

## Project information

### Keywords

Moose (*Alces alces*), space use, migrations, habitat use, resource selection, monitoring, management, ecosystem services.

### Project title

Moose in Finnmark – spatial ecology and management in a changing landscape

### Year

2016

### Project leader

Rolf Rødven/Erling Meisingset, Norwegian Institute of Bioeconomy Research (NIBIO, changed 1 Aug 2016)

### Geographical localization of the research project in decimal degrees (max 5 per project, ex. 70,662°N and 23,707°E)

70.144°N, 28.391°E

### Participants

Erling Meisingset, NIBIO

Rolf Rødven, UiT – Arctic University of Norway

Erling J. Solberg, Norwegian Institute for Nature Research (NINA)

Rolf Ims, UiT– Arctic University of Norway

### Flagship

Terrestrial

### Funding Source

Fram Centre, Regionalt forskningsfond Nord-Norge, Tana kommune, NIBIO

### Summary of Results

The overall purpose of the project is to investigate spatial use of moose in Finnmark, focused on large-scale seasonal movements, and small-scale habitat use and resource selection.

The purpose is split into following sub goals:

1. Investigate how seasonal migrations is related to sex and age, and how this is molded by biotic and abiotic factors.
2. Investigate how habitat choice is influenced by vegetation type and interactions with other herbivores.
3. Evaluate if passive sensors like camera traps may represent an alternative to GPS-collaring large ungulates.
4. Establish knowledge on habitat use and migration of moose in Finnmark as a base for future management.

As described in the application, the main focus in 2016 has been capturing and marking moose with GPS GSM collars. The fieldwork was carried out the second week of March. We planned to mark 25 individuals, but software problems with some of the GPS collars limited the number. 19 individuals, 4 males and 15 females were successfully captured and equipped with GPS collars (see figure 1 for locations). The moose were tracked by helicopter and darted from the helicopter using a dart-gun

(CO<sub>2</sub>-powered rifle; Dan-Inject) with 2.0ml darts containing appr. 8mg Etorfin. The animals age were estimated to be from two year to adults (more than 5 years), and other relevant measures was taken. Capturing caused no significant complications for the animals, neither could we notice deviating movement patterns the subsequent couple of days after capture and release. Capturing and marking was approved by the Norwegian Environment Agency (Miljødirektoratet) and the Norwegian Animal Research Authority (Forsøksdyrutvalget).

