

## Field report 2017

### Nordic Resource Management - NUNAVIS - Greenland

#### 1. Project implementation overview

In Greenland, the project activities have been concentrated in three geographical areas in South Greenland where there have been concrete opportunities, within the existing legislation, to further develop experience and methods on local monitoring and management related to the stocks of musk oxen and reindeer.

In Ivittuut (Region 11), the municipality of Sermersooq, where a larger local stock of musk oxen is found, the focus of the project has been on the management of the musk oxen stock. Minimum counts have been developed and implemented, and citizen meetings, establishment of natural resources councils, input to management planning, development of stock model calculator, hunting quota fixing, as well as training and dialogue about the management of the locally important stock of musk oxen have been undertaken.

On the Nanortalik peninsula, Kujalleq Municipality, where a stock of musk oxen has been relocated to the area in 2014, monitoring and control, citizens' meetings, establishment of natural resources councils, minimum counting development, stock model calculator, inputs for management, as well as gathering of experience in relation to musk oxen stock relocation have been conducted.

At Isortoq near Qaqortoq, Kujalleq Municipality, the project has worked with a stock of domestic reindeer owned by Caribou Greenland and has contributed with minimum counts and total counts, stock model calculator, input to management including relationship with adjacent areas, and from these activities extracted management experience in relation to stock optimization, grazing resource assessment and stock off take rates.

#### 2. Project achievements

**Development, testing and training in tools for stock minimum counts.** With efforts in 2015, 2016 and 2017, a good *method for minimum counts* has been further developed together with specifically local participants in Arsuk/Ivittuut. During the period, local hunters have been trained in conducting minimum counts.

The project has resulted in people in *Arsuk being trained and able to continue* to conduct minimum counts and that the natural resources council has taken responsibility for making minimum counts each year. Local minimum counts have had a direct impact on quota setting, which has influenced the development of the musk oxen population in the local area. The project has shown that minimum counts are crucial for management of the stock and that it is possible to train local users in the method, thereby gaining the necessary knowledge about the minimum counts and ensuring local ownership of the minimum counts. For minimum counts there must be 5-8 people that are trained and it is estimated that about 50% of the trained will have the opportunity to participate regularly in subsequent counts. How often training should take place depends on how much experience people already have and how much time it takes for a team to cover an area. There should be at least two years of training to learn to count correctly, requiring knowledge of area, gender and age identification, counting methods in relation to division of areas, distance and time to be used. Local training and involvement in minimum counts also depends on the context of the village including what interest there is in the stock and its utilization. A minimum counting module has been developed.

The project has made a great effort to calculate the *uncertainty margin* in connection with minimum counts, as this is an important parameter in the proper knowledge of the stock size and therefore influences the quota setting and management decisions. The uncertainty about the number of animals seen in the minimum counts has been discussed a lot, also locally, and a greater degree of knowledge about it has been created during the project. There has been input from different counts during the year (figures showed about 40% not counted) as well as combination of minimum counts and flight total counts in Cape Atol (about 50% not counted). Locally, it is believed that there are not so many animals that are not counted in the minimum counts in Ivittuut, and as a consensus (also for use in the stock model - see later), it is now agreed to work with an estimate of 30% not seen in the minimum counts in Ivittuut.

The *timing for minimum counts* must be decided based on when hunting takes place and when it is most practical to cover large areas and see the highest percentage of the animals. Changing of the time of the year for doing minimum counts will have consequences for the comparison of the counts across years. In Ivittuut there is still a discussion about the best time for doing the counts, but locally there is also the knowledge needed in order to make relevant decisions on this.

In relation to the *financial resources to do minimum counts*, there is significant support locally for continuing with minimum counts, but there is also a need locally to get petrol costs associated with the counts covered. Financial support to the minimum counts is going to be applied for by the natural resource committee via the village council from the municipality. The application is expected to be 5-7,000 kroner per count, which is to cover the amount used for petrol for 2-3 dinghies used during the minimum counts. APN will use this application as a model for other similar applications for minimum counts in other parts of the country.

