

RAPTOR ABUNDANCE

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PURPOSE

Predators may play a key role in the functioning of arctic tundra ecosystems and could potentially control the abundance of their prey. Avian predators, mostly raptors and seabirds, are the most diverse groups of predators in the Arctic and range from highly specialists to highly generalists. Measuring annual variation in their abundance is thus essential to understand trophic interactions in the tundra. The most accurate method to quantitatively measure their abundance is based on enumerating the number of active nests found over a pre-defined area. Defining the area to be searched is probably the most difficult decision to make, and this area will differ according to the species of interest. Differences in detection probabilities of nests among species are also a problem. Although statistical methods have been developed to tackle the latter problem (e.g. line transect methods), it is unlikely that these will be applicable here because of the low number of nests that we are likely to find in most areas. A second simple method is also proposed as a relative index of annual and seasonal abundance of avian predators.

TIME PERIOD

On Bylot Island, the best period to conduct predator nest searches (Procedure 1) is from about 10 June to 10 July. Searches can be started earlier as most of these species have started to nest by 1 June, but surveys may be more difficult to complete before snow-melt. Dates may need to be adjusted slightly at other sites depending on the latitude. For visual counts of predators (Procedure 2), we recommend that is done throughout the period of presence in the field.

PROCEDURE 1 – NEST SEARCHES

All raptor species¹ are of interest but those most likely to be encountered are:

- Snowy Owl (SNOW)
- Rough-legged Hawk (RLHA)
- Peregrine Falcon (PEFA)
- Gyr Falcon (GYRF)
- Golden Eagle (GOEA)
- Common Raven (CORA; not a raptor but nests in similar habitats)

These species typically nest in rugged terrain. These range from low hills and mounds (e.g. snowy owl) to steep cliffs (e.g. gyrfalcon). At each site, one will have to define such habitat on maps and measure its size. The size of the area to be searched may vary but should range between 10 to 50 km². On Bylot Island the potential areas where raptors nests can be found cover approximately 30 km². It is important to have a log of areas that will have been searched for raptor nests. The best way is to record a track of our walking path in a GPS, either by having the GPS continuously on during the searches or by recording points periodically. These tracks should be saved and later downloaded into a computer.

¹ Short-eared Owl is another raptor species that can be encountered at some sites (sub-Arctic ones). However, because this species is found in lowland habitats, it is included in the protocol for tundra seabirds that nest in such habitat.

The area should be surveyed on foot, preferably walking on high ground (e.g. ridges) to obtain a good view of the surrounding. At each vantage point, thoroughly scan the surrounding landscape. In most cases, these species will reveal to the observer the presence of their nests by their alarm call, often several hundred meters from their nests. Hearing an alarm call is a sure sign of a nesting pair of raptors and extensive searches should be conducted in such areas. Similar searches should be conducted when a raptor is found perched on the ground.

Different species select different sites for nesting. Snowy owl nest are usually those most accessible. Their nest is typically on a ridge or a low mound on gentle slopes or along ravines or deep gullies. They do not add nesting material to their nest; they just dig a small depression in the ground. However, their white color greatly facilitates finding their nests. Rough-legged hawk and peregrine falcon usually nest on elevated sites relative to the surrounding, often difficult to reach (e.g. large boulders, rock pinnacles, hoodoos, etc.). Golden eagles and gyrfalcons typically nest on ledges along cliffs and are the most difficult to reach. Hawk, eagle and falcon all build nests made of branches that can persist for more than one year (hawk and especially eagles can make fairly large nests). The presence of white lines of dried bird droppings on rocks is often a good sign to find the nests of those species.

During the surveys, one should note all raptor sightings with relevant information (e.g. the species, whether in flight or on the ground, presence of alarm call, attacks by the bird) and record the position in the GPS. All nest defence behaviour (i.e. alarm calls, attacks, etc) are very important because even if no nest are found, such cases will be counted as a nesting pair. All nests found should be positioned with the GPS and its content checked (see protocol on nest monitoring). We recommend using a standard notation to record nests of different species. This notation should be the 4-letter codes used by the bird banding laboratory to identify species followed by a number (e.g. SNOW01 for nest #1 of snowy owl). The official codes to used are provided with the species names above. If a nest cannot be reached, you should try to reach a vantage point from where you could see the content of the nest with binoculars.

Areas need to be surveyed only once. However, if a bird was seen exhibiting nest defence behaviours but no nest was found, you should attempt to revisit the site at least once a few days later and searched again, especially if the same behaviours are observed.

Raptor nests may sometimes be found outside the systematic procedure described above. Indeed, nests can be found opportunistically, e.g. during other activities in the field or by colleagues studying other species. We ask that anybody finding a nest of any of the species described below take the position with a GPS and report the observation to us. The information will be kept but we will indicate that the nest was found accidentally rather than during a systematic search.

Search and inspection of raptor nests should be made with great care. First, be very careful when walking on steep hills or along cliffs and do not take any undue risk that could result in a fall. Second, raptors often attack people when approaching their nests and their claws can cause severe injuries. Always be alert when checking those nests, especially when you bend over nests or when you are in unstable position (e.g. along cliffs).

PROCEDURE 2 – VISUAL COUNT

Visual counts should be conducted every 2 days from an elevated point of view (e.g. small hill, observation tower). During a 10-minute period, all visible parts of the study area should be scanned and each individual bird of the species mentioned above should be counted and, in addition, **all seabird species (gulls, jaegers) listed in the protocol on those species**. If possible, the bird's age (adult or juvenile) should also be noted. We recommend conducting these counts late in the afternoon or early in the evening, a period of day that should not conflict with other field activities. On Bylot Island counts are

conducted between 17h00 and 21h00. If on certain occasions counts are done at a different time than predetermined for a particular site, it should be noted.

MATERIAL

- Binoculars
- Map of the sector and field book
- GPS