

Protection of Rock Art

**THE ROCK ART PROJECT
1996 – 2005**

**Final Report from the
Directorate for Cultural Heritage**



Oslo 2006

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SUMMARY: Following some years of preparation and preliminary work, *Protection of Rock Art – The Rock Art Project* was initiated in 1996. After 10 years, the project has achieved important results within the protection, management and presentation of Norwegian rock art. In the years following completion of the project, there will be a larger focus on management, at the same time that research and development will continue.

KEY WORDS: Rock Art Project, protection of rock art, research, conservation, management, presentation, communication

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Cover photo:

*Section of rock painting in Geithidleren, Årsand in Kvinnherad municipality.
Photo: Arve Kjersheim © Directorate for Cultural Heritage*

Preface

With this the Directorate for Cultural Heritage presents its final report for *Protection of Rock Art – The Rock Art Project 1996-2005*. The Rock Art Project has been a large, collective effort that has involved many institutions and individuals. It has also been a lift for Norway as a ‘culture’ nation, and as far as we know, Norway is the only country in the world where the Government has invested so much, for so long and so systematically in prehistoric rock art. Altogether, the Government has invested 57 million NOK over the 10 year project period, as well as the investment of considerable resources at the local and regional level, although we lack a specific figure for how much has been used here. It is especially gratifying that the effort has not ended with the conclusion of the project. At the national, regional and local level, strong efforts have continued, both economically and in the use of other resources.

The Directorate for Cultural Heritage has been responsible for directing the project, where a series of collaborators have been involved for shorter or longer periods (see Appendix). The specific work has been carried out in the regions by collaborators attached to the counties / Sámi parliament, the regional archaeological museums in Oslo, Stavanger Bergen, Trondheim and Tromsø, Norwegian Institute for Cultural Heritage Research (NIKU), ArK-foto and Norwegian Institute for Air Research (NILU), as well as conservationist Kjartan Gran.

In the annual reports from the scientific institutions and the county cultural management, the labour investment and results from research and development work are described and presented. In this report, we will therefore not directly address these results at length or in a detailed manner, but describe and evaluate the different priority areas and the most important results from the perspective of the Directorate for Cultural Heritage. Nevertheless, this report will be presented as a combination of descriptions of what has been done, accumulated knowledge and experience, and experience-based guidelines that the Directorate for Cultural Heritage emphasizes, so that the report will also have a practical value. Since this report was finalized at the end of 2006, we will also incorporate some of the follow-up efforts that have taken place since the end of the project.

The Directorate for Cultural Heritage wishes to thank all of those that have been involved in the project over these years for their considerable efforts, vitality and enthusiasm. It is thanks to the efforts of the many collaborators that we can say that the Rock Art Project has been a success. Through the project we have achieved strengthened interest and support for rock art preservation in Norway, and the project has been noticed internationally. The project has achieved substantial and important spin-off effects within research, management and communication.

The Directorate for Cultural Heritage also wishes to express gratitude for assistance and support, including permission to make use of photographs and illustrations, in connection with completion of this report. And lastly, but not least, we will thank the Ministry of the Environment, not just for making the project economically possible, but also for their generous support and understanding before, during and after the project period.

Anne-Sophie Hygen has been the author of the report.

Oslo, December 30, 2006

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1. Introduction

On January 1, 1996 the ten year *Protection of Rock Art* – The Rock Art Project was initiated and subsequently completed on December 31, 2005. The Rock Art Project was initiated following significant individual efforts from a number of parties within regional cultural heritage management through many years, and over time also through a collective understanding of problem areas, motivation and efforts within the Norwegian professional community.

This report will provide an overview of the background and conditions for the project, its progress, organization, central problem orientations and discussion themes, experiences and results. Following completion of the project, a comprehensive guide for the protection of rock art was produced, developed by the *Norwegian Working Group for Rock Art Conservation* (Bjelland & Helberg (eds.) 2006). Therefore this report will not go into detail regarding the concrete professional results and recommendations that the project has produced.

Ten years with the Rock Art Project has given us important results and experiences, but we do not have all the answers and have not reached our objective with regard to protection of the Norwegian rock art. Nor will this ever be possible. Protection efforts are far from complete even though the goals for the actual project, protecting 300 localities, was achieved by a good margin. Firstly, this figure only represents a lesser share of the collective Norwegian rock art; secondly, it is an obligation to follow up work with the protected localities with active protection, management and long-term maintenance efforts; thirdly, acquired knowledge and experience must not only be maintained but further built upon through continued research and development. It has been gratifying to see that the Government funding for continued protection of rock art has been maintained following completion of the project.

The Rock Art Project could never have been carried out without the significant efforts of and cooperativeness within regional cultural heritage management. Administration of the project has been the responsibility of the Directorate for Cultural Heritage, but the work has been carried out regionally and locally with great energy and willingness. There have never been sufficient resources to do everything that was desired each year, nor for available manpower. It was therefore seen as extremely positive when the project period was extended from 5 to 10 years in 1998 with the following argument given in Parliamentary Proposition No. 1, 1997/98: “A time frame up to 2005 is necessary in order to protect 300 rock art localities responsibly, based on the knowledge that is acquired through the project on influential factors and preservation procedures.” Subsequent experience confirms that this was a correct conclusion. We have needed this additional time in order for knowledge and experience to develop stepwise and at an appropriate pace, and be spread to and involve additional institutions and individual parties.

The Rock Art Project has received considerable attention, both in Norway and elsewhere in the world. Within Norway, we have experienced both an appreciation of and support for the actions taken and the project itself, and our experience and expertise is sought after internationally. This is also a strong incentive for continued efforts and further development.

In 2000, the Directorate for Cultural Heritage published a halfway report for the Rock Art Project, with contributions from the five regional archeological museums, Norwegian Institute for Cultural Heritage Research (NIKU) and the Directorate for Cultural Heritage (Hygen (ed.)

2000). In order to avoid unnecessary repetition concerning the Rock Art Project's premises and first four years, we refer in general to this publication. For a more detailed presentation of results and guidelines for measures taken, see Bjelland & Helberg (eds.) 2006. Results from the Vingen Project, which was a part of the Rock Art Project, will be published as a joint report in 2007 (Lødøen et al. (eds.) 2007, in prep.).

2. An Awakening Consciousness¹

Throughout the 1900s, attention was from time to time drawn to the poor preservation condition of rock art in Norway. There were no reports from systematic investigations prior to the 1970s, and no thorough assessment of status undertaken by professionals before this time. However, on the basis of observations, one had reason to assume that rock art in a number of locations was in the process of being inflicted significant damage, and there are statements of concern to be found in the archives; without any noticeable consequences in the direction of concrete actions.

An initial systemic assessment of conditions, supported by the Arts Council Norway, was conducted in western, central and southeastern Norway respectively, by the University of Bergen with the participation of the Museum of Archaeology, Stavanger, the Museum of Natural History and Archaeology in Trondheim in cooperation with The Norwegian Institute of Technology (NTH), Tromsø Museum and the University Museum of Antiquities in Oslo. The investigation led to production of the report *The Rock Art Project 1976-1980* (Mandt & Michelsen 1980). At this point, the University of Bergen was already involved in what was to be a long-standing and intensive interdisciplinary effort for the preservation of the rock art locality Ausevik in Flora municipality, Sogn og Fjordane county, and of the large rock carving area Vingen in Bremanger municipality in the same county. The poor condition of the rock art was disheartening and the preservation problems were perceived as nearly unmanageable. Without a focused effort, it was assessed that a significant amount of the rock art would be irretrievably lost.

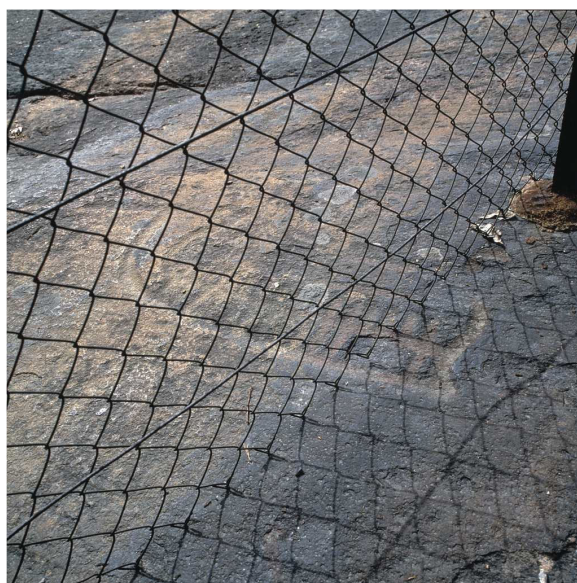
At this juncture, especially within the interdisciplinary research community at the Bergen Historical Museum with professor Gro Mandt as the driving force then and all through The Rock Art Project, additional systematic investigations were conducted during the 1980s and 1990s. Continued surveys of conditions at Ausevik and Vingen in particular made up a majority of these investigations (Michelsen 1978; Mandt 1991). Important baseline material was produced by Anders Hagen's comparisons of early tracings and casts with the current situation. Hagen's observations were later confirmed through laser scanning of portions of the same material (Bjelland & Sæbø 2004:4; 2005:5. Also see Chapter 5.1.1).

There was broad agreement that the reasons for the deterioration were numerous and complex, and that progress was contingent on an interdisciplinary effort. It also became clear that there were problems with the disintegration of rock art over the entire country. Similar reports of concern were received from each of the five regional archaeological museums, and a nationwide professional rock art community was being developed. During the first years, the community was hindered by limited professional contact and a lack of venues for the exchange of knowledge and experience, so that work at the national level progressed slowly during the 1980s.

¹ For a systematic review of rock art preservation history up to the end of the 1990s, see Mandt 1997.

Too slowly, according to the University of Bergen, so in 1990 they arranged an international rock art seminar in Sunnmøre based on their findings and experience surrounding the condition and preservation of rock art. This became in many ways the starting point for the collective Norwegian initiative for the protection of rock art, and the acknowledgement of rock art's threatened condition also reached the Directorate for Cultural Heritage. In January 1991, immediately in the wake of the seminar in Sunnmøre, the Directorate for Cultural Heritage appointed a committee following an initiative from the National Council for Cultural Heritage (Statens Kulturminneråd) – *The Rock Carving Committee*. The committee was commissioned to map the existing knowledge concerning the theme on a Nordic basis, provide recommendations for further work, and also establish a course in the management and communication of rock art. The report *Rock Art: a Cultural Treasure in Crisis. Findings on conservation / preservation of rock art in Norway* was issued in December of the same year (Dahlin, Mandt, Riisøen & Sognnes 1991).

The committee provided partially detailed recommendations on which actions should be initiated and how the work should be organized. The report discusses, among other things, knowledge requirements, survey, documentation, management and presentation / communication – all terms and tasks that were to become central in the Rock Art Project. At the same time, intense efforts were made with the case within parts of the regional cultural heritage management apparatus and following pressure from Østfold county, the case was taken up in the National Parliament question session by Kjellaug Nakkim, Høyre, Østfold on December 15, 1993. Minister of the Environment Thorbjørn Berntsen took up the case, with the result that the Directorate for Cultural Heritage was asked to consider special protective measures for rock art during the course of 1994. In part based on a systematic archival review at the regional archaeological museums, the report *The Directorate for Cultural Heritage's plan of action for the Protection of Rock Art* (Directorate for Cultural Heritage by Brit Solli 1995). In the following year, *Protection of Rock Art – The Rock Art Project* was initiated, involving the Directorate for Cultural Heritage, the regional archaeological museums and the county councils as the most central cooperative partners in the project.



An image from this locality in Fredrikstad municipality was used on the front cover of the Directorate for Cultural Heritage's plan of action in 1995. The reason for using this particular locality, was because this was one of the Norwegian localities with the worst preservation condition.

Photo: Arve Kjersheim © Directorate for Cultural Heritage

3. The Rock Art Project – Implementation

3.1. Goal and organization

The Rock Art Project's quantitative goal was to protect 300 rock art localities of the total of 1100 known in 1995², by the end of 2000. The scheduled point in time for completion of the project was delayed until the end of 2005, because it was realized that more time was needed to complete and systematize the results of the research and development work.

In the project plan, the need for a yearly budget of 11 million NOK was indicated. Reality turned out to be somewhat different. The actual yearly appropriation at the beginning was 2 million NOK, but this was subsequently increased to ca. 5.7 million per year.

The definition of protection here is the gathering and storage of the source value following field documentation, including image documentation, condition assessment, development of a management plan³ and, if necessary, conservation actions. The four protection phases have been defined through the project period as follows:

Protection phase	Definition
Phase 1: Documentation	Documentation including condition assessment (archaeological and technical / scientific documentation, image documentation).
Phase 2: Management plan	Production of a management plan. A standardized format is used that guides short-term and long-term actions, forms of collaboration and professional and economic responsibility.
Phase 3: Actions	Potential physical actions are initiated. <i>When phase 3 is carried out, protection is considered complete</i>
Phase 4: Follow-up	Follow-up, review and revision of the protection plan.

At the same time, research was to be carried out on the causes of disintegration and the development of methods for delaying or limiting damages. The development of a documentation standard and a separate database were of central importance from the outset.

The Directorate for Cultural Heritage was the project "owner", and while a number of collaborators brought the project forward during the first years, from 1998-99 onwards a more stable staff was organized consisting of a project leader, two project collaborators, an advisor for protection and a steering committee (from 2001) (see Appendix). The project group – the executive – consisted of the counties / Sámi parliament, the regional archaeological museums, NIKU and others. Fieldwork, research and development, documentation and development of the database were carried out by the project group and commissioned by the Directorate for Cultural Heritage.

3.2. Actions, organization and economy

One of the first actions in the project was a course in protection of rock art that was arranged in Bergen in 1997. The course gathered central actors within the rock art community, and the

² Note that after 1995 a considerable number of new localities and panels were documented, in addition to new figures from previously documented panels.

