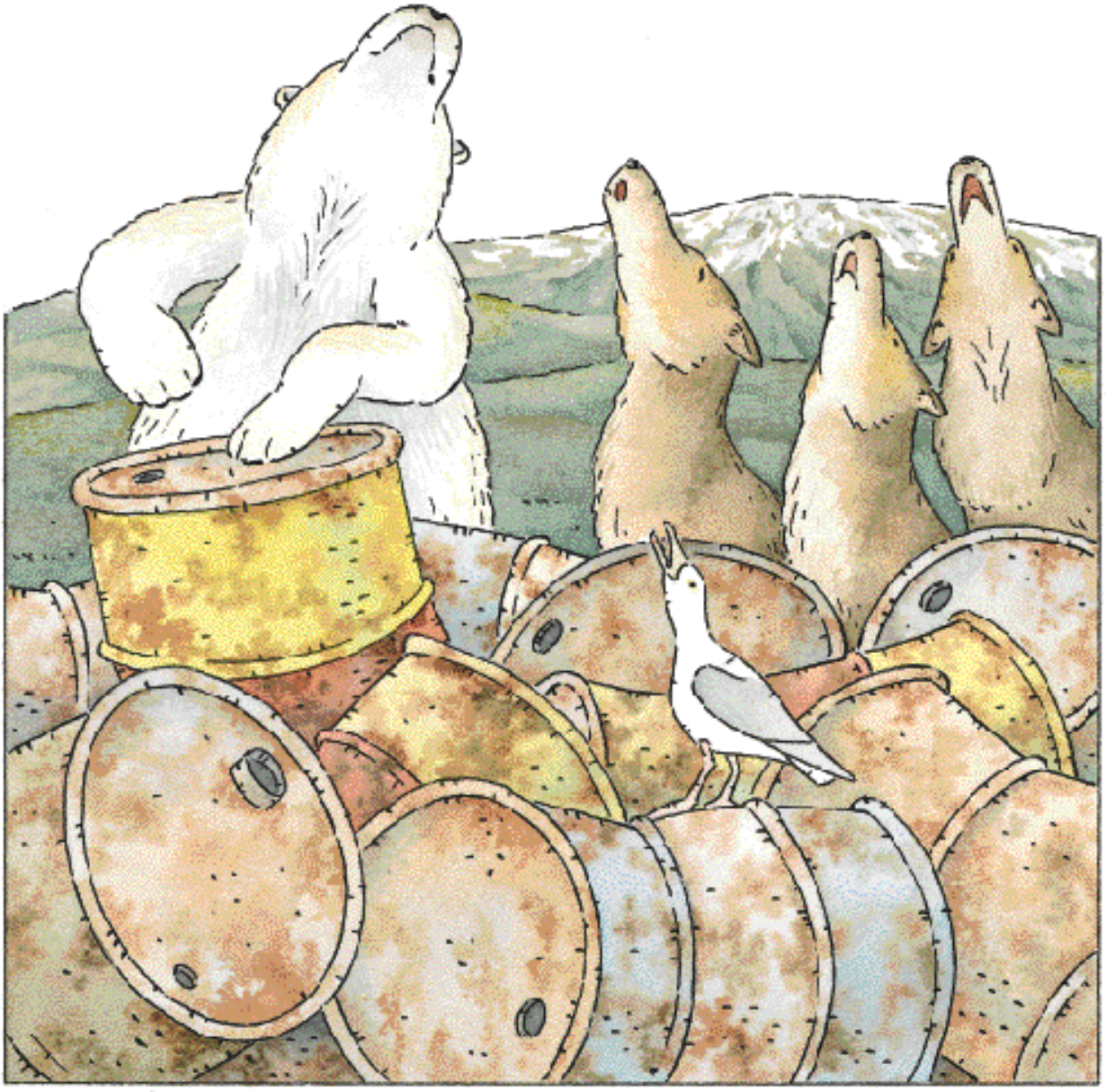
GUIDELINES FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA) IN THE ARCTIC

ARCTIC ENVIRONMENTAL PROTECTION STRATEGY



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http://www.vyh.fi/fei/intercoo/arctic/index.htm,
where additionally can be found information on
EIA procedures in the eight arctic countries

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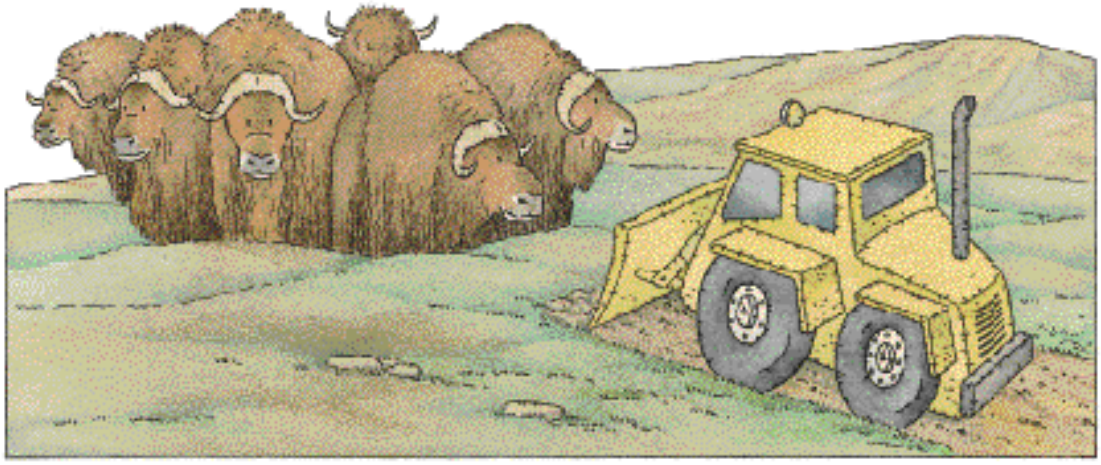
Information on the EIA procedures in the eight arctic countries available on the www at http://www.vyh.fi/fei/intercoo/arctic/index.htm



Preamble

In 1991 at Rovaniemi, Finland, ministers from all arctic countries approved the Arctic Environment Protection Strategy (AEPS), which seeks to protect the Arctic environment. The Arctic Council was established in September 1996 and the programs of AEPS continue under its umbrella. One of the key objectives of the Arctic Council is to promote sustainable development. Sustainable development is defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their needs. Sustainable development requires a planning approach where environmental integrity is maintained at permissible levels of development. Environmental impact assessment may assist this planning approach, and, therefore, is one of the important means for achieving this objective.

At their meeting in Inuvik in March 1996, the Arctic Environmental Ministers asked that guidelines for environmental impact assessment (EIA) be prepared. The Ministers recommended that the guidelines should focus on circumstances and issues of special importance in the Arctic, and explore ways of dealing with cumulative impacts, transboundary issues, the participation of indigenous people, and the use of traditional knowledge. Finland was asked to act as a lead country for the writing of the guidelines.

EIA provides opportunities for local people to participate and communicate with developers and administrators, and to have a say in matters that affect their environment. These guidelines aim at reaching a wide audience of private persons, support groups, local administrators and developers, federal administrators and ministers of arctic countries, and at giving practical advice for practitioners in carrying out environmental impact assessment in arctic areas.

■ The Arctic Environmental Protection Strategy (AEPS) was adopted by Canada, Denmark/Greenland, Finland, Iceland, Norway, Russia, Sweden and the United States through a Ministerial Declaration at Rovaniemi, Finland, in 1991. The programs under the AEPS are: Sustainable Development and Utilization (SDU), Conservation of Arctic Flora and Fauna (CAFF), Arctic Monitoring and Assessment Program (AMAP), Emergency Prevention, Preparedness and Response (EPPR) and Protection of the Arctic Marine Environment (PAME). In future, the AEPS programs will continue under the auspices of the Arctic Council.

Acknowledgments

These guidelines are the result of a truly international effort. After an initiative by the Finnish Minister of the Environment, Sirpa Pietikäinen (1994), international workshops and active correspondence among the Arctic countries concerning texts and ideas have carried the process to this point. A list of all persons and organizations that took part in producing these guidelines can be found on page 42. The support of the Task Force on Sustainable Development and Utilization and the encouragement of the Senior Arctic Affairs Officials have also been crucial to the preparation of these guidelines.

1 Introduction

Environmental impact assessment, hereafter called EIA, aims at avoiding deleterious effects on the arctic environment, including all its fauna and flora, abiotic components, natural resources, and human health, security and well-being.

What is the aim of these guidelines?

