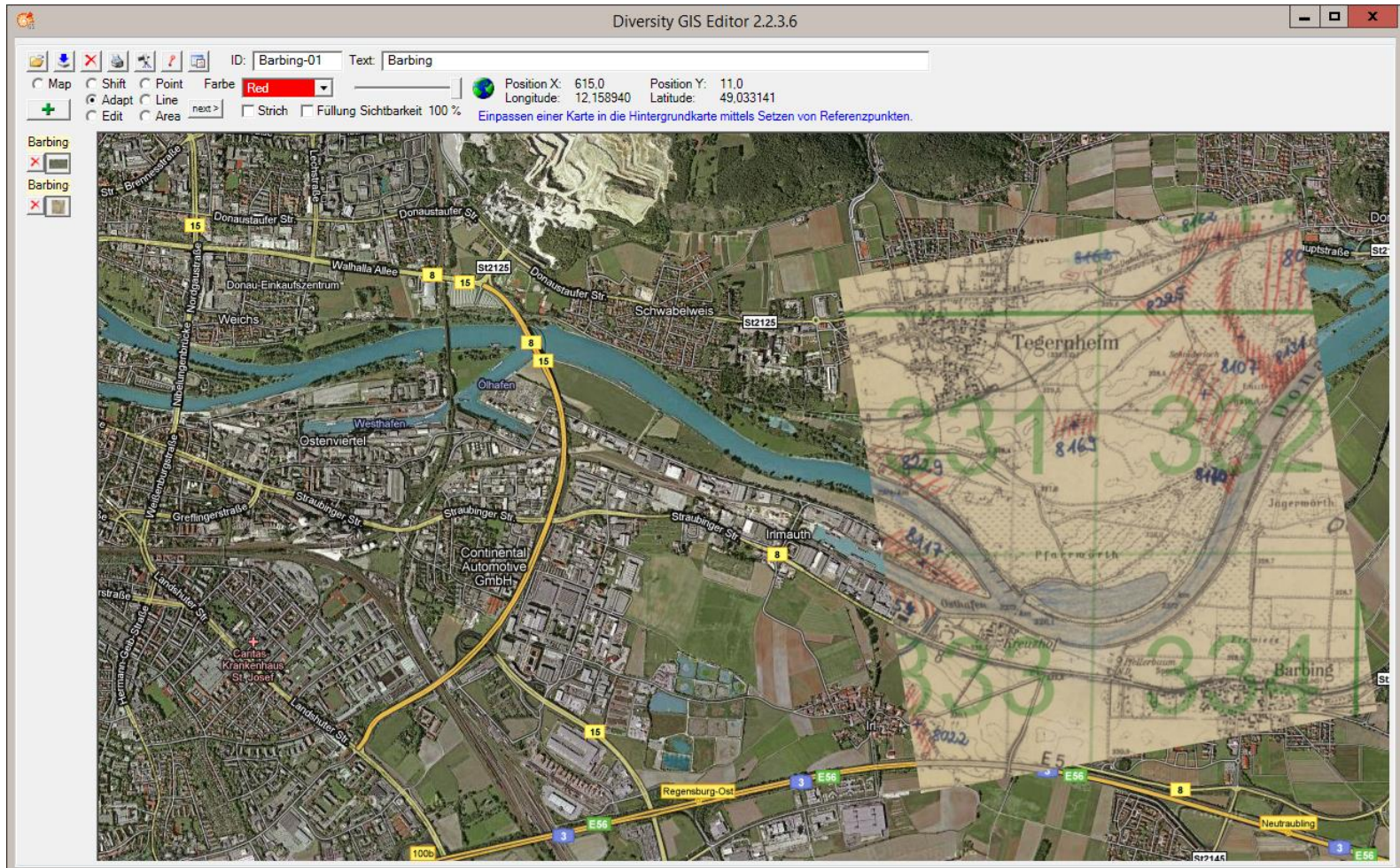


Now select 3 pairs of corresponding landmarks with the mouse alternately on the reference map and the historical map.





The next click will adjust the picture automatically to the background map and the georeferencing has been done.