³ Use of the term "management plan" in this report applies to both a general plan and more detailed plan(s) of action.

course report became an important tool for discussions, future planning and prioritizing (Lødøen, Mandt & Riisøen (eds.) 1997).

During the course of the project period there have been changes in staff, budgets and priorities. However, the project has been recognizable in that the main focus – the protection phases and research and development work – has been consistent. By and large, the project group has also been the same, even though there has been some replacements of individual members. The yearly cycle has begun with the Directorate for Cultural Heritage sending out a project plan with priorities for the following year. The various institutions then sent in an application / offer for tasks within their district and area of competence. The field season has been used for documentation and protection actions in the field. The results of each year's fieldwork and research and development were then edited and systematized in the yearly reports. A summary of the yearly reports and priorities for the following year's work comprised the project plan for the following year.

The project has consistently distributed the economical resources in the following manner:

Research and development and method development:	31%
Documentation:	19%
Database, including data entry:	9%
Management:	23%
Communication:	11%
Competence development:	7%

Commissioning has gone from the Directorate for Cultural Heritage to the five regional archaeological museums, research institutes and central individual actors, that have collaborated with the counties concerning priorities and actions, and that have functioned as their collaborators and advisors in the respective counties. Concrete management actions have been undertaken through a subsidy for the management of the archaeological cultural heritage based upon applications from the counties to the Directorate for Cultural Heritage, but with considerable regional and local components.

Funding in addition to that appropriated to the Rock Art Project and made available from the Directorate for Cultural Heritage for management of archaeological resources including rock art each year, has varied significantly during the project period. Between 50% and 60% of these management resources have been used for management and presentation of rock art. Since 2006 the subsidy for management and protection of the Alta World Heritage Site has in its totality been charged to the budget post for World Heritage, and therefore comes in addition (1 million NOK in 2006).

3.3. Rock art seminar and Rock art network

The annual *Rock Art Seminar* has been an important meeting place for the project group. The seminar, arranged by the Directorate for Cultural Heritage, has gathered around 50 participants each year, and various problems and research results have been presented. In recent years, the seminar has been located in the different regional archaeological museum districts, and one day is reserved for an excursion to rock art localities in the area. Conversations and discussions in the field have probably been some of the most valuable at the seminars. The rock art seminar was also arranged during the year following completion of the project, in 2006, and this is an event that will continue.



*From the rock art seminar in Nord-Trøndelag in 2005.
The participants are on an excursion to Leirfall in Stjørdal.
Photo: Inger-Marie Aicher Olsrud © Directorate for Cultural Heritage.*

In an earlier phase of the Rock Art Project, there was a need for more direct professional contact between counties and colleagues that worked with rock art than was possible during the Directorate for Cultural Heritage's yearly rock art seminar. This need led to the start of the *rock art network*. This was an informal contact channel that appeared in 1997 after Rogaland county contacted Østfold county for an exchange of experiences. It was immediately apparent that this was something that the other counties and regional archaeological museums wanted to participate in, and from 1999 the Directorate for Cultural Heritage was also included. From 2003 the rock art seminar was decentralized and included excursions to rock art localities, so it turned out that the need for the rock art network no longer existed.

The rock art seminar has been arranged in the following towns / counties:

- 1996-2002: Oslo
- 2003: Bergen/Hordaland
- 2004: Fredrikstad/Østfold
- 2005: Stjørdal/Nord-Trøndelag
- 2006: Stavanger/Rogaland
- 2007: Tromsø/Troms

Gatherings in the rock art network were arranged in the following counties:

- 1997-1: Sogn og Fjordane
- 1997-2: Østfold
- 1998-1: Hordaland
- 1998-2: Finnmark
- 1999-1: Rogaland
- 1999-2: Nord-Trøndelag
- 2000: Finnmark, the conference *Bergkunst 2000* in Alta
- 2001: No arrangement
- 2002: Vest-Agder

3.4. Documentation standard and database

A central task in the first year of the project was the development of a documentation standard and a database for rock art, which was thought to be of vital importance for the administration and further management of rock art. At the start of the project there were no formal plans for a national cultural heritage register, so development work became a task for the Rock Art Project. A desire from many interested parties for the creation of a common rock art database for Norway and Sweden was unfortunately not possible to fulfill. This led to the Directorate for Cultural Heritage accepting responsibility for the development of the Norwegian documentation standard, and NIKU accepted the task of following up the work. The result was the *rock art database* that was in operation until June 2006. In 2004 the collective national cultural heritage register *Askeladden* was ready for use. As a follow-up, efforts are being made to complete a condition module for rock art, so that all cultural heritage information can be gathered at a single location. Both economics and the necessity for rational management indicated that two separate databases would not be practical, and the rock art database was discontinued as an independent database in 2006.

It cannot be ignored that criticism of the documentation standard has at times been considerable. At the start, the objective was for the rock art database to be able to unite the wishes and needs within, respectively, research and management, and the structure and form of the database was a response to this desire. It turned out that, in practice, a good combination was impossible to achieve. Both the standard and the actual database were halfway measures that turned out to be too clumsy and comprehensive; for filling out in a field situation, in the data entry phase and in practical application. Nevertheless, there is no doubt that both valuable and fundamental information was gathered, and we all obtained some degree of new experience.

3.5. Research and method development

A prerequisite for good management of rock art is knowledge about the consequences of different actions – or the lack thereof. Therefore knowledge about decomposition factors is so important for management. Based on multidisciplinary scientific documentation – image documentation and condition documentation – combined with knowledge about the culture historical and contemporary context of the rock art, it is this basic knowledge that establishes the terms for management and for the choice of goal-oriented protection actions. Such important questions and comprehensive material must of necessity generate debate, and methods for both protection and presentation have been continuously discussed.

At the start of the project, there was a clearly expressed desire to find “the correct method” for the different actions. One example of this is the efforts directed towards finding a “rock art paint” – a standard paint that could be applied regardless of differences in rock type and climate. The question was if it was possible to find a paint that was sufficiently open to diffusion, that would age evenly and well, and that would adhere equally well to all types of rock. After establishing a test panel (without rock art) with different types of paint in Alta and in Vingen – one was also set up in Bohuslän, Sweden – it was determined that such paint was impossible to find. On the other hand, the question of whether or not to paint in rock art has been a topic of discussion through most of the project period, and this debate is still not completely resolved (see Chapter 4.6).

Other central themes for research and method development have been lichen vegetation and lichen treatment (see Chapter 4.4 and 5.4), management methods (see Chapter 4.3, 5.2 and

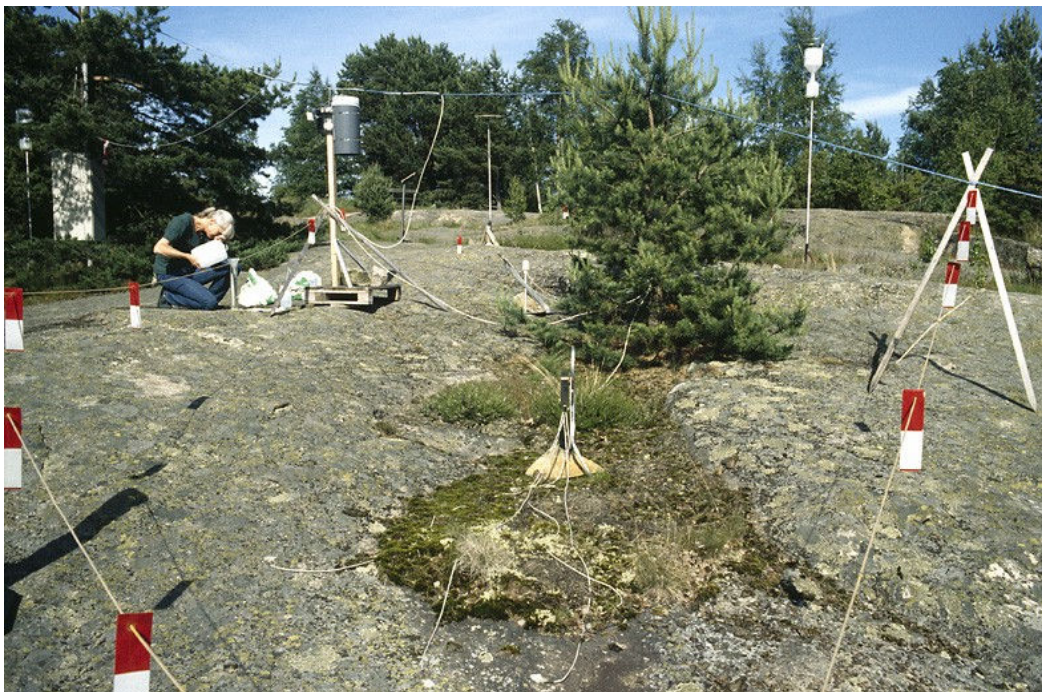
5.4), temporary and permanent covering (see Chapter 4.8 and 5.6), documentation methods (see Chapter 5.1.1) and methods for communication and presentation (see Chapter 5.5).

3.6. International cooperation

The development of a standard for documentation of rock art was a central theme in the cooperation with Sweden through the *Interreg II-A* project *Helleristninger i Grensebygd* (*Rock Art in the Borderlands*; cf. final report, Kallhovd & Magnusson (eds.) 2000). On the Swedish side the objective was a database adapted to management. On the Norwegian side work was undertaken on a database that also, at least in part, could safeguard the research need for detailed information and search possibilities, even though management was also a primary goal for us. Gradually it became clear that a joint documentation standard and database for Norway and Sweden was not possible to achieve, since the two countries had such different starting points and goals for the work. The result was *Hällrist* in Sweden and the *Rock Art Database* in Norway. Nevertheless, the actual process provided an expanded understanding and valuable experience, also during the work with Askeladden.

Even though this part of the joint effort did not succeed, the cooperation with Sweden relating to research on the causes of decomposition and development of methods produced results. The parties have cooperated on joint trial panels in Oslo, Østfold and Bohuslän.

At a number of locations, metering stations were set up for air, rainwater, run-off and temperature in order to investigate the effects of various environmental parameters (Löfvendahl & Magnusson 2000:49-50). Through these measures it was possible to partially confirm and partially invalidate the effects of the influence factors that had been hypothesized in advance, and their consequences (Skaar 1997:79-86; Dahlin (ed.)1998; Dahlin (ed.) 2000).



Station for measuring the contents of water and air at Begby in Fredrikstad municipality. The test station was set up by the Norwegian Institute for Air Research.

Photo: © Ragnar Utne.

A roof was also built over a research panel at Litsleby in Tanum, Bohuslän, without producing any unambiguously positive results (Löfvendahl & Magnusson 2000:50-52). A roofed structure can under certain circumstances be effective, but such a drastic action must be considered very carefully in each instance based on a variety of problems to be addressed.

Another important priority area within the Interreg II-project was research concerning landscape and cosmology in the Bronze Age, and education, information and tourism. The research project was carried out through a collaboration that also included the universities of Gothenburg and Oslo, and new source material was gathered for further studies of landscape, habitation, social organization, rites and cosmology in the border region in the Bronze Age (Kristiansen & Prescott 2000:107-122).

The sub-project on education, information and tourism (Hygen 2000 a:123-136) led, among other things, to a joint popular scientific publication on rock art in Bohuslän and Østfold and their different contexts (Hygen & Bengtsson 1999) in four languages, in a guide brochure for selected localities - *Hällristningsresan, Bohuslän* and *Helleristningsreisen, Østfold (The Rock Carving Tour, Bohuslän and Østfold, resp.)*, each in three language editions, and in a joint information brochure for the public in four languages.

Cooperation in the Interreg II-project established the foundation for an enduring Norwegian-Swedish competence network. Experience from this project also led to a new cooperative project, Rock Art in Northern Europe – *RANE* (2002-2005) (Magnusson 2006; also see the final reports from the expert groups at <http://www.rane-online.org/>). This project was oriented more towards management, value creation and presentation of rock art for the public. The partnership was expanded to also include Finland and Denmark. In addition, the project took initiative for cooperation with Russia within the *TACIS*- program, and after preparations in 2005, a “micro project” was carried out in 2006.

RockCare – Tanum laboratory of cultural heritage was a project that the Swedish National Heritage Board (Riksantikvarieämbetet) developed with international partners in the years 1998-2001, but without Norwegian participation. Nevertheless, a number of our rock art communities were in contact with the project, and have benefited from its experiences and results (<http://www.w-heritage.org/RockCareweb/>).

The work with protection of rock art in Norway has gradually also become recognized outside Norway and Scandinavia. Already in 1996 NIKU established a three year long cooperation program on the conservation of cave paintings with research institutions in France, in which Tromsø Museum and Nordland county were also involved. NIKU’s cooperation with cultural heritage authorities in Zimbabwe (1997-1999) and Zambia (ongoing since 2001) has involved education, documentation, and direct conservation of painted rock art. Bergen Museum’s archaeologists, botanist and geologist are presently engaged in documentation, protection, conservation, management and presentation of rock art in Galacia in northern Spain (Nieto et al. 2004). Tromsø Museum has been collaborating with cultural heritage authorities in the Russian Republic of Karelia through a number of years, with continuing cooperation in 2007-2008 with the preservation and presentation of rock art where the Directorate for Cultural Heritage is also involved. Tromsø Museum also has collaboration with The Rock Art Research Institute at the University of the Witwatersrand in Johannesburg on the documentation and interpretation of rock art in South Africa. As a result of the expertise that has been developed through the Rock Art Project, the Directorate for Cultural Heritage has since 2001 led, and drawn in other Norwegian professionals, professional advisory services

connected to the management of rock art areas in Kazakhstan (2001-2006), Uzbekistan (since 2003 and ongoing) and Azerbaijan (2006-2007) (see among others, Hygen 2004 and 2005; Hygen & Helskog 2006), as well as in Pakistan (from 2004 and ongoing) (Marstrander 2004).



