3.1.4. Aerial counts

Objective

By observing individuals / groups from aerial devices, it is possible to estimate local density following a total count or applying distance sampling methodology (recording the distances to which they have made such observations).

Measure estimated

Population density.

Applicability

Ungulates in relatively open areas.

Methodology

Aerial counting is not a single method. Aerial counting is used as a tool within other methods (like direct counts, strip and line transect, distance sampling, CMR). There are several possibilities conducting aerial counts: helicopters, gyrocopters, small planes, microlight aircrafts, drones, blimp. However, in many countries these are only allowed to fly by daylight.

For counting hoofed game, aerial counts may be used as direct counts or as distance sampling. A well working setup is using a microlight with thermographic imaging (TI, for detection) and parallel video (for distinguishing species) (Franke et al. 2012, Gräber et al. 2015). These are good methods for inaccessible areas, and they work well in swamps and reeds (Franke pers. comm.). In open areas, the noisy vehicles may cause the flight of animals resulting in underestimated and biased estimation of the population parameters.

This method may give a fast overview on population size and distribution (e.g., conducted with drones). However, the researcher opinions about precision and accuracy of aerial surveys are conflicting, likely due to the difficulty of obtaining the correct number of individuals in each area (e.g., Jachmann 2002, Ronnegard et al. 2008). Unmanned aircraft systems are promising alternatives in studies that require the estimation of spatial patterns of different species in large areas –like epidemiological ones- where traditional methods (e.g., line transects, drive counts, etc.) are not feasible due to logistical reasons (Barasona et al. 2014).

Especially on large areas in more open habitats it can be the only way to get reliable census data in a short time: e.g., seals on the shore, reindeer, and moose in northern Scandinavia).

Evaluation

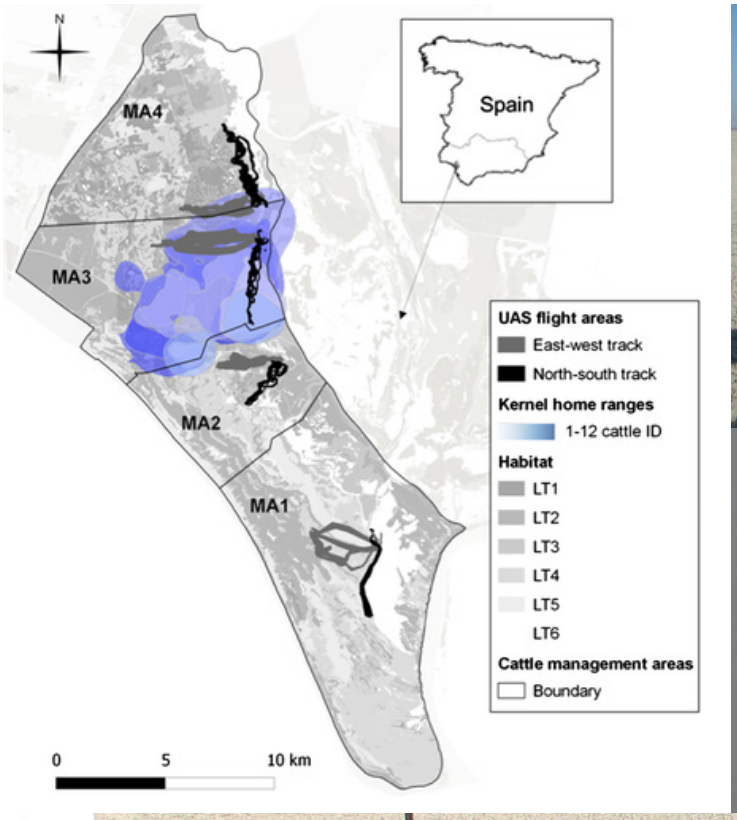
· Pro: working quite well for wild ruminant in open area, larger areas might be achieved during one count. It is possible determining spatial distribution patterns (e.g., at the wildlife/livestock interface).

· Con: high costs, with colour cameras, and in many countries, only by daylight that results in low detectability crepuscular or nocturnal wild ruminant during daytime (hidden under trees), need of thermographic cameras, mainly in winter, weather and habitat structure dependent, evaluation comparatively costly. High expertise required (e.g., drones)

· Accuracy: limited – high, in relation to the environmental conditions.

· Habitat: very good for large open landscapes (Tundra, swamps, reed, moors), possible in mixed landscapes in winter, least accuracy in forest areas.

Recommendations to improve comparability and accuracy: Currently, that the use of thermographic and night vision cameras associated to aerial counts is still to be developed, there is the need to calibrate this technology for wild ungulates.


N
MA4
MA3
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Spain
UAS flight areas
East-west track
North-south track
Kernel home ranges
1-12 cattle ID
Habitat
LT1
LT2
LT3
LT4
LT5
LT6
Cattle management areas
Boundary
0
5
10 km