## **Edit mode - Geo referencing of maps without coordinates**

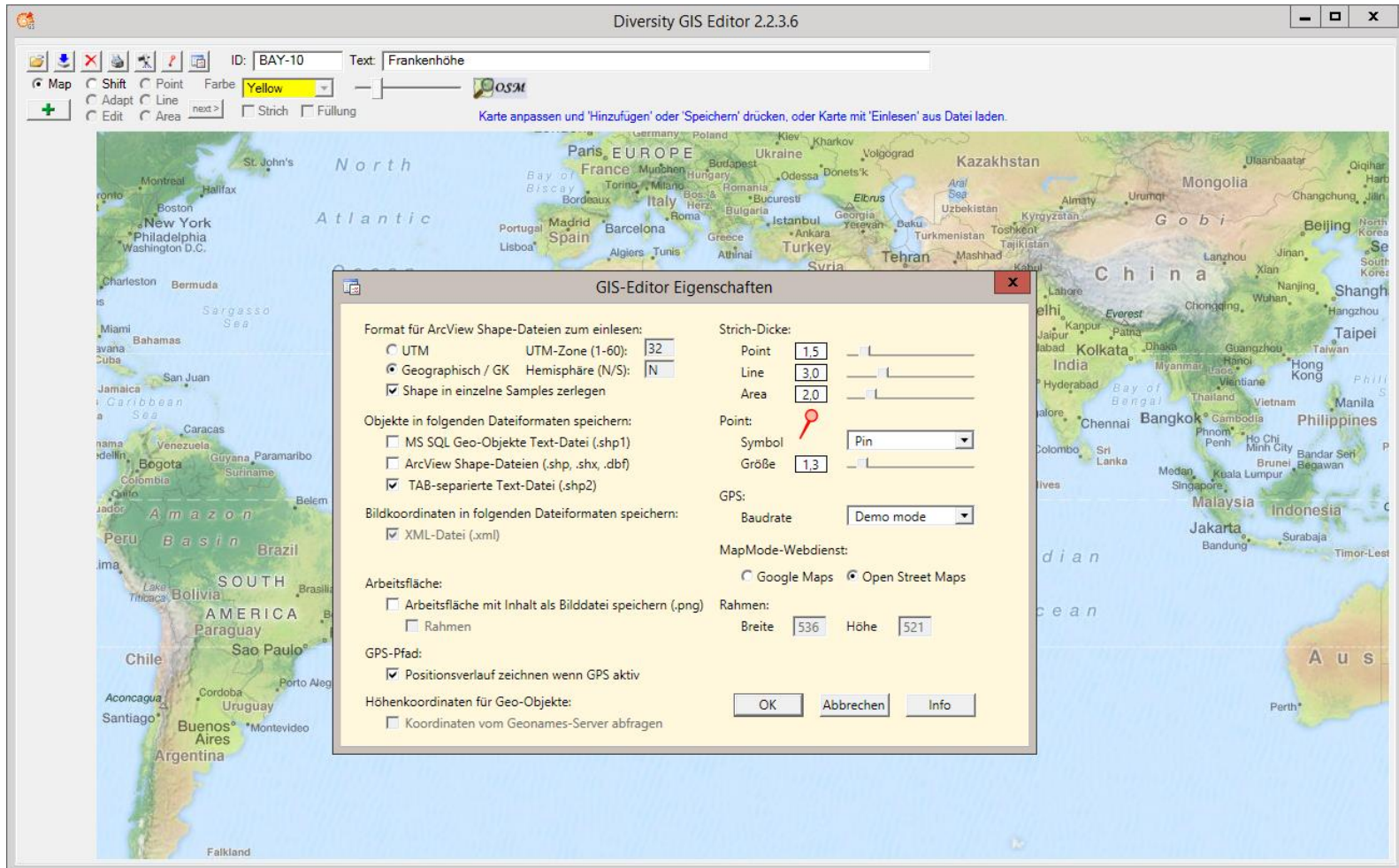
- Load a scanned map picture to the working area using the Read button
- Shift the picture by dragging the upper left corner point with the mouse
- Scale the picture by dragging the lower right corner point with the mouse
- Distort the picture by dragging the upper right or lower left corner point
- Saving the adapted picture will store its coordinates according to the position on the background map

## **Adapt mode - Geo referencing of maps without coordinates**

- Load a scanned map picture to the working area using the Read button
- Select 3 pairs of corresponding landmarks on both maps
- The scanned map will be adjusted automatically to the background map
- Saving the adapted picture will store its coordinates

The GIS Editor supports 3 kind of formats to load or save shape files from disk: SQL Geo objects with attributes, ArcGIS binary shape files and TAB separated text files.

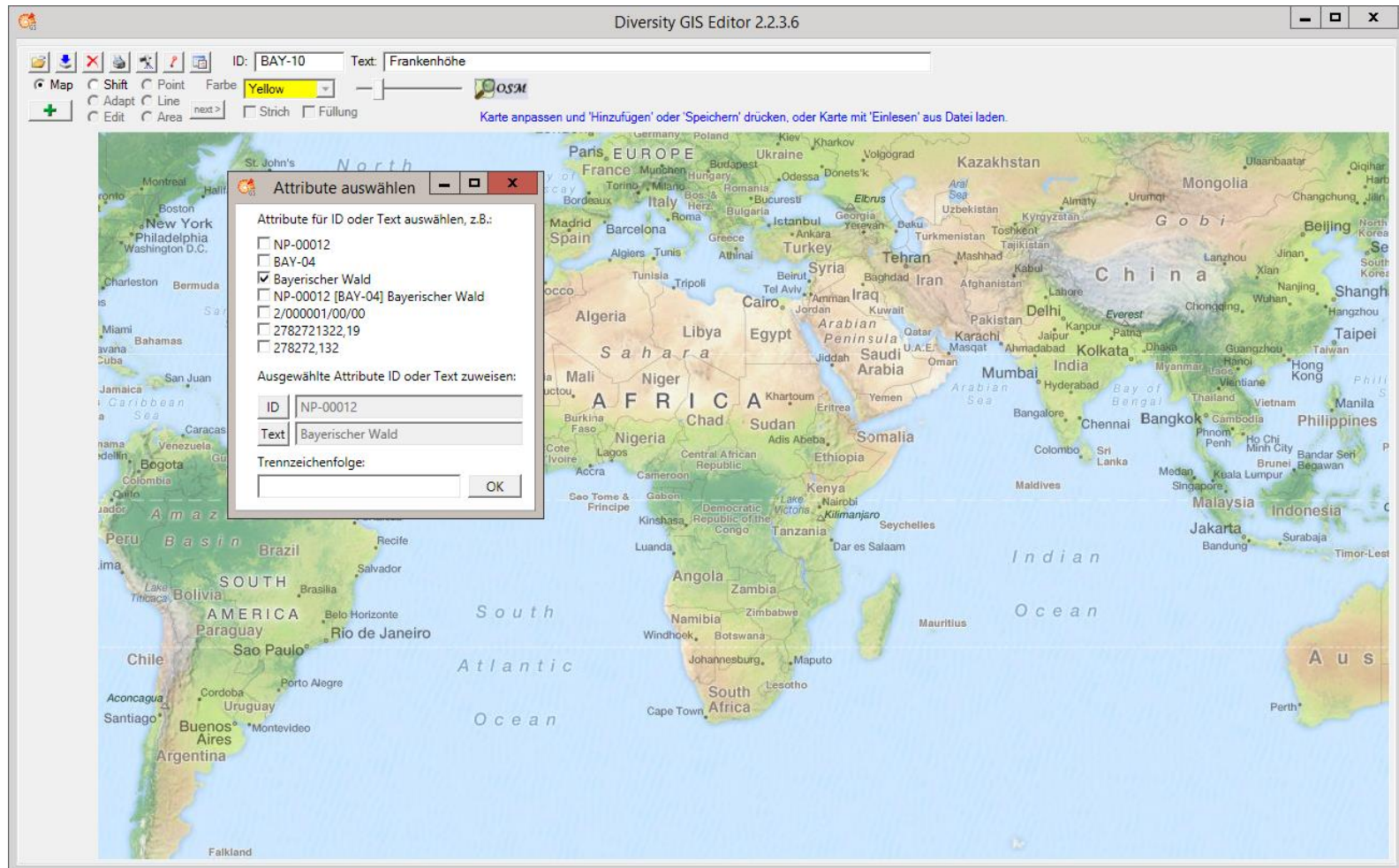
ArcGIS shapes may contain WGS84, Gauss-Krüger or UTM coordinates, which are automatically converted to the GIS Editor's coordinate system when loaded.