*Conservationist Kjartan Gran, Tromsø and project leader for the Tamgaly Project Alexey Rogozhinskiy, Almaty, Kazakhstan, discuss actions for the stabilization of a burial chamber with rock art within the large rock art area Tamgaly, Kazakhstan in 2002.
Photo: Anne-Sophie Hygen © Directorate for Cultural Heritage.*

4. Some Central Themes ⁴

There have been major discussions in the Rock Art Project; before the project started in 1996, in the first couple of years and later during the course of the project, as well as after its completion. This was to be expected. There have been many different professions, many professional communities and management levels, and strong individuals involved in the project. In the aftermath, we can state that even though a number of things could and should have been handled differently, the project has been a success. We do not have all of the answers and solutions, but no one expected this at the outset in 1996, and a number of themes have not been addressed adequately. There are constantly many, and largely unanswered, questions, actions that have not provided perfect results, and many localities and panels where active protection actions remain to be done.

A series of problems linked to the management of rock art are addressed in a sub report from the RANE Project and we refer to this in general (Bertilsson & Lødøen 2006).

There are number of particularly critical themes that have been raised during the course of the project period. Some of these will be taken up and discussed below.

⁴ Some of the themes taken up in this chapter are also discussed in Hygen & Olsrud 2006.

4.1. Were damage developments accelerating?

In the plan of action for the pilot study (Riksantikvaren 1995), it was pointed out that about 95 % of the panels with rock art in Norway were damaged in one way or another, and that damage developments were accelerating. This damage percent confirmed at a national level the results of a condition survey of 133 sites in Østfold (ca 1/3 of the known total in the county at that time) in 1993 and 1994, where a damage percent of 94 was calculated (Vogt 1994:37 ff.; Hygen 1995). In Østfold there was an obvious and considerable damage and weathering problem, and each spring handfuls of mineral grains and loose pieces of the rock had to be brushed off of several carved surfaces following the winter.

In the 1980s and beginning of the 1990s, the National Heritage Board in Stockholm carried out a series of projects associated with the possible effects of pollution on cultural heritage sites and monuments, and published a number of reports (e.g. Gullman (ed.) 1992; Österlund (ed.) 1996). These projects created a basis for the hypothesis that polluted air and precipitation was an important cause of the damages observed on the rock surfaces with carvings. At a number of locations in Norway and Sweden, test stations were established for measuring air and water, administered in part by the Rock Art Project (Dahlin (ed.) 1998; Dahlin (ed.) 2000), and in part within the Swedish-Norwegian Interreg II Project (Löfvendahl & Magnusson 2000:47-72 with references). Based on the measurements, it could however not be demonstrated that pollution had the negative effects that were expected (ibid:69-71). On the other hand, it could not be disproved that acid rain, which was much more serious in the 1960s and 1970s and earlier, could have led to the dissolution of weak minerals in the rock and therefore to accelerated erosion and weathering of the rock surfaces as a later consequence.

However, the question was raised as to whether the damage development was actually as alarming and rapid as assumed; that is if this was a relatively new phenomenon or a process that had actually taken place through several hundred years at the same tempo (Walderhaug & Walderhaug 1998:128). Was there actually a basis for the acute panic, or was it unwarranted and exaggerated? Or was the case that it was first in the 1990s that there was a more widespread recognition of the observations made by the rock art community at the University of Bergen over many years, that rock art was in crisis and that something must be done – and quickly?

In retrospect, the point is that the alarm from Bergen was heard, that it was well founded and that the Rock Art Project was established as a collective effort. However, it cannot be concealed that an unpleasant theme has arisen in the wake of this discussion: Have many decades of conservation and management contributed to damage development (ibid: 130)? A range of physical and chemical methods have over time been used to consolidate rock surfaces, seal cracks and cavities, clean carved surfaces of lichens, etc., and even though the intentions were the best, can have contributed to creating more problems than those solved (Goldhahn 2005:57); at least after the fact. If this is correct, something that is in no way unlikely even though it is not tested systematically⁵, there is little we can do with “past sins” other than acknowledge and learn from them.

⁵ Such a systemic testing is in itself hypothetical, in that those who have previously carried out the work, from the interwar period up until the 1970s to 1980s, have for the most part never reported their actions; that is exactly which rock surfaces were treated, when, why, how and with what.

4.2. Protection and "the most vulnerable"

Protection was redefined during the course of the Rock Art Project to a protection phase 1 (documentation) and phase 2 (development of a protection plan), and potential immediate actions in phase 3 (see the protection form, Chapter 3.1). But even though the documentation is carried out and a plan of action made, this does not necessarily mean that the site or the locality is protected in a practical, physical sense.

When the pilot project was carried out in 1995, the protection concept and phases were established, and the goals for the Rock Art Project were formulated, there were so many unsolved problems and challenges that presumably none of those involved predicted the scope and consequences. This insight came later, and necessary adjustments were made well before the project midway point (see Hygen (ed.) 2000).

Among other things, a redefinition was undertaken of what would be "the most vulnerable" sites for protection within the framework of the project. From the outset, this was interpreted for the most part as "the most damaged" sites or those that were most exposed to attrition. The result of such a protection policy could easily have resulted in the use of considerable resources for protecting sites that already were in very poor condition, while those that were in good or relatively good condition, without attention would have been exposed to all types of disintegration. And the consequences of such a protection policy? In 50-100 years we might have been left with only degraded and destroyed rock art in the country.

Following input at one of the rock art seminars, the Directorate for Cultural Heritage wrote in a report made after four years of the Rock Art Project:

"The norm is that 300 of the most vulnerable localities will be protected. But what is "most vulnerable" is not automatically given, this must be related to the actual problems in the individual counties and regions. In some places a relevant problem can be condition – good or poor, in other places the location of the rock art, and in still other places the fact that a site is presented to the public and therefore exposed to degradation by visitors." (Hygen (ed.) 2000:10).

It was not the Directorate for Cultural Heritage that was to decide which localities and sites were to be protected, or if actual protection required immediate actions in protection phase 3. In large part it was up to the regional cultural heritage management institutions working closely together to prioritize localities for a protection effort in each county.

4.3. To act in harmony with nature

During the rock art seminar in March 1998, the Museum of Archaeology, Stavanger (AmS) presented a range of practical recommendations for the protection of rock carvings. The following year this was published in a report from AmS for protection efforts at Austre Åmøy in Stavanger municipality (Bakkevig 1999:97 ff. See also Bakke et al. 2000:117-120). The recommendations were based on how nature behaved, which foreseen as well as unforeseen consequences human intervention in nature has or can have, and how futile it is to attempt to oppose nature. The recommendations are simple, economical to carry out and the actions are easily maintained. Since they are based on natural forces, agency and tools, such actions also involve minimal intervention, in the actual rock art as well as in the surrounding environment (also see Chapter 5.4).

The recommendations were quickly adopted by the Directorate for Cultural Heritage and actively used in protection recommendations for the regional cultural heritage agencies, in recognition that we needed a clearer awareness surrounding a holistic perspective on protection. The Directorate for Cultural Heritage has also conveyed these practical recommendations in their advice to projects in other countries.

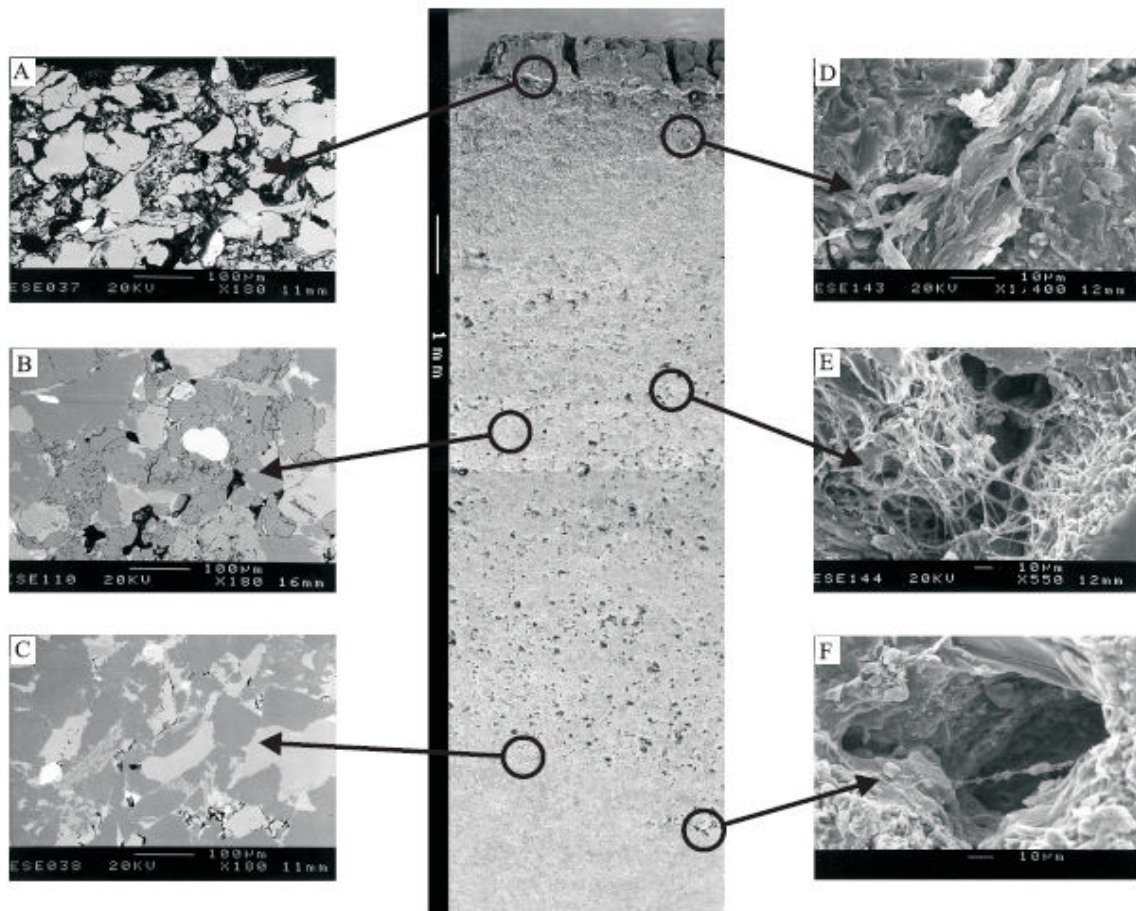
Nevertheless, the idea of “acting in harmony with nature” was not altogether original in 1998. In the report *Skadeinventering av hållristningar i Bohuslän (Damage registration of rock art in Bohuslän; Magnusson & Berg 1994)* it is pointed out that extensive exposure to sunlight, and associated significant daily fluctuations in temperature, is one of the most obvious causes of damages to rock surfaces with carvings. One of the report conclusions is that significant temperature variations must be prevented, particularly strong direct sun rays. Preferably, the rock surfaces should have a constant temperature as much as possible (ibid:5). The consequence of this finding was that in some instances shade giving trees were planted in strategic places near / in front of rock carvings in Bohuslän, that at the same time could satisfy the need for air circulation. Through a close collaboration between Bohuslän og Østfold since 1990, the work and results in Bohuslän had an influence on the management of rock carvings in Østfold, and were also an influential factor for condition survey in the county in 1993-1994 (Hygen, Rostad & Vogt 1993; Hygen (ed.) 1994. Also see Hygen 1995).

“Nature” and “the natural” are and have naturally always been influenced by humans and culture. The landscape in the Stone Age and Bronze Age was entirely different than it is today, as was the landscape 200 and 100 years ago as well. Land uplift and the vegetation regime are important factors; landscape management, settlement patterns, economy and politics are other factors. To aim for recreating the original landscape and environment – “nature” and “culture” – surrounding rock art is futile. In contrast, an understanding and analysis of the landscape that rock art is a part of, is both useful and necessary in order to conduct a good and appropriate management. This is also one of a number of reasons why the Rock Art Project placed so much weight on developing management plans before management is initiated. Management plans require just this type of understanding of the contexts for rock art, and of the consequences of management actions in both the short and long run. At the same time, a further development of appropriate natural and environmentally based management methods will be an extremely constructive and exciting challenge in the years ahead.

4.4. Lichens – beneficial or problematic? ⁶

Through many decades, lichens have been removed from rock carved surfaces at various places in the country. The few facts available from the first half of the 1900s, indicate that this took place in some places beginning in the 1930s. The motivations for removal of lichens appear to have been multiple and varied over time, but originally the rock surfaces were cleaned in connection with documentation of the carved figures and consideration of the public’s understanding and experience. At a later point problems associated with preservation of rock surfaces came into the picture. These were based on general knowledge about the acid producing attributes of lichens that lead to selective disintegration of minerals and therefore the disappearance of harder minerals, and about the ability of lichen hyphae for expansion and contraction in the rock resulting in additional weakening of the weathering surface (see Haugen 1994 with references, and below).

⁶ Questions and problems related to lichens and lichen issues are addressed in a number of chapters in the Rock Art Project midpoint report (Hygen (ed.) 2000), and it is generally referred to these: Bjelland et al. 2000:41-43, 49, 52; Bakke et al. 2000:117.



SEM (Scanning Electron Microscope) images of the weathering surface under the lichen *Ophioparma ventosa*. (A) BSE image at the surface, (B) in the midsection and (C) in the transition between weathered and unweathered rock. Black areas indicate pores and cavities, various grey tones indicate different types of minerals. (D) SEM-image of a pore that is filled by a lichen hyphae at the top of the weathering profile, (E) pore with hyphae in the middle of the weathering profile and (F) pore with individual hyphae at the base of the weathering profile. Photo and caption: Torbjørn Bjelland (Bjelland 2003:70-77).

With regard to preservation issues through the Rock Art Project, there have been three principle questions that were raised: Is lichen, dependent upon species, rock type, climate and other conditions, harmful for the carved rock surface and if so, to what degree? Can lichens, or certain lichen species, in some instances provide protection by holding minerals and the weathering surface stable? Or is removing lichens the most damaging action of all?

