BROWN HARE (*Lepus europaeus*)

Best practice guidelines for successful brown hare monitoring on farmland

Line-transect spotlight method

The brown hare is a crucial part of a healthy farmed environment and holds significant value as a game species across Europe. To evaluate conservation efforts and promote sustainable hunting of local hare populations, clear monitoring guidelines are vital. The line-transect spotlight method, detailed in this factsheet, provides a user-friendly and efficient tool for anyone interested in monitoring the trend in local hare populations on farmland. Following protocol draws upon valuable experiences gained during the North Sea Region Interreg PARTRIDGE project.

WHY

Brown hares are a characteristic component of our agricultural landscape. They are widely regarded as a bio-indicator of healthy farmed environments and are a favoured game species in small game shoots across Europe. As a result, monitoring local hare populations provides a valuable tool to assess both farmland health and sustainable hunting bags. Moreover, standardised monitoring, such as hare counting, can help measure the effects of implemented management strategies for local wildlife, for example in farmland restoration or small game conservation projects. It allows local farmers and hunters, or any other interested stakeholder group, to optimise future management practices to help achieve maximum success.

The easy-to-use protocol described below provides a best-practice hare monitoring method for professional ecologists and game managers/hunters, but also volunteers, and even children. The method is ideal for a wide range of (citizen science) projects. The hands-on experience of hare counting, or any other type of field monitoring for that matter, is fascinating for everyone involved. It is a brilliant way to actively engage and enthuse people about their native wildlife.

