

Sampling interval in telemetry studies on animal home ranges

M. von Schmalensee* and R. A. Stefánsson

Institute of Biology, University of Iceland, Sturlugötu 7, Reykjavík, Iceland
and West-Iceland Centre of Natural History, Hafnargötu 3, Stykkishólmi, Iceland

P. Hersteinsson

Institute of Biology, University of Iceland, Sturlugötu 7, Reykjavík, Iceland

The home range of an animal has been defined as “that area traversed by the individual in its normal activities of food gathering, mating, and caring for young” [1]. More recently a common definition of a home range is that it reflects an area with a defined probability of occurrence of an animal during a specific time period [2]. The size and shape of animal home ranges, along with their potential overlaps with each other or specific resources, provide important biological information on the species in question and home range analysis have therefore received growing attention in biology. Home ranges are usually modelled from discrete observations obtained by tagging individuals with various types of VHF or GPS transmitters.

As modern methods to calculate home ranges are highly sensitive to sampling regime an important aspect of obtaining locations is to decide a proper sampling interval. This issue has received much attention in the literature for decades, with contradictory views on the relevance of autocorrelation. Swihart and Slade [3] provided the only statistical method for calculating autocorrelation between locations, that is whether the location of an animal at time $t+1$ is dependent on the location of the animal at time t . The underlying assumptions for their calculations however only apply to a very few real cases and recent studies have shown that relevant biological information may be lost with the elimination of autocorrelation [4]. On the other hand, a standardized sampling method is crucial for calculating home ranges used for comparison and statistical tests. The literature has called for methods to determine an appropriate sampling interval but so far no solutions have been proposed.

We are in the process of reviewing 350 papers on home ranges or related topics published in 2005-2007 in order to quantify and evaluate telemetry sampling design and data analysis.

We propose three new methods to calculate an appropriate time between recorded locations in animal home range studies:

- 1) Biological time to independence.
- 2) Incremental analysis on the effect of a growing sampling interval.
- 3) Minimizing the number of locations with equal coordinates.

References

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*e-mail: menja@nsv.is