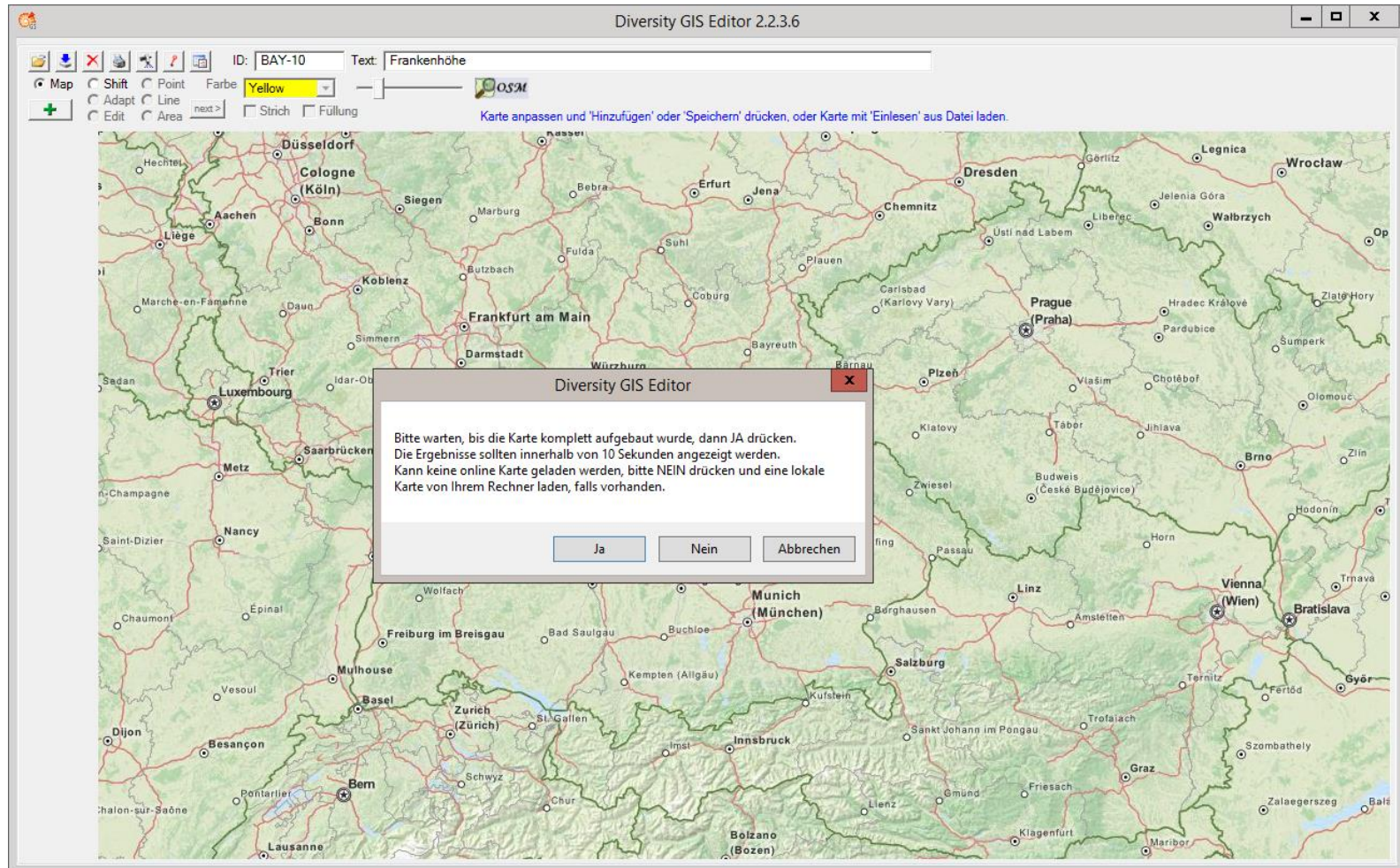


You may treat the shapes as one sample or split them into their components.

If an ArcView attributes file is available, you may select the sample ID and Description from the attribute entries.