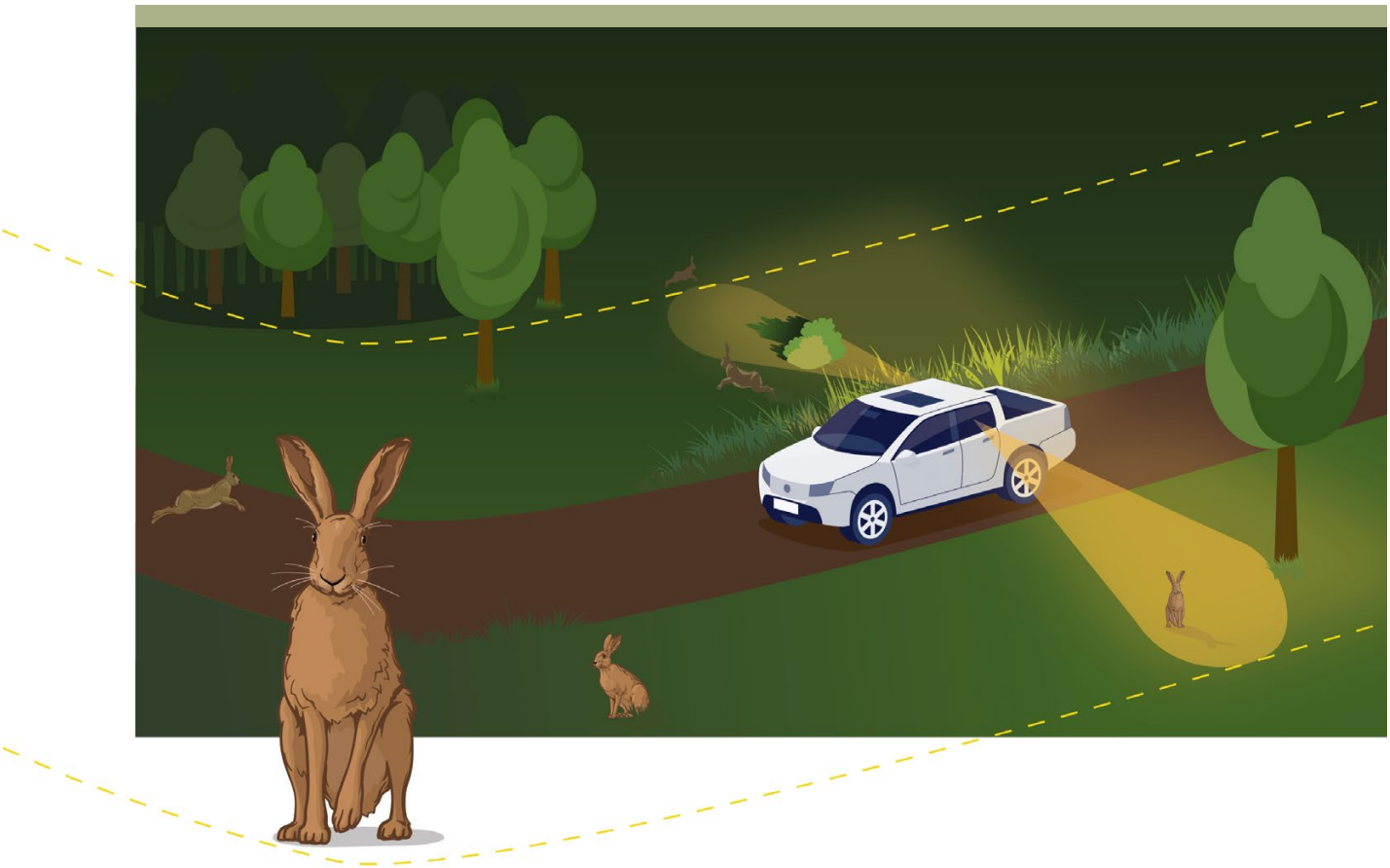
PROJECT SET-UP

In the PARTRIDGE project, demonstration areas were compared to paired reference areas, in order to better interpret and detect meaningful trends and evaluate the effectiveness of management practices on hare numbers. In the case of a similar project, aiming to evaluate a specific management approach, monitoring should be conducted in both demonstration and paired reference areas. Apart from not receiving any of the management measures or other experimental treatments undertaken at the demonstration area, the reference area must be spatially near and agriculturally similar to the demonstration area. To ensure that the two areas are independent, however, they should be at least 6 km apart to avoid hares moving between sites. As the monitoring requires a certain minimum number of observations to detect any hare trends, study areas should be sufficiently large. A minimum area of 500ha is recommended. The current technique can be used for other projects as well, but without a comparison, reference area, changes will be more difficult to interpret.

HARE COUNT

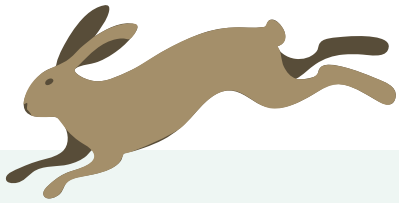
During the winter period, when visibility is highest due to a lack of cover, hares are counted along fixed transects. These line counts are done at night using bright spotlights. It is recommended that you notify local police and possibly residents and hunters prior to undertaking a count. Over multiple years, the trend in these counts gives a reliable indication of the changes in brown hare winter abundance within the area.

- Counts should be conducted between January-February, after the closure of the hunting season and before the beginning of vegetation growth in farmland, when visibility is still sufficiently high, while being as close to the start of the hare breeding season as possible. Depending on the area and the height of vegetation, this timing can be adjusted. A minimum of two evening counts should be performed, preferably followed by a third count in case the first two counts differ by more than 25%. Separate counting sessions should be at least one week, maximum two weeks, apart and the same time period must be applied each year. At least three counts per year are recommended to obtain reliable results at each site.
- In case of fog, rain (the light beam is reflected by the rain drops), severe frost, snowfall or heavy wind, the counting session should be postponed to a later date, as these unfavourable weather conditions are likely to affect the precision of the count.
- Counting is carried out during the first half of the night, when hares tend to be most active. It should start at least 1.5 hours after dusk. As tiredness of the observers can reduce counting precision, counts should not take longer than three to four hours and should thus stop before midnight.
- Spotlights with a minimum range of 150-200m and a concentrated beam are required.
- Transects are spread throughout the project area at fixed locations. Ideally, each 100ha square of a project area should be covered by one 1-km transect. The network of all transects does not need to



cover the complete study site, but the area covered should be representative of the project site. It should not be limited to the best areas for brown hares.

- Each transect should be between 800 and 1500m long. Considering the average visibility of 200m, ensure that adjacent transects are more than 400m apart to avoid double counting (i.e., observations of the same individual).
- The thoughtful choice of transects at the start of the monitoring project is crucial as they will be fixed once set and hence should not be changed throughout the project. Keep in mind that all transects should be accessible during the counting period and across many years. It is therefore advised to conduct a pilot monitoring run in the field before the true monitoring session begins, rather than rely on map-based decision making only.
- In addition to the counting sessions, a viewshed measurement is carried out each year. This involves marking the areas along the transects that are visible with the spotlights on a map of the area during the counting season. It provides a way of mapping buildings, hedges, reed beds, crops, etc. that decrease or obstruct visibility. Any visibility change along the set of predetermined transects over the course of several years or even between subsequent years (e.g. changes in the siting of winter catch crops), should be considered.