With regard to the musk oxen stock in Nanortalik, the minimum count method has been tested for that area. The test showed that it is not possible to make minimum counts before the stock is significantly larger and thus not the first 8-10 years after the relocation of the 19 musk oxen to the area. This provides a good input to an assessment of financial resources spent on *stock counts relative to the stock density in a given area*. Over the next coming years, it will be a series of local observations that will form the basis for assessing stocks. This should be seen along with the use of the stock model calculator (see later). In relation to the reindeer stock in Isortoq, both minimum counts and total counts have been made. The minimum counts in Isortoq have given input to local management and provided learning to other minimum counts.

In connection with minimum counts, there are also a number of areas where the project has shown that *vulnerability* might be surfacing in the future. In other areas than Arsuk/Ivittuut and Isortoq, the project has not been able to do proper follow up training in minimum counts. Also, the future minimum counts depend on continued support from the local side as well as on economic conditions, where a possible financial support from the municipality is still unclear.

**Development, testing and training in model for ungulate stock calculator.** A computer-based model has been further developed by the project for the *calculation of development in stocks of musk oxen and reindeer in Greenland and elsewhere*. It can be used to provide an overview of stocks and especially to discuss quota size and their impact on stock development. It is considered to be a good tool for both local governance and for APN's management feedback about local quotas for hunting. Minimum counts must also be made in the future in order to feed local data into the modeling. The model has been further developed, presented to the users of Ivittuut and Isortoq, installed on a number of stakeholders' computers, and presented at a common Nordic webinar. Training in the use of the model has been undertaken. Various stakeholders have shown great interest in the use of the model and there is a consensus that the model can be a good tool for managing both musk oxen and reindeer stocks.

The model is *based on local knowledge* about the stocks and it sets the local knowledge into a biological framework, which helps in predicting stock development. It can be used by anyone including researchers, managers, hunters and locals with some knowledge of computer use. It requires installing software on a PC, which, however, is not always completely smooth. The model will be available on a USB key along with a guideline and a video guidance for its use. Two versions of the model are available, a simple version where only quota (= number of animals shot) can be inserted as a variable and a more complicated version where all four parameters (see later) can be inserted as variables. The simple version is available in Greenlandic, Danish, and English. It is relatively user-friendly. Later web version will be further user friendly. The model is dependent on four parameters, all based on information from minimum counts: It is 1) Population size at start including its gender and age variation (the better the count the better the forecast) 2) The number of animals shot (by gender and age class) 3) The natural mortality as % 4) The number of cows getting a calf.

In Ivittuut the local minimum count and other local knowledge about musk oxen have been used in the model. Through the running of the model, useful input for discussion of *future quota setting* has been created. When new data from the next minimum count is available, these are to be sent by the natural resources council to APN, which will enter them in the full model and return an email with a new library file that then can be used in connection with the annual discussions and suggestions on quota setting. This process should be repeated annually.

In Isortoq, the model has been used in relation to the domestic reindeer stock and has helped to get a better overview and provided input to strategies for stock management including the strategy for slaughter off take. The model will in future be part of the management of Isortoq.

The model has been *applied to the newly established musk oxen stock* in Nanortalik in order to calculate future stock size and quotas. This is done without the minimum counts, but based on the exact figures for the relocation in July 2014 (19 animals - of which 12 females and 7 males, of which 17 were 2.5 years and 2 were 1.5 years old). Running the model on this stock shows very clearly that the stock is extremely vulnerable if mortality (including poaching) is growing. It shows that there will be a minimum number of 10 years (up to 2024) before there can relevant quotas for hunting and that this will only be on trophy bulls. The findings suggest that the stock is extremely vulnerable to any form of poaching. The model has provided important input for the management of the stock. The project work shows that the model can also be used to assess population viability in relation to other musk oxen or reindeer relocations, as it can show the influence of hunting/poaching, and it can show how large the stocks to be relocated should be. The model is a sensible management tool for the various decisions related to relocations.

*Issues to be aware of in the future use of the model*, relates to the need for all relevant partners to continue to use and update the model with new data. In addition, it is important to emphasize that the model's calculations are only useful if the information fed into the model is of reasonable quality; this applies to information about minimum counts (including gender and age), mortality (including natural death and number of hunted animals) as well as the percentage of females who get calves. The further steps in relation to the use of the model is that the natural resource council looks at the latest data (2017) of the minimum counts, uses the model, and during the winter 2017-18 proposes hunting quotas to APN. Thereafter, it will be every year that the natural resource council sends data from the minimum count to APN, followed by APN updating of the model and then returning the library file to the natural resources council who then uses the model for quota proposals.