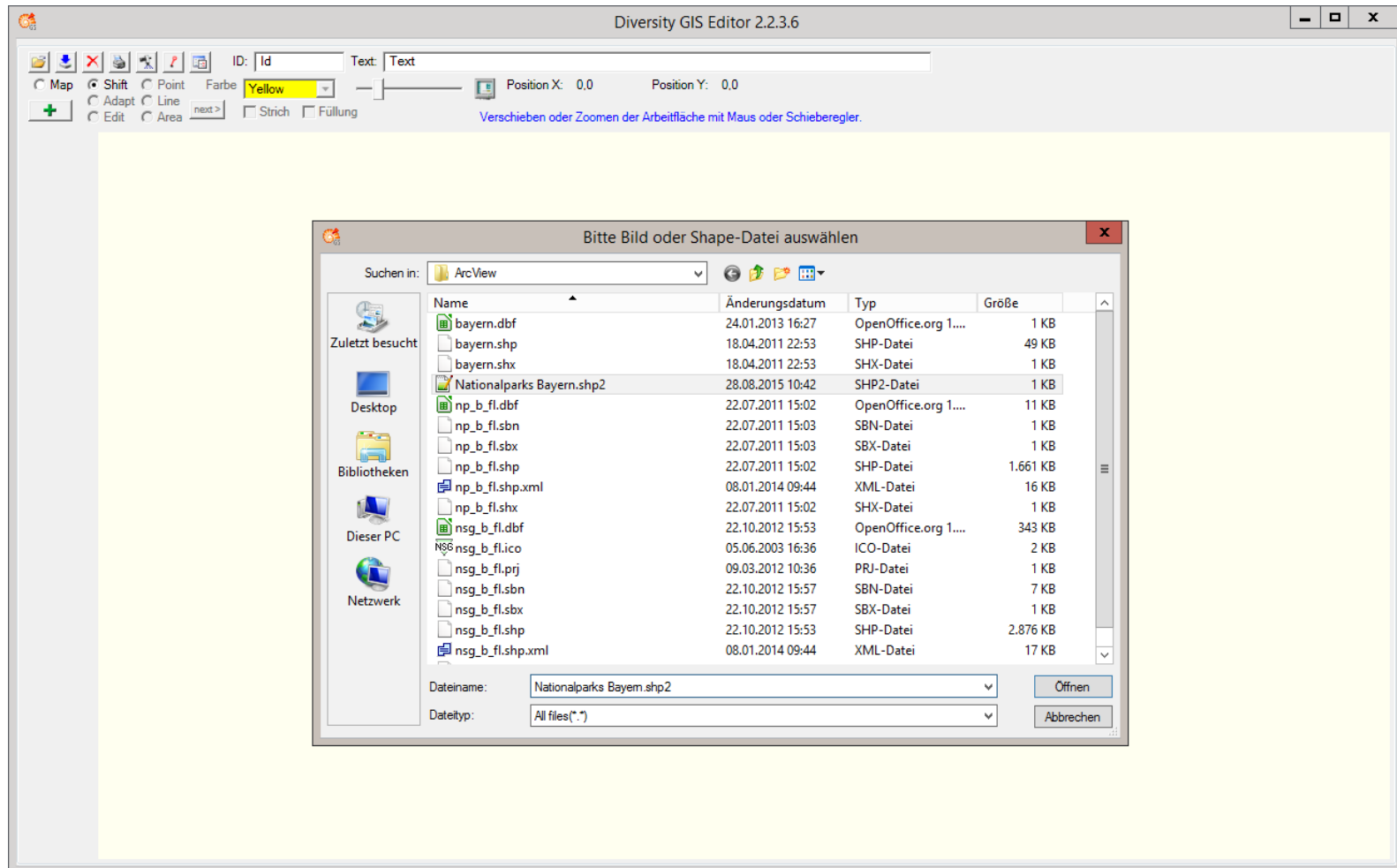
If no background map is loaded, the GIS Editor will create a map automatically due to the coordinates coverage of the shapes.





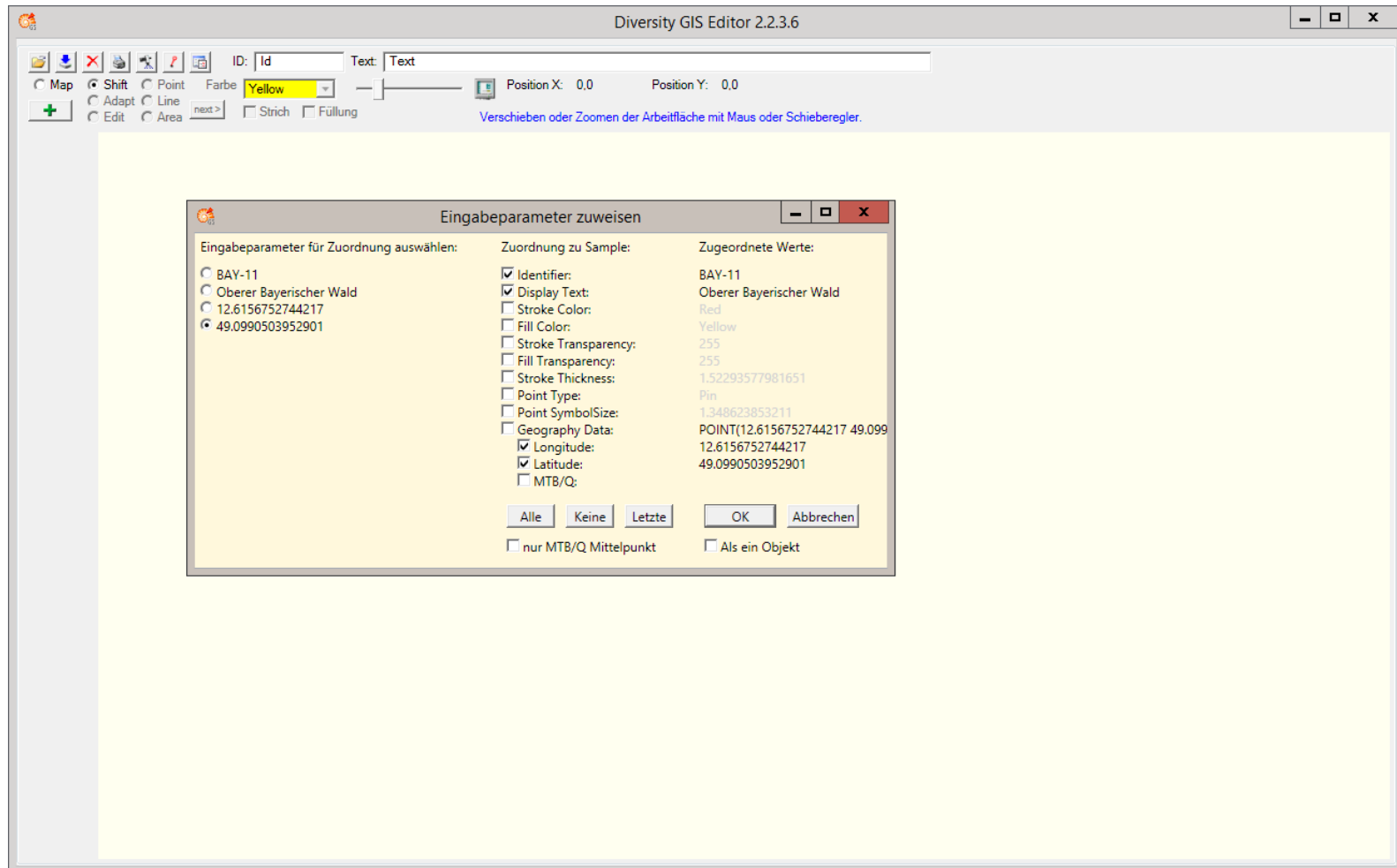
Collectors often document their samples in Excel files.

