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SWEDISH ENVIRONMENTAL  
PROTECTION AGENCY



# **The establishment of the first public avalanche forecasting service in Sweden**

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**Swedish Mountain Safety  
Council**

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# 1. INTRODUCTION



## SWEDEN AND THE SWEDISH MOUNTAIN RANGE

- ❖ Sweden is about 1800 km long and has app. 9 million inhabitants, 80 % lives in the south of Sweden
- ❖ The Swedish mountains stretches app. 1000 km along the Norwegian border in the northern half of the country and it spans from 61° to 69° north and part of the area is well above the Arctic Circle.
- ❖ Villages and tourism with ski resorts is concentrated around major roads. Small local populations, few roads and dark midwinters means few visitors in essential major parts of the terrain during low season.



# 1. INTRODUCTION





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## SWEDEN AND AVALANCHES

- ❖ Avalanche accidents in Sweden involve, with few exceptions, people who voluntarily seek steep terrain, either at their free time or at work.
- ❖ The need for reliable public avalanche information in the Swedish mountains has been discussed for a long time, mainly requested by Swedish skiers, snowmobilers and other stakeholders.
- ❖ Since the year of 2001, there has been 37 Swedish fatalities due to avalanches, a majority of those in other countries.



## 2. THE NEED FOR AVALANCHE FORECASTS IN SWEDEN



Two strong trends have put light on the need for avalanche forecasts in Sweden

The first, changing terrain use in the mountains. (Both among skiers and snowmobilers)

The other one is globalization of winter recreationalists (we all travel more seeking the best skiing)

## 2. THE NEED FOR AVALANCHE FORECASTS IN SWEDEN

### Target groups and surveys

- ❖ Main target groups , people travelling in the mountains during winter (skiers, snowmobilers, reindeer herders, nature wardens)
- ❖ Infrastructure is rarely affected by avalanches, such as railways, roads and communities
- ❖ To learn more about how our main target groups are using avalanche terrain, we have conducted a series of targeted surveys, analyzed the responses and published a series of reports which have given us a good basis to better understand their needs of information and tools and how we can work to prevent future avalanche accidents.

## 2. THE NEED FOR AVALANCHE FORECASTS IN SWEDEN



FORSKNINGSRAPPORT L

### Behovsutredning avseende lavinprognoser för svenska fjällkedjan

*Råder det brist på relevant information om när och var det är lavinfarligt i Sverige?*



Stefan Mårtensson  
Petter Palmgren



*International Snow Science Workshop Banff - 2014*

SNOWMOBILING IN SWEDEN IN 2014 - TRENDS, ATTITUDES TO RISK AND KNOWLEDGE ABOUT AVALANCHES

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**ABSTRACT:** In spring 2014 a web survey aimed towards Swedish snowmobilers were conducted. The aim was to identify riding habits, attitudes to risk, knowledge of avalanches and the use of safety equipment. In total 2917 snowmobilers responded. The results provide new and important knowledge about behavior and attitudes to risk and general knowledge about avalanches and avalanche awareness. 34 % of the snowmobilers state that they are sometimes or often in contact with avalanche terrain. Of those, 19 % has been involved in at least one avalanche related incident. In the same group, only 14 % are regularly equipped with avalanche transmitter and probe. Among those who are using avalanche safety equipment, 33 % states that they rarely or never practice to use it.

In Sweden the use of snowmobiles has greatly increased the past 20 years and so has the popularity regarding freeriding with snowmobiles in steep terrain. The total number of snowmobiles is now more than 280,000. Between 2005 and 2014, 102 snowmobilers in Sweden were killed in snowmobile related accidents in total but very few accidents during this period has officially been avalanche related which is surprisingly.

Do Swedish snowmobilers use the terrain differently than in North America and in Norway where there is much more accidents recorded or is there a difference in their attitudes to risk, or is the relatively few avalanche accidents just a coincidence? Is the relatively few accidents connected with the development of stronger and faster snowmobiles? Will Sweden also see a growing number of accidents with more victims? Are there other factors?

The final results will be used in the Swedish Mountain Safety Councils efforts to develop future avalanche education programs for snowmobilers and as a way to support research and development in the area.

**KEYWORDS:** (Snowmobile, Avalanche Education, Avalanche Awareness, Surveys, Attitude, Risk management)



### Offpiståkning – riskminimering eller riskacceptans?

– Svenska alpin- och snowboardåkare om offpiståkning och laviner



Fjällsäkerhetsrådet  
Franska.se  
December 2013



## 2. THE NEED FOR AN AVALANCHE FORECASTING PROGRAM



### ICAR PREVENTION WORKGROUP



## 2. THE NEED FOR AN AVALANCHE FORECASTING PROGRAM



## 2. THE NEED FOR AVALANCHE FORECASTS IN SWEDEN

In February 2015, the Swedish Environmental Protection Agency (SEPA) received a mission from the government to begin the establishment of an avalanche forecast program in cooperation with relevant actors within the Swedish mountain.