On the basis of systematic lichen investigations, especially in connection with the Vingen Project over a number of years, *Ophioparma ventosa* has been identified as one of the most “aggressive” species (Bjelland 2002). One question that has been raised, is if it is correct that the rock surface under lichens (or certain lichen species) exhibits special signs of weathering, or if lichens (or certain lichen species) prefer rock that is already weathered (Walderhaug & Walderhaug 1998:125 ff; Bakkevig 2004). Criticism of the identification of lichen as a damage factor (e.g. Bakkevig 2004:73 ff.) is refuted on the basis of a number of years of research, which concludes that the differences in weathering that can be observed under different lichen species, are a result of the fact that some lichen species are more “aggressive” with regard to weathering than other species (Bjelland 2002, 2003:70-77 and 2005:49-52).

Another issue is if, and if so how, we should remove undesirable lichens without causing additional damage. Without doubt, lichens have been removed in many parts of the country using in part rather brutal means and methods at least until some point after 1990, but of course undertaken with the best intentions. Today there is a requirement that management actors must clearly state why one desires or views it as necessary to remove lichens from rock carving surfaces. However, it is now emphasized that removal of lichens should only be done in the instances where there are binding plans for regular follow-up of the actions. This means, among other things, that the treatment should not be used immediately or uncritically if the motive is only image documentation without management oriented follow-up (also see Chapter 5.4).

4.5. Concerning care and intervention

There is little doubt that the lichen removal is an intervention. The same is the case for direct conservation. Still, there are some actions that are less easily classified. One reason that this has been a recurring theme for discussion, is that the type of measure taken has consequences for who can or should carry them out. Should it be a cultural heritage archaeologist at the county level as a part of their management tasks, or a conservationist or someone else with specialized expertise? Care/management or intervention? The Directorate for Cultural Heritage has defined care/management as a conservation measure that does not involve intervention in the rock surface, and where the motivation is preservation, potentially presentation as well, and that an important element of care measures is that they function as a preventative against damage so that one can avoid later conservation measures. Conservation, on the other hand, is defined as an action that involves a direct intervention in the rock surface, but emphasis should be placed on the difference between preventative and direct conservation (Riksantikvaren 2000:8-10). Nevertheless, these definitions, roles and tasks, and the division between management and intervention, is not always unambiguous (see Egenberg 1994:51-52).

When speaking of actions classified under intervention, or that lie in an unclear boundary zone between care/management and intervention, the actions must be evaluated by interdisciplinary expertise and in advance written in a plan, where the decision basis is documented. The action is undertaken under the supervision of / guidance from a conservationist or someone with similar competence, and documented.

Reversibility is a requirement and injunction in all technical conservation, but in practice impossible to carry out (Norsted 2006 b:8-9). In rock art conservation the question is particularly associated with consolidation of panels with Mowilith DM 123 S, that was first used at the Ausevik locality in 1979 (Michelsen 1992). Criticism of this method has, among other things, been that it is irreversible (e.g. Bakkevig 2004:68-70). In principle the criticism is justified, also in light of the fact that experiments were carried out directly on the rock panels (Michelsen 1992:28). However, it can also be established that there would have been little left of the carvings at a locality like Ausevik if this action had not been carried out; at this point pieces of rock with carvings had been swept away by the bucketful through a number of years, and the situation was desperate.

Cement had been used earlier in certain situations to fill cracks and larger gaps in the rock. This has not been shown to be effective, it is unsightly and it represents a significant intervention. In a way it can seem odd in retrospect that this was done in the first place. But we must also remember that things have developed and changed drastically over time, not the least during the past decade; including preservation ethics, preservation methods and an

understanding of how rock art can actually be perceived and interpreted. Only a few years ago, documentation and interpretation was restricted to the figures on the rock exclusively, while the cracks, depressions and the topography of the rock were not perceived as relevant parts of the interpretive basis. Consequently these were not documented. The cracks were perceived as locations for damage development, and were therefore filled in at some locations, in some cases with cement. Today these actions can only be taken note of, and we can learn from them in a practical, principle and ideological sense. The challenge is to work towards continually better and more effective preservation methods that avoid or involve a minimum of direct physical and visual intervention, and not the least to continue with research and interpretation of source material as a premise for management.

4.6. To paint or not to paint rock carvings

In Scandinavia the practice of painting rock carvings started during the interwar period, and from about 1950 it was common to paint localities in connection with presentation. The background appears in part to have been a consciousness of the painted runestones in Sweden and the practice of repainting these. In addition there existed a hypothesis that the much older rock carvings had been or could have been painted, preferably with red ochre comparable to the rock paintings (Johansen 1944). An exciting observation is that at certain locations there are traces of painting on ground/polished figures, such as those in Simon Kranehula in Vågan municipality, and these must have been painted at some point in the past (Norsted 2004:3). Incidentally, recently carved, and potentially in the past refreshed, rock carvings would have been clearly distinguished from the surroundings rock surface, so that they were clearly visible, at least for some years.

There have been four main arguments for the painting of rock carvings: First, that the general public should have an opportunity to experience the fantastic rock art, and not have it restricted to researchers and professionals. The carvings are often so shallowly carved and covered by lichens that they are hardly visible. Secondly, painting can appear as an “exclamation mark” when the carvings lie in a farmyard, parking lot or in residential areas: be careful, do not unintentionally destroy! The third argument is that through painting some selected visitors’ sites and with that making them more accessible, we can restrict visitors to the majority of places and thereby give these better protection. The majority of visitors are satisfied with this, they do not need to see everything. The fourth argument is that repainting previously painted panels discourages visitors themselves from painting, scraping and pecking in the figures to make them more visible.

The Scandinavian countries have been repeatedly criticized internationally for our practice of painting rock carvings (most recently Bednarik 2006:2). The majority of the critics of the practice have, at the same time, never been in Scandinavia, and express themselves on a general basis and in principle. Knowledge of our distinct Scandinavian problem generally leads to a more differentiated view (such as Bahn 1998:270-271).



*Section of the rock carvings at the locality Solberg, Skjeberg in Sarpsborg municipality. The carvings have been painted through many decades, and the painting layer is thick and partially cracked. These figures are so deep that they show extremely well without painting.
Photo: © Ragnar Utne*

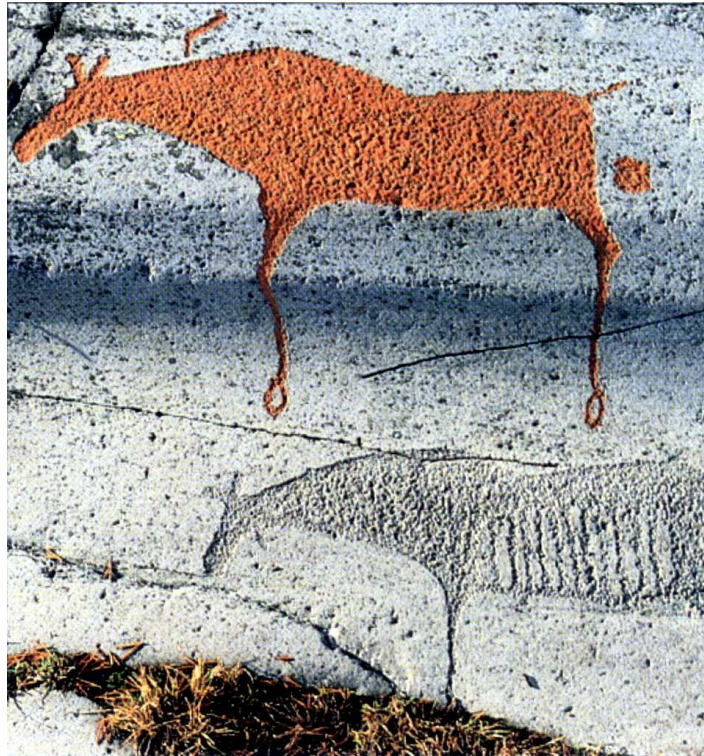
Much of the criticism appears to come from a widespread misunderstanding: they believe that we paint everything that exists. One reason for this is that we often illustrate lectures and publications with images of painted rock carvings, and that photos with temporarily chalked in figures are interpreted as permanently painted. In reality, the number of painted panels is probably less than 3% ⁷. When this figure is presented internationally, at least some of the criticism is silenced.

Still, the painting of rock carvings is a highly controversial theme. The international criticism is justified and should be taken seriously – and is taken seriously. The practice has been discussed by both individual researchers and cultural heritage institutions in Norway for a number of years (see among others the discussion in Høgestøl et al. 1999:33-35 with references; Bertilsson & Magnusson 2000:102-103; Hygen 2000 b:184). In the management plan for Vingen the majority of counter arguments are described, and it is concluded that there is no doubt that painting represents a drastic intervention and, among other things, hinders the study of pecking technique and reduces experience value of the carvings. Painting undertaken by persons without the necessary experience, has unfortunately occurred far too often, so that the painted figures are inaccurate in relation to the carved lines (Mandt & Riisøen 1996:43 f.).

Vogt has formulated the negative aspects of painting, and the practical consequences, as follows:

⁷ In the last half of the 1990s, a collective estimate for Norway and Sweden was undertaken, based on the total number of painted panels in Østfold and Bohuslän that together represented about 1 % of the known total (Hygen & Bengtsson 1999:205). According to this figure, the proportion of painted panels in the two countries together could be estimated at around 2 %, in Norway possibly closer to 3 % (Hygen 2000b:184). As the number of panels and localities has increased, the percentage has been reduced proportionately.

”The rock carvings are presented in a way that is unnatural and give a false impression of how they originally appeared. But more importantly, there are certain indications that weathering of the rock surface can occur more rapidly under the paint than if the surface is not painted. The influential processes still remain unclear. This has made cultural heritage management cautious with painting, if this is harmful it is better to have a restrictive attitude.” (Vogt 2006:11).



*Painted – unpainted. An example from Hjemmeluft/Jiepmaluokta, Alta.
Photo: Arve Kjersheim © Directorate for Cultural Heritage.*

Currently it is anticipated that the practice of painting will be discontinued. But this must be done gradually. The cultural heritage managers have themselves “taught” the public that rock carvings being presented are painted red, and we need time to accustom the visitors to other ways of experiencing them. At the same time, cultural heritage management must be given the possibility to develop alternative presentation methods (see Chapter 5.5). The Directorate for Cultural Heritage views painting as an intervention, and it is currently being evaluated if this is an action requiring a dispensation application.

4.7. The archaeological context – not just images on rock

At times there can be a contrast between the process of investigating, preserving and disseminating rock art and preserving cultural deposits that may exist near or in association with rock art.

In the Vingen Project, as a part of the Rock Art Project, archaeological excavations came to be a part of the overall project. It was a general problem that in connection with cleaning in and around the rock art sites and panels, especially when removing the turf that had grown up over the carved surfaces, archaeological material could appear, but without being adequately investigated there and then. This was perceived as highly problematic, and the University of

Bergen addressed the problem. In 1998 for example, in addition to shovel tests, two smaller test excavations were initiated at Vingen, with interesting results (Mandt 2000:22).

Even though the archaeological excavations in association with rock art were also undertaken before the 1970s, it was the excavations in Østfold in 1975-76 that introduced a new phase in this work (Johansen 1979). Inspired by these investigations, excavations were later started in Bohuslän (Bengtsson 2002 and 2004). The first was the investigations at Lille Oppen within the Tanum World Heritage Site in 1998, and at present there have been undertaken around 30 excavations in connection with rock art in Sweden and Norway. In addition, larger investigations have occurred on Bornholm in Denmark in recent years (e.g. Kaul 2005).

The background for the archaeological excavation activity is the recognition that the rock art cannot be understood in isolation but only as a part of a collective archaeological context (see also Chapter 5.6). On the basis of the excavations, cultural remains have been documented in close association with the carved rocks at a series of locations; in Østfold and Bohuslän typical burn layers, heat-altered rock, burnt flint, broken pottery and burnt clay, in addition to rock concentrations and constructions (Bengtsson 2004:103-129). Such rock constructions directly in front of the panels have significant principle similarities with a series of post holes found below and close to the large carved rock Madsebakke on Bornholm, that is interpreted as evidence of an enclosure (Kaul 2005:135).

Parallel with this increased contextual recognition, was the introduction of new ways and methods for documentation of the actual carved surfaces. Previously one usually only documented the actual figures created on the rock surfaces. Cracks and cavities were consequently disregarded, even where these were clearly a part of the composition. Likewise, the combination of alternative problems and documentation methods in Alta made possible new interpretation opportunities; the micro topography of the rock, character and expression were found to be an integrated part of the collective composition and significance. Through the traditional documentation methods, tracing and rubbing, one obtains a flattened image of the rock, that is without the curves, unevenness and dynamics. In part through the use of 3D scanning and partly through perspective drawings, totally different possibilities appeared both for the interpretation and communication of the carved rocks with the figure compositions (Helskog 1999 and 2004; Helskog & Høgtun 2004).

Water seeps over the carved surfaces are usually interpreted as a part of the motif context, but the water can be damaging. Sometimes one must choose if one will preserve this context or the actual carvings. If the water can be channelled away without an intervention in the rock surface, such an action can be necessary.

4.8. "Here rests a rock carving"

The heading to this chapter is taken from a sign that was set up by one of the large rock carving sites at Aspeberget, Tanum in Bohuslän. The panel was artificially covered with a thick layer of sand, earth, and turf, so that it appeared as a grave mound.

Many of our attempts with preservation methods through the Rock Art Project, and also prior to this time, have in common that they can be interpreted as an attempt to give the rock art a "time-out" – a type of parking while we wait for new and improved methods for preservation, a better microclimate or just waiting for spring with less daily variation in temperature. One

action that combines these wishes with the need to keep the carved surfaces clean, is covering.