These may easily be converted to TAB separated text files, which the GIS Editor is able to import.



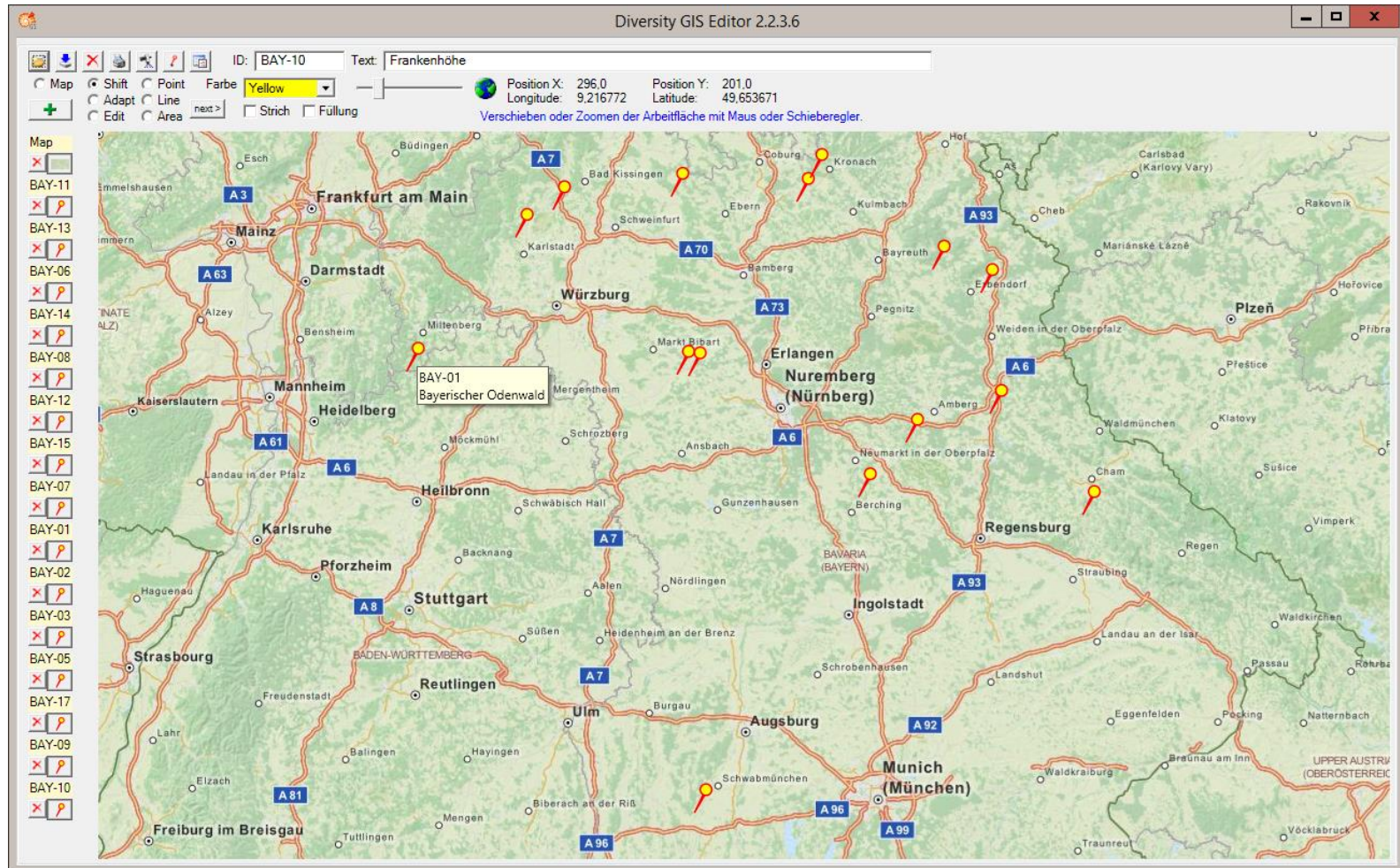
Assign each column of the input file to an appropriate shape parameter.

Only 2 values are mandatory: Longitude and Latitude.