These guidelines aim at giving practical guidance for environmental assessments to all parties involved in development activities in the northern circumpolar areas, but especially to local authorities, developers and local people. The guidelines raise issues that are unique to arctic assessments – such as permafrost – but they also emphasize universal issues that are particularly important in the Arctic – such as public participation and the use of traditional knowledge.

These guidelines are not intended to replace existing procedures adopted by international, national or provincial laws, land claim agreements, regulations or guidelines. As they do not recommend any particular procedure for EIA, these guidelines are applicable across jurisdictional boundaries and in different EIA processes. They aim at providing suggestions and examples of good practice to enhance the quality of EIAs and the harmonization of EIA in different parts of the Arctic.

What are the key tasks of an EIA?

EIA is a process of identifying, communicating, predicting and interpreting information on the potential impacts of a proposed action or development on the environment, including humans, and to propose measures to address and miti-

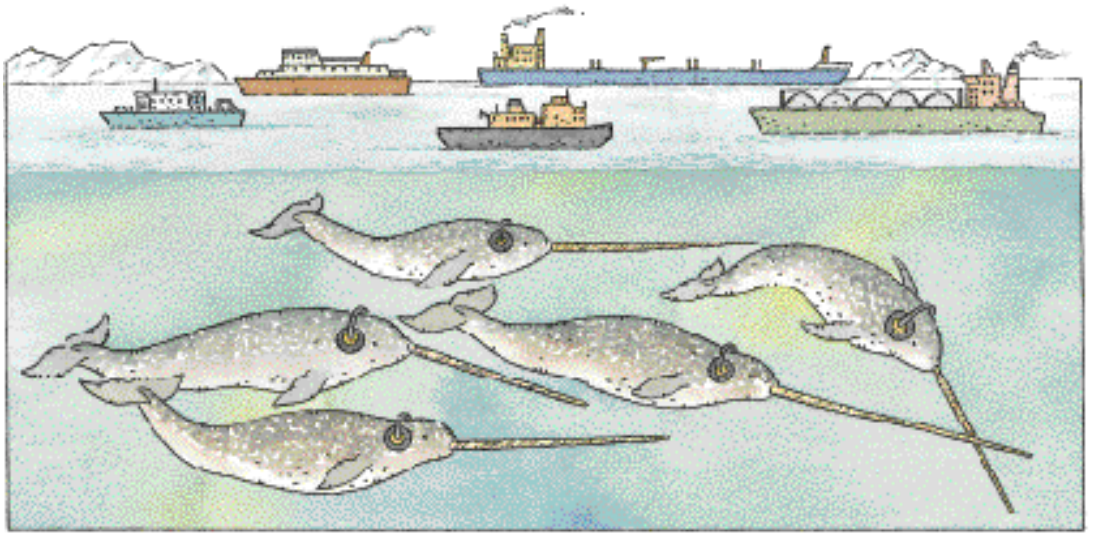


Table 1. Tasks in an arctic EIA process

Application of EIA	The decision to conduct an EIA for a project should take into account the special conditions in the Arctic; arctic-specific thresholds and sensitivity criteria are strongly recommended.
Scope of the assessment	The scope of an assessment should include all potential environmental, socio-cultural and economic impacts, especially impacts on the traditional uses of resources and livelihoods of indigenous people and also the consideration of alternatives.
Baseline information	The following key issues should be considered: combining traditional and scientific knowledge, using methods compatible to existing data collection programs in the Arctic, including socio-economic matters, using both qualitative and quantitative information and allowing sufficient time for collecting and compiling baseline information.
Impact prediction and evaluation	Issues identified through scoping are analyzed and expected impacts defined by identifying the type of impacts, by predicting the magnitude, the probability of occurrence and the extent of the impacts and by determining the significance of the impacts. In the Arctic, cumulative impacts are of special concern.
Mitigation	Mitigation aims at avoiding or lessening impacts. In considering mitigation measures, special arctic features should be taken into account and the public should also be involved.
Monitoring	Monitoring should include follow up of impacts, verification of predictions and feedback on mitigation and project operations. The environmental conditions in the Arctic make monitoring a demanding task requiring careful planning.
The environmental impact assessment document	An environmental impact assessment document should be prepared and provided to all involved parties. The document describes the project and its likely impacts upon the environment.
Public participation	An EIA should ensure effective public participation and consultation. Unique features such as the culture, the socio-economic situation and the remoteness of the Arctic should be considered in planning and carrying out public consultations in the Arctic.
Traditional knowledge	In the EIA process, traditional knowledge should be used in the understanding of possible consequences of predicted impacts and in reducing uncertainties.
Transboundary impacts	Assessments of transboundary impacts require project developers and authorities to make allowances for different legal systems, to provide translations when necessary, and to make special arrangements for public participation across jurisdictional borders.

gate these impacts. An overview of the tasks in the EIA process, as covered by these guidelines, is given in Table 1.

EIA should be initiated at an early stage of project development so as to become an integral and influential part of planning. In addition, EIA is a means of improving decision-making, because it allows for the input of public opinion, and other knowledge and information, to ensure fairness and balance in the final decisions.

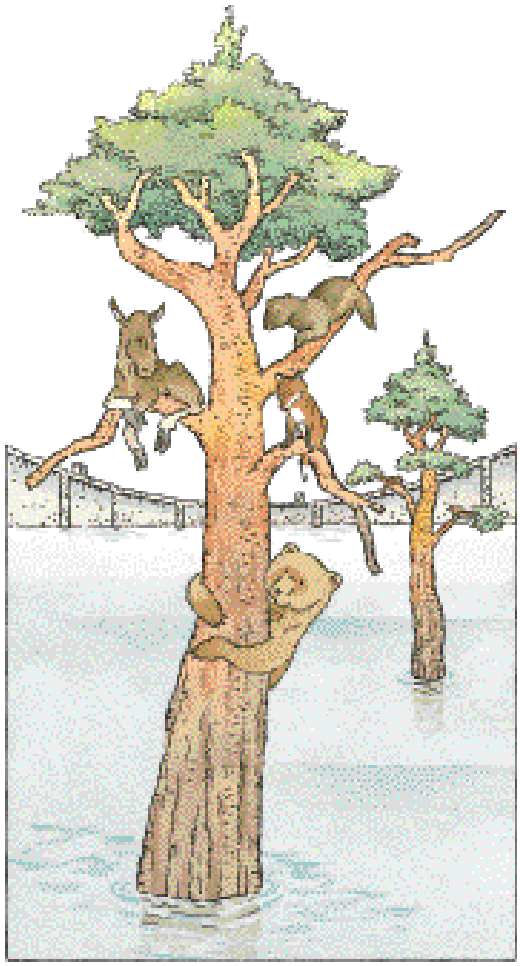
■ **The Panel of the Northwest Territories (NWT) Diamonds project in Canada concluded that, provided the project is developed as proposed and subject to the Panel's recommendations, the project can be an example of sustainable development in the mining industry. In coming to this conclusion, the Panel observed the determination expressed by the proponent to draw on project revenues to invest in the social- and human-resource capital of the NWT through its employment preference, its work with the indigenous communities, and its education and training programs. The Panel draws this conclusion in the context of a rapidly expanding and young population, and in an economy limited in its ability to provide for the livelihood and well-being of this growing population.**

NWT Diamonds Project, Review Panel Report, Canada 1996.

What are the objectives of an arctic EIA?

The objectives of an arctic EIA are:

- to estimate and describe the nature and likelihood of environmentally damaging events to provide a basis for decision-making;
- to provide for the incorporation of traditional knowledge and consultations with the developer, the public, regulatory and non-regulatory authorities to guide decision-making;
- to assist project design and planning by identifying those aspects of location, chosen technical solutions, construction, operation and decommissioning that may cause adverse environmental effects, including social, cultural, health and economic impacts;
- to identify environmental options and to evaluate the environmental implications of all viable alternatives. Project proposals should balance environmental protection and the conservation of natural resources with other social, health and economic considerations; and



- to devise and implement remedial measures for eliminating or minimizing undesirable impacts.

