

## ARCTIC AND RED FOX DEN MONITORING

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### PURPOSE

With a good knowledge of every available denning site in a study area, an annual visit of each den at the time of reproduction becomes an effective and rapid method for monitoring the abundance and success of both fox species. Adequate den monitoring in a given study area provides information on the total number of reproductive adults, the number of litters produced, and the approximate number of cubs in each litter. A good estimate of the status of each fox species can then be obtained from this information.

### TIME PERIOD

Visit of dens should be conducted during the denning season, especially during the period when pups are visible outside the den. For arctic foxes, this corresponds to end of June to beginning of August. For red foxes, this period largely depends on the latitude of the site, and varies between March and July. At high latitudes such as on Bylot island (73°N), cubs appear on the den between early June and mid July. We recommend doing the den survey at the beginning of July (around July 5<sup>th</sup>) to maximize the chances of observing the majority of litters from both species.

### PROCEDURE

#### Ideal sampling

- Den monitoring should be conducted in the smallest period of time allowing for the visit of every den. This will avoid counting the same individuals twice due, for example, to relocation of a litter during the rearing period. Each den of the study area should be consecutively visited and inspected for signs of occupancy by foxes. Before approaching a den, verify from a distance with your binoculars or spotting scope the presence of foxes at the den.
  - If foxes are present, identify the species and the minimum number of cubs in the litter. Note the date, time and duration of the observation period.
  - If no fox is observed, walk up to the den and observe signs of utilisation. Strong fox odor in the openings, extensive trampling of vegetation, freshly excavated openings, high abundance of scats (juvenile scats can be differentiated from adult scats by their small size) and fresh prey remains are usually characteristic of a den used for reproduction. Furthermore, arctic fox pups will often bark from inside the den when approached by a human. If a den seems to be active, try to confirm its status by observing it for an hour from a location at least 500 meters away. Note the date, time and duration of the observation period. Duration is important because it is usually positively correlated with the number of pups observed.
- Continuous observation during several hours is required to get an accurate estimate of the number of cubs at an active den. Since every den should be visited in the shortest

possible period, we therefore recommend doing a first visit of every den and subsequently coming back and establishing temporary campsites at some of the active dens to estimate accurately the litter size. It is useful to identify a potential campsite at each active den during the first visit to minimize the disturbance when returning to establish the camp. Try to find a campsite at least 500 meters away from the den but with a good view on it.

- When the status of every den is confirmed, at least 5 active dens should be randomly selected to estimate the average litter size for each fox species. To estimate litter size, establish a camp at least 500 meters away from the den but with a good view on it. Cubs are mostly active from dusk until dawn but can also be observed during daytime. A continuous observation for 48 hours is usually required to have a good estimate of the litter size. Since it is never possible to be absolutely sure of litter size, “minimum litter size” is usually reported. Note the date, time and exact duration of the observation session.

### Light sampling

The visit of every den is essential to have an adequate monitoring of fox species. However, if the establishment of temporary camp for 48 hours is impossible, one or several shorter observation periods can also be conducted at active dens from a location at least 500 meters away. Note the date, time and duration of the observations to ease the subsequent interpretation of data on litter size.

### **PERSONNEL**

Number of persons and days required to conduct the den monitoring largely depends on the number of dens to visit, the size of the study area and the mean of transportation. As an indication, about 15 person-days (7-8 days for a team of 2 persons) and helicopter support are required on Bylot island to visit 100 dens dispersed over a 425 km<sup>2</sup> study area. A supplementary 10 days are further required to establish temporary camps at active dens to determine minimum litter size.

### **MATERIAL**

- map of the area indicating location of every den
- geographical coordinates of dens
- GPS receiver
- binoculars or spotting scope
- temporary camp site material

### **DATA MANAGEMENT**

- number of holes
- surface (length x width)
- GPS position
- Den number