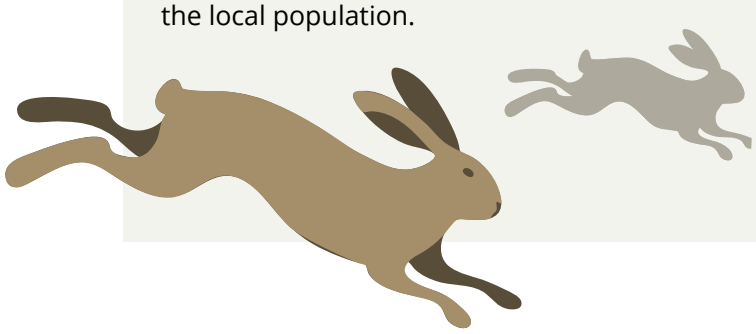


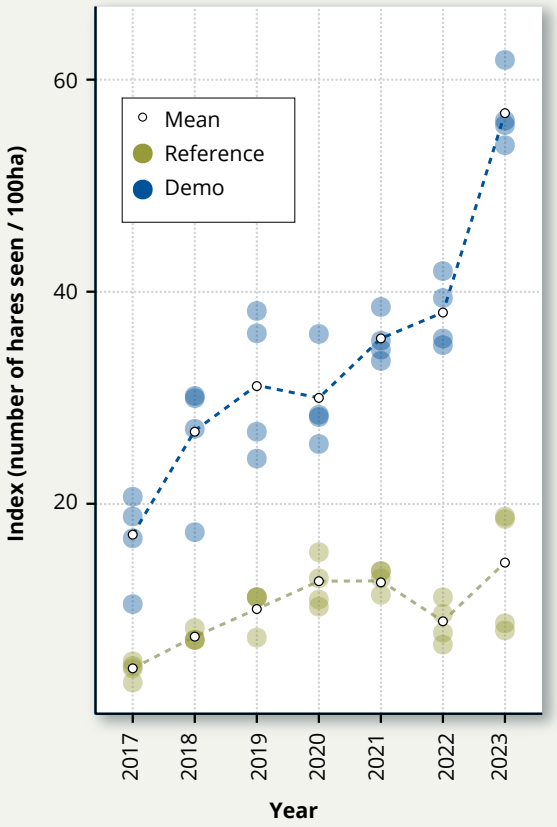
Counting session

- For each counting session the date, start and end time, name of the observers and weather conditions (% cloudiness, precipitation, wind force, visibility) are recorded.
- Each transect is done by car (or 4x4 vehicle) at a slow driving speed between 4 and 10 km/h.
- While driving, the spotlights should be oriented at right angles to the driving direction, that is sideways from the vehicle, to maximise the observation distance. To increase the detection of shy or fast-moving individuals, it is recommended to sweep the spotlight forward across the landscape at regular intervals.
- A counting team consists of at least two people, preferably three. One person drives, the others hold the light and record the observations.
- All sightings are marked on a map. This map should provide a detailed representation of the area to facilitate marking the observations. Preferably, this map should also include the viewshed of the current counting period.
- In case the observed species is not identifiable, the vehicle can stop and the use of binoculars is allowed to aid identification. As binoculars can increase detectability, they are not meant to be used continuously. Their use is restricted to clarifying the species and number of animals detected.

DATA ANALYSIS

For each counting session, an index (number of hares seen per 100 ha) is calculated. This index equals the total number of hares observed for that session divided by the viewshed area in hectares (total area obtained from the annual viewshed measurement), multiplied by 100. Per year, a mean index is calculated from the indices from each counting session. Graphs of the trend of this mean over the years gives a good indication of the trend in the winter hare abundance in the area and thus an efficient way of monitoring the local population.





WORDS OF CAUTION

Stick to the protocol! Deviations from the protocol should be avoided as much as possible, as they can seriously affect the precision of the counts. Therefore, it is important that all participants are aware of the protocol guidelines and comfortable with the implemented technique before monitoring starts.

Be careful with the interpretation of the results. Although the calculated index (number of hares seen / 100 ha) suggests a measure of density, it should not be interpreted as an estimate of the population density. Since counts were restricted to open areas and the detectability of hares was not considered, they do not provide an accurate picture of hare population density within the study area overall.

BACKGROUND

This factsheet is based on experiences collected during the seven years of the North Sea Region Interreg PARTRIDGE project, where brown hare (and other species groups) were monitored at 10 demonstration and 10 reference sites across Belgium, England, Germany, the Netherlands, and Scotland. For more information visit: PARTRIDGE, Interreg VB North Sea Region Programme.

BACKGROUND LITERATURE

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