GPS Preprocessing

This is the first step in creating a configuration file for an Agent Based Model. The goal of this notebook is to allow the ABM to be configured to accurately represent the GPS dataset used.

The first steps are to filter out GPS points that have a poor DOP, that could result in a poor location lock, and to seperate timeseries trajectories where the time interval is not regular. Several files are created based on the following conditions:

- Deer Season
- Male/Female animals

The output of this notebook is passed to another notebook, that uses an R kernel, to fit a movement model to the data.

```
/tmp/ipykernel_164692/1439837228.py:1: DtypeWarning:

Columns (11) have mixed types. Specify dtype option on import or set low_memory=False.
```

Home Range Centroids

Let's assume that the animals spend most of their time within their home range. The DLD paper takes the average lon/lat position as the centroid to the home range which seems sensible. The data we have spans over years though, and it is likely that a home range will drift or change due to dispersement or population pressures. Let's calculate the monthly convex hull and use that centroid as the home range centroid:
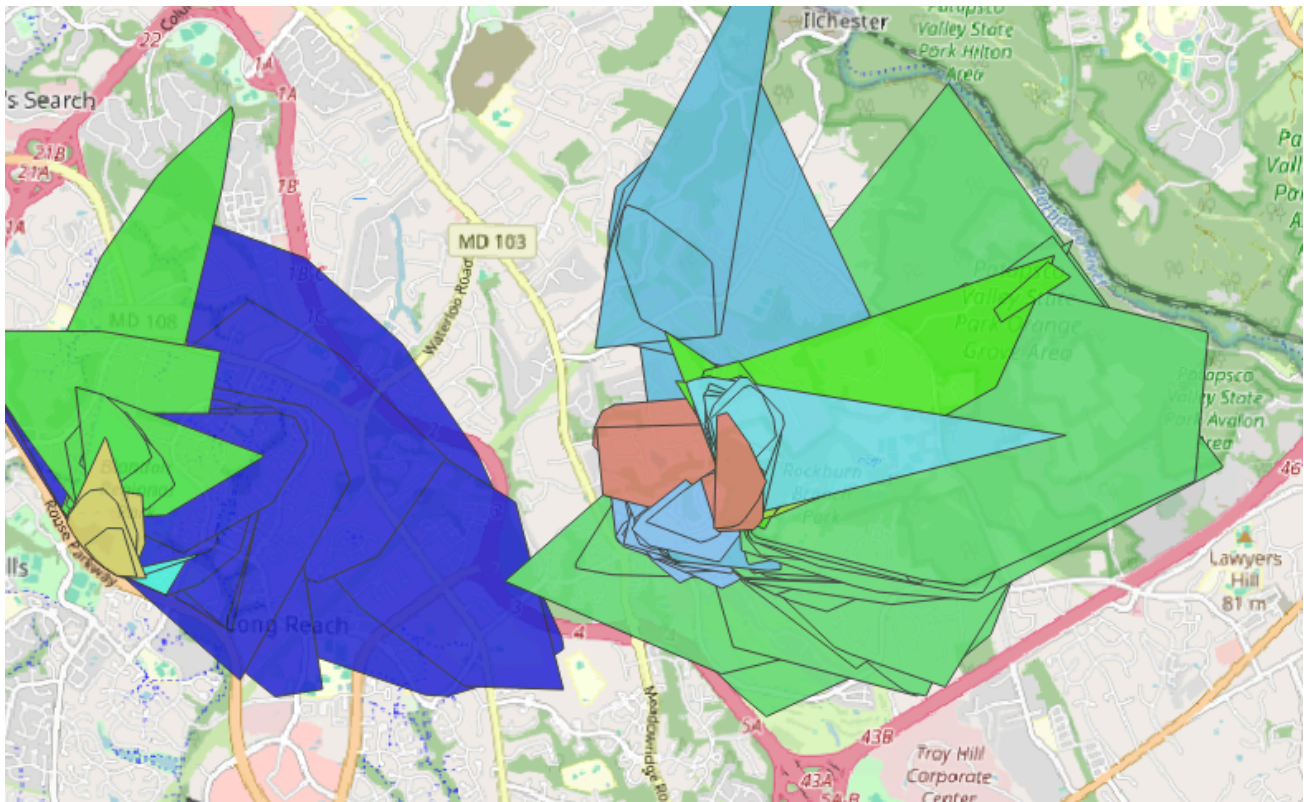
Monthly GPS home ranges coloured by deer ID

Filter GPS Data and create new IDs

Filter the GPS data to remove points with poor GPD DOP. The HMM and trajectory analysis assumes that the data is regularly sampled. We could either resample/interpolate the data to avoid gaps or create new ID's for trajectory segments that are seperated by gaps.

Steps taken: - Calculate a datetime from the seperate columns - Calculate timedelta for consecutive GPS fields - Drop events that have a GPS:DOP greater than 10)