Already early in the 1980s, the first rock carvings in Norway were covered with insulating mats. This involved a small group of figures at Ausevik that were in extremely poor condition (pers. comm. from Gro Mandt). After this, a number of covering projects were carried out in Vingen during the first half of the 1990s (Mandt & Riisøen 1996:40). The actions led the question of covering as a form of protection to be taken seriously in the Norwegian and Swedish rock art communities. “Who will take responsibility for letting the rock carvings stand exposed? Who dares to leave them uncovered?” (Egenberg 1995:21). Both among the public and in professional circles there was expressed in part considerable scepticism. The public were afraid that they would no longer be able to see the rock carvings, and in parts of the professional community the lack of unrestricted access to the original research material was disliked. A combination of external and internal communication and information dampened criticism and instead generated a broad understanding and support. Firstly, it will only be a small part of the total number that can be covered, either temporarily or permanently. Secondly, in principle it is not a matter of course that the rock art source will always be more accessible than, for example, the grave mound source or settlement site source.



Insulation over the carved rock serves as protection against freeze and thaw processes and inhibits lichen vegetation. The picture is from Vingen in Bremanger municipality.

Photo: Arve Kjersheim © Directorate for Cultural Heritage.

Under commission from Østfold county an attempt was made to arrive at an appropriate and effective covering method (Skårer 1995), but this method was never implemented in practice. After the winter of 1995-96 in Bohuslän serious frost damages were discovered on one of the panels at Aspeberget in Tanum sogn (Tanum 12, although not the one mentioned above), and it was decided to cover it. In combination with the damming up and containment of surface water, the carved rock was covered with geotextile, mats made of mineral wool and a tarpaulin (Magnusson, undated report). A number of carved surfaces were covered in

Bohuslän and Østfold through the Interreg II Project *Helleristninger i Grensebygd (Rock Art in the Borderlands)*; Bertilsson & Magnusson 2000:100-101).

Experiments and actions have continued in a number of places in Norway under the direction of the Rock Art Project, with varying materials and methods (e.g. Gran 2006; Olsson 2006; Bårdseth in prep. See Chapter 5.6). Today there appears to be a broad agreement among professionals that covering can solve a series of problems in a careful manner, and that this can apparently happen without negative consequences. Knowledge at the present time is, however, too limited for any final conclusions to be reached. Different covering methods and materials have different qualities, and may with that bring about unintentional repercussions to a variable degree. It is clear that both covering in itself and methods and materials for covering will be the topic of debate and experimentation in the future.

5. Results and Methods

An ongoing theme in the Rock Art Project has been that we must stop experimenting directly on rock surfaces and in the immediate vicinity and not do anything before we are certain that it will not have negative damaging effects. It is a given that this has its background in the knowledge we have obtained from earlier poor or insufficient actions and their negative or directly damaging consequences. However, the security ideal involves some in-built dilemmas. Total assurance of the safety of all actions involves testing on trial panels or in the laboratory over the course of years, without carrying out actions in the field. This can entail a kind of inability to act, and in the meantime the situation can become even worse. In other words, we are required to act on the basis of our understanding at any given time, and admit that we can never be totally sure that the action will not have negative effects. Examples of such actions are cleaning of the carved surface with alcohol, the question of lichen removal and when it is right to do it, and different forms of covering.

Another dilemma is that even if we feel sure of an agent or a method, our actions to handle a problem in a good way can lead to the creation of new ones; thus initiating a chain reaction that we do not have full control over.

The consequences are firstly that research and development work and experimentation on test panels and in the laboratory must continue in order to obtain more reliable results of the tests that are initiated; additionally that we must take some chances to achieve anything at all, but insure good documentation of what we do, how we do it, with what and why. Then we will at least in the future have possibilities to understand the effects of what we do now.

5.1. Documentation

The actual survey work, meaning what has been recorded and where it is located, has been and is insufficient and to a certain extent random, in that the results are dependent of where earlier efforts have been put into effect and how thorough the investigations were. One example that shows to what degree the number of new panels and figures at known sites increase when one starts new and systematic survey and documentation, is the survey that took place in Onsøy in Fredrikstad municipality in 1998. The number of sites increased from 36 to 84 in the course of several days of intensive fieldwork (Vogt 2000). With that, we in Norway were also able to confirm what had already been experienced through the documentation projects in Bohuslän, that an increase to more than double the known total after a goal-oriented effort is normal. Another example is Skien, where the total through

partly voluntary, partly professional efforts within an extremely limited area in Gjerpendalen, increased from 6 to 14 over a short period in 2003. Experience indicates that the 40 localities that are now known in Skien municipality, are only the tip of the iceberg (Vogt 2006).

One of the greatest “sins” from the past is that actions (among others casting, painting and cleaning of rock surfaces) were not documented, or at best inadequately documented. We do not know *what* they did, *where* or *when* they did it, or *why*. In some instances we can make some more or less vague conclusions, but throughout there were actions taken – without documentation or reporting. But the situation is highly variable, dependent on which individuals and institutions were involved in the different areas and at different times.

At the close of 2006 there were 43 known localities with rock paintings of which 9 are deep caves. Within the Rock Art Project all cave paintings were investigated and documented (Norsted 2006 b:25). For open localities, 11 have been completely condition documented, while 10 are partially documented. The remaining 13 currently lack phase 1 documentation.

Of the rock carvings, ca. 500 localities are completely documented for phase 1. The process of placing the recorded information into the cultural heritage database Askeladden is ongoing.

5.1.1. Image documentation

A strengthened effort within documentation in the Rock Art Project showed that earlier image documentation was extremely inadequate. This was in itself not a new experience. Presumably it will also continue to be the case that new research perspectives will see new and different things than what has been seen before. But with new methods and tools we will at least to a greater degree than before approach a one hundred percent demonstration of occurrences at the individual localities.

In addition to photography, tracing has traditionally been the predominant method for documentation of rock carvings in Norway, and remains so. The tracing technique has been further developed by filling in the traces with dots instead of making contour drawings (as in Vogt 2006). Gradually one has also obtained steadily better results from photographic documentation, including both day and night photography, because of more advanced equipment and methods for data processing. While the rubbing technique is considered the best method for image documentation of rock carvings in Sweden, this method has been used to a much lesser degree in Norway, even though it has been shown to give very good results. Through rubbing one can in part also obtain better direct documentation of, for example, the rock’s characteristics. However, some of the carved surfaces are too fragile for this method to be used. It is acknowledged that both of the two methods require interpretation, but the interpretation occurs in different phases of the documentation process. In many cases a combination of the three techniques will give the best result, even though in practice it is both a technical and economical question if this is possible.

In many instances it has been shown to be necessary to mark the visible figures (this applies only to rock carvings) prior to photographing and tracing on plastic film. What is best, or the least potentially damaging, has been discussed both within and outside of the Rock Art Project. Especially in Sweden it has been common to use lime slurry or quartz slurry for marking the figures. In Norway we have mainly recommended quartz slurry if there is an absolute necessity for such a clear marking (Bjelland & Helberg (eds.) 2006:48). A compromise solution between no marking and full infilling with slurry is careful and slight marking with lime-based, easily soluble and porous chalk. It is a prerequisite that all

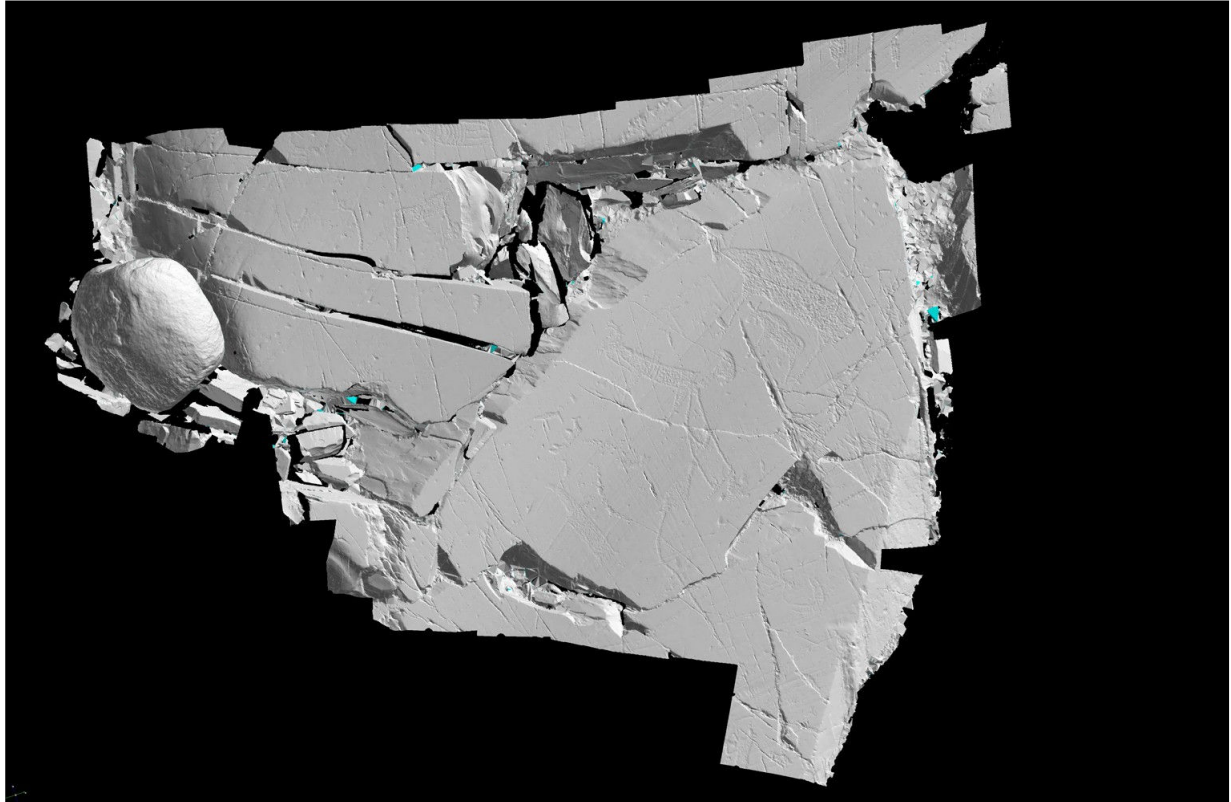
temporary marking is completely washed away with clean water and a sponge immediately following tracing. To avoid that those outside the country think that we paint everything that exists, it can be sensible not to publish photographs of chalked rock carvings. Or, if one still wishes to do this, it should be stated in the caption that this involves a temporary and harmless marking that was washed away immediately after being photographed.

Based on the principle of minimal intervention in all processes, rubbing will normally, and with the assumption that it is completely justifiable in relation to the attributes of the carved surface, be a better solution than tracing if the tracing requires a highly visible marking of the carved lines. The rubbing technique is also quicker to use and is therefore more economical.

During the course of the Rock Art Project there has in general been developed a steadily more explicit attitude that the methods used should as much as possible be based on the principle of minimal intervention. This also applies to methods for documentation. Considerable attention has therefore been focused on documentation methods that do not involve intervention in the rock surfaces, such as laser scanning. With a laser scanner the object is covered – in this case the rock surface – by 3D measuring points with high density, and through further processing 3D models are produced with great precision and with multiple application possibilities. This technique gives a precise and initially objective depiction of both the figures and the surfaces, with all of their cracks, curves, cavities and possible damages.

The first large scale attempt in Scandinavia to use scanners in image documentation, was done within the RockCare Project (<http://www.w-heritage.org/RockCareweb/> - Documentary → Working methods. See also <http://www.metimur.se/> → Intressanta uppdrag → Hällristningar, og → Hällmålning). Before this, scanner documentation was undertaken at individual locations in Sweden at a small scale, where the results were presented as micro topographic printouts. The goal was to be able to follow the weathering process over time (Swantesson 1992; 2006 a; 2006 b).

In Vingen, 3D scanning of individual carving figures has been carried out as they are today, and the images were compared with scanning of castings of the same figures that was done in 1925. Through such comparisons it was possible to see the development of erosion over ca 75 years. In 1925 the rock surface was smooth, and the carvings had clear traces. Today the surface is extremely rough because of extensive granular weathering, and the transition between the lines and surrounding rock surface is far more uneven; the carvings are no longer clear. In addition it could be observed that the rock surface that previously had been covered with turf, had more extensive weathering damages than the surface that had laid open (Bjelland & Sæbø 2004:4; 2005:5).



*3D-scanning of parts of the locality Kåffjord in Alta. The scanning was done by Metimur in 2002.
Photo from Alta museum.*

In 2002 and 2004 the large Kåffjord locality within the Alta World Heritage Site was scanned as a part of the RANE Project (<http://www.rane-online.org/> → Results: WP 2 Documentation: 3D recording of rock carvings using the ATOS technique). The purpose was to insure maximal quality documentation in advance of covering, and so that the scanned images could be used in connection with communication efforts. Because of certain problems with after-treatment of the data the results were not as good as expected, but the basic documentation material was still extremely useful. An exhibition was produced at the Alta museum in 2005 where the large scanned images comprised an important element.

Casts of rock carvings were previously undertaken in a number of instances, in the beginning with plaster. The results at times were such that for many years afterwards traces of plaster were left on the rock surface. Even though later attempts were made with better and less damaging materials, primarily silicon that releases from the rock surface well, it has now been decided that casts of rock carvings in Norway will no longer be done. The reason is that we will avoid the addition of foreign material, such as slip agents in this case, in and on the rock (Bjelland & Helberg (eds.) 2006:56).

Image documentation of painted rock art is normally done in a different way than for rock carvings, since the painted images in principle are not to be touched. Tracing of the paintings is therefore in most instances not possible, except where those on open localities are covered by a hard silica skin that protects the paintings. Where this is not the case, documentation is undertaken through a combination of photography and detailed measurement (for a description of the method, see Norsted 2000:145-146 and Bjelland & Helberg (eds.) 2006:44-46, 49-51 and 53). In the Rock Art Project, method development and implementation of

documentation of painted rock art has largely been undertaken by specialists at the Norwegian Institute for Cultural Heritage Research (NIKU), ArK-foto and Tromsø Museum. At a later point Bergen Museum and the Norwegian University of Science and Technology, Museum of Natural History and Archaeology (NTNU, Vitenskapsmuseet) also developed expertise in image documentation of painted rock art. Courses in the documentation of rock paintings have been arranged in order to spread expertise.



