**How to Run Home Range Analyses in R**

**Minimum Convex Polygons and Kernel Density Estimates**

This document provides guidance on what information to include and how to format input files to efficiently run home range analyses in R, using the set of “GenericHR” scripts created by Joanna Burgar 03-Oct-2019.

Input files:

1. “Animal\_Metadata.csv”
2. Telemetry data – either in the form of shapefiles or csv(s) downloaded from the manufacturers website; e.g., “Animal\_TelemData.csv”
3. “Collar\_Metadata.csv” (optional, extra information about collars – useful if redeploying)

R Scripts:

1. 00\_TelemDataPrep.R
2. 01\_MCP.R
3. 02\_KDE.R
4. 02\_KDE\_advanced.R
5. 03 \_TelemVisual.R

Output files:

1. MCP shapefiles
2. KDE shapefiles
3. Telemetry animation (visualization) files

Input files (detailed):

1. Upload animal data from a single csv –Animal\_Metadata.csv– with each row as a new capture/release entry, not necessarily a new animal. \*denotes required information, otherwise optional dependent on study and species:
   1. AnimalID\*: a unique identifier for each animal to track animal over time (this is especially important if collars are redeployed on the same/different animals, as then collar serial number cannot be the unique identifier)
   2. Animal characteristics\*:
      1. Species
      2. Sex (F = female, M = male, U = unknown)
      3. Age\_Class (A = adult, J = juvenile (young of year), Y = yearling, U = unknown)
   3. Comments\*: a space for any animal related comments, variations to the specific values in the required fields
   4. Other information:
      1. site/location where animal was captured
         1. either spatial coordinates (if UTM record zone); OR
         2. specific project place names
      2. date and time when animal was captured
      3. site/location where animals was released
         1. either spatial coordinates (if UTM record zone); OR
         2. specific project place names
      4. date and time when animal was released
      5. Health condition upon capture/release
      6. Capture method
      7. Immobilization drug, concentration, volume
      8. Animal measurements (species specific)
2. Upload telemetry data in csv and/or shapefile format(s). If required values are missing from any field, suggest dropping that observation to keep data as clean as possible. Require the following:
   1. AnimalID: to link back to Animal\_Metadata.csv
   2. Spatial coordinates: if not lat/lon then also need datum/utm zone
   3. Date of telemetry observation
   4. Time of telemetry observation
   5. Some value of confidence of telemetry observation (e.g., 3D, 3D); this is not necessary if data was already cleaned and data contains only verified observations

Important things to consider:

* Consistency is KEY! When recording meta data it will save you grief down the road if values in required columns maintain the same format/spelling/location names
  + Use the comment field to add in details that vary
  + If including spatial coordinates, stay consistent with coordinate system (e.g., UTM vs lat/long) and include Datum/Zone and same format, preferably with entries either in separate columns or separated by the same punctuation style:
    - Easting; Northing; Zone
    - Longitude Decimal Degree; Longitude Decimal Degree; Datum
  + For the Date.Time fields, keep the formatting the same, preferably as:
    - “%Y-%b-%d %H:%M%SS” (e.g., 2019-Oct-03 10:50:00)