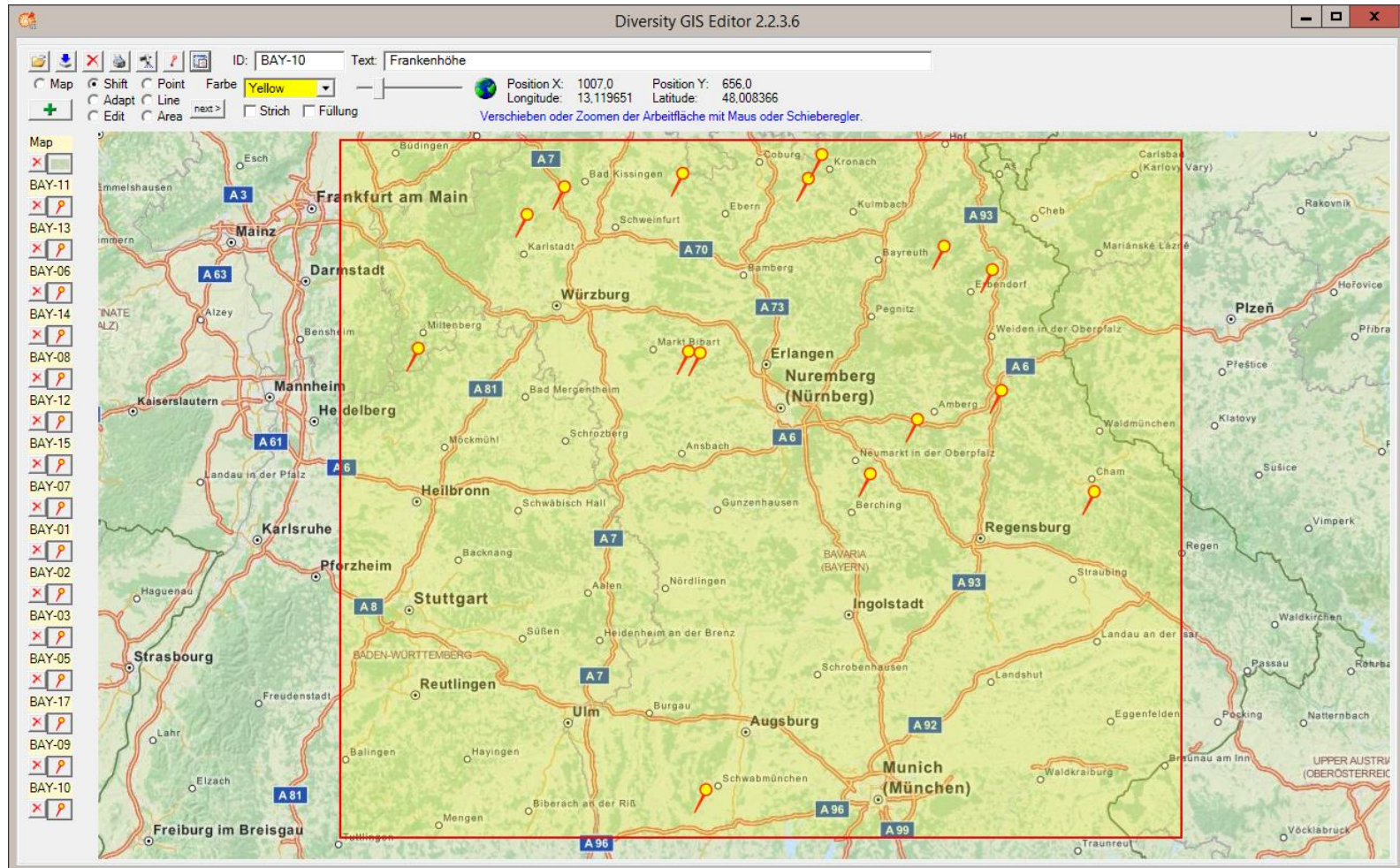
Then press OK and the data will be shown.





