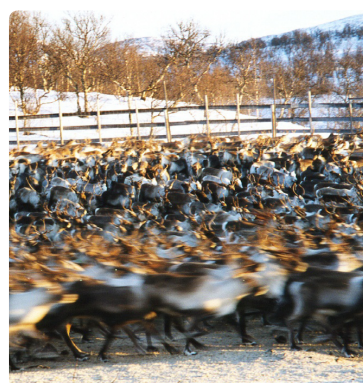




SWEDISH ENVIRONMENTAL
PROTECTION AGENCY

Environmental objectives in the mountain landscape

A synthesis of research problems connected
to the management of a limited resource



EXECUTIVE SUMMARY
Report 6366





An analysis, and an example, of how interested parties can become involved in the setting of an environmental objective and in the management of a limited resource.

BACKGROUND

The environmental work of Sweden is implemented with the aid of a system of environmental objectives, which contains 16 environmental quality objectives. One of the Swedish environmental quality objectives is “A Magnificent Mountain Landscape”. The definition of this environmental quality objective is:

“The pristine character of the mountain environment must be largely preserved, in terms of biological diversity, recreational value, and natural and cultural assets. Activities in mountain areas must respect these values and assets, with a view to promoting sustainable development. Particularly valuable areas must be protected from encroachment and other disturbance.”

There are several interim targets belonging to this general objective. Indicators are used to follow up and evaluate whether or not the interim targets are being achieved. Interim targets and indicators for “A Magnificent Mountain Landscape” are shown in the table below.

Interim target	Indicator	Assessment	Issue with interim target/indicator
Damage to land and vegetation caused by human activities shall be minimal no later than 2010.	Number of reindeer in the mountain area Number of terrain vehicles in use in the mountain counties		The number of terrain vehicles does not indicate the frequency of driving and is thereby not an appropriate indicator of land abrasion. Research has shown that reindeer grazing is an important process in order to maintain biological diversity in the mountains.
Noise in the mountains caused by motor vehicles in terrain and aircraft shall decrease and fulfil the following specifications, namely that: - at least 60 per cent of terrain vehicles in use shall meet the high noise requirements (lower than 73 dBA) no later than 2015. - noise from aircraft shall, no later than 2010, be at a minimum within both regulation area class A, in accordance with the Terrain Vehicle Ordinance (1978:594) and within at least 90 per cent of the national park area.	The number of terrain vehicles that meet the given requirements regarding noise Noise in the mountains		The noise issue is, in many respects, a matter of values – what is an acceptable noise level? The number of terrain vehicles does not indicate the frequency of use. The existing registry includes both vehicles in use and deregistered vehicles. In addition, there is a great number of terrain vehicles used in the mountains, but owned by persons residing elsewhere. Nor does the number of terrain vehicles give an indication of the aircraft activity.
No later than 2010, the majority of areas with high representative natural and cultural values in the mountain area shall have a long-term protection which, when required, includes maintenance and restoration.	Protected mountain environments		There is no information on what is considered a valuable cultural environment or where such is located. The indicator gives no guidance on how, e.g., cultural values are preserved.
No later than 2005, a programme of measures shall be in place and shall have been initiated for endangered species requiring targeted measures.	Number of wolverines in the mountains Regeneration of the arctic fox Birds that nest in the mountains		

Due to the negative development for the environmental quality objective “A Magnificent Mountain Landscape”, the Swedish Environmental Protection Agency initiated a preliminary study in the winter of 2008/2009, the purpose of which was to unravel the problems surrounding this environmental quality objective, as well as to obtain knowledge regarding how management tools can be used to promote a sustainable development in a complex system (where the mountains are used as an example).

The commission from the Swedish Environmental Protection Agency was to:

- Analyse how the actors concerned view the format and usefulness of the environmental objective.
- Investigate the conflicts that exist in the mountain areas and how these affect the environmental objective.
- Evaluate how the management of the mountain resource has functioned thus far.
- Conduct a future analysis to describe the changes needed in order to achieve the objective.
- Propose guidelines for a future research programme for the mountain areas.