SEPA should have a principal responsibility for the service and be responsible for the management and financing. Operational parts can be outsourced to other actors.

The mission was reported to the Government (Ministry of the Environment and Energy) in September, 2016.



### 3. THE FORECASTS- ESTABLISHMENT

- ❖ The establishment of Sweden's first public avalanche forecasting service, started in 2015, initiated by the Swedish government and is a true milestone in the Government's public safety efforts. It is also the latest avalanche forecasting service that has been launched in the world.
- ❖ The first avalanche bulletins were published in January 2016 and daily bulletins have been issued for 3 separate areas. In the coming 3 years the forecasting service will try to cover up to 8 regions, which covers the most visited areas.

### 3. THE FORECASTS- ESTABLISHMENT

The main goals of the Swedish avalanche service are:

- ❖ To reduce the number and severity of avalanche incidents
- ❖ To provide visitors with a good basis for decision
- ❖ Offer visitors safer experiences in the mountains

### 3. THE FORECASTS- COMMUNICATION

- ❖ The avalanche forecasts have been issued on a standalone website, [www.lavinprognoser.se](http://www.lavinprognoser.se).
- ❖ The priority in the design has been clarity and simplicity, but also to stay in line with international standards.
- ❖ Forecast have been issued daily for the three regions at 5 pm. Forecasts comprised the two following days.





### 3. THE FORECASTS- ORGANIZATION

#### Principle sources of information:

- ❖ Contracted, local network of avalanche technicians
- ❖ Weather data and forecasts from SMHI, Swedish met – office
- ❖ Cooperation with local actors, like ski areas, guides, mountain hut wardens and the public



### 3. THE FORECASTS- ORGANIZATION

#### DAILY STAFFING

- ❖ Forecasters
- ❖ Area managers in each region
- ❖ A varying number of field observers
- ❖ A meteorologist from SMHI
- ❖ Communication through daily conferences and InfoEx





### 3. THE FORECASTS - MODEL



### 3. THE FORECASTS - MODEL

- ❖ Forecasts are introduced in a context where certain industry standards exist
- ❖ Standards are primarily learnt on avalanche courses.
- ❖ Swedish professional avalanche courses have been based on CAAs ITP course system for more than a decade. Canada's Observation Guidelines and Recording Standards for Weather, Snowpack and Avalanches (OGRS) has been the national standard among professionals since then.
- ❖ More than 150 people have taken the "Avalanche technician" course, similar to CAA's Industry Training Program ITP L1 and close to 3000 persons have taken shorter avalanche courses.