Photographic documentation of painted rock art requires both knowledge and experience – and much equipment. Photographer Arve Kjersheim (ArK-foto) during documentation of Sandenhulen on Værøy.

Photo: Terje Norsted © Directorate for Cultural Heritage.

5.1.2. Condition documentation and damage assessment

Condition documentation is undertaken through a multidisciplinary collaboration between archaeologists, geologists, botanists and conservationists, and possibly other specialists. The documentation has been done as a combination of filling in the documentation standard and adding a colour signature for the different identified damage types on a reduced tracing or a photograph. The method was developed by the University of Bergen in 1999 (Gjerde & Gundersen 2000; see also Bjelland & Helberg (eds.) 2006:57-60), and is now used not only in Norway but also in a number of other countries (see Hygen, Bjelland & Gran 2002:33-36⁸; Bertilsson & Fredell 2003:29-32; Marstrander 2004:4-5). At the Museum of Archaeology, Stavanger (AmS) they have chosen to use a graphic signature, not colours, that obviously works just as well (Høgestøl, Kjeldsen, Bakke & Bogarp 1999:19-62).

Rock carvings

The most common damages that can be observed on the carved rocks, and their assumed causes, are:

⁸ After this method was introduced during a central asian workshop in Kazakhstan in 2002, it is now used in a number of Central Asian countries and Russia.

Damages	Causes
Peeling along old crack formations	Frost action Vegetation growth (root damage) Treading on the rock
Air pocket (cavity in the rock)	Natural chemical processes and weakening in the mineral composition of the rock
Break in an air pocket (open rock cavity)	Frost action Treading on the rock
Exfoliation (large and small flakes parallel with the rock surface)	Frost action Treading on the rock
Crack formation (including micro-cracks) and their expansion	Frost action Salt action (chemical) Lichen influence (chemical, mechanical) Vegetation growth (root action)
General weakening of the rock surface (erosion) Loss of minerals and pieces of the rock, dissolution of soft minerals	Exposure time, mineral composition, rock type Previous acid rain (hypothesis) Frost action Chemical influence from trees (especially spruce), humus, moss, vegetation debris Lichen influence (chemical, mechanical) Salt influence (chemical) Treading on the rock Previous cleaning activity (hypothesis)
Vandalism and other human-induced damages (tagging, painting, scratching, “new figures”)	Lack of general awareness Imprudence Lack of maintenance, information and communication

This overview indicates that the best damage avoidance actions are to reduce the influence of frost, keep the rock surfaces clean and work with peoples’ attitudes.

Painted rock art – open localities

Concerning painted rock art at open localities, the damage picture is for the most part the same as for carvings, but the exception is treading on the rock surface. This is because painted rock art appears on vertical surfaces protected by overhangs of variable size, in some instances also on surfaces in the actual overhang. Since the painted figures should not be touched to begin with, it is only possible to carry out conservation actions to a limited degree. In Finland, where they have many painted localities, the protection work is limited to documentation and in some instances presentation. In Norway, however, there have been attempts to glue the exfoliations on test panels, and micro-vegetation can, at least in some cases, be carefully removed mechanically, for example with a soft wooden tool (Lindgaard & Sæterhaug 2006:2).

Painted rock art - caves

The damage picture is different for the painted rock art in the deep caves, where an entirely special environment develops that for the most part applies to all caves; even if they represent different challenges for conservation. The most important decomposition factor that has been found to influence the condition of cave paintings, is moisture: Infiltration water, that consists of weak salt solutions, and condensation (Norsted 2006 b:27-28).



*Fingalshulen in Nærøy municipality. The relationship between the temperature outside and within the caves can in the spring and early summer produce condensation that is damaging for the paintings.
Photo: Arve Kjersheim © Directorate for Cultural Heritage.*

Infiltration water as a cause of damage involves dripping water from the ceiling and out of cracks and fissures that seeps into the caves and causes scouring of the painted figures. This can occur slowly with small amounts of water that spread out over the cave walls, or rapidly after snow melting and heavy rain. If a great deal of water enters at once, it can be disastrous. Condensation forms when warm air from outside is drawn into the caves in the spring and early summer and meets the cold rock walls. The condensation forms as a thin film on the surfaces, first high up in the cave, and subsequently spreading further and further downwards towards the cave floor. Through a slow process this causes the pigment to lose its adhesion and cohesion, thus spreading out to make the figures lose their contours (pers. comm. from Terje Norsted. See also Bjelland & Helberg (eds.) 2006:27-29).

Little can be done to avoid the damages to the cave paintings that are caused by natural processes. We cannot seal up cave entrances to stop condensation. Drainage channels, to stop infiltration water, have been attempted in other places in the world, but the actions are highly visible and disfiguring, and are not considered an alternative for us. The only thing we can do is to ensure an optimal degree of documentation, and otherwise generate positive attitudes and make good rules of behaviour so that the visitors will not cause damages (pers. comm. from

Terje Norsted). We have unfortunately seen a number of instances of both older and more recent humanly caused damages in the caves, such as graffiti, soot and contact with the figures that makes the colours rub off. In some instances it has been and can be in the future necessary to close painted caves for visitors, both to protect the rock art, and to protect the visitors against threatening stone blocks and rock falls in the cave.

5.1.3. Documentation and management with the aid of GIS ⁹

Finnmark county started using GIS (Geographic Information Systems) as a tool in the management of rock art at Alta in 2003. The goal has been to obtain a functional informational database with an overview of the location, content and history of the rock art.

The goals are threefold:

- To assist preservation, management and care of the sites. Different types of coordinated information make it easier to obtain an overview of condition, which actions were done where and when, and to plan further protection measures.
- To make the information accessible for researchers. Preservation of the rock art is dependent on new knowledge, both in terms of technical preservation and with regard to the significance of the rock art to the past society, that can be communicated and create more interest in preserving the rock art.
- To make the information accessible to the public. Preservation of the rock art is dependent on interest from the public, but at the same time a recognition that many of the rock art panels must be protected due to the danger of damage. Some of the information is not accessible to the general public, such as, for example, precise location coordinates.

All the known rock art sites at Alta are recorded through GPS and direct drawing-in on orthophotos. Seventy-eight new digital map objects have been produced. These have been linked to diverse information, such as the identity and character of the sites and different types of actions, joined directly to the map objects by an attribute table. Other relevant information, such as photographs, tracings, rock art reports, management plans and other literature, is indirectly attached to each object.

5.2. Management plans

Protection phase 2 is the production of a management plan. The individual management plan has as its basis the documentation that is done in protection phase 1.

In 2000 the Directorate for Cultural Heritage constructed two models for management plans for archaeological sites and monuments. One for rock art, based on a suggestion from UKM (now: Museum of Cultural History) in Oslo, and one for other archaeological sites and monuments in general. The reason for this division was a desire to connect the management plan for rock art, and the individual points in it, directly to the documentation standard. Subsequently it has been shown that the general template also works best for rock art, and this is why the Directorate for Cultural Heritage recommends it:

<http://askeladden.ra.no/maler/skjotselsplan.doc>

The major point of providing a template for the management plan was to simplify plan work, make the plans mutually comparable and prepare for a minimalization of the scope of the management plans. Experience has shown that long and wordy management plans do not

⁹ Thanks to Karin Tansem, Finnmark county, for providing information in this chapter.

work very well. It is, and will be, emphasized by the Directorate for Cultural Heritage that a management plan should be short, concrete, and action-oriented in both a short and long-term perspective. Also included within the scope of management are actions for presentation and communication connected to the actual place, that is the actual rock art and surrounding area.

Management plans are made at the site level, locality level or area level. Many of the plans are as of 2006 ongoing through practical protection and management, but there is undoubtedly a certain lag regarding concrete actions related to the plan produced. To take up this lag, and to maintain ongoing management and protective actions, is one of the greatest challenges in the period following the conclusion of the project.

5.3. Conservation

Based on the norm of minimal intervention in rock art, the Rock Art Project has had a strong focus on indirect and preventive actions; that is as much as possible to eliminate the causes of damages and problems before they occur or develop in an uncontrolled manner. Management (Chapter 5.4), presentation and communication (Chapter 5.5) are good examples of preventive and indirect actions.

Direct conservation involves by definition interventions, and these are or can be controversial since full reversibility – an ideal for all forms of technical conservation – is normally unachievable. In the first year of the Rock Art Project, the conservation agent Mowilith DM 123 S was still being used for the consolidation of cracked, flaking and exfoliated rock surfaces. This consolidation agent does not satisfy the requirement for reversibility, but has still made it possible to save rock carvings that otherwise would have been totally broken up; for example Ausevik, where the agent was first used in 1979 (Michelsen 1992).

Today we are restrictive with the use of Mowilith DM 123 S for conserving rock carvings. It has been shown, among other things, that Mowilith swells with the addition of alcohol/ethanol. Since ethanol is used to remove lichens, this combination is unfortunate. The long-term effects of Mowilith are also little documented.

At the start of the Rock Art Project, we had both the hope and faith that we would find the optimal method for consolidating weathered and eroded carved surfaces, protection of cracks and exfoliation, etc., with the help of safe and appropriate conservation agents. During the course of the project we have become more and more reserved. At the same time the recognition that we cannot protect and preserve everything has become more apparent. We must actually accept that nature runs its course – everything decomposes and disappears. The goal is to delay and limit the decomposition, we cannot stop it. In tandem with this recognition the development of methods has moved steadily in the direction of indirect and preventative work methods, involving a combination of creating good preservation environments, working with people's behaviour and attitudes, etc.

Nevertheless, it is important to continue the study of materials and methods, that can be implemented in crisis situations. Ongoing testing of new methods and conservation agents in the laboratory and on test panels will therefore continue.



Humanlike figure at Ausevik in Flora municipality. A number of years ago cement was placed in a large cavity below the figure to stop the vertical peeling off of the weathering surface that threatened this important motif.

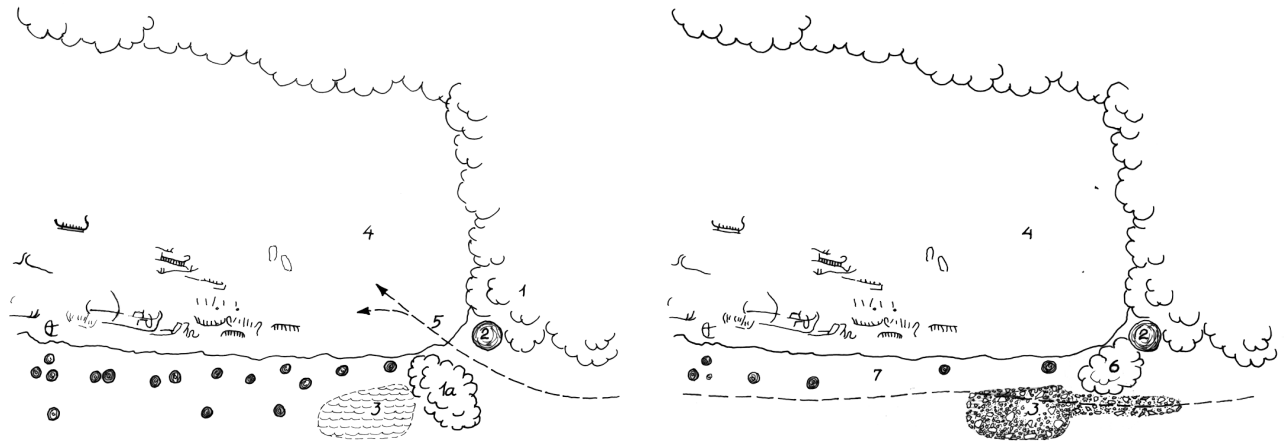
Photo: Trond Lødøen.

After a cautious start in 2001, the work continued with removal of the painted graffiti and torch soot in the painted cave Helvete, Trenyken on Røst in 2006. It was possible to partially remove, and partially reduce most of the it through extremely careful techniques (Norsted 2006 b:33-34). Graffiti on rock art is fortunately not a significant problem in Norway, but is extremely disfiguring and damaging when it occurs. While painted graffiti on carved panels in the majority of cases can be relatively manageable to handle, carving and fresh pecking is much more problematic. These are themes that are necessary to work further with, among other things based on experiences from other countries. The removal of graffiti obviously represents a significant intervention in itself, that must be undertaken by those with the right expertise, but it is considered necessary in order to avoid a rub-off effect: graffiti has a tendency to encourage others to continue. As a rule this type of disfiguring and damage is reported to the police.

5.4. Management and maintenance

The simplest and most economical action for the preservation of rock art is vegetation management. This type of management has both a preservation and preventative effect, but all initiated actions require maintenance. Regular, i.e. yearly, maintenance that halts the need for all-out efforts that are demanding in terms of both time and expense, provides the best short and long term preservation and best serves the interests and needs of the public. Vegetation management includes the actual rock surfaces (careful brushing, washing, dealing with turf, moss and lichen on the carved rock), the immediate surrounding area and a reasonably delimited environment around it. However, it is important not to remove trees that can provide effective shade for the paintings and carvings, and therewith contribute to reducing daily variations in temperature on the surfaces. Additionally, management and maintenance of areas is necessary in association with presentation, such as paths and access roads, parking places, rest areas, etc.

Through simple naturally based agents it is possible to undertake careful manipulations of nature. We have found the planting of prickly, unpleasant bushes particularly appealing where we do not wish the public to go, and at the same time keep the area where we wish people to walk neat and tidy (Bakkevig 1999:98). We can in this way lead the public where we want, without disturbing or damaging interventions.



The illustration to the left shows how the public naturally uses the most direct approach to the rock with carvings – the path marked 5 between the damp area 3, the bush 1a, tree 2 and brush 4. The consequence is that they walk right up on the panel. The illustration to the right shows how, by planting prickly bushes marked 6 in the old path, filling the damp area 3 and leading the path along the panel and to location 7 on the lower side of it, can avoid approaching directly into the rock.

Illustration: Sverre Bakkevig.