The preliminary study resulted in the report *“Environmental objectives in the mountain landscape - A synthesis of research problems connected to the management of a limited resource”*.

A COMPLEX SYSTEM

In Swedish terms, the situation in the Swedish mountains is unique:

1. Ownership and access rights are unclear.

The Swedish mountains are for the most part owned by the Swedish State. Whether the State is actually the rightful owner of this land has, however, been subject to debate for a long period of time. Several different groups, including the Sami, have made claims to the land, and despite several Government inquiries, there is currently no acceptance of the prevailing ownership conditions. In addition, the Sami have the right to reindeer husbandry based on prescription from time immemorial, an access right which, inter alia, includes the right to reindeer grazing, hunting and fishing on the land of another party.

2. There is a multiple use of the landscape resource which does not exist anywhere else in the country.

Reindeer husbandry has to co-exist with large-scale forestry; mountain agriculture with reindeer husbandry; tourists with locals; predator enthusiasts with livestock owners; hunters with reindeer owners and so on.

3. To a greater extent than the common Swede, the people who live in the area depend on natural resources that exist in the mountains for their survival.

As an example, almost 90 per cent of the population in the mountain areas use meat from game on a regular basis.



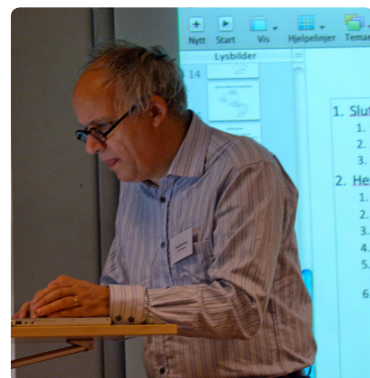
METHODOLOGY

The work has taken place in several steps, centred around three workshops where around 40 authorities, interest organizations and experts participated. Systems analysis methods (group modelling) were implemented in order to map the problems in the area, the different roles of the participating actors and their view of each other's activities. In preparation for the first meeting, a questionnaire containing questions with regard to the environmental objective, its format and usefulness, was sent out to all the participants. The responses were then used as a starting point at the first meeting to jointly define various concepts and problems as well as to draw up a first draft to a causal loop diagram. A causal loop diagram (CLD) is a tool often used within systems analysis in order to describe complex multidimensional problems which require a holistic approach. These diagrams map out the connections between various parameters in a system and create a type of network image which can be interpreted in a simple and transparent way. Arrows are used to illustrate the connection between cause and effect.

At the second meeting, causal loop diagrams were developed for six vital subsystems, namely: 1. Snowmobiling, 2. Tourism, 3. Energy and mining industry, 4. Agricultural industry, 5. The mountain environment and the cultural identity of the Sami, and 6. Administration, power, authorities and strategic planning. Based on the diagrams developed for each subsystem, a general idea was formed of how the various parts were interlinked and how they affect, or are affected by, the environmental objective.

At the third meeting, the conceptual models developed in the first two meetings were tested and revised. Recommendations for concerned authorities were formulated and a proposal for a research programme drawn up.

In addition to the three joint workshops, there were a number of smaller meetings for individual groups of interested parties. A summary of the national and international research literature regarding the management of joint resources, where the management of predators was used as an example, was also made.



RESULTS

A similar evolution of the diagram took place in all of the subsystems. The diagrams for the various subsystems were then incorporated into a schematic system diagram where the relationships between heavy industry, energy production, tourism, community services, agricultural industry, environmental objectives and authority regulation of these activities are included.

Some of the most important results from the group modelling were that:

1. The participants' knowledge of their own significance and that of others in the system increased.

- The interested parties obtained a clearer idea of the role they play in the mountain system and a significantly deeper insight and understanding of the values and points of view of the other groups.
- The connections between various activities and processes, their effects on the environmental objective, as well as on other aspects of a sustainable development, were identified.
- All of the participants agreed that the mountains have a limited sustainability, that all activities must share the available space and that overshooting this sustainability, for any longer period of time, threatens all activities in the area.

2. The environmental objective is vaguely worded and difficult to implement.

- Both the environmental objective and the interim targets are vaguely worded. The relevance of the indicators was questioned, as were their ability to be measured and followed up.
- The environmental objective has not been broken down into operationally usable interim targets that work in practice.
- The environmental objective does not take into consideration social and economic development.

