ABSTRACT: Snowmobile avalanche related accidents is an increasing problem in Norway. Out of the 58 fatalities between 2009 and 2015, 10 were snowmobilers. Another fatality and many close calls occurred the Easter of 2018. The amounts of snowmobilers in avalanche terrain is higher than people are aware of. The activity has developed under the public radar until recently. Our study area, Finnmark county, has a long recreational snowmobiling heritage with more official trails than roads. Much use of avalanche terrain is illegal. So, obtaining data for research and public analysis is challenging in comparison to the US, Canada, Svalbard and Sweden, where avalanche terrain is a legal option. We lack knowledge of snowmobiler’s behavior and rationality in avalanche terrain. Our goal is to reduce avalanche accidents, despite the illegitimacy and controversies of snowmobiling. This study investigates how, where and when relevant and reliable data can be collected. The findings may be useful for avalanche forecasting (both warnings and educational resources on Varsom.no) and for addressing the seven hours avalanche curriculum introduced to the snowmobile license qualifications in 2017. Findings from the 2017-2018 winter season show that parts of the snowmobiling community have changed their behavior in avalanche terrain, both in Finnmark and on Svalbard. However, data from more seasons are needed to corroborate the findings, as the changes in Finnmark may be due to an abnormal snowpack in 2018.

KEYWORDS: Snowmobiling, illegal, qualitative methods, avalanche education, decision-making.

1. INTRODUCTION

There is no documented research in Finnmark on snowmobiling in avalanche terrain and no qualified knowledge base for future preventive measures locally, regionally or on a national level. Mehus (2012) and Jeppersen (2005) have performed related domestic research among snowmobilers without specifically focusing on use of avalanche terrain. Foreign experience should be helpful, but we need to develop our own knowledge base since sledding in avalanche terrain in Norway is mostly illegal and undetected.

This research is the first part of the project “What ordinary Skiers & Snowmobilers Do, NOT DO and Why in Avalanche terrain” financed through the Research Council of Norway. The main goal of this study is to test and secure research methods and locations needed to develop new theory later in the main project. In order to collect qualified data, we need to:

- Get the right informants and access to a “under the radar” snowmobile community
- Find the right locations & timing for fieldwork

2. METHODS

We applied mostly qualitative methods, based on an ethnographic approach (O’Reilly 2012, Hesjedal 2016). We primarily used distant or participating observations and random open conversations in the field. Building new theory demands an open approach, and we would like to be conscious about bias and preconceptions. Structured interviews were options for cross check or where observations were unpractical or dangerous. A concern during this study has been how to get access to data from an illegal activity.

The project does not plan to use sensitive personal information, observational technics or field notes that can or will identify informants. Therefore, developing a method during the pre-project that collects data on both practitioner’s reflections on own practice, and their practice as observed during the activity, is crucial for the main project and was the focus of this article.

2.1 How to get the right informants and access to the “under radar” snowmobile community?

The use of core informants and casual talks out in the field should give access. Our former experience (Michaelsen 2016) has shown that people are honest when dealing with a mutual subject - that can kill you - is on the agenda. The
researcher’s credibility among the field and reliability as interpreter will be crucial for the project. The researcher’s credibility will be tested when directly relating to the informants. Getting the “truth” when dealing with an illegal activity will demand delicacy expressing a knowledge they can identify and appreciate. Proven not there to “catch” them and “turn them in”, will hopefully give reliable data. A possible challenge here is not blending in like the ski touring part of the main research project since the activity in focus is illegal according to Norwegian law. Significant “under the radar” insider information will be hard to get. Core informants will hopefully fill in that gap. On the other hand, this distance should help the researcher obtain a more objective eye on what data will be worth interpreting so that the amount of data doesn’t get out of hand. It will be of great interest for the ongoing project to learn how earlier efforts have solved this sensitive issue in this or related fields.

2.2 How to plan and time the right locations for our fieldwork?

In addition to our own knowledge based on three decades field experience in the region, our plan was to get assistance from younger core informants that are part of the snowmobile community in focus. When to get access to data will be strongly dependent on several conditions; weather, snow cover and specially accessibility. The core areas for observation need to be accessible using touring skis as well as with a snow mobile. Observations will have to be done in an opportunistic manor since the observer or observed are not there at all the time. So, valuable observations will be missed during the season just because of absence or flat light.

