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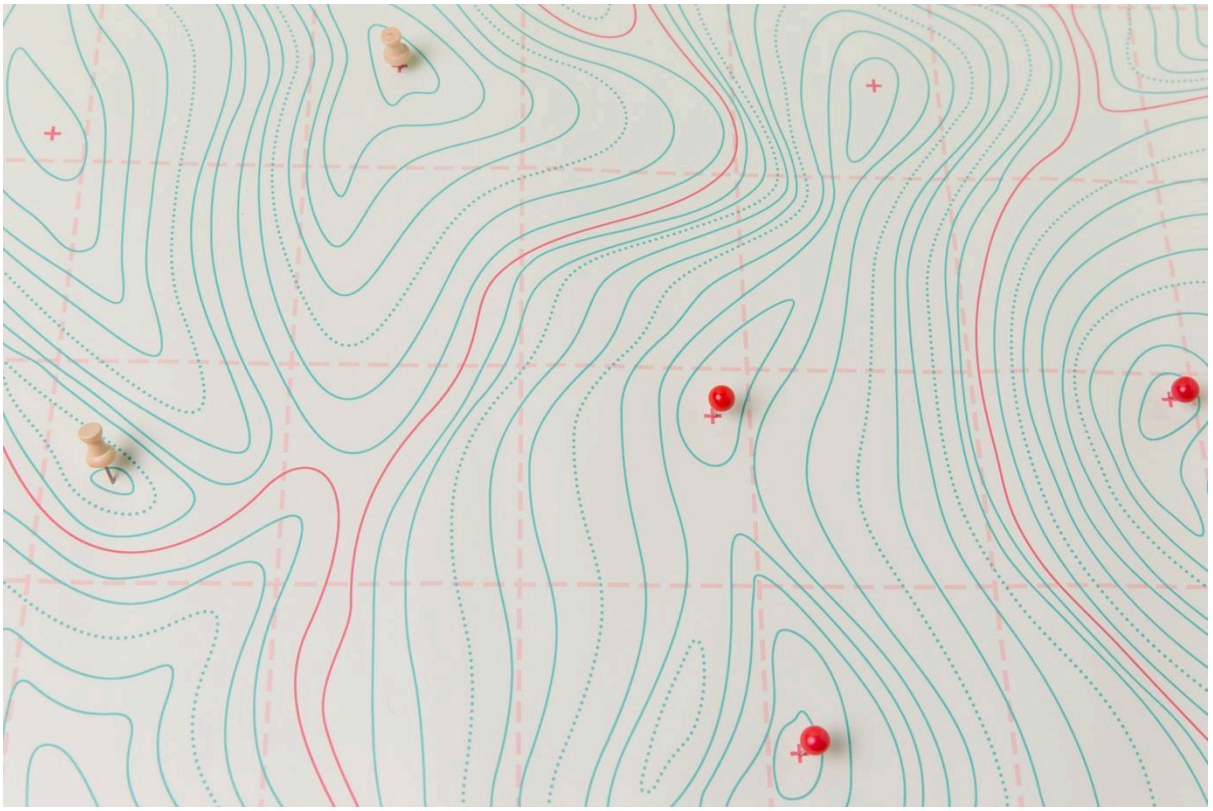
Map and georeferencing



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Version 1 – January 2024 – Produced by WOWnature®

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Index

Background and objectives of georeferencing 3

WOWnature's georeferencing system 4

First level: general visualisation of all areas 4

Second level: perimeter overview of each area 5

Third level: specific visualisation of your contribution to reforestation or forest protection 6

Functioning and limits 7

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Background and objectives of georeferencing

As a human society, we now face an unprecedented ecological and social crisis.

One of the most urgent problems to be addressed is global warming. It means that the earth's climate is changing due to human activities, especially the emission of increasing amounts of greenhouse gases into the atmosphere (resulting in an increased greenhouse effect). United Nations Secretary-General António Guterres reminds us that this change in the Earth's climate poses an existential threat to humanity. For this reason, scientists, industry organizations, as well as major media globally are adapting the terminology used to describe the situation in which we find ourselves, preferring to use terms such as climate "crisis" or "emergency."

But the climate crisis is not the only problem. Another extremely serious, and partly interconnected, issue is the loss of biodiversity. Biodiversity, which can be defined as "the variety of living organisms, their genetic variability and the ecological complexes of which they are a part," is important not only because of its intrinsic value, but also because many processes and benefits fundamental to our well-being depend on it, such as crop pollination, the availability of clean water or soil productivity.

Trees and forests play a key role in this context: as is now widely known, they play a key role in climate change mitigation and adaptation while also providing a myriad of other benefits, including providing habitat for biodiversity. By supporting WOWnature's projects, therefore, every person can make a contribution in this regard.

For us at WOWnature, transparency to those who rely on us for something so important is crucial. With the intention of increasing transparency, we are committed to geo-referencing (i.e., attributing geographic location information) the areas where we have been able to intervene because of the support of those who have chosen us. We do this by placing, for each adopted tree and each protected area, a pointer on the map visible from the restricted area and associating with this pointer a pair of GPS coordinates (visible by clicking on the pointer).