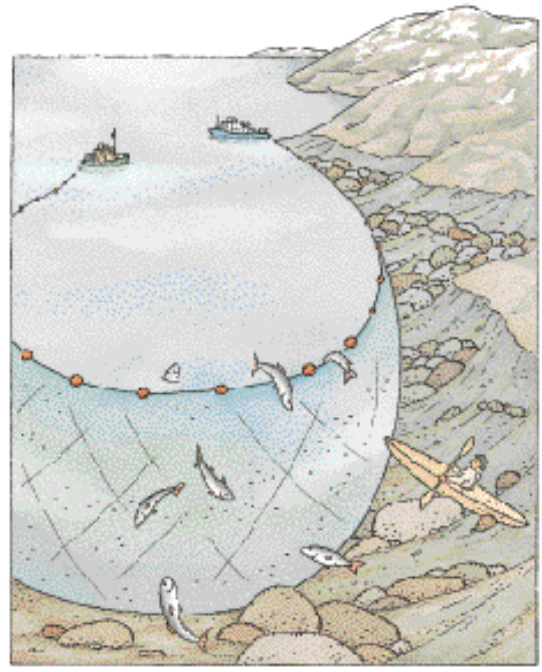
EIA is used extensively throughout the world in the initial stages of project preparation. In many countries, including all the Arctic countries, EIA is mandatory for specific, often large-scale activities. EIA will also be an integral part of the Arctic Offshore Oil and Gas Guidelines, which is being prepared under PAME (Protection of Arctic Marine Environment, AEPS). The key concepts of EIA are defined in appendix III. Information provided on the World Wide Web (WWW or Internet) gives an overview of the EIA process in the Arctic countries, including the required contents of environmental impact statements (see Contents for Web site).

What makes EIA special in the Arctic?

The objectives of environmental impact assessment in the Arctic cannot be met without paying attention to the special features of the Arctic. Although the Arctic is not a uniform area with respect to topography, population density, land use or politics, many common features can be recognized in the climate, the socio-cultural conditions and the functioning of the ecosystems. These affect the investigations that are carried out, the choice of methods and approaches and the time span of the assessments. For example, the simple ecosystems and the slow breakdown of contaminants may influence fundamental assumptions in predicting the fate of pollutants. The lack of baseline information may lengthen the EIA process compared with EIAs in temperate regions, and the importance of traditional knowledge in the Arctic demands new ways of collecting information.

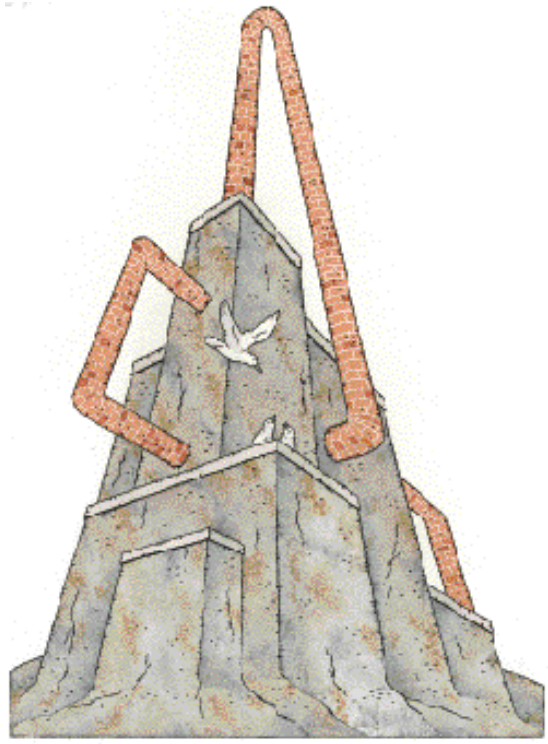
A first step in planning an arctic EIA is to identify those features that are particularly relevant to the project in question. A list of such features is provided in appendix I. More extensive descriptions of the Arctic are given in the sources of information, which include Internet links to extensive bibliographical lists (appendix IV).

The Arctic also has several unique areas that require special attention in assessments. These areas may represent unique or sensitive geomorphological characteristics or biotopes, have special importance for the functioning of arctic ecosystems or are sites with special spiritual, cultural and other socio-economic values (appendix II). Some of these areas may be protected by law or treaties, such as national parks or areas of specific interest; however, the vastness of the Arctic necessitates that every assessment should identify such areas within the area of potential impact at an early stage in the assessment.



What are the important elements for an arctic EIA?

EIA in the Arctic should be based upon the same principles and include the same elements that characterize EIAs in other parts of the world. The elements that are of particular importance in arctic conditions include the following.



1. Multidisciplinary nature

Many different fields of study and interests are normally covered by an EIA, such as biology, geology, engineering, socio-economics and cultural heritage. This multidisciplinary approach is even more important in the Arctic, where the connection between the natural environment and socio-economic features may be stronger than in other regions. The use of many different types of information also includes accepting traditional knowledge as an important source of information in assessing potential impacts.

2. Flexibility

EIA is a flexible process that can deal with the complexity and the diversity of cultural settings, and can provide a forum for the exchange of differing views and interpretation of information. EIA can also be adjusted to the size and scope of individual projects.

3. Participatory function

The EIA process allows for the participation of a wide range of stakeholders who often hold different views and have different values, including non-monetary values of the Arctic and its environment. The demographics of the people in the Arctic regions varies, but some characteristics are shared. Many Arctic people live in sparsely populated areas, and most still have livelihoods that depend upon large geographical areas. Iceland is the only area in the Arctic not inhabited by indigenous people. Russia is the most complex of the Arctic countries in the sense that it is inhabited by a large number of very distinct indigenous groups, each speaking a unique language.

4. Cumulative effects

In the Arctic, cumulative impacts are of special concern because of the sensitivity of the area and the long recovery times.

5. Precautionary principle and assessment

The precautionary principle or approach, which is a part of numerous international treaties and declarations, has emerged as an important issue in EIA. As reflected in Principle 15 of the Rio Declaration, the precautionary approach provides "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a

reason for postponing cost effective measures to prevent environmental degradation". This approach is particularly relevant in the Arctic, where baseline data are scarce and there are gaps in the understanding of the important ecological functions in the Arctic systems. The precautionary approach should therefore be encouraged when carrying out EIAs in the Arctic. Similarly, environmental risks of development activities should be assessed in arctic EIAs.

How should EIA be included at other levels of planning?

While cumulative impacts are recognized during the assessment of projects, many cumulative impacts on the arctic environment cannot be dealt with effectively at the individual project level. Land use and resource use plans or area plans are often developed for particular regions. These plans can be used to guide the future direction of a sector, for example, the forest sector or reindeer husbandry, by taking into account sustainability criteria. The assessement of these plans, often called strategic environmental assessment, includes similar tasks to those used during the environmental impact assessment of individual projects. At the same time, these plans can be a basis for the assessment of individual projects and specify conditions a project has to meet to avoid significant adverse impacts.

■ **In Ny Ålesund, Svalbard, Norway, an assessment of environmental impacts has been initiated at the strategic level. The objective is, among other things, to assess the environmental impacts caused by human activities in specified areas, to assess the conflicts between various scientific research and monitoring projects in the same geographical area and to recommend actions to reduce these impacts to a minimum level and, to the extent possible, maintain and restore the qualities of the Ny Ålesund area as an undisturbed reference area suitable for a wide spectrum of environmental monitoring and scientific research.**

More information: Fred Theisen, Norwegian Polar Institute, P.O.Box 5072, Majorstua, Norway.

2 Application of EIA

The decision to conduct an EIA for a project in the Arctic should take into account the special conditions in the Arctic. Arctic-specific thresholds and sensitivity criteria are strongly recommended. The decision to identify and specify the type of assessment to be applied to a project is commonly called screening.

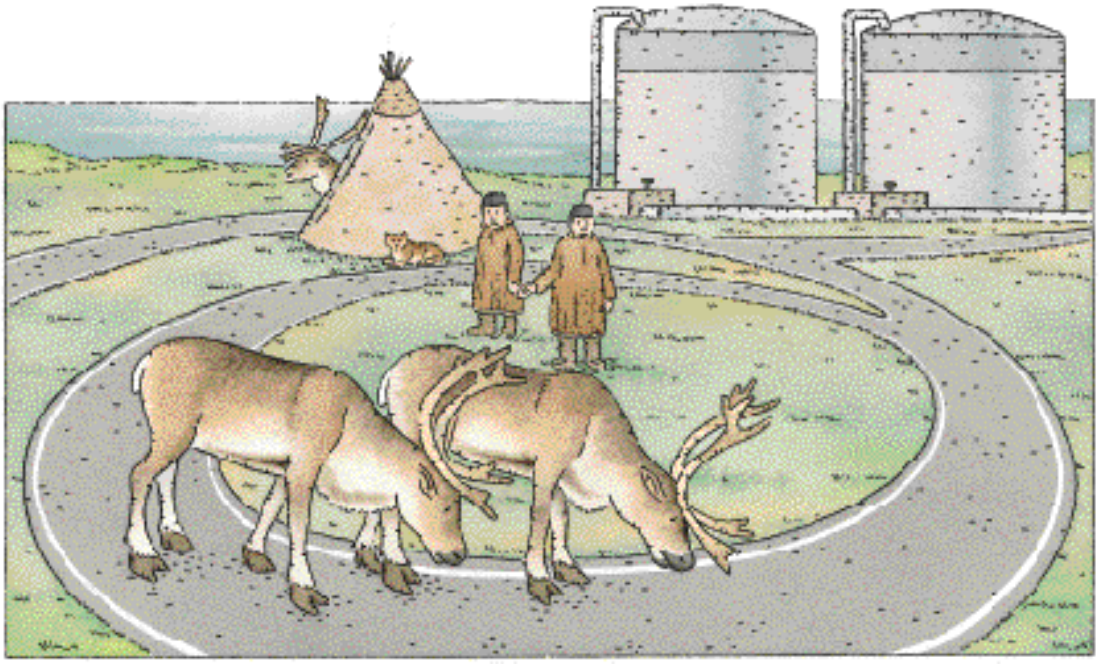
When should EIA be applied?