Another example of a cautious manipulation of natural vegetation for protection and management purposes is found at the locality Leirfall in Stjørdal, Nord-Trøndelag. From having been an open grazing landscape with a panoramic view over the village, the site was in 1999 completely surrounded by high trees and bushes. The dense vegetation not only blocked contact between the carved surfaces and surrounding cultural landscape; it almost completely blocked out the light and air. The dark and damp microclimate encouraged a marked growth of moss and lichen on the rock surfaces, something that has not been found to be especially favourable; for preservation or presentation, nor is amenable to a reliable interpretation of the rock carvings' past natural and cultural environment. A conscious and goal-oriented change of the situation through thinning of the vegetation surrounding the Leirfall carvings in 2001 created much better preservation and experience conditions, and lay the foundation for more clearly implemented actions for management and maintenance (for example Olssen 2006).



Management of the locality Hegre, Stjørdal in Nord-Trøndelag, before and after vegetation management in 2005. Photo: Camilla Olsson, Bergkunstmuseet/Stjørdal Museum.

Management and maintenance must also be carried out yearly at installations that are set up in connection with presentation, such as signs, platforms and footbridges, waste management, etc. It should be obvious that presented localities should at all times be kept so clean and well looked after that their high preservation value is demonstrated through this good maintenance: this signals respect, generates respect for the location and increases the understanding for the protective concept.

Good routines for yearly maintenance have been established at many places, and tasks that are marked on the long-term part of the management plan, are carried out in a good way. At other locations management work is undertaken in a less systematic and routine way, and there seems to be two main reasons when problems occur: A lack of labour resources in regional cultural heritage management, and a lack of anchoring in the municipalities, that in most instances are expected to take responsibility for a much of the general vegetation management around the localities (including access paths, parking, rubbish, etc.). This shows how important it is to anchor management plans through concrete, binding agreements with municipalities, property owners or others, something the Directorate for Cultural Heritage strongly encourages, and that should actually be an obligatory part of the management plan.

Management of the actual rock surfaces is normally carried out by professionals, such as archaeologists, conservationists, botanists or those with similar expertise, or after guidelines from and control by professionals.

In recent years, pure ethanol has been used on a number of carved surfaces as an agent for killing lichen and algae growth. Ethanol is sprayed and/or brushed on the rock surface, which is then normally covered for a minimum of two years to strengthen the effect and so that the hyphae that reach down into the rock, will die. The length of the covering period is dependent on the intensity of lichen vegetation and local climatic conditions. After this the treatment must be repeated regularly to avoid “aggressive” pioneer species, and the follow-up is less time and labour demanding than the initial effort. Ethanol has not been found to have negative effects, either on the rock surface or with respect to the surroundings. Alcohol for cleaning carvings and rock surfaces must however not be used on areas that were previously consolidated with Mowilith DM 123 S.

The conclusion so far is that ethanol treatment is a gentle as well as effective method (Bjelland et al. 2001), even though there are still some unsolved ethical and practical

problems associated with the method (Bjelland 2005:52). This form of treatment for the carved surface lies in the borderland between care/management and conservation / intervention, and should be carried out by or following consultation with and advice from, conservationists or professionals with similar competence in this field.

Still one can say that appropriate soft brooms and brushes, buckets for the collection of vegetation debris and sufficient amounts of water are the most important tools necessary to keep the carved surfaces well preserved, clean and well managed (e.g. Engebretsen 2006). Brushing of lichen remains requires washing with plenty of clean water afterwards, so that the lichen hyphae do not spread over the rock and cause new growth of lichen vegetation.

5.5. Methods for presentation and communication

For many decades the painting of rock carvings, often combined with simple and standardized information signs, was for the most part the only method for presentation in the field. The arguments against painting are that it is technically, ethically and aesthetically problematic (see Chapter 4.6), and a variety of individuals in a variety of contexts, have presented alternative presentation and protection methods – that to a large degree are linked together.

The Directorate for Cultural Heritage has called for a principal stop in painting of previously unpainted panels or repainting of panels where the old paint is so worn that it is almost completely gone. Careful renewal of previously painted panels may be accepted for the time being, provided there are good arguments for it. In this case the worn parts of the figures should be retouched with weaker paint, so that the paint as a whole wears down evenly without appearing unattended and neglected in the meantime. The goal is to stop painting rock carvings, and instead develop and carry out alternative presentation methods.

As the interest in presentation and communication has increased over time within cultural heritage management, and society's rightful interests and demand for accessibility, experience and information are more clearly articulated, there has been a greater willingness and ability within management to think and act alternatively.

In Rogaland an attempt has been made to limit cleaning with ethanol to the carved lines, in order to make the figures more clearly visible in contrast with the surrounding rock surface. At the majority of locations where ethanol is used to clean carved surfaces for the purposes of presentation, however, one sees that the results are better when the entire surface is washed. On a cleaned rock the figures will come forward clearly, even in poor natural light conditions. Another point is that we should also ask ourselves why it is so necessary to always have the figures visible, by painting or cleaning the carved lines or other means. How can we present carvings without painting or cleaning them? (Goldhahn 2005:57).

During 2006, with completion in 2007, the large Kåfjord locality within the Alta World Heritage Site was covered. This occurred after a period of management, cleaning of the panels and not the least thorough documentation. Within the RANE project scanning documentation was undertaken of the entire locality. Even though for economic reasons it was not possible to obtain maximal results out of this method in terms of communication, it was still possible to create an exciting exhibition at the Alta Museum with scanned images as the main element. Through new methods for communication we can safeguard our responsibility to the public even when the actual location, such as Kåfjord, is not open or directly accessible for the public.

Hjemmeluft/Jiepmaluokta at Alta was a pioneer in Norway as far as the building of walkways and platforms in Norway is concerned, with constructions starting in 1982 (Helskog 1988 a and 1988 b:38-41). Subsequently there have also been constructed platforms for the public at some other rock carved sites. Even though platforms and constructed walkways represent a new visual element in the landscape, it may be necessary to protect the rock art as well as vegetation, and they can give visitors a higher quality experience. Such solutions should, however, be considered very carefully with regard to a series of factors before they are chosen, such as topography, surrounding landscape, infrastructure, need for protection and visitor frequency.



Public platform at Fossum in Gjerpen, Skien municipality, just before unveiling by the mayor in 2003. The platform is built entirely without impacting the rock surface. Light sources were mounted underneath the floor of the platform in 2006. Photo: Sonja Molaug, Telemark county.

When platforms and walkways are planned and constructed, emphasis is placed on making the actions totally reversible, which means that there is no boring or other form of intervention in the rock. It has been shown that this is possible to achieve, through carefully adjusting the construction to the height differences and micro topography of the rock. If this due to various reasons proves impossible, one must choose alternative solutions to a platform. There are also stringent requirements for aesthetic and architectural form, satisfactory adaptation to the landscape and its natural forms and lines, high quality and durable materials¹⁰ and production, and a construction that easily allows effective repair and maintenance (for example as done in Fredrikstad municipality in the 1990s, see Tjernås 1997). At present, the last public platform that was built after such principles is at the locality Fossum in Gjerpen, Skien municipality.

¹⁰ For example, pressure impregnated materials should not be used, and wood should not be treated with oil, staining og similar products. This is to avoid runoff of potentially damaging agents onto the rock. The wood that is chosen, however, should have the same durability as pressure impregnated materials.

In Norway there are some examples of walkways and platforms that are permanently fastened to the rock and therefore do not fulfil the requirement for full reversibility, but these are from a period before this norm was implemented. There is also a special situation at Ausevik in Flora municipality. Here one has chosen to use the existing postholes from the earlier fence as fastening points for the platform construction, to avoid making new ones (Leivestad 2004).

One example of an exciting non-interventive method for communication of rock carvings is guiding with night lighting, something that has been shown to be extremely popular and well suited for the general public in both Norway and Sweden in recent years. Another method is to provide complete tracings of a panel on an information sign, and has been practiced by a number of counties for some years. This gives the public a possibility to identify and discover the figures themselves, using the “template” on the sign – a considerable stimulation for experience. And not the least, it is necessary to explain to the public why we no longer wish to offer painted rock carvings.



*The platform at Ausevik under construction in 2006.
During the construction phase the rock carving panel is covered.
Photo: Valborg Leivestad.*

At the locality Fossum as mentioned above, small light points are mounted in the platform, wired to a battery and solar panel, and shine an oblique light over the panel. This is an economical and good alternative to painting, it does not involve intervention, and it gives the public a good visual experience.

Another example of such an oblique lighting solution is the actions that have been planned by Buskerud county over a longer period of time and that have now been implemented at the locality Skogerveien in Drammen. At this location small spotlights will be built into a new wall that will surround the carved surface and carry a roof construction (Buskerud fylkeskommune 2005). Oblique light is used here as well, as an alternative to painting as a form of presentation; the locality had been painted through many years, but will not be painted again.

Skogerveien is an example of an extreme situation, both in terms of location and preservation conditions. The locality lies completely squeezed in between private homes and a road. An existing granite wall was collapsing, and contaminated water had seeped over the panel for some years. At the same time this locality is one of only a few with hunter's rock art (*veideristninger*) in Østlandet, it is well known in the national and international professional community and among the public, the motifs are unique and the location receives many visitors. Improvement of the preservation and visitor conditions was an absolute necessity. The total solution that was chosen, however, should not be taken uncritically as an example to follow. Even though the structure is constructed based on principles of minimal intervention and with stringent requirements for architecture and materials, it represents a fairly drastic action. In many ways this is a good example that solutions for preservation and presentation must be evaluated, created and chosen individually, based on a series of factors that vary from place to place.

During the RANE project a report was produced on "On-site installations" and "On-site Information", and we refer in general to these (Søborg 2006; Aronsson 2004).

We need additional possibilities, new ideas and creativity in the development of alternative presentation and communication methods, so that we some years from now can finally stop painting rock carvings. This is a challenge for the cultural heritage management and research communities, now and in the near future.

5.6. Archaeological excavations

Both in Alta and Vingen it was natural to develop hypotheses around chronology and relative age between the rock art and habitation evidence, since settlements and rock art at both locations occur within a common location context. In the late 1970s and early 1980s archaeological excavations were undertaken of settlements and house remains in connection with the rock carvings at Alta, dated respectively to the Early and Late Stone Age (Helskog (ed.) 1982:15-16; Helskog 1988 b:21-22 and 26).

At Vingen it was argued that the rock art was produced in the Late Mesolithic and towards the transition to the Neolithic, chronologically between 7500 and 5200 BP (uncalibrated) (Lødøen 2001). Between carved surfaces and carvings on loose blocks there is found at Vingen nine round or oval depressions with rocks around the perimeter, with a diameter of 4-5 meters, interpreted as habitation structures. The excavations showed that the raw materials used for artefact production are typical of the Late Mesolithic in Vestlandet. The other find categories also indicate a relative contemporaneity with the rock art. Of particular interest are finds of artefacts interpreted as hammer stones (ibid:215-217), that also argue for a connection to the production of carvings.

The most recent rock art localities in Norway to be investigated archaeologically are the painted locality Ruksesbåkti in Indre Sandvik/Cuoppogieddi in Porsanger municipality in 2003 and Simon Kranehula in Vågan municipality in 2005. At Simon Kranehula neither the material from the excavation near the two panels within the cave nor from the test excavations outside produced results that can say anything about the context of the rock art in the area. Apart from remains of activities during the past 50 years, there was not found any datable material or artefactual material that could be dated (Helberg 2005).

In front of the largest and most interesting section in terms of figures at the painted rock art locality Ruksesbákti, a total of 8 m² was excavated (Helberg 2004). No structures were found, but the artefact material was found to be representative for the period Late Stone Age to Early Metal Period. Radiocarbon dates showed that the area was in use from the end of the Late Stone Age to approximately the end of the Middle Ages (ibid:6). The paintings were most likely produced within this period. The close proximity to a larger site with house depressions of the Gressbakken type (*Gressbakkentufter*), a type that is dated to around the transition between the Late Stone Age and Early Metal Period, in the opinion of Helberg can indicate a later age for the paintings than the Gressbakken house depressions, i.e. the Early Metal Period, a period that corresponds with the dating that is generally suggested for the painted rock art in Norway (ibid:7).



*B. Hebba Helberg and Marthe C. Pramli during excavation of the locality Ruksesbákti in Indre Sandvik/Cuoppogieddi in Porsanger, 2003.
Photo: Dag Magnus Andreassen.*

Such investigations provide an opportunity for new interpretations of the relationship between carvings and other human activity within a given area, with consequences both for future research in Scandinavia and other places, and for conservation and management.

5.7. Covering of rock carvings

An important point in the covering discussion is if it involves temporary covering to remove lichens from the rock surface and prevent significant and/or frequent temperature fluctuations, or if it is a permanent covering that will protect the rock “against all dangers” for an indeterminate time.

The ideal would be if one could wait with the “real” covering until one had all the data available from trials where environmental monitoring was included. The situation, however, requires that one in specific situations must also in this area initiate actions based on the assumption that it is the best solution, seen in relation to existing knowledge about the concrete factors that threaten the rock art.

Four types of covering have been tried out and undertaken:

Covering with plastic

When a carved rock surface is sprayed or carefully brushed with alcohol, it is covered for a minimum of two years to strengthen the effect of alcohol treatment, prevent premature washing away of alcohol and stop light penetration. After this treatment the lichens have loosened and can easily be washed away with a brush and plenty of water. Alcohol treatment must be repeated regularly in order to avoid the reestablishment of lichens.

Winter covering

The goal of winter covering of rock carvings is first and foremost to prevent frost damages in the rock surface, that occurs especially when there are many temperature passages around the freezing point during the course of the winter and early spring. Not the least, systematic temperature measurements at the Leirfall locality in Stjørdal, undertaken by The Norwegian University of Science and Technology, Museum of Natural History and Archaeology (NTNU, Vitenskapsmuseet), have shown that surprisingly many such passages occur, and April is found to be the most problematic month. With good covering the temperature of the rock surface is held essentially stabile (pers. comm. from Roar Sæterhaug).