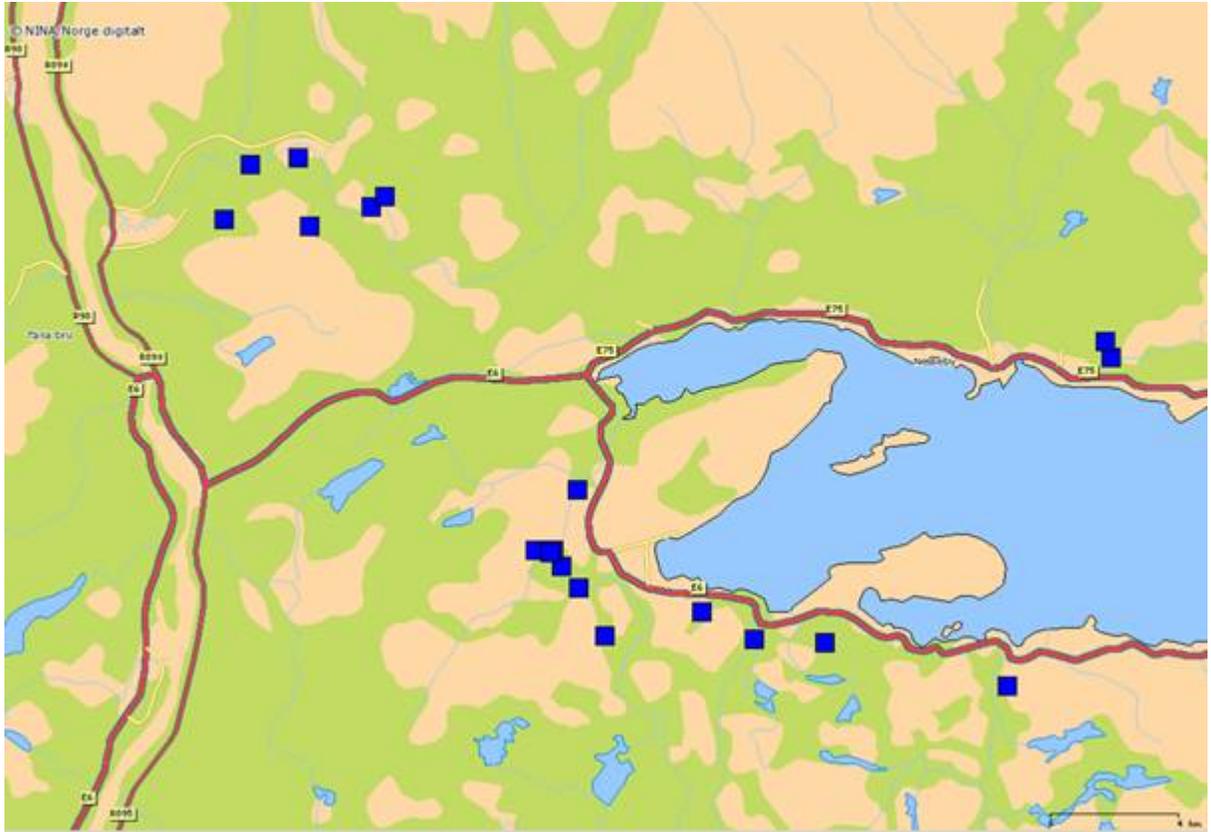


Figure 1. Positions of marking sites, March 2016.

While most of the moose were captured in the vicinity of Vesterelv and Suki area, the animals started to spread out in April and May, some of them for long distances, to Krampen and Austertana (see figure 2 for movement patterns). During May and June the spatial distribution was rather aggregated, probably due to calving and postpartum nursing. However, some individuals showed surprisingly high mobility, roaming around large areas of the Varanger peninsula. One individual roamed across the national border into Finland for some weeks, before returning to Norway.

In wintertime, moose in Varangerbotn and Vesterelv frequently cause collisions with cars. Hence, managers have promoted culling to reduce collisions. However, preliminary results show that all of the moose marked in Vesterelv moves out of the area before October, when the hunting starts, probably causing culling strategies to be less effective locally. Likewise, preliminary results indicate the Vesterelv area to be a hotspot in wintertime for moose in both Tana, Vadsø and Sør-Varanger, indicating that different culling strategies made by the municipalities may be, in the worst case, antagonistic to each other.

Reindeer fences seem not to severely limit movement patterns of moose in wintertime. For movement in summertime this is unclear, and both seasons need more scrutinizing of data. On the other side, with an exception of one individual for three days, there was no crossing of Tana river by any moose before late October. This is surprising, as the river is covered by ice from November/December to April, as well as moose often being observed in proximity of the river. However, whether it is the river or the

road/infrastructure that causes this is still unclear.