In the Arctic, EIA should be applied to activities associated with the exploitation of both renewable and non-renewable natural resources, public use, military activities and the development of infrastructure for different purposes that may cause significant environmental impacts. The growing development in the Arctic may also bring new types of activities, whose impacts have so far only been found in more temperate areas.

The two main approaches for deciding on the application and the extent of EIA procedures are mandatory assessment based on lists of environmentally harmful projects and case-by-case decisions. The use of these approaches varies among jurisdictions (see Arctic site on WWW). An intermediate approach using threshold levels has also been used. Some jurisdictions also apply lists that exclude certain minor development activities from assessment.

Why specific arctic thresholds?

Threshold levels ensure the application of EIA processes to activities that may



have significant adverse impacts. Since most Arctic countries have only part of their territorial lands and waters in the Arctic, national laws do not always take into account the sensitivity of arctic areas, which may require lower threshold levels. In jurisdictions that do not have case-by-case selection criteria, assessment decisions should be based on threshold levels specific to arctic conditions, for example, production levels, capital expenditure, land demands, or quantities of emissions.

■ **According to the Icelandic EIA Act, any new road construction requires an EIA, whereas in other countries EIA is often applied only to major infrastructure projects. The EIA led the developer of the Dragsnesvegur road project to propose mitigation measures in the Environmental Impact Statement as follows:**

- **where possible, integration of the road into the existing landscape;**
- **avoidance of damage or loss to special features of shores and bays; and**
- **revegetation of the gravel extraction sites.**

More information: Holmfridur Sigurdardottir, National Physical Planning Agency, Laugavegur 166, IS-150 Reykjavik, Iceland, email: holmfr@islag.is

How to use the sensitivity criteria in the Arctic?

Sensitivity criteria, in terms of land area and time period, are particularly useful in case-by-case decisions. These criteria draw attention to the possibility of cumulative impacts, and can be used in planning for the avoidance and mitigation of impacts. A list of potentially sensitive areas in the Arctic can be found in appendix II. Because almost every activity in the Arctic will be close to one or several sensitive areas, further specification is usually necessary to make them useful as application criteria. Land use descriptions or plans, which identify the sensitivity of different areas, and the Circumpolar Protected Area Network of CAFF (Conservation of Arctic Fauna & Flora, AEPS) provide further information. Additional criteria for selecting projects may include social, cultural and socio-economic conditions, and regional and global natural values.

■ **In 1991, the Swedish icebreaker Oden carried out its first scientific expedition in Arctic waters. An Environmental Impact Assessment was undertaken because of concerns about the effects of underwater noise, interference with marine mammals and exhaust emissions.**

More information: SSPA Maritime Consulting AB, P.O.Box 24001, S-400 22 Gothenburg, Sweden

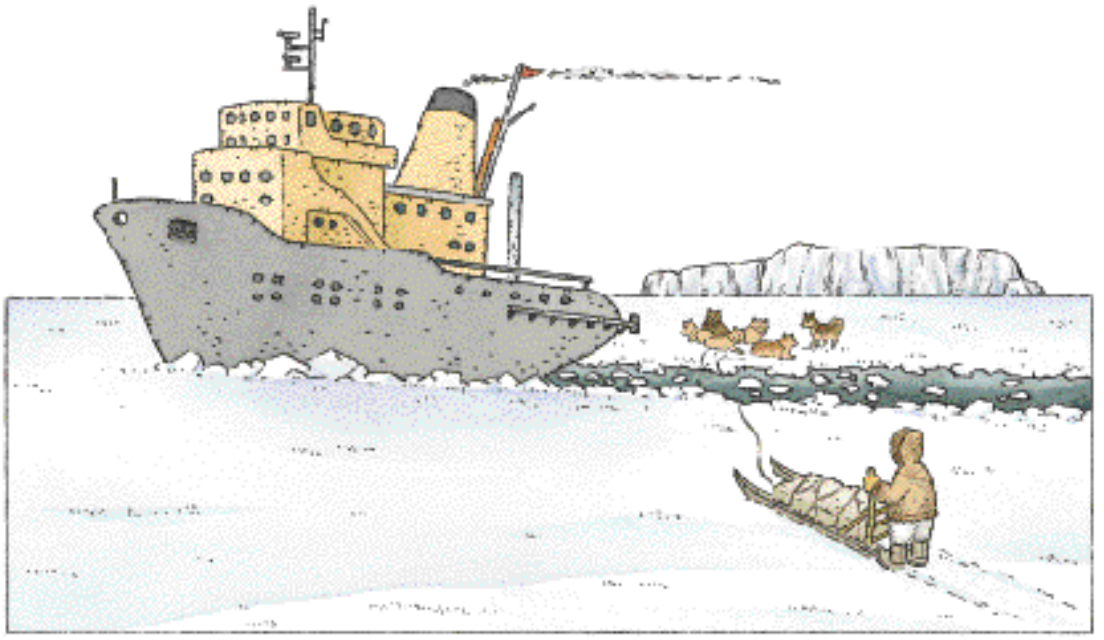
3 Scope of the assessment

The scope of an assessment should include all potential environmental, socio-cultural and economic impacts, especially impacts on the traditional uses of resources and livelihoods of indigenous people and also the consideration of alternatives.

What is scoping?

Scoping determines the environmental impacts of the proposed project, brings into consideration alternative means of carrying out the project, including technical and technological alternatives, identifies the potential effects on the sustainability of resources in the project area and clarifies the mitigation measures that will be analyzed in the EIA process. Scoping should specify the project and its alternatives in sufficient detail to identify potential direct and indirect impacts, including cumulative effects. Additionally, scoping should set realistic temporal, spatial and jurisdictional boundaries for the assessment, and specify key environmental criteria to be addressed and methods to be used in the assessment.

■ **"Northerners are anxious to participate and to share both the challenges, the risks and the benefits but they obviously must be partners. The impacts are clearly going to be there, both good and bad. They are inevitable but with due process, planning and management, they are manageable. The impacts, risks and prob-**



lems will be reduced by allowing more time, more resource and small scale projects. The most difficult area is that of social change."

G.N. Faulkner, DIAND, Beaufort Sea Hydrocarbon Production and Transportation, Review Panel Report, Canada, 1984

