Template for a writing a data collection protocol

Date: 2020-06-07	*Version:* 1	*Authors:* D. Ehrich and R.A. Ims

Rough-legged buzzard and snow owl nest survey

Motivation

Both rough-legged buzzards and snowy owls are raptors specialized on small rodents, but they differ in their degree of arctic specialization and in their preferences regarding small rodent prey. The snowy owl is a lemming specialist, which only breeds in years when lemmings are abundant, but not in peak small rodent years when lemmings are absent. The rough-legged buzzard is not an exclusively arctic species, but breeds in Arctic and north boreal areas. It is a small rodent specialist, which prefers lemmings, but breeds successfully also in small rodent peak years dominated by for instance grey-sided voles. In some areas, such as on Kolguev Island in the eastern Barents Sea, a few rough-legged buzzards can also breed without small rodents, preying mainly on goslings and willow ptarmigan. The breeding activity and the diet of these two birds of prey reflect the status of the small rodent specialist predator guild.

State variables: This protocol describes data collection for three state variables contributing to the monitoring target specialist predators (BT10) of the small rodent module: Rough-legged buzzard breeding Varanger (V40), Snowy owl breeding Varanger (V39), and Avian predator diet Varanger (V41)

Reference to method: Rough-legged buzzard nest surveys and diet analyses based on pellet dissection have been used for instance by Pokrovsky et al. (2014) and Fufachev et al. (2019). For snowy owls see for instance Gilg et al. (2006).

Spatial study design

Rough-legged buzzard nest surveys are carried out in the the COAT Varanger intensive design localities; in Vestre Jakobselv and Komag, including Sandfjorddalen. In these areas, we focus on cliff areas, and check in particular a list of specific nest sites which have been used in previous years.

In Komag these are: ko_fv_1, ko_fv_2, ko_fv_3, ko_fv_4, ko_fv_5, ko_fv_6, ko_fv_7, ko_fv_9, ko_fv_10

In Vestre Jakobselv these are: vj_fv_1, vj_fv_2, vj_fv_3, vj_fv_4, vj_fv_5, vj_fv_6

The nest localities are in the GPS-file “Rough-legged buzzard nests 2019.gpx”: https://uitno.app.box.com/file/675704973652

For snowy owl, we focus mainly on sites where snowy owl breeding has previously been observed. Sites where the species was nesting in 2011 are visited and landscape elements suitable for snowy owl breeding are inspected.

Temporal study design

The nest survey at all rough-legged buzzard nest locations and snowy owl sites is carried out in early July, when buzzards (snowy owls) have eggs or small chicks. Nests that were active at first visit, are visited a second time late in July, as late as possible during the summer field season. At this time, all nests have chicks.

Snowy owl nests should be visited a third time during the fall field work.

Procedure

Visit the nest location and check for the presence of adults, eggs and chicks. If you can approach the nest, take a picture for chick age determination. Record all remains of prey in and around the nest. If it is not possible to climb to the nest, use binoculars to count the chicks where possible. If buzzards show territorial behaviour at other locations, look for possible new nest sites.

Collect pellets close to the nest, and if you have time, look for the sitting places of the adults, and collect pellets there. The pellets from the nest and from the sitting place should be collected in different bags. Wrap each pellet in a small piece of toilet paper, so that the single pellets remain separated in the bag. Label the bags with the name of the nest, the date, and either nest or sitting place.

NB! Do not stay close to the nest longer than necessary to avoid unnecessary disturbance and stress for the adult birds. Do not go the last meter(s) to the nest, if you can see what is in it from that distance and do not visit the nests more often than required by the protocol. Never touch the chicks or the eggs, as this may increase the risk of nest abandonment.

For snowy owl nests, a third nest visit should be carried out to collect pellets and prey remains. Snowy owl nests consist of a flat nest bowl in the ground, where vegetation is scratched away. They and are often situated on a small mound in the terrain. During the nesting period, the nest bowl gets filled with prey remains and pellets, which form a mat of bones and hair mixed with owl feces. Collect all this material and put it in a bag marked "**nest material**" and with the nest locality. Use disposable **gloves** to handle the material.

There are often many pellets on a mound near the nest (nest mound). These are from the chicks, when they start to move out of the nest about 2-3 weeks after hatching. Collect these pellets and put them in another bag marked with "**nest mound**" and the nest locality.

The adults, in particular the male, like to have elevated sitting places (mounds or stones) at a distance of 100-200m from the nest. There can be many pellets close to these places. Inspect therefore possible sitting places in the surroundings of the nest. Collect pellets found in a separate bag marked "sitting place" and the nest locality.

For each nest there should thus be three bags:

1. Nest material
2. Nest mound
3. Sitting places

All bags should also be marked with the nest locality, the date and the name of the collector.

Plastic bags can be used to collect the material, but they should be opened to dry the material and prevent it from molding. If it is not too wet, it is better to collect the material in paper bags. It can

also be transferred to paper bags later, if it was collected in a plastic bag – but remember careful labelling of the new bag if you transfer!

Equipment needed

- Binoculars
- Camera
- GPS
- Paper bags for pellets
- Toilet paper roll
- Marker
- Notebook and pencil

Information recorded in the field

For each nest location, note date, whether the nest is in use or not, as well as number of adults, eggs, living and dead chicks. Take also GPS coordinates (decimal degrees of longitude and latitude) as at some nest localities the exact placement of the nest can vary somewhat between years. Nest coordinates should be taken as close the nest as possible – not from e.g. the other side of the valley if you observe the birds from there. In cases where approaching the nest is not possible, and GPS coordinates are taken from far away, please note down information on distance, direction etc. to enable other observers to relocate the nest.

If you can approach the nest, take a picture for chick age determination. Record all remains of prey in and around the nest. If it is not possible to climb to the nest use binoculars to count the chicks where possible. If a new nest is found, give it a new number.

Sample processing after field work

Paper bags with pellets should be dried in the field as good as possible, and given to Dorothee Ehrich once back in Tromsø.

Information recorded in the lab

Pellets are dissected in the lab to record prey remains according to a separate protocol.

Data processing

Data from each nest visit are recorded in the file “Datasheet for rough-legged buzzard and snowy owl nest visits.xlsx”

Training requirements and specialized skills

Observers need to be familiar with the targeted bird species and their pellets.

References

Fufachev, I.A., Ehrich D., Sokolova, N.A., Sokolov, V.A., Sokolov, A.A. 2019. Flexibility in a changing arctic food web: Can rough-legged buzzards cope with changing small rodent communities? Global Change Biology 25: 3669-3679.

Gilg, O., Sittler, B., Sabard, B., Hurstel, A., Sane´, R., Delattre, P. and Hanski, I. 2006. Functional and numerical responses of four lemming predators in high arctic Greenland. Oikos 113: 193-216.

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