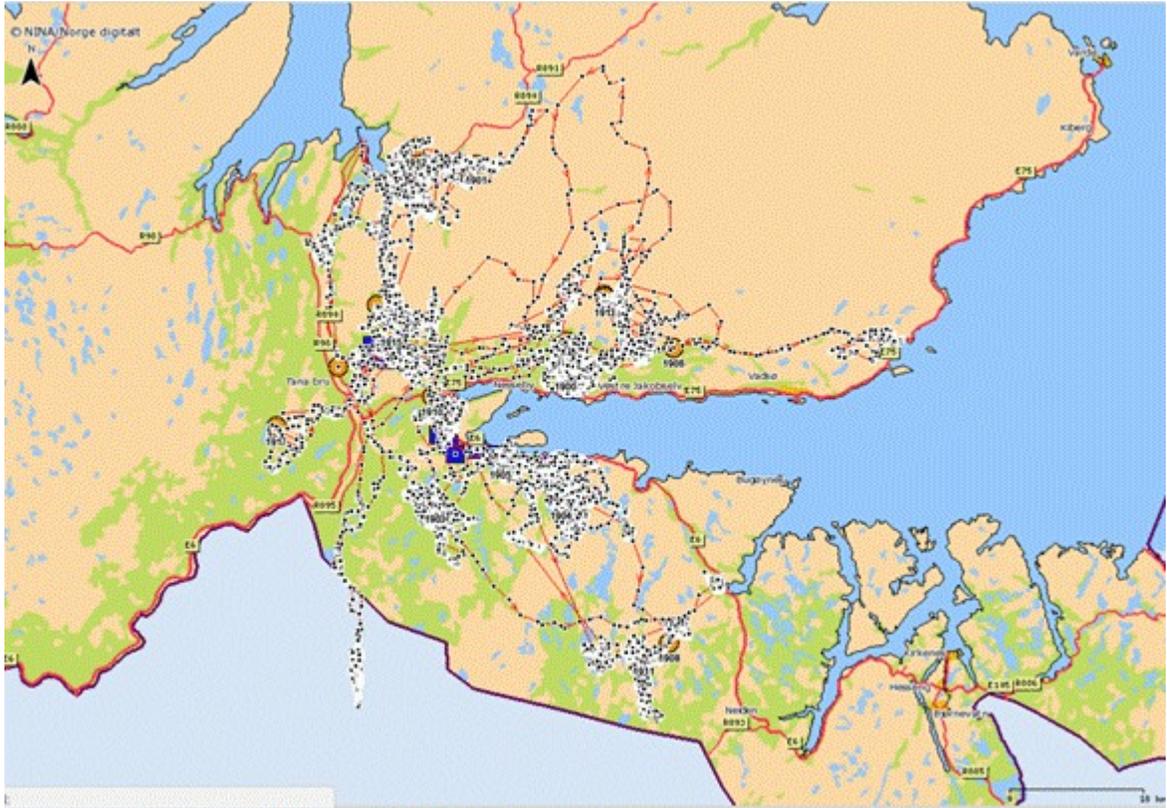


Figure 2. Track records of the nineteen moose based on positions recorded by the GPS collars, from 9 March to 12 November 2016.

Master and PhD-students involved in the project

None at the moment, but master projects may be included at a later stage in the project.

For the Management

The project is strongly focused on management of moose in Finnmark, both regarding novel knowledge on seasonal movement patterns in the northernmost moose population, as well as coherence between seasonal movement patterns and management areas. In addition, the project will provide information on how moose utilize areas infested by geometrid moths, as well as investigating the use of camera traps as a supplement or replacement of GPS collars.

Published Results/Planned Publications

The project aims to publish three peer reviewed papers: (i) spatial habitat use of moose in an changing ecosystem, (ii) habitat use, resource selection and life history of moose, and (iii) GPS collars versus camera traps – methodological comparisons (eg. Journal of

#### Communicated Results

The project has established the Facebook page *Elg i Finnmark*. The page has approximately 350 followers and posts has reached as many as 1300 users. The facebook page is used as two-way communication to answer questions as well as receiving observations, etc.

The project has been promoted in both national and local media:

Rødven, R., Os, Ø., Rolandsen, C., Madslie, K. & Solberg E.J. Presentation of field work and project on NRK national news \*Dagsrevyen, March 2016.

Rødven, R. News article, Sagat, March 2016

Rødven, R. News article Finnmarken, September 2016.

The project has been presented orally on four meetings:

Rødven R & Solberg, E.J. Oral presentations to municipal government, NGO,s and general public. Tana & Nesseby municipalities, March 2016.

Rødven, R. Oral presentation, NJFF Finnmark, annual meeting. Nov 2016.

Meisingset, E. Elgen i Finnmark: Områdebruk og forvaltning i et landskap i endring (Moose in Finnmark: Space use and management in changing environment). Oral presentation. Naturdatas viltkonferanse. Hell, 04.11.2016.

#### Interdisciplinary Cooperation

The project has cooperated with Norwegian Veterinary Institute (VI), represented by Knut Madslie.

The project also cooperates with other projects in the area, like *COAT* and *After the pest*. We also did imply the latter in open meetings in the municipalities in March.

#### Budget in accordance to results

The funding has been used as planned in the application.

Could results from the project be subject for any commercial utilization

No

If Yes

There is no commercial utilization planned.

Conclusions

The project *Moose in Finnmark – spatial ecology and management in a changing landscape* has successfully captured and equipped 19 moose with GPS/GSM collars in 2016. To our knowledge, this is the northernmost population of moose ever been GPS collared, and may hence provide novel knowledge on spatial use by moose living in the outskirts of their natural habitats. So far the project has revealed that the space use of moose is more extensive than expected, roaming over large distances. The seasonal patterns seem to be like expected, with a spread space use after birth and nursing during summer, as opposed to larger flocks and aggregation during winter. Movement patterns indicate considerable movements across management borders, indicating challenges to local management.

The project will continue next year. Due to results from this year we will emphasize marking animals on the western side of Tana river, to investigate spatial use towards Ifjordfjellet and the more continental parts of Finnmark. We plan also to refine the data gathering next year by using GPS collars with cameras. This may increase the resolution of habitat choice of individuals, of particular importance to investigate behavior and habitat choice in moth-infested areas, and to disentangle three dimensional diet selection in such areas. Likewise, such cameras will provide novel information on time of birth and mother/offspring associations.