Experiments with winter covering show that it is necessary to cover sufficiently large areas. Mats and tarpaulins must extend around 1.5 meters outside the figures in order to avoid infiltration of cold air. It is the entire rock surface that must be protected, not just the carvings. The mat system must be fastened properly without involving physical intervention, the top covering must be solid and dense to avoid tears that allow the insulation to become wet, and the actions must have an aesthetically acceptable design. Practical and appropriate solutions must be found for covering and uncovering and for storage in the summer season (Bjelland & Helberg (eds.) 2006:82-83).

With better methods for weighing down the covering layer, as well as solutions for the actual mat constructions and improvements in routines for uncovering and covering processes, it appears that winter covering now works well and in accordance with its intentions.



Application of winter covering at the locality Holtås in Levanger municipality in 2005. At the base a layer of black plastic, above this mats sewn into covers, and on the top a tarpaulin. Everything is weighed down with sand bags.

Photo: Camilla Olsson, Rock Art Museum/Stjørdal Museum (from Olsson 2006).

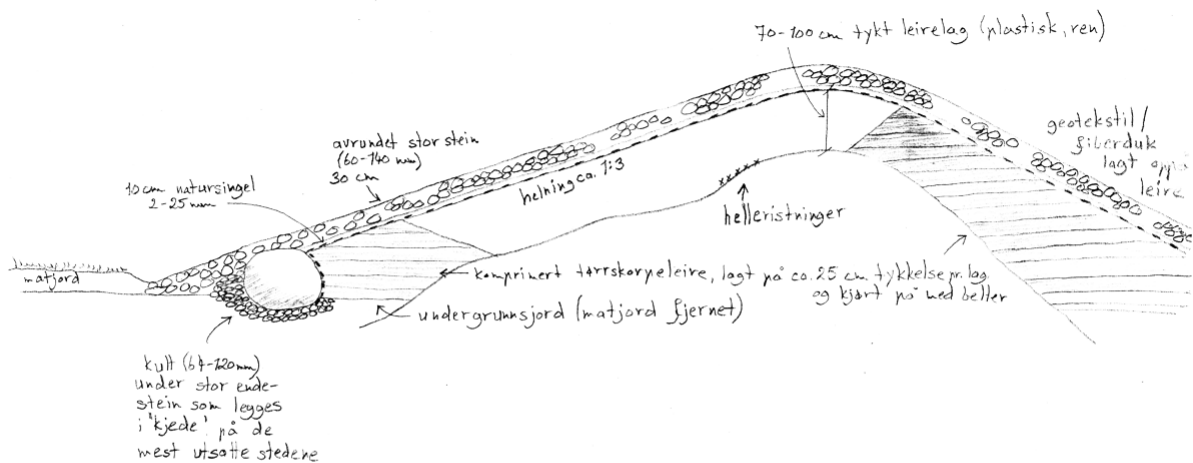
Long-term covering with mats and tarpaulins

Currently there are only a few carved surfaces with long-term covering in Norway. In Vingen early attempts with covering were made using insulated mats (Mandt & Riisøen 1996:40). After a period with testing of materials and methods, the methods have been additionally improved (Gran 2006; Bjelland & Helberg (eds.) 2006:78-80). Covering of the two large Kåfjord panels and Storstein, both localities within the Alta World Heritage Site, was prepared within the Rock Art Project and undertaken in 2006 with completion in 2007.

At the Kåfjord panels, in sewn insulated mats are placed over a tarpaulin, and this is covered with a thick and solid polyethylene or PVC tarp. Everything is temporarily held in place with ropes and in sewn sand bags, but in 2007 the rope will be replaced with rustproof wire fastened to hooks cast in heavy cement blocks. Three inspection windows have been made and temperature gauges are installed (Gran 2006). The Storstein locality is temporarily covered for a five year period, in principle in the same way as at Kåfjord (ibid.).

Permanent covering

The construction of E6 through Sarpsborg municipality in Østfold came into contact with a number of carved panels, and it was decided to cover five panels permanently: four in 2005 and the last in 2006. Four of these panels were covered using the method illustrated below.



Materials and methods for permanent covering of rock carvings along E6 in Sarpsborg municipality, Østfold. Principle drawing. Illustration: Kristin Berg, Statens Vegvesen, 2005 (Ernfridsson 2006:5).

6. Future Perspectives

6.1. General comments

As the Rock Art Project neared completion, there developed a considerable – and in many ways justified – anxiety at the regional archaeological museums and within county level cultural heritage management, and also at the Directorate for Cultural Heritage. How would the future protection of the Norwegian rock art be secured following project completion in 2005?

Already in the Directorate for Cultural Heritage’s midway report for the Rock Art Project in 2000 it is stated:

”None of the management levels – the Directorate for Cultural Heritage, the regional archaeological museums and the counties – can deny their follow-up responsibility; not professionally, not in terms of competence and not economically. It seems clear that financing must be found at a central level to continue preservation work. However, centrally-applied economic resources are only one of a number of instruments that can be employed. If the work is to succeed in the long-term, it must to an increasing degree be anchored, both professionally and economically, in the regional management apparatus. To stimulate and encourage enthusiasm and a willingness to take initiative, in addition to national and international networks, will be of vital importance.“ (Hygen 2000 b:187).

In the report from the Archaeological Institute at the University of Bergen in the same publication, the period following project completion is also discussed (Mandt 2000:25-26). Here it is pointed out that the following terms are necessary for continued work with

responsible protection: interdisciplinary cooperation, development of expertise, collaboration and network building, and continuous follow-up of the rock art panels / protective actions. The establishment of a national multidisciplinary competence group is also recommended (ibid:26). It should be pointed out that just such a group, the *Norwegian Expert Group for Rock Art*, exists at project completion, as a continuation of the *Norwegian Expert Group for Rock Art Conservation* established by the Directorate for Cultural Heritage in 2002. The group is headed by the Directorate for Cultural Heritage, and it meets twice a year.

Therefore already halfway through the project there already existed long-term perspectives for work after completion of the Rock Art Project. At the Directorate for Cultural Heritage there was a long-term strategic effort towards the Ministry of the Environment with respect to documenting the need for a continuation of rock art work after 2005, and for continued funding for this work. This strategy has produced results (see Miljøverndepartementet 2005 a:27). It was not possible in advance to provide clear signals as to whether the work would continue, since this authority lies with the Ministry of the Environment and the Government. We can also be encouraged by the following recommendation mentioned in the national budget proposal for 2006 regarding rock art:

”Funding can be given for actions insuring that the results from the Rock Art Project are used for management, conservation and communication. Funding can also be given for further development of methods.” (Miljøverndepartementet 2005 b:172).

But not everything can be solved by Government funding, and even a yearly amount for this purpose in the national budget is not sufficient. The greatest concern at the start of a new phase in the Norwegian rock art work is insufficient manpower within regional cultural heritage management and the weak economy in the majority of counties and municipalities. Management tasks required by law have increased dramatically since the reorganization of cultural heritage management in 1990. Even though the majority of counties have increased their work force through externally financed positions since 1990, there are not sufficient resources to invest in the care of the cultural heritage in general, and rock art in particular, to the degree that is desired and that all of us wish for. The university museums also lack sufficient internal resources to face the needs. How this can be resolved remains uncertain. However, the situation is not completely hopeless. There is a high level of motivation and significant efforts although the conditions are not totally satisfactory, and this is what we must use to face challenges in the coming years.

6.2. Themes that point towards the future

In the final phase of the Rock Art Project, and through the summarization of what we have achieved in different forums, the future challenges have become steadily more apparent. In addition to the need for significant efforts in concrete management and care, and the completion of previously produced management plans, such challenges and themes can be summarized as follows:

What about the others?

Since only a minor part of the Norwegian rock art has been included through various actions within the Rock Art Project, we must also address the other localities. The Directorate for Cultural Heritage sees it as both professionally and ethically correct to start the process by insuring that these localities also undergo primary documentation. So, if nothing else, we insure that this documentation is in place as a starting point for further knowledge production as well as future management.



It is impossible to approach an understanding of the rock art at Vingen, Bremanger municipality, without placing the rock carvings within a context of landscape and other human use of the area through thousands of years. The photograph is taken from Vingenneset.

Photo: Arve Kjersheim © Directorate for Cultural Heritage.

New methods for image documentation

To achieve the goal of primary documentation of all Norwegian rock art localities, requires more effective methods for image documentation; both for the rock paintings and the rock carvings. Additional alternative methods need to be tried out, costs and results evaluated in relation to existing methods, and image documentation carried out over the entire country in the coming years. GIS solutions, with combinations of maps, images and texts, will provide interesting future perspectives for more than just the rock art in Alta.

At the same time there must be developed professionally satisfying and at the same time effective methods for handling, distribution and providing access to image documentation.

Decomposition causes and protection actions

It is important to continue research and development efforts related to the causes of rock art decomposition, and additionally attempt to isolate the different causes in relation to the range of damages. This is necessary in order to avoid that actions directed against one type of damage or a set of damages, have unforeseen negative consequences with regard to other preservation parameters. The goal is to acquire increasingly better and safer methods to limit and delay damages.

Covering methods

We have come a long way forward in the development and undertaking of covering methods in relation to concrete problems and different local conditions. However, we are only at the start of this development, and need both short and long-term experience with the coverings that are completed, and a larger and even safer range of methods and materials.

Conservation of the in situ meaning of rock art

We have come much further than was the case only a few years ago in taking into account other aspects of rock art beyond figures, motifs and image composition into a holistic interpretation and management of rock art. What research produces of interpretation is what is to be managed, conserved and preserved. Areas of concentration involve an increased focus on interpretively based preservation, conservation and management, and a closer collaboration between archaeological research and management.

Handling of graffiti and similar factors

There is a need for continued testing of methods for safe removal of traces of painted and carved graffiti and other additions of foreign material on carvings and paintings. There should be placed more effort in the exchange of experience with other countries, where they can have more experience than us, and in the testing at trial panels before actions are carried out. Another interesting problem is if techniques for the removal of painted graffiti can also be used where there is a thick layer of old paint in the rock carvings.

General management

Many good management plans for rock art have been produced, and many are being implemented. Beginning in 2006 the focus in rock art work will gradually shift more and more towards management, which means active initiation of actions described in existing management plans. The Directorate for Cultural Heritage's funding policy will follow this strategy. It is also a great challenge to make it easier for the counties to be in a position to intensify their management activities, and to stimulate the municipalities to strengthen their own efforts. Further development of methods for naturally based management will continue.

Presentation and universal design

It is both a requirement and a challenge to insure that rock art localities are presented in relation to norms for universal design. Through the Directorate for Cultural Heritage's funding politics, projects oriented towards such solutions will have high priority. It is further important to ensure that constructive ideas and practical solutions are disseminated.

Alternative communication methods

Parallel with a reduction in the painting of rock carvings, it is necessary to develop new alternative presentation methods. In this work the research and management institutions must be actively drawn into a collaboration, in addition to the general public: Municipalities, schools, the tourism industry, voluntary organizations and private individuals. Alongside the concrete methods and agents, a general change in attitude is also required.

International cooperation

Several of the actors that have been active in the Rock Art Project, have had a considerable international engagement related to active management and preservation of rock art and through participation in international seminars and conferences. This has produced positive spin-off effects back to the Norwegian community and expanded our collective experience horizons. At the same time we have from our privileged situation in rock art work in a series

of projects been able to support other less privileged countries and professional communities. This should continue.

7. Final remarks

Knowledge, experience, cooperation, consciousness and engagement – these are keywords that describe well the status after ten years of the Rock Art Project.

The guide that the *Norwegian Expert Group for Rock Art* completed in 2006 (Bjelland & Helberg (eds.) 2006), provides a good impression of how large and comprehensive the theme protection of rock art is. To be able to protect rock art requires a close cooperation between professionals from a large number of professional groups, and it is not a given that such cooperation is as easy to accomplish when the collaborative partners are spread in various dissimilar institutions and in regions with very different conditions. There have been impediments to progress, but collectively the prepared rock art guide, contents of the annual reports, the large number of management plans, and the many well managed and well presented rock art panels have demonstrated that the Rock Art Project was a worthwhile investment.

The Rock Art Project has not existed in a vacuum, just as rock art itself is not an isolated prehistoric phenomenon. Knowledge built up within one professional area, and within one project, can have a positive influence on others – it produces a spin-off effect. We have seen many good examples of this during these years since the start of the Rock Art Project, both within the country and abroad. We will fairly certainly see others in the years to come.



*Section of the paintings in Solsemhulen, Leka in Nord-Trøndelag.
Photo: Arve Kjersheim © Directorate for Cultural Heritage.*

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Appendix

Directorate for Cultural Heritage's collaborators in the Rock Art Project 1996-2005

The following collaborators at the Directorate for Cultural Heritage have for shorter or longer periods had various functions within the Rock Art Project. The overview is presented in roughly chronological order.

Synnøve Vinsrygg	1996
Inger Karlberg	1996-1997
Elin Dalen	1996-1998
Harald Hermansen	1996-1999
Jostein Løvdal	1997
Jostein Bergstøl	1997
Knut Paasche	1997-1998
Marit Chruickshank	1997-2005
Harald Ibenholt	1998-2005
Inger-Marie Olsrud	1998-2005
Anne-Sophie Hygen	1999-2005
Line Bårdseng	2001
Director of the Administration Department and Director of the Department for Area Planning	Ledergruppens arbeidsutvalg 1997-1998
Director and Assistant Director of the Department for Conservation	Ledelse i linje 1998-2001
Director of the Administration Department, Director of the Department for Conservation and Director of the Department for Information Services	Styringsgruppe 2001-2005

Note:

Numerous collaborators at the regional archaeological museums, counties/Sámi parliament, Norwegian Institute for Cultural Heritage Research (NIKU), Norwegian Institute for Air Research (NILU) and others have participated during the project period in the rock art work and have made an invaluable contribution. Since it is difficult to produce an overview that includes everyone, without omitting individual persons, the Directorate for Cultural Heritage has chosen not to produce a specified list of names.