2.3 Securing the quality of the data

Several issues where crucial for the quality of the observations. One obvious challenge was how to observe without disturbing. Observing activity from a distance should reveal undisturbed behavior. Mapping new and old tracks would give objective information. These observations combined with informal individual/group conversations/interviews with assistance from core informants should give sufficient cross check concerning what they are doing and even why.

2.4 How to get reliable data?

As often as possible the observations and notes should be shared with core informants for comments, corrections and approval. All data, notes and core informants will be linked anonymously with the possibility to examine if needed.

Pictures and proof of tracks and activity that doesn’t reveal any identification will be preferred. Film and taped interviews will not be our priority in this study, based on ethical issues and practical reasons, since it easily can create an unnecessary volume of less valuable data reducing the amount of observations.

3. DATA COLLECTION AND TESTING

3.1 What did we do and how did we do it?

The winter of 2017-2018 was special because of a thin snow cover early season, followed by a drought lasting almost two months (January and February) resulting in a deep and wide spread persistent week layer situation lasting the rest of the season.

Before early January, there was less activity than planed since the thin snowpack created what snowmobilers call “Caskoføre” or “insurance conditions”. This implies a high risk of damaging your sled having to deal with expensive insurance payments. The few field days (Fig. 1) obtained and conversations with informants confirmed the low level of activity. The period did display a rare opportunity to map the total amount of tracked terrain used legal and illegal. Unfortunately, nobody within management in the County or Municipality documented the seldom situation.

Figure 1: Data collection in 2018. Locations are 1a Kviby, 1b Øksfjordbotn, 1c Alta City, 1d Øksfjord, 2a Hammerfest, 2b Tana and 3 Reisa.

Our observations started again after a period of absence because of ski related fieldwork in the Alps and USA. The snow cover was still lower than average until Easter. This period continued to influence the favored riding options. On the other side the snow cover was at its deepest in our focus areas, making them even more attractive than normal.

An overview of observations is given in Tab. 1.
Table 1. Dates and locations for the data collection.
Unstructured talk was carried out via phone regarding 1b Øksfjordbotn control measures and lethal accident in 3 Reisa. Accidents Reisa and 2b Tana were checked with police.

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3.2 **Direct observation**

This method has been the most challenging since it is time consuming. It demands the right timing and knowledge about the activity to be able to interpret what you see. The field days we encountered were rewarding, documenting new finding within the use of avalanche terrain that could make implications for future management. Pictures were used as documentation without any ethical issues.

3.3 **Informer observation**

Contributions from external informants have provided more relevant data, specially documenting what accidents and incidents imply of activity in relation to our findings in our focus areas closer to Alta. These data were gathered through direct contact over the phone or email using pictures and other live documentation to be able to make the right interpretations. The police were contacted to clarify facts when needed. We tried to get annual contributions from the mountain police without result.

3.4 **Unstructured conversation**

Information from core informants have been crucial in our verification of our direct observations and use of other sources. These “talks” where planned, but with no other agenda than the topic in hand there and then. They have been done in the car or on the phone asking for their interpretation of our findings. The notes after the discussion were then passed on to the informer for verification. Several of these discussions have been game changing within our interpretation of the data.

3.5 **Random conversation**

Casual talks with random informants in the field have been useful in verifying our interpretations of our direct observations. But even more important, they function as an unbiased quality check of the core informant’s contributions.

3.6 **Structured interview**

We never got the opportunity to perform any Structured Interview in this preliminary stage.

3.7 **Survey**

A Kahoot was performed during a public Avalanche Seminar organized by the Center for Avalanche Research and Education in the city of Alta. The Kahoot was designed as an opening session that evening documenting behavior and preferences among ski touring and sledding. The final results are not ready and since the evening was not for snowmobilers only, the turnout was not as high as during former snowmobiler “only” avalanche happenings organized in Alta.

3.8 **Media**

Web based regional news have worked as important preliminary information to incidents and relevant issues beyond our focus areas.