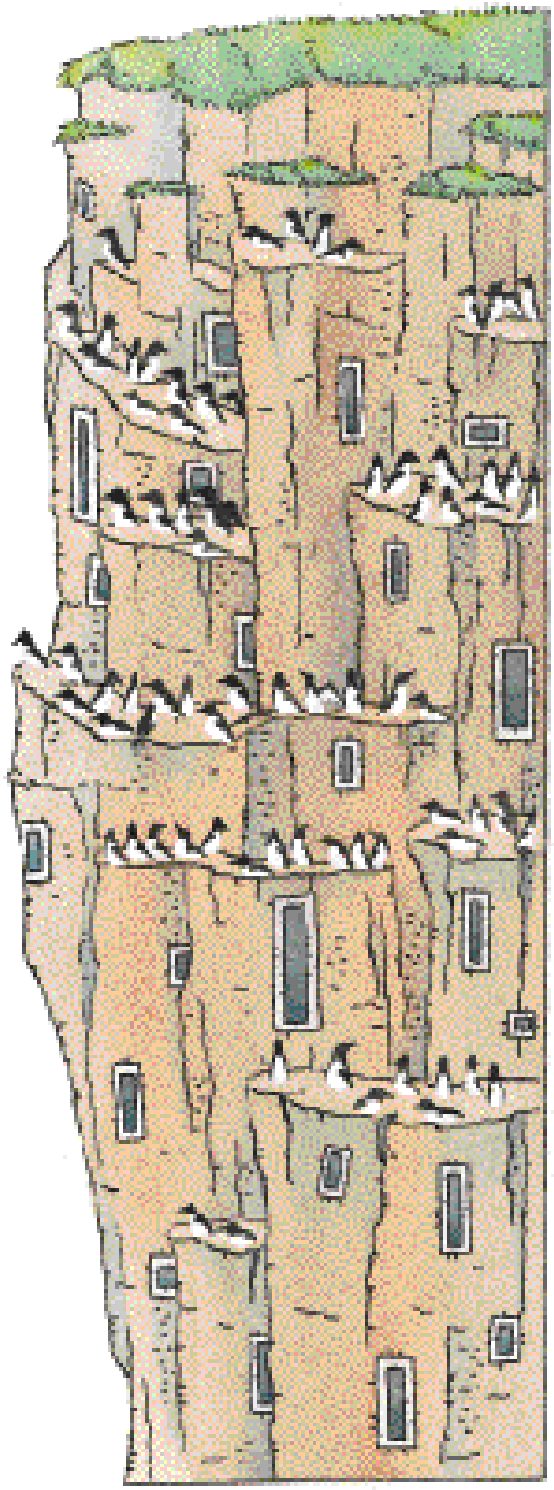
Why determine the scope?

By determining the scope systematically, the assessment of the project and its alternatives can be focused on the important environmental issues and risks, taking into account special arctic features and areas of particular importance. Additionally, a well-defined scope would reduce overall assessment costs.

Why alternatives?

The recognition, discussion and consideration of alternatives, including the alternative of no action, are necessary for determining the scope of an assessment. Alternatives permit a comparison of likely impacts and mitigation measures. As a result of uncertainties in data and a lack of detailed knowledge of ecological and socio-cultural conditions and functions, many impacts can only be examined through the relative differences between alternatives.

For many activities, reasonable alternative sites within a region are usually available. However, some activities are site-specific, such as mining, extraction and use of natural resources, shipping (port facilities often depend on deep-water access), oil and gas operations, major restoration and rehabilitation projects, additions and extensions to existing installations (e.g. oil refineries), housing developments and military installations. In all cases, alternatives based on different approaches to the realization of the



project should be considered. In addition to no action, these might be choices on scale, appearance, technology, waste discharges, mitigation measures, and traffic management.

What is specifically arctic in scoping?

Because of the close connections between the environment, culture and economics in the Arctic, it is important that scoping takes a broad view of the issues to be dealt with in the assessment. Clearly, one of the most important features in arctic assessment is the early and full involvement of indigenous people and other local communities, who hold special knowledge of the Arctic. Public participation in scoping is necessary for the efficient use of this knowledge. Without public participation it is virtually impossible to cover the full range of diverse and complex values and viewpoints typical of the Arctic inhabitants. The participation of the public could lead to a negotiated agreement between the researchers and indigenous or other local communities so that information can be shared in an organized and acceptable way, and the roles and responsibilities of all parties can be described clearly.

Public involvement in determining the scope of assessments is useful especially for controversial activities. Scoping may identify problems or conflicts, which can be alleviated or solved while the proposed project is still being developed. Scoping may also be used to coordinate actions of the various agencies involved in the assessment and decision-making processes.

An open process while determining the scope of an EIA is also a crucial first step towards building mutual confidence in fair environmental assessment and problem-solving, and ultimately in a fair decision-making process.

4 Baseline information

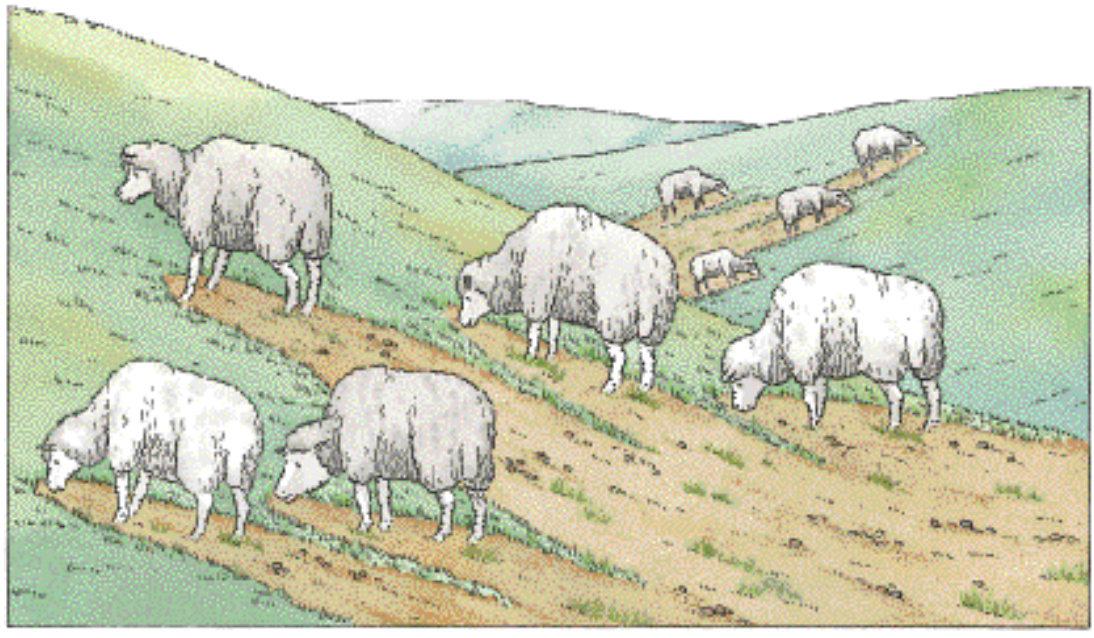
In determining and obtaining baseline information, the following key issues should be considered: combining traditional and scientific knowledge, using methods compatible to other programs for gathering baseline information in the Arctic, including socio-economic matters, using both qualitative and quantitative information and allowing sufficient time for collecting and compiling baseline information.

What is baseline information?

Baseline information characterizes the conditions at the time the project is proposed. Some of the baseline information can be quantitative, for example, concentrations of heavy metals in organisms. Other baseline information is qualitative, illustrating socio-cultural conditions or general features of landscapes.

Why is baseline information needed?

Baseline information is needed on all central issues in the assessment, taking into account a broad definition of the environment. Baseline information provides a reference for all assessments, and for the comparison of alternatives and mitigation measures. It is used as a starting point in the prediction of likely impacts resulting from the project and of naturally occurring changes in the environment.



How can baseline information be obtained?

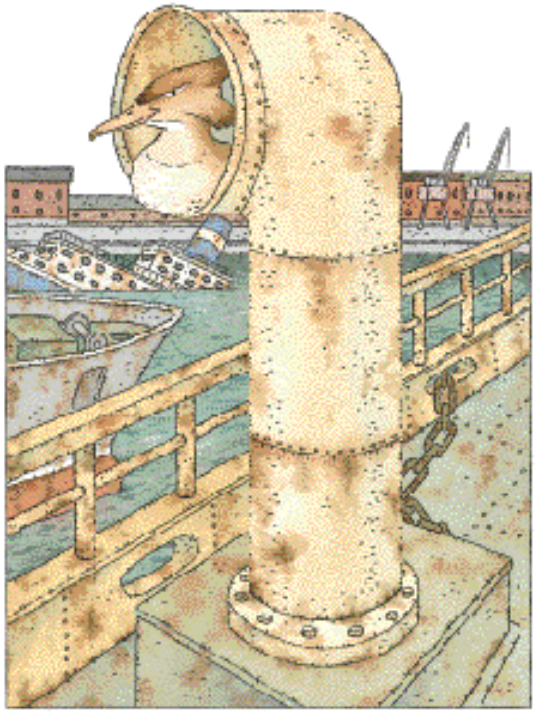
Baseline information is found in documents and data banks, but field studies and interviews with indigenous and other local people are often necessary. Existing scientific programs may be too general to give sufficiently detailed data for specific projects. It is important to assess the availability and quality of data and information sources so that the compilation of baseline information for a specific project can be linked to other monitoring and baseline programs, including their techniques and methodologies.

Many indigenous people in the Arctic hold accumulated knowledge regarding the Arctic environment and on the sustained use of Arctic resources. Their knowledge of local cultural, social and ecological systems and the changes in these systems over time, including recent trends, may be an essential complement to scientific observations. Indigenous knowledge of the indicators of stress in sensitive ecosystems may also be crucial for planning the assessment. Communities and individuals that hold this knowledge about the environment may be identified during the scoping phase of the EIA.