Similar conclusions have been drawn in several research studies. Emmelin (2005)* sorts the environmental objectives into scientific and ideological or utopian objectives and says that the mountain landscape objective cannot be defined in a strict scientific sense. Much of that which is included in the wording of the objective is noticeably related to time, individuals and values. To have value-based, ideological environmental objectives is not wrong, but it can, according to Emmelin (2005)* lead to problems with legitimacy, among other things.

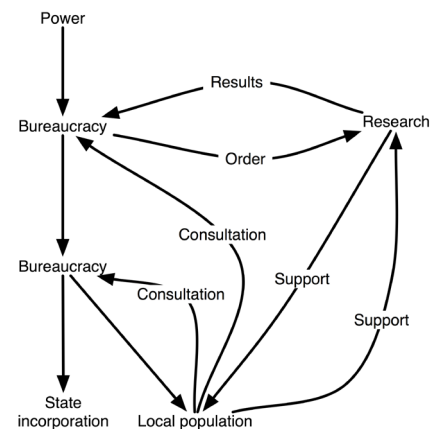
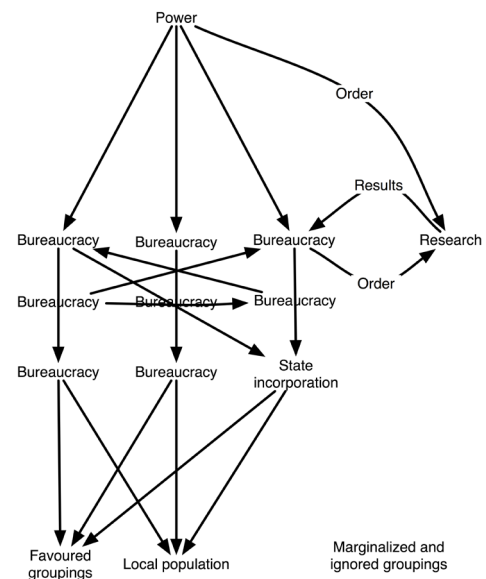


* Emmelin, L. 2005. Att synas utan att verka – miljömålen som symbolpolitik? I Lundgren, L., 2005. Konflikter, samarbete, resultat. Perspektiv på svensk miljöpolitik. Festskrift till Valfrid Paulsson. Kassandra. In Swedish.

RESULTS

3. The management system currently in place is being questioned.

- Many of the participants feel there is a lack of local support, participation and commitment.
- The multiple bureaucratic levels make contact and communication with the authorities difficult. The images below shows how the interested parties view the current management (top) and how they would like it to be (below). Less bureaucracy, closer relations with local actors and a higher level of transparency in the execution of authority and processes are wanted.
- Historical events and local experiences of misuse of power and abuse have led to a questioning of the credibility and legitimacy of the authorities.
- The participants lack an overall view where they can clearly see what type of participation is possible in order to achieve a working management of the mountain resource.



One of the points of departure for the work with the environmental objectives is that different sectors and actors in society must cooperate in order to achieve the environmental objectives. There are, however, few examples of situations where interested parties have been a part of shaping the environmental objectives or in the choice of indicators for following these up. “A Magnificent Mountain Landscape” is no exception. This exclusion in the environmental objective process leads to a lack of understanding for the achievement of the objective and paves the way, together with the complex access arrangements of the mountain resources and the dependence of the local population on these arrangements, for conflicts with regard to the management of the mountain environment.

FACTS: JOINT MANAGEMENT

At the 1992 World Summit in Rio, world leaders agreed that sustainable development also includes a social dimension and that the concerned parties ought to have the possibility to participate in decisions pertaining to joint resources. Since then, there has been a great increase in research on the central and local management of common resources. Both forms of management entail benefits as well as drawbacks. While State management often leads to a better overview of the resource and has an overall perspective, the decisions that are made hardly ever have local support or are adjusted to local conditions. With regard to local management, the opposite is true. The solutions are locally adapted, but seldom consider the whole picture. By combining the benefits of both systems, researchers have defined something they call “joint management”. However, there is not one form of joint management but rather several different ones, depending on how power is divided between the actors included in the joint management system.

