

ALL SPECIES INCIDENTAL POPULATION MONITORING PROTOCOL

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PURPOSE

We are unable to accurately estimate the absolute abundance of all vertebrates in the tundra communities we study, largely because of lack of time and also the low abundances of many species. However, these species may play a fairly prominent role in the food web, for various lengths of time. Our understanding of differences in the composition and dynamics of community interactions, especially between study sites or between years, will be enhanced by at least a relative abundance estimate for some of these species. This protocol outlines a technique for providing a relative abundance estimate based on incidental observations.

SPECIES OF INTEREST

The technique can be applied to virtually all vertebrate species, whether or not they are subjects of more accurate and labour-intensive population estimation protocols. There is value in obtaining a record of incidental observations for all of our focal prey and predator species, because these give an index of the relative levels of activity within the study area. However, the technique is most useful for giving us insights into the abundance and timing of less frequently encountered species, such as certain birds (waterfowl, ptarmigan), and mammals (ungulates, larger wide-ranging carnivores). If there are problems with accurately keeping track of abundant species, because many observers are likely seeing the same ones or counts are too time consuming, then the best strategy is to focus only on the small mammals themselves, their key alternative prey (geese, shorebirds, waterfowl, ptarmigan), and all predatory birds and mammals.

PROCEDURES

The relative abundance of species is recorded as the number of individuals seen per hour spent in the field per observer. We will group these data for all observers and over selected time periods to give a cumulative encounter rate index. This encounter rate technique has been tested in a boreal forest context (Hochachka et al. 2000). Potential biases resulting from changing observers through time, different rates of travel among observers, and different geographical focus among observers, seem to be swamped by the overall trends as long as the data set is compiled by a large number of observers and has a high number of encounters (Hochachka et al. 2000). Some of our study sites likely satisfy these conditions (especially Cape Churchill, Bylot and Herschel), and many of the observers will be consistent across years in our study sites. However, the likelihood of making observations varies with the observers' activities and mode of transport in the field. The observer should record whether they were on foot, using a motorized ground vehicle (boat, ATV, Snowmobile), or using aerial transport. If the observer(s) were doing very focussed ground work (e.g., vegetation sampling, or building exclosures) with little likelihood of making observations in the broader landscape, then that time should be subtracted from the total time elapsed for observations.

When to record? Encounter rates should be calculated for time spent in the field, away from base camp. Observations made right from the camp should be recorded separately, and merely as a record of species observed, rather than an encounter rate. This is because it is difficult to estimate the amount of time spent in such observations at camp when much of the observers' attention is mostly on camp infrastructure.

What to record? Records should be kept daily in field note books, including start and end times for the period of the day spent in the field doing activities that have a reasonable chance of allowing observations, and a list of species with number of individuals, sex and age if possible, and any comments about unusual sightings. These should be transferred to the digital data file daily if possible. In addition, the data sheet should include mode of transport (foot, ground vehicle – type, aerial vehicle – type).

Reference

Hochachka, W.M., K. Martin, F. Doyle and C.J. Krebs. 2000. Monitoring vertebrate populations using observational data. *Canadian Journal of Zoology* 78:521-529.