4. **PRELIMINARY RESULTS AND CONCLUSION**

The snowpack 2017-2018 was atypical, producing a full season persistent week layer situation in most of Northern Norway. Our observations documented predominantly technical riding around the forest line and not the “traditional” high marking. These results have to be cross checked with more years of observation with the same methods in the same area.

Reflections on own practice have been noted during conversations done randomly, unstructured and during the Kahoot. They show an openness despite the likely illegality of their activity. Our findings support a “game change” in attitudes and behavior. The core areas for snowmobiling have also relocated the past years. The majority of riders from the city of Alta have moved there riding further out to the coastal snowpack with a thicker snow cover and more often powder conditions. This is explained by the evolving riding preferences mentioned by informants and as a noticeable generation shift. New snowmobiles enhance performance in dense forest and deep powder. This new generation with the newest technology seek new skills demanding different terrain with deep powder. They therefore avoid most avalanche...
terrain in contrast to the “old school” of high marking mostly performed in avalanche terrain. As the sledders pointed out themselves, anyone with enough horsepower can ride straight up a mountain face. High marking isn’t THE challenge anymore and they express an averseness to exposing themselves to the high avalanche danger high marking implies. The truth in this and variation within the regional snow mobile communities will be valuable outcomes of our project.

The researcher’s credibility was tested fluently when relating to and getting access to informants. Despite not being a sledder himself, the researcher has been used the past two decades by the snowmobile community organizing avalanche courses for recreational snowmobilers and professionals. The avalanche preventive skills in general are not very high within the community. A random meeting during a field day opened up the opportunity supporting a 2019 avalanche course for hard core riders. This can contribute significantly in getting even more into the random casual talks that often represent what’s truly going on. Avalanche knowledge and skills should give respect despite not being a sledder. The researchers 3 decades of ski touring in the same mountains, international and national avalanche related work has given needed recognition as a practitioner among the snowmobilers. Cooperation with local media during avalanche awareness campaigns avoiding tabloid coverage putting blame on anyone has also preserved credibility. This local experience and knowledge has proven an advantage in getting access to informants and in reducing unnecessary data. Eventual interpretation bias can be examined evaluating the various verified data notes.

Based on our experience this winter, we will continue monitoring the focus areas that have proven to be the core areas. The greatest limitations of field observations like weather and snowpack demand a prolonged opportunistic approach, getting out when conditions are right. The researcher has to be accessible and respond accordingly. There is a risk that valuable data is lost since the most rewarding field sessions are weekends with good light just after fresh abundant snowfalls. Never the less, the most rewarding field work demands deep local knowledge of the core areas combined with credibility within the community and a true understanding of what’s going on. This is possible as of now considering the preconditions needed to access qualified data.

5. OUTLOOK

The project is part of a long-term strategy initiative by the Center of Avalanche Research and Education, CARE (Engeset, R. 2016). The results will be presented through CARE, Varsom.no, UiT The Arctic University campus Alta, Norwegian avalanche conferences, International Snow and Science Workshops (ISSW) and more. Target groups will be local and regional authorities, snowmobile organizations, outdoor life education, the Norwegian Avalanche Warning Service (Varsom.no), avalanche course development and infrastructural authorities and contractors.

This pre-project study, addressing the how’s, where’s and when’s of the data collection methods for illegal Snowmobiling will continue into the main project ending in 2021. The planned project will lead to new crucial knowledge for mitigating the avalanche problem in the North of Norway. The leader of the planned main project is Carsten Rolland - Professor at School of Sport Sciences at UiT the Arctic University of Norway. Bjørn Michaelsen (UiT, Alta) is the research leader during the qualifying project building the fieldwork on experience within ski touring (Michaelsen, 2012 & 2016). He is a Geographer with 25 years of experience observing people in avalanche terrain domestic and abroad and one of few in Norway organizing avalanche courses for snowmobilers in the county. Assistance will be provided by Kjell O. Olsen – anthropologist & Professor at UiT/Alta within qualitative methods and Rune Engeset – associate professor II at CARE/UIT, head of the Norwegian Avalanche Warning Service & Chairman for the European Avalanche Services. For the main project international academic cooperation is planned.

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