- 1. Information** Local actors are informed of the decision which has already been made. This is a one-way communication between the central and local levels.
- 2. Consultation** The parties meet, usually late in the decision-making process. Local actors have the opportunity to communicate their views on the management.
- 3. Communication** Exchange of information takes place between the parties. Knowledge at the local level starts to be utilized, and this level becomes involved in certain operative measures.
- 4. Advisory organs** The local actors are afforded the opportunity to participate in the development of management plans in an advisory capacity.
- 5. Cooperation** The local actors are afforded the opportunity, through negotiations, to participate in the development and implementation of the management plans. Their influence in the decision-making process is limited however.
- 6. Joint management boards are appointed** Joint goals for the management are established and joint decisions are made at the local and central levels as the central level sees fit.
- 7. A partnership is formed** The parties are equal and make joint decisions.

In order for a management system to be defined as a joint management system, all involved parties must have opportunity to participate in the decision-making process regarding how, and by whom, the resource is to be used. Therefore, information, consultation and communication cannot be considered joint management.

According to Camilla Sandström, lecturer in Political Science at Umeå University, there are still no examples of joint management in Sweden despite the integration of concepts such as decentralization, local management and joint management in Swedish environmental protection policy: “The examples of joint management that we have seen so far have been in the field of State management, where there have been attempts to increase local participation in order to implement centralized political decisions on a regional level. The regional and local actors have very limited possibilities of influencing the decision-making process”.

FUTURE CHALLENGES

There is no indication that the management of, and access to, the mountain resource will become less complex in the future. A number of future challenges has been identified, which may come to affect the mountain environment, the people who live in it as well as the possibility to achieve the environmental objective.

1. Climate change

The annual mean temperature in the Swedish mountains has risen by approximately one degree Celsius since the end of the 19th century, and estimates show that it will continue to rise. At the same time, the ecosystem of the mountains belongs to one of the most sensitive to climate change. The forest will keep climbing higher up and bush encroachment in parts of the mountain environment will take place. The fundamentals of land-based industries (forestry, agriculture, reindeer husbandry, the fisheries sector and hunting) will change as a result. Reindeer husbandry, for example, will be affected in several ways, both positive and negative, and may in addition come to be an important factor in counteracting the effects of climate change (overgrowth) in the mountain environment.

2. Increase in tourism

Tourism is an important source of income for those living in the mountain counties and it is predicted to grow in the future, since climate change will most likely have a greater impact, at least in the short term, in the Alpine region than in the Swedish mountains. Summer tourism may also be boosted as the dry, warm Mediterranean climate could result in people heading north. One of the activities that is expected to grow in the future is terrain vehicle traffic. At the same time, many are interested in noise-free areas in the mountains.

3. Expansion of wind power facilities

The interest in expanding wind power facilities is growing, and the mountain area is one of the areas with the greatest potential for producing wind energy. Between 2004 and 2008, 19 new wind power stations have been established in the mountains. Research shows that many tourist groups see wind power stations in the mountains as negative.

4. Mineral prospection

Sweden has rich mineral and metal assets and is currently a country of great interest to both Swedish and foreign mineral prospection companies. The applications for exploration permits in the Swedish mountains have increased significantly in recent years and show no signs of diminishing.



CONCLUSIONS

Based on the results, a number of conclusions were drawn:

- Many of the problems in the mountain areas are connected to each other in a complex but describable manner.
- A holistic approach is necessary if the environmental objective is to be achieved.
- The authorities are experiencing great problems with legitimacy in northern Sweden.
- Many of the actors concerned feel marginalized and neglected in the current management system.
- Old ownership and access rights conflicts have to be resolved if a dialogue is to be resumed and credibility restored.

Many of the reasons for these problems in achieving the environmental objective is thereby due to factors beyond the fields of environmental policy and administration.



Photo: Ashok Rodrigues/Photos.com

RECOMMENDATIONS

During the course of the work, it became clear that there is a great need for change if the environmental objective is to be achieved and a sustainable development is to be promoted. Based on the group models and the literature review, the participants produced six recommendations to the concerned authorities.