■ **Baseline information on issues specific to the Arctic are included in the Arctic Monitoring and Assessment Programme (AMAP). This information can also be found on the WWW (http://www.grida.no/add/).**

What data and information are available?

Appropriate baseline and monitoring information may be accessible from



established international arctic programs, scientific organizations and non-governmental organisations. Appendix IV lists important sources of data and information concerning the Arctic.

Seasonal and year-to year-variation and investigation costs

Because the Arctic environment is frequently subjected to large fluctuations in seasonal and year-to-year conditions, long-term observations are needed to understand the potential perturbations in the Arctic environment. This increases even further the usually high costs of conducting investigations in the Arctic. Coordination of assessment activities with early exploration can reduce some costs. Cost saving can also be achieved through efficient use of different sources of information and traditional knowledge.

5 Impact prediction and evaluation

In the impact prediction and evaluation stage of an EIA, issues identified through scoping are analyzed and expected impacts are defined. This analysis should:

a)
identify the types of impact;

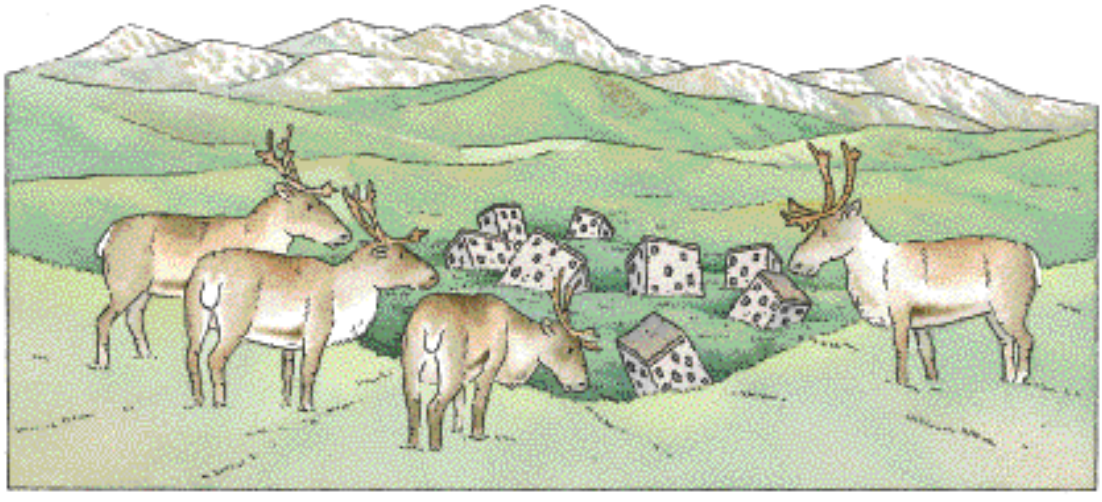
b)
predict the magnitude, the probability of occurrence, and the extent of the impact; and

c)
determine the significance of the impact.

5.1 Types of impact

Impacts on the environment can lead to changes in existing conditions; the impacts can be direct, indirect or cumulative. These changes can be found at different ecological (species to ecosystem) and social (individual to community) levels, can vary over space and time, and can be either positive or negative.

Direct impacts refer to changes in environmental components that result from direct cause-effect consequences of interactions between the environment and project activities. Indirect impacts result from cause-effect consequences of interactions between the environment and direct impacts. For example, the effect of pollution may not only be seen directly in the loss of local vegetation, but indirectly as a degeneration of the health, culture and social structure of local people. Cumulative impacts refer to the accumulation of changes to the environment caused by human activities (e.g. past, existing and proposed activities, including activities associated with



the project under assessment). These changes occur over space and time and can be brought about by environmental effects that are additive or interactive. Marine mammals in the Arctic, for example, can be affected by hunting, oil spills, loss of habitat, and commercial fishing pressure on prey species.

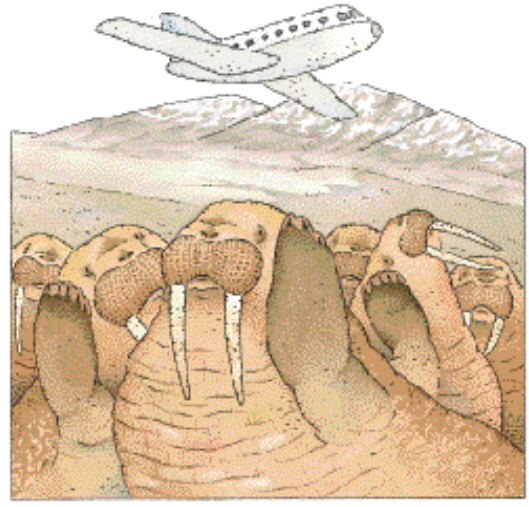
■ **The initial assessment of potential impacts of oil exploration in the Fylla area, Greenland, focused on the general ecology of the area, offshore fish and shrimps and their fisheries, seabirds, marine mammals, and the coastal zone and the exploitation of its resources. Potential impacts of oil exploration activities, seismic activities and oil spills were assessed, taking into account that the consequences of, for example, oil spills are more severe during the winter season than during other seasons.**

Oil exploration in the Fylla Area, Ministry of Environment and Energy, the National Environmental Research Institute, Technical Report, no. 156, March 1996.

5.2 Cumulative impacts

Why are cumulative impacts addressed in an EIA?

It is important to describe and analyze the accumulation of change to the environment due to project-related impacts, even though the projects may be small and their impacts minor. Cumulative impacts resulting from development activities should be considered at the resource and land use planning level. Cumulative impact assessment at the project level, along with an understanding of environmental impacts at the resource and land use planning level, helps set that project and its impacts in a broader ecological and development context.



What are the types of cumulative impacts to be considered?

Cumulative impacts may be characterized by the intensity, type and extent (spatial and temporal) of human activity or source of change to the environment, and by the influence this change may have on the environment. The source of change could be:

- activities resulting from several developments occurring at the same time or sequentially (e.g. mine development, construction of access roads);
- activities resulting from many different developments over extended time periods and space (e.g. mine development, construction of access roads, urban development); and
- activities resulting from global occurrences widely dispersed over time and space.

What should be considered when assessing cumulative impacts?

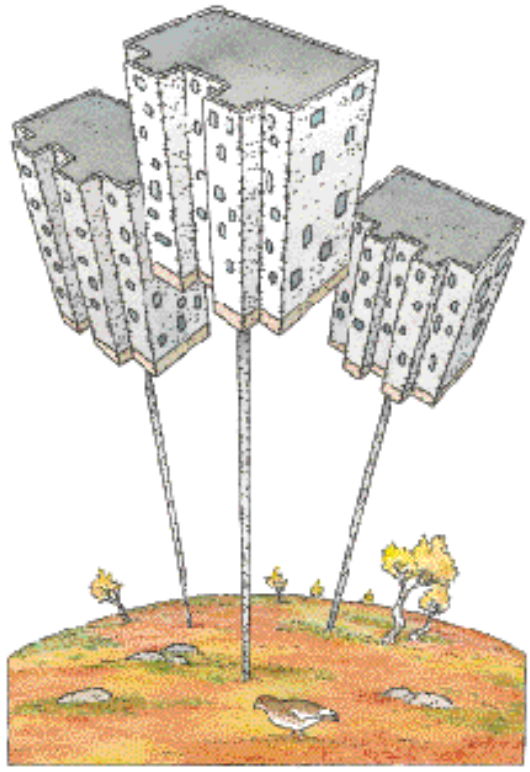
Some key issues to be considered when assessing cumulative impacts associated with the project:

- focus should be on valued ecological components, including arctic sensitive areas;
- spatial boundaries should be defined with respect to valued ecological components;
- temporal boundaries will vary with projected life span of project impacts;
- assessment should be kept at reasonable and manageable levels.

The spatial and temporal boundaries of the cumulative impact assessment should be established, and the activities (past, existing and proposed activities, including those associated with the present project under assessment) that will be addressed in the assessment should be identified. Time and resources, and the roles and responsibilities in cumulative impact assessment, should also be determined.

5.3 Impact Prediction

The accumulated knowledge and the findings of the environmental investigations form the basis for the prediction of impacts. The requirements for exact predictions are not necessarily met because of uncertainties in the data and a lack of baseline data. Claims of exact predictions do not necessarily indicate assessments of high quality or accuracy, in fact, detailed predictions may be misleading and direct attention and resources away from central issues that are important to the assessment. Hence, it is important that the predictions outline different scenarios and that the underlying assumptions are presented transparently.