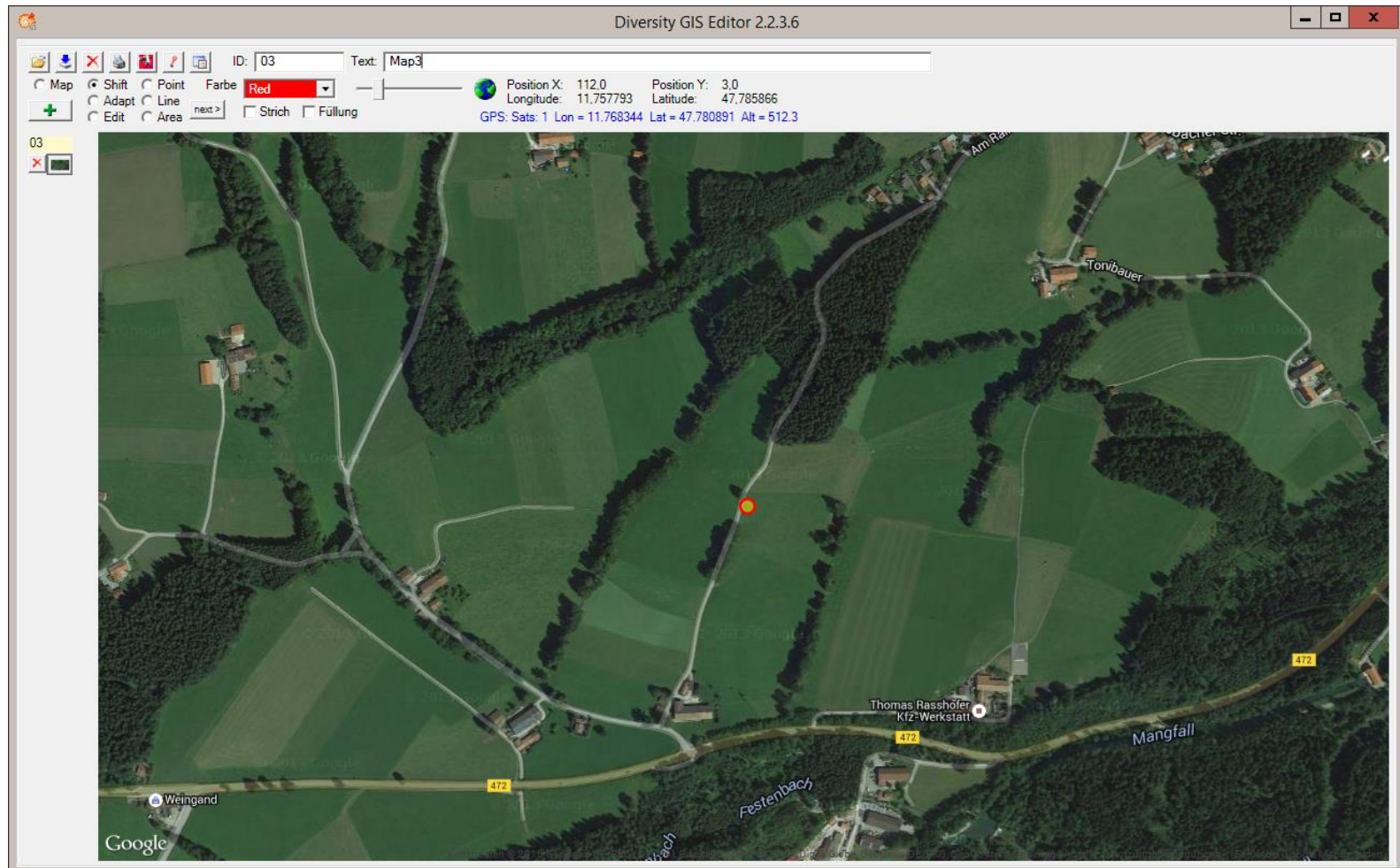
You may save the complete working area including shapes as an image for presentations, or just a part of it by setting a frame.

The saved working area remains georeferenced and could be used as a background map.



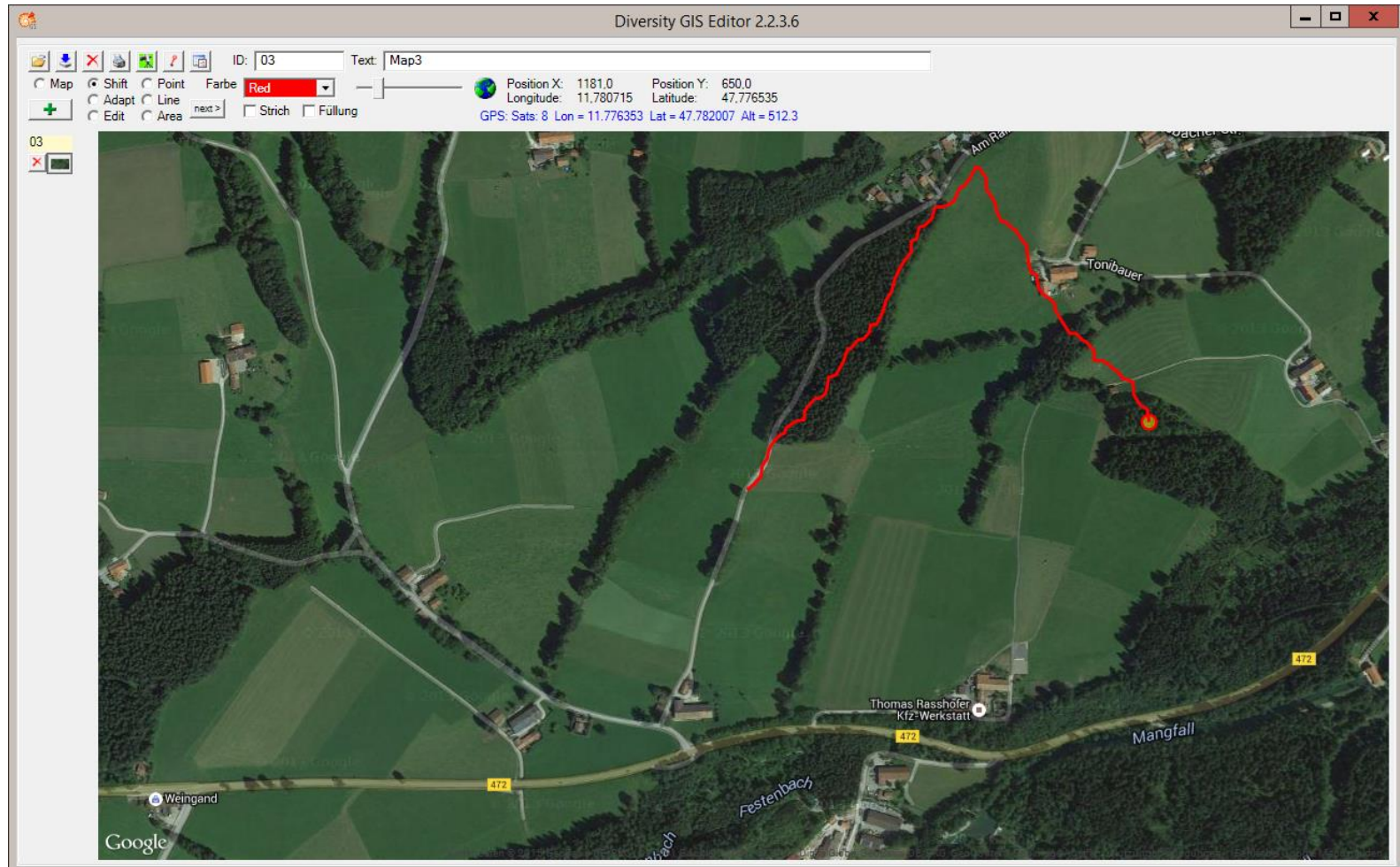


If your laptop is equipped with a GPS device, you can use the GIS Editor to display and track your current position. When the GPS toggle button is switched on, the GPS device detection will be started and the button will change its color, if successful.