**Further development and testing of governance structures for local participation in natural resource management.** Natural resources councils have been established as voluntary councils of citizens who are interested in the management of the musk oxen. The council in Arsuk has worked well during the project period and has been involved in minimum counts, management inputs and actions including quota proposals. The *natural resource council has secured a reasonable degree of local participation* and

has been important in the area of local responsibility for the management of the stock. Matrices for monitoring by the natural resources council of key aspects in the management of the stock in the area has been developed and can be used in the future work of the natural resource council. The council wishes to continue its work and will seek cooperation with the village council and ultimately with the municipal council. The project has shown that local ownership and rights (allocation of quotas) in connection with the management of stock are important.

As local citizens, represented through the natural resources council, are assessed to be the best available option for management of local stocks of musk oxen (or reindeer), *formalization of delegation of such management responsibility* from APN to the local level should be pursued. Natural resources councils are a collection of volunteer-interested citizens. For democratic reasons, it is important that there is a form of formalized relationship with the democratically elected bodies in the local area and above. Natural resources councils only work so long as they have an opportunity of making a difference and be listened to by various decision-making authorities, hence, it is important to ensure that such dialogues actually takes place.

**Development of management strategies and testing input to management plans.** Key aspects of the management of musk oxen stocks are, and will be, minimum counts and quota setting using local knowledge and stock model calculator as well as controlling what actually happens with the stock. The project has shown that the management of local musk oxen and reindeer stocks is primarily about *maximizing the value over time* that the stock can give to the economy in a given area. This must be done in a sustainable way, regarding nature and the environment parameters as a framework but not as goals in themselves. Experience in Ivittuut shows that in recent years there has been an opportunistic strategy, but that there is greater interest locally in a stable output from the local area (when the choice is given, stability is chosen). It is clear that using the calculator model can help choose a strategy, which promotes stability. The project has resulted in important *input to a management plan* for the musk oxen stock in Ivittuut, and further work should be done to actually develop such a management plan. There is agreement that a management plan should be simple and concise. Management ideas have been presented locally including local license issuance, distribution of stocks to larger areas, relationships with reindeer stocks in neighboring areas (further ideas are captured in the summaries of the meetings).

**Development of capacities and informing about experiences.** Overall the project has managed to build capacities in use of tools and methods for local participation in monitoring and management of natural resources at the local level in Arsuk, Nanortalik and Isortoq. Capacities at management level in authorities in relevant departments in Nuuk have also been developed. The projects has through a range of workshops and communications also secured capacity development more broadly among Nordic stakeholders. The project has ensured that information about the use and practice of integrating local knowledge with resource management has been made available to relevant stakeholders within Greenland and in other Nordic countries.

### 3. Key lessons learnt

Based on the Greenlandic project experience, the following key lessons are stressed:

- It is considered worthwhile to undertake an assessment of all musk oxen and reindeer stocks in Greenland in relation to where it is possible to promote local ownership and economy through

minimum counts, use of calculator model, quota setting/allocation and establishment of local councils of interested users of the stocks.

- Minimum counts of stocks of musk oxen and reindeer is a valuable tool that can be used for better management of these stocks and can be done with the involvement of local users whom can be trained in undertaking the counts.
- Computer-based stock calculator model, which has been further developed in the project, can be used effectively to estimate stock developments for stocks of musk oxen and reindeer. The model can be used in different versions by researchers, managers and local users, respectively, and use of the model provides valuable management input in relation to setting of hunting quotas.
- In relation to local stocks of musk oxen and reindeer, it is essential that the stocks be managed with a view of maximizing the value of the yield from these stocks. In this context, it is also important that stable yields of stocks be aimed at, as this best supports the local economy.
- In order to ensure the best possible management and the most economically advantageous support for the economy, it is important that hunting quotas related to local stocks primarily and to the extent possible are allocated to local citizens in the villages most directly linked to stocks. This also ensures optimal management in relation to local involvement and with regards to control of the stock exploitation. In the context of local involvement in management, it is advantageous to establish local councils of users interested in the activities related to the stocks concerned.
- For future relocations of musk oxen stocks, the number of animals, which are relocated should be at least 25-30 animals, as this will ensure a growing stock that is less vulnerable and relatively faster leads to opportunities for hunting quotas.