Once a potential impact has been determined during the scoping process, it is necessary to identify which project activity will cause the impact, the probability of occurrence of the impact, and its magnitude and extent (spatial and temporal). This information is important for evaluating the significance of the impact, and for defining mitigation and monitoring strategies.

What are the important considerations for impact prediction?

Baseline condition. The baseline condition of a resource, ecosystem, or community without the potential effects of the proposed project must be established before the impact prediction process begins.

Uncertainty. Arctic EIAs contain uncertainties resulting from measurement error and absence of information, particularly in the case of cumulative and socio-cultural impacts. Qualitative risk and scenario analyses may alleviate some of the problems caused by the uncertainties.

Spatial limits. Impact assessment, including cumulative impacts, must consider all activities that affect environmental components, even those components that lie outside the immediate area affected by the project. Because of the natural conditions in the Arctic, the affected area often is larger than in temperate areas.

Temporal boundaries. Impact assessment, particularly for assessments of cumulative impacts, may extend beyond the period of time required for the assessment of the project activities. This is especially true in the Arctic because most physical, chemical and ecological processes are slower than in more temperate regions. Assessments should take into account the impacts of past, existing and planned activities as well as those activities associated with the present project.

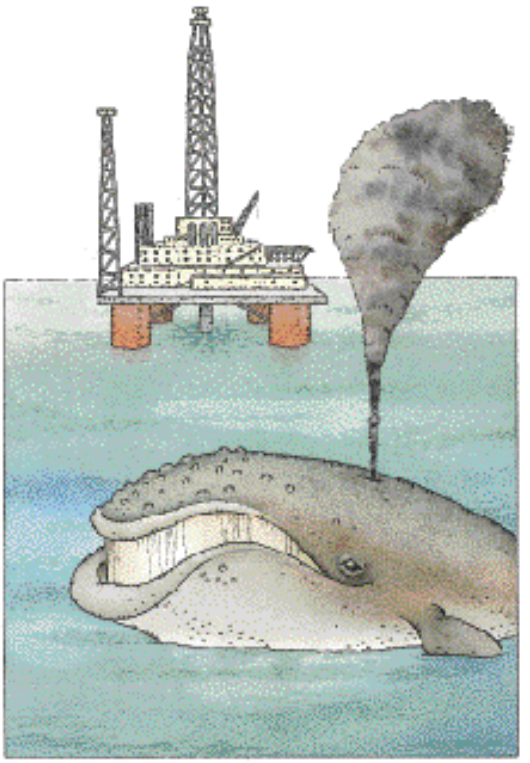
Incremental condition. An impact prediction process should describe the incremental contribution of the project to impacts on the environment. Thresholds and additional criteria can be identified for some specific resources, which establish levels of impact beyond which resources cannot be sustained.

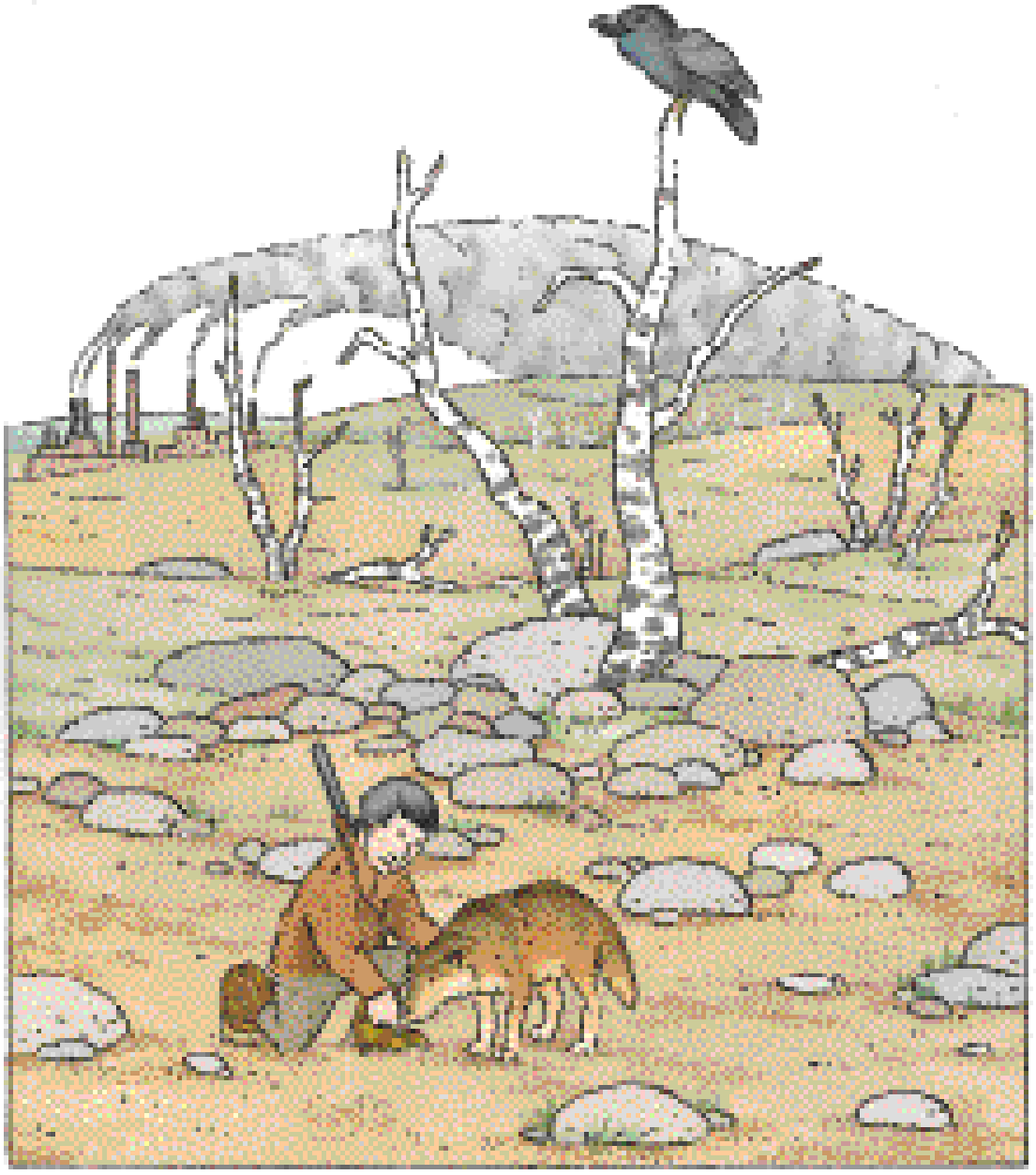
Interactions. Assessments of the interactions between impacts, particularly when considering cumulative impacts, should be included in the impact prediction process; for example, transfers of material between ecosystems or ecosystem components, and connections between human culture, resource use and the environment.

Quantitative and qualitative methods. Qualitative impact descriptions, combined with the consideration of key uncertainties and quantitative data where appropriate, may provide a means for comparing alternatives.

Are there important considerations for impact prediction in the Arctic?

The understanding of the complex interactions of effects is particularly important in the Arctic because of its slow, non-linear, and potentially irreversible ecological and physical processes. Several arctic characteristics play a major role in impact prediction; for example, the effect of temperature on chemicals, the recovery rate of vegetation after the construction phase and changes in the permafrost after a disturbance. There are common arctic features (see appendix I) that need to be considered, and which play a major role in impact prediction.





5.4 Evaluation of impacts

The purpose of impact evaluation is to assign relative significance to predicted impacts associated with the project, and to determine the order in which impacts are to be avoided, mitigated or compensated.

The significance of impacts may be determined during many phases of an assessment; however, determination usually occurs during impact prediction. Consideration of impact significance could affect the scoping exercise, and monitoring results could lead to a re-evaluation of impact significance. Decisions on impact significance should be presented clearly, and in the case of disagreement, the different points of

view on significance should be presented.

■ **A migratory animal, such as caribou or reindeer, may only be affected by the proposed project within a 10-kilometre radius of the project site; however, during migration, these animals may be affected by other activities a hundred kilometres away.**

How is impact significance determined?

Decisions on significance should be based on existing standards, discussions, judgement and agreement. These decisions should take into account the characteristics of the impact such as the number of affected persons, and the magnitude, extent, duration and reversibility of the impact. The applied methods and the criteria used for ranking significance should be clearly presented. The key elements for assessing the significance of impacts include:

- level of public concern;
- scientific and professional judgement;
- measure of disturbance to ecological systems;
- impacts on social values and quality of life;
- existence of environmental standards, that is, international, national, provincial or local agreements; and
- availability of mitigation practice and technology to ameliorate impacts.