This paper explains how we do this georeferencing and highlights both the positive aspects and limitations of this process, so that any person who decides to rely on us can know what to expect and what the degree of accuracy of this system is.

WOWnature's georeferencing system

The georeferencing system (and thus the geographical information of projects) of WOWnature has three levels, which are listed here and further explained below:

1. General visualisation of the totality of areas (here)
2. Visualisation of the perimeter of each area
3. Specific visualisation of your contribution to reforestation or forest protection

First level: general visualisation of all areas

The general visualisation of the totality of areas is accessible from the main menu by selecting the "Map" item. In this section, areas are displayed by means of differently coloured pointers:

Blue pointers = active areas where you can adopt or donate new trees
Fuchsia pointers = active areas where you can protect forests and improve the ecosystem
Orange pointers = inactive areas. They can be past projects, projects in progress, etc.

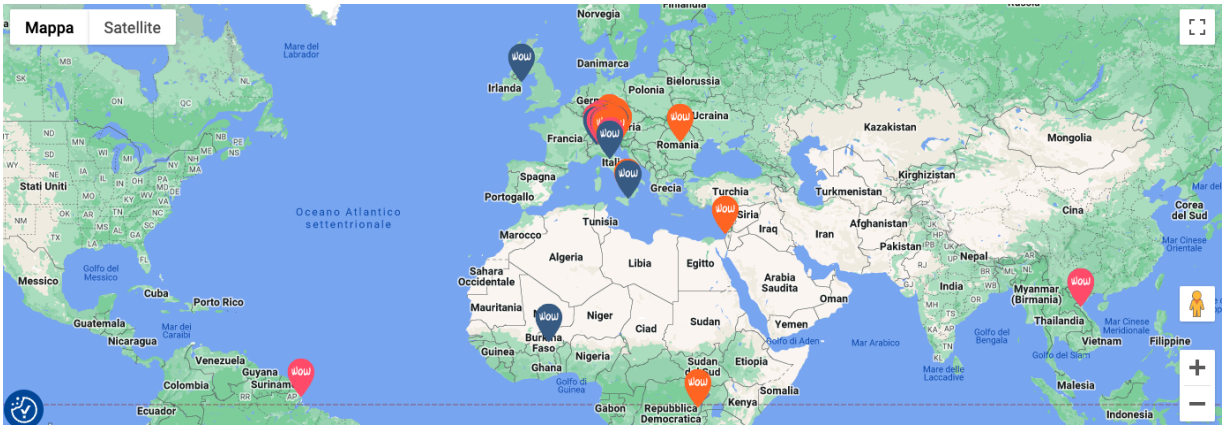

Figure 1 - Map with the overview of our areas

Second level: perimeter overview of each area

For each area, the polygon(s) of the overall project area where we are going to intervene (in some cases over several years) is identified. This map is accessible from each area's page.

Figure 2 - example map showing the perimeter of each area

Figure 3 - The area in Figure 2

Third level: specific visualisation of your contribution to reforestation or forest protection

Each user can display, within his or her own restricted area, a pointer that locates the specific area of intervention (within the larger overall project area) on which you have intervened thanks to your support. This pointer allows a more precise identification than the generic polygon of the area (which can be as large as tens or hundreds of thousands of square metres), but is still subject to a margin of error. Please refer to the following sections for more on this subject.

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Functioning and limits

The location provided on the maps of the WOWnature site is produced from the technical plans of the interventions and the associated files in vector format for geographic information systems (e.g. shapefiles).

The perimeter of each area (the 'second level' mentioned in the previous sections) is derived directly from the technical plans and associated files. It therefore requires no further reworking beyond integration on the WOWnature site maps.

The pointers of the overall map of the areas (the "first level" mentioned in the previous sections) are in most cases the centroids of the polygons of the individual areas (where the centroid is the "mean position" of all points that make up the area).

On the other hand, the 'third level' of visualisation, i.e. the specific visualisation of the contribution made by the individual user, which can be accessed from the restricted area, deserves further investigation.

In this case, the pointer and the coordinates associated with each tree adopted are defined "at the desk", corresponding to the days on which the trees are planted, taking into account:

- The specific area on which the intervention supported by the user through their adoption was carried out (which, for example, in cases of multi-year projects may be a portion of the overall project area)
- The extension of the area
- The planting density (the number of plants per hectare)
- The species used
- In some cases, also the planting layout, i.e. the arrangement of the plants (not always because in some cases planting is done deliberately by randomly arranged groups of plants)

This means that the coordinates assigned to each tree will, by definition, have a certain margin of error, but should give a moderately accurate representation of the distribution of trees and their location in space. For this reason, the user receiving the coordinates of their

tree knows that they can expect the tree to be in the vicinity, but not necessarily in perfect correspondence, of the point identified by the pointer and co-ordinates.

In the case of the pointer and coordinates provided for protection project support, on the other hand, the co-ordinates (located at a point representative of the intervention area) are unique for all users because the support may not be directly related to a specific area (e.g. the whole area benefits from fire prevention interventions).