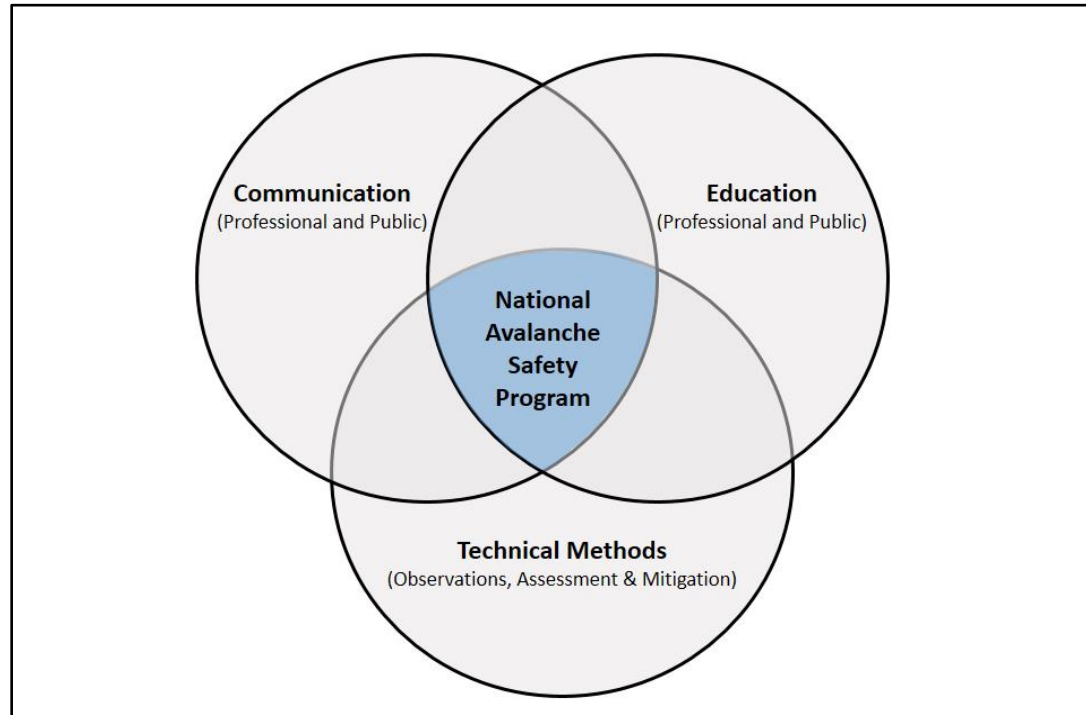
### 3. THE FORECASTS - MODEL

- ❖ SEPA aim to take a broad approach at the avalanche industry as a whole. Education is a key, and we will continue to base our course system on the CAA's Industrial training program.

From that follows:

- ❖ The choice to keep using OGRS as professional observation standard, using the conceptual model and the Swedish version of the North American avalanche danger scale.
- ❖ That said, we encourage the work to bring the two existing standards together to make just one international avalanche danger scale in a close future.

### 3. THE FORECASTS- MODEL





## 4. EVALUATION OF THE FORECASTING SERVICE



## 4. EVALUATION OF THE FORECASTING SERVICE

- ❖ The forecasts have been evaluated by public users and professionals via a web survey
- ❖ A thorough evaluation by the 25 participating avalanche professionals
- ❖ An international evaluation made by Grant Statham from Canada.

## 4. EVALUATION - USER SURVEY



## 4. EVALUATION - USER SURVEY

Respondents gave good grades to the avalanche forecasting service.  
(N = 207)

- ❖ 80 % use the forecasts as an important decision tool
- ❖ 80 % respond that the forecasts are easy to understand and use
- ❖ The respondents consider the forecasts as comparable with forecasts in other countries.



## 4. EVALUATION- INDEPENDENT INTERNATIONAL EVALUATOR

### Swedish Avalanche Warning Service Program Review



Prepared in May 2016 for the:  
Swedish Environmental Protection Agency



By: Grant Statham  
Alpine Specialists  
Canmore, Alberta, Canada  
grant@alpine-specialists.com



*- “There is no doubt that the Swedish avalanche forecasts provides visitors and nationals alike with a solid basis for decision making. Avalanche forecasts are a starting point; they provide an initial estimation of mountain conditions to help the public plan their trip. Ultimately, people make their own choices and have an individual responsibility for their own risk, but using an avalanche forecast provides them with a significant head-start.” - Grant Statham 2016*

## 4. EVALUATION- INDEPENDENT INTERNATIONAL EVALUATOR

In the international evaluator's report, there is a number of recommendations, such as:

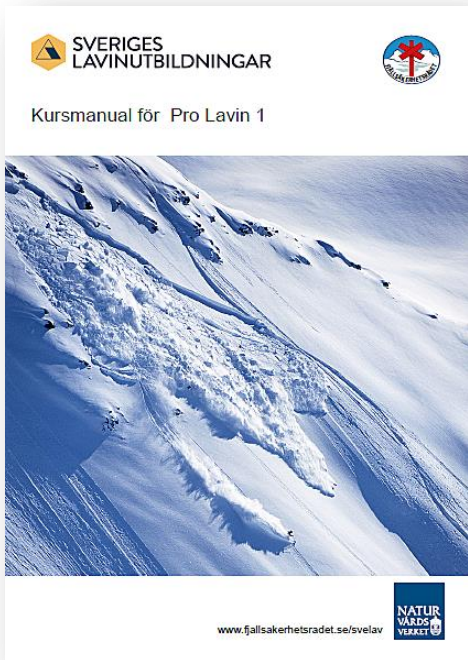
- ❖ Establishing an incident report system, in order to evaluate and measure the effects of preventive work.
- ❖ Expanding the number of areas slowly and make sure there is local expertise in each new area.
- ❖ Continue work on Sweden's Avalanche Training program, education of both professionals and the skiers and snowmobilers is crucial for the future success of the avalanche forecasting service.

## 5. FUTURE DEVELOPMENT

- ❖ Further development of communication
- ❖ Avalanche terrain classification
- ❖ Increased International collaboration
- ❖ Developing methods regarding measuring success in the program  
(mission from our agency as well as from the Swedish Government)



# SVELAV- Swedish national standard of avalanche educations



# SVE LAV





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