Which arctic features influence the determination of significance?

Environmental impacts in the Arctic are often complex, multidimensional and widespread, and the associated social and political issues are value-laden and conflict-prone. The interpretation of the assessment findings should recognize that:

- many important impacts cannot be quantified;
- there is no common base for comparing the significance of different types of impacts such as impacts on flora and fauna and impacts on cultural values;
- developers, indigenous people and other groups can have widely differing world views through which they interpret assessment findings, and judge the significance of the findings;
- the different structure of knowledge gained from local and indigenous people has to be analyzed and evaluated using suitable methods for determining the significance of impacts;
- the sensitivity of the arctic environment demands special attention, possibly in the form of special arctic thresholds for significance; and
- the uncertainties in the Arctic stress the importance of the precautionary approach.

6 Mitigation

In considering mitigation measures, special arctic features should be taken into account and the public should also be involved.

What is mitigation?

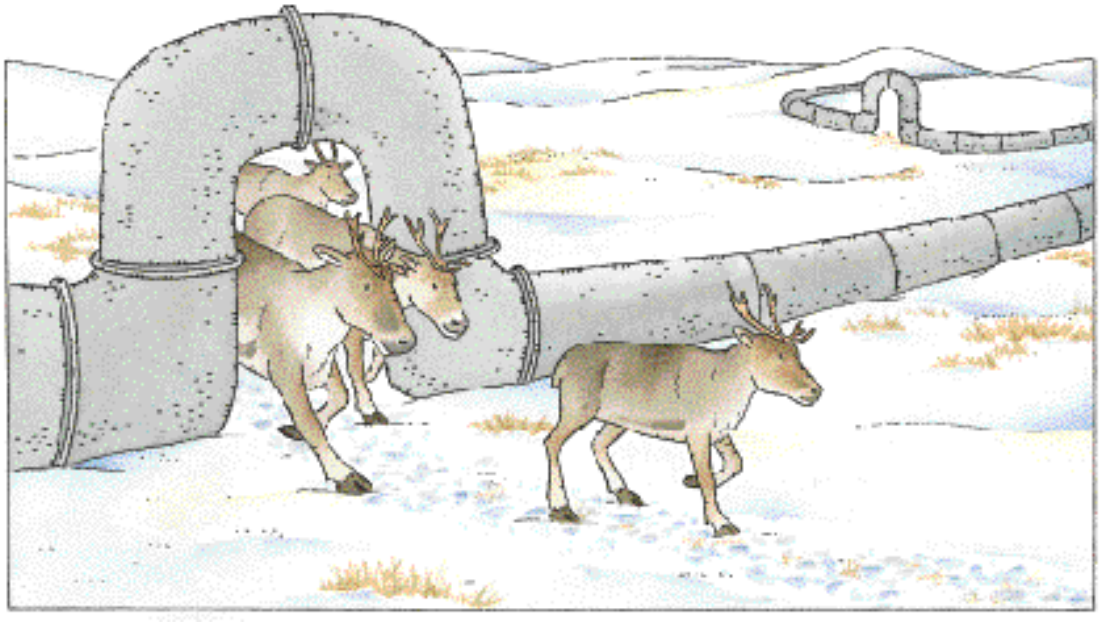
Mitigation is the action taken to avoid or lessen the adverse effects of an activity. Mitigation may address ecological, economic or socio-cultural effects. Project planning and implementation may include mitigation in several ways.

- Plan the location or timing of an activity to avoid affecting specific resources or sensitive areas.
- Include mitigation measures in project design to reduce the impact. For example, pipelines can be designed to allow for passage of migratory animals.
- Undertake a mitigation program concurrently with a project to alleviate impacts. A program for inhibiting thawing of permafrost would be an example.
- Undertake a mitigation program after an activity to restore an affected resource or area, or to replace lost or damaged resources in the affected area or elsewhere. For example, damaged freshwater fisheries can be mitigated by stocking of fish or restoring river habitats.

When are mitigation measures identified?

Mitigation measures can be identified any time during project planning, implementation, and operations. In particular:

- as a result of public consultations or past experience, mitigation measures



can be identified early and included in the design and assessment of a proposal;

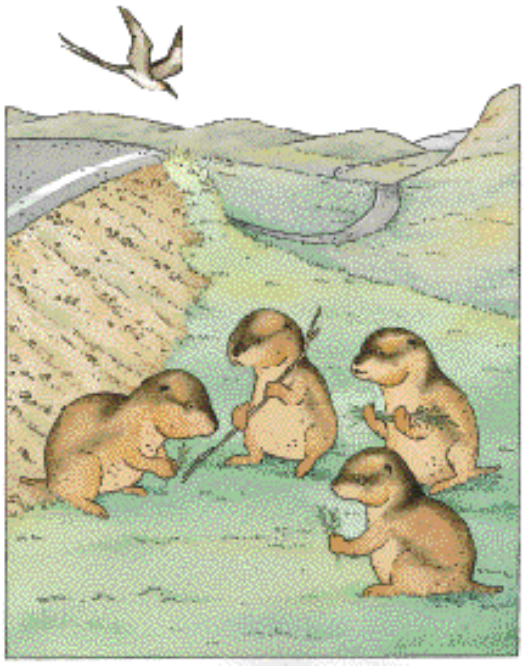
- mitigation measures may be developed in response to specific impacts identified in the EIA and adopted at the time a project is implemented; and
- measures may be developed to mitigate impacts that are not identified until after a project has been implemented.

■ **In the Fylla area, oil spill response plans with operational environmental sensitivity maps for enhanced damage control during spills were proposed as mitigation measures.**

Oil exploration in the Fylla Area 1996, Ministry of Environment and Energy, the National Environmental Research Institute, Technical Report, no. 156, March 1996.

Why is mitigation considered in the EIA process?

Careful planning and project implementation can reduce or avoid unwanted environmental impacts. This can best be accomplished if the development of mitigation is an integral part of the EIA process. Public participation in the EIA process allows adverse effects and mitigation measures to be identified and evaluated prior to a decision. In the Arctic, mitigation measures are often developed in consultation with indigenous communities. This ensures that effective measures can be adopted when a project is implemented. The description of the nature and magnitude of potential impacts in the EIA also can be a basis for designing specific mitigation to reduce those effects. Finally, if mitigation is identified during the EIA process, monitoring of the activity can be designed to assess the effectiveness of those mitigation measures that are part of the project.



Who is responsible for mitigation?

The party who initiates the proposal and conducts the activity is usually responsible for mitigation. Government agencies approving or regulating a project must ensure that approved mitigation measures have been implemented and are working effectively.

Are there mitigation measures specific to the Arctic?

To be most effective, mitigation should be tailored to the anticipated effects of a proposed project on a specific component of the environment. Some aspects of the arctic environment that are especially susceptible to adverse effects should be examined routinely in an EIA as candidates for mitigation.

- Oil spills in sea ice or pack ice are difficult to clean up and pose a particular risk to marine mammals.

Projects that may cause oil spills should include plans for containment and clean-up of spills, including a description of the location and capabilities of oil spill clean-up equipment.

- Coastal areas in the Arctic include essential habitats for migratory birds and other species that may be particularly vulnerable to disturbance by aircraft and other human activities. If a project involves transport by air, minimum altitudes or specific flight paths can be designated near essential habitats to minimize impacts on nesting birds and other species.

- Traditional hunting and fishing activities by indigenous people usually take place during fairly well-defined periods of the year. Mitigation measures can be developed in consultation with indigenous communities to avoid or minimize conflicts with these activities.

- Damage to permafrost can cause long-term adverse effects such as differential settlement, terrain instability, and erosion. Mitigation measures to avoid or reduce these effects should be included in project plans.

- Vegetation grows very slowly in the Arctic. Therefore, facilities should be sited to minimize disturbance to vegetation.

How is the effectiveness of mitigation determined?

Once a project is implemented, monitoring the activity will assess the effectiveness of mitigation measures. In some cases, a monitoring program can be established as part of the project, in order to measure actual environmental effects and to assess the extent to which mitigation measures are reducing impacts. Some impacts may occur that were not anticipated or that are more serious than predicted. Monitoring of the activity and the affected environment may suggest new or revised mitigation measures.

To assess the effectiveness of mitigation, information on the environment should be collected into a well-defined baseline prior to project implementation. Once a project is implemented, measuring the change in environmental conditions relative to the baseline conditions will give an indication of the effectiveness of mitigation measures in avoiding or reducing impacts.

7 Monitoring