1. Develop a new management strategy.

The current management system is dominated by a “top-down” perspective with clear legitimacy issues. A more efficient strategy would be to develop a locally supported vision, where plans and implementations are tested and gain support through a “bottom-up” perspective, without necessarily losing the overall view.

2. Work with a cohesive sustainability perspective.

Sustainable development is often divided into three different parts - economic, ecological and social sustainability. The mountain landscape objective should take all three into consideration and not only, as is currently the case, the environmental aspects.

3. Develop adequate and operationally usable environmental objectives.

Both the environmental objectives and the interim targets should be comprehensive and relevant in a cohesive sustainability perspective. They should, additionally, be measurable and usable in practice for the individual actors.

4. Develop effective and qualitative indicators.

Indicators that are relevant, clear and possible to follow up are necessary to evaluate whether the implemented measures have an actual effect and at which rate and resource efficiency the objective is being approached.

5. Develop integrated prognostic tools and realistic future scenarios.

Integrated prognostic tools should be developed in order to predict the effects of several simultaneous changes (within, e.g., environment, socioeconomics and policy) in the mountain environment.

6. Develop grassroots contacts and local coordination.

In order to avoid marginalization and a weakening of local perspectives, the local coordination should increase and the conflicts be kept to a minimum. The communication and integration between local and national levels must also be reinforced and improved if the local legitimacy is to increase and the environmental work become more effective.

A new research program

The participants agree that a new interdisciplinary research programme is needed for the mountain area. The programme should be based in the environmental quality objectives and deal with all three aspects of sustainable development, i.e., economic, ecological and social. The development of adequate and operationally usable environmental quality objectives, interim targets and indicators should be an important part of the research programme, together with defining sustainability on different levels and identifying management models that work in practice. The programme should involve researchers, users and authorities and should be characterized by practical field work where methods and results are tested and applied in real situations. Great emphasis should be placed on communicating results in a manner which is easy for the interested parties to understand and implement.

ACTORS, INTERESTED PARTIES AND STAKEHOLDERS WHICH PARTICIPATED IN THE PROJECT

Ájtte, principal museum of Sami culture, special museum for the mountain region
The Mining Inspectorate of Sweden
Destination Funäsdalen
Dorotea Municipality
The Swedish Ecotourism Society
The Swedish Energy Agency
The National Property Board Sweden
The association “Sveriges fåbodbrukare” [Swedish summer farming]
The Swedish Armed Forces
The Swedish Board of Agriculture
The Federation of Swedish Farmers
The County Administrative Board of Jämtland - nature conservation
The County Administrative Board of Jämtland, reindeer/land department
The County Administrative Board of Norrbotten, reindeer/land department
The County Administrative Board of Norrbotten, culture/environment
The County Administrative Board of Västerbotten, land department
The County Administrative Board of Västerbotten, environmental protection
The County Administrative Board of Västerbotten, culture/environment
Malung-Sälen Municipality
The Swedish Society for Nature Conservation
The Swedish Environmental Protection Agency
Norra Dalarnas turistråd [the Tourism Council of Norra Dalarna]
Nätverket Norden [Nordic Network]
The Swedish Polar Research Secretariat
The Swedish National Heritage Board
The Swedish Police/Mountain rescue
Rovdjursföreningen [Swedish Society for the Protection of Predators]
The Sami Parliament
Skistar
The Geological Survey of Sweden
Svenska jägareförbundet [the Swedish Hunter's Association]
The Swedish National Grid
Svenska liftanläggningars organisation [the Organisation for Swedish Ski-lifts]
Svenska samers riksförbund [the Swedish Sami Federation]
Svenska turistföreningen [the Swedish Tourism Association]
Swedish Tourism
Sveriges snöskoteråkarens centralorganisation [the Confederation of Swedish Snowmobilers]
Sveriges snöskoterägares riksorganisation [the Federation of Swedish Snowmobile Owners]
Swedish Agency for Economic and Regional Growth
The Swedish Road Administration





Information regarding the report

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