# **Introduction**

Stave Ecological Park is a major green spot and a sanctuary for passing and breeding birds in South East London, UK. It is placed at the heart of the [Russian Dock](https://goo.gl/maps/hMWiEgHD7XjRD5Cp6) where piles of imported wood were kept afloat on artificial lakes to avoid deteriorating while not in use. Managed by [TCV](https://www.tcv.org.uk/find-tcv/), they decided to increase the number of meadows, to attract pollinators and increase the resilience of the park biodiversity with the aim of both reinforcing the spot as a landmark for birds and mitigating within reason the potential side effects of Climate Change.

The map is designed for the TCV board and the main aim is to show how they could incorporate GIS for a better/more efficient management of the park. It is merely meant to showcase the potential capabilities of technology and GIS concepts applied to conservation. A proper, tangible, concrete and likely more valuable objective would probably be showing how meadows are performing when measuring their ability to spread around the park, particularly in the vicinity of them. More widespread wild flowers may mean more widespread insects, increasing and distributing their biomass in overall terms as well as its primary production at any point on time, above all when chicks are around.

I coined the name “overspills” for those flowers that could be found as a direct effect of the meadows. The criteria used was a) majority of found flower species are a subset of those in the nearby meadow and b) they are close enough to the meadows themselves. Here I was not after counting species or counting the area that those species covered. Just whether or not those found flowers were overspills.

# **Ambiguity and Uncertainty**

I faced here various aspects of ambiguity and uncertainty, as well as uncertainty derived from the ambiguity as follows:

* It is uncertain what an overspill is given that we cannot measure the direct cause of it. We can just estimate that it is actually one. For example, defining closeness is ambiguous depending on many conditions such downwind meadows with a slope and not hurdles in from of it would have more ability to spread, so vicinity for them would allow larger distances than other cases. For real, this would need to be “judged” on meadow-by-meadow basis.
* It is uncertain when a meadow starts and finishes given that the line defined by nature is fuzzy. Some meadows are surrounded by man-made fences to avoid people and dogs getting in so it is easier to define the perimeter line. The decision of what is meadow and what is not, is an ambiguously taken by a person to such an extent that a meadow could “expand” its border given its performance, and have no overspills at all.
* It is also uncertain whether new found wild-flowers are “new” or permanent residents. Do we need to measure how long or how frequent overspills are present in a place to label them as “overspill”? Also what is the life-expectancy and “reproduction” capacity of certain species? This sparks the question: when, given these parameters, we consider that a flower instance or instances are good enough to become an overspill?

# **CRS and Spatial Resolution**

Given the difficulties of finding a simple yet detailed-enough map of the park, I decided to use Google Maps as my backdrop raster. The information shown on its properties says that tile size in pixels 250x250 and in meters 152 x 152 roughly. This means that the spatial resolution is ~0.59 meters. So that size of the object is the smallest Google seem to be able to provide right now.

The map has a scale of 1:1900, meaning that 1cm on the map shows roughly 19 metres for real although this depends on whether the map is to be shown on a device or hard copy, as well as the pixel density of the former and DPI of the latter.

The CRS was EPSG 3857 – WGS 84 / Pseudo-Mercator, which units are in meters. I used the same CRS for all vector layers.

# **Layers Description**

Apart from the Google raster each meadow was abstracted by a separate polygon vector. This is because I went to the field and took the coordinates of the corners and then use the Convex Hull algorithm to calculate the minimum boundary of those points, which I exported from a scratch layer to a permanent polygon vector. The attributes associated to this layer were:

1. Name
2. Calculated Area and Perimeter

Similarly, flowers were represented using separate point vectors, so that depending on their relationship with meadows they would belong to different category. Each instance of each category was vectorised, first by importing a bunch of taken coordinates via csv and the exporting them to shapefiles. The attributes of these layers were:

1. Name of the species
2. Date of capture

I saved the style of each flower category so that I could reapply it to each instance. The same process was used for meadows.

# **Problems Found**

* The Convex Hull was yielding the “wrong” area because I didn’t realise that the vector files were being re-projected using EPSG 4326 which unit of measurement is degrees rather than meters.
* Points are oversized as those representing edge flowers at the edge of the meadow were not visible. Above all on the Print Layout.
* The altitude parameter of flowers was stripped off as I did not have such details for the rest of the park - raster. The altitude is important to determine the obstacles meadows face to spread, however showing no altitude for the whole park would mislead readers.
* I had to discard other secondary meadows to compromise a decent map scale.

# **Improvements**

* The data is not representative of the reality as there is obviously more flowers and more meadows around the park.
* Points should have another attribute about number of flowers found.
* A raster showing altitude and a vector layer showing trees are important to see meadow obstacles.