The number of satellites which are actually found can be seen in the status line.

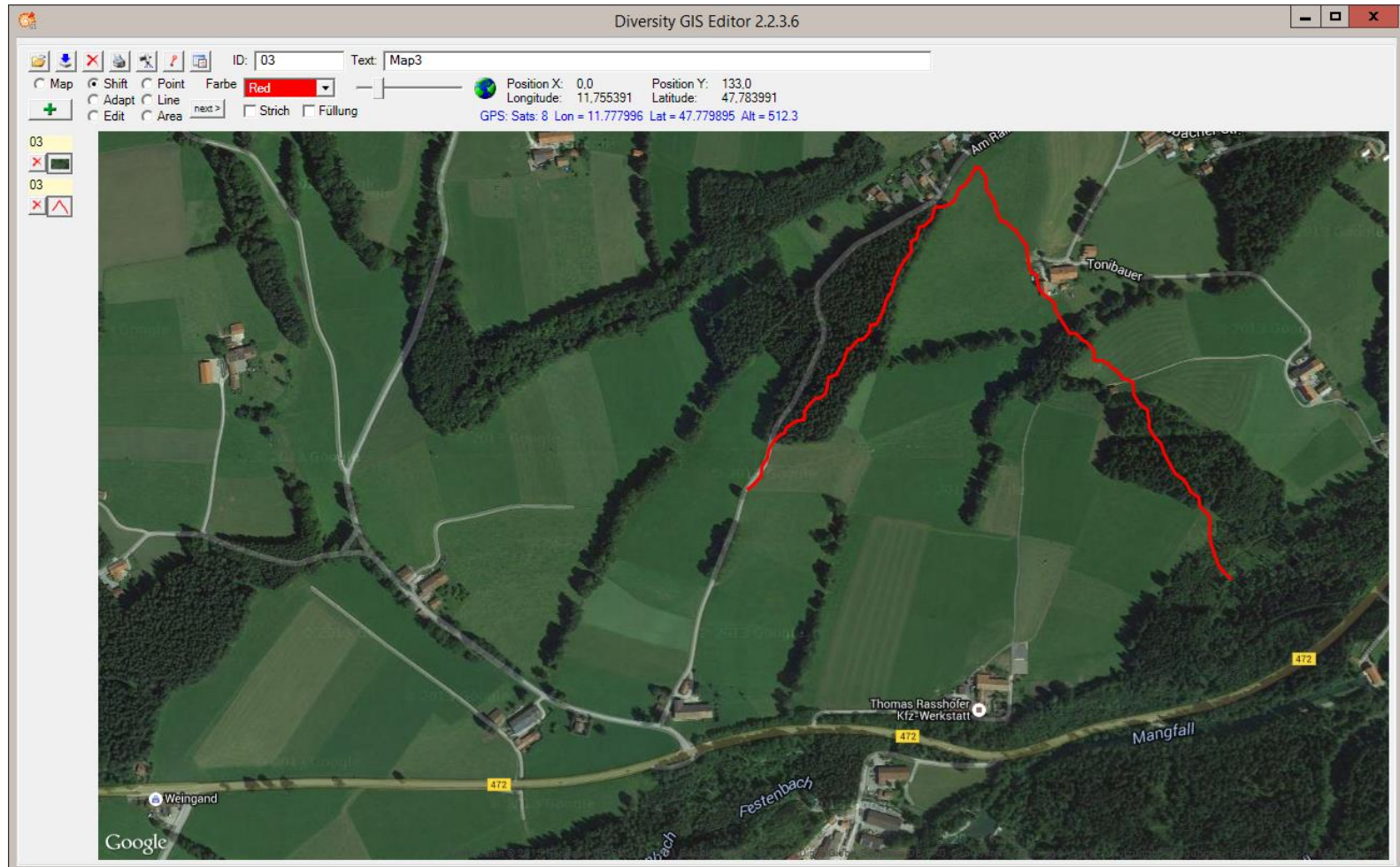
The current position is shown on the background map.





When tracing has been enabled, your movement is displayed as a Linestring, which will be put to the sample list as soon as the GPS button is switched off.

So your route can be saved and preserved as a shape.



## **Read shapes from memory device**

- ArcGIS shape file compatible
- Geographical WGS84, Gauss-Krüger and UTM coordinates are supported
- Load shape as one sample or split it into its components
- Select sample ID and Description from ArcGIS attributes (if available)
- Assign shape parameters when importing TAB separated text files
- If no background map is loaded, the GIS Editor will create a map due to the coordinates coverage of the shapes

## **Save shapes to memory device**

- Supported formats: SQL Geo Objects, TAB separated text file and ArcGIS binary shape files
- Save complete working area or a part of it including shapes as image (georeferenced, could be used as off line map)

## **GPS - Show and track position**

- Supports GPS devices
- Number of satellites indicated by color of GPS button and in the status line
- Current position is shown on an appropriate background map
- Route could be tracked and stored in a Linestring sample



## The Diversity GIS Editor

- Promoted for citizen science experts in the long-term initiative “Flora von Bayern”
- Services are offered by the SNSB IT Center in cooperation with the Bavarian Environmental Agency, the Bayerische Vermessungsverwaltung and the WWF Deutschland.
- Training material, digital maps and GIS shapes are offered under <http://www.bayernflora.de>.

Contact: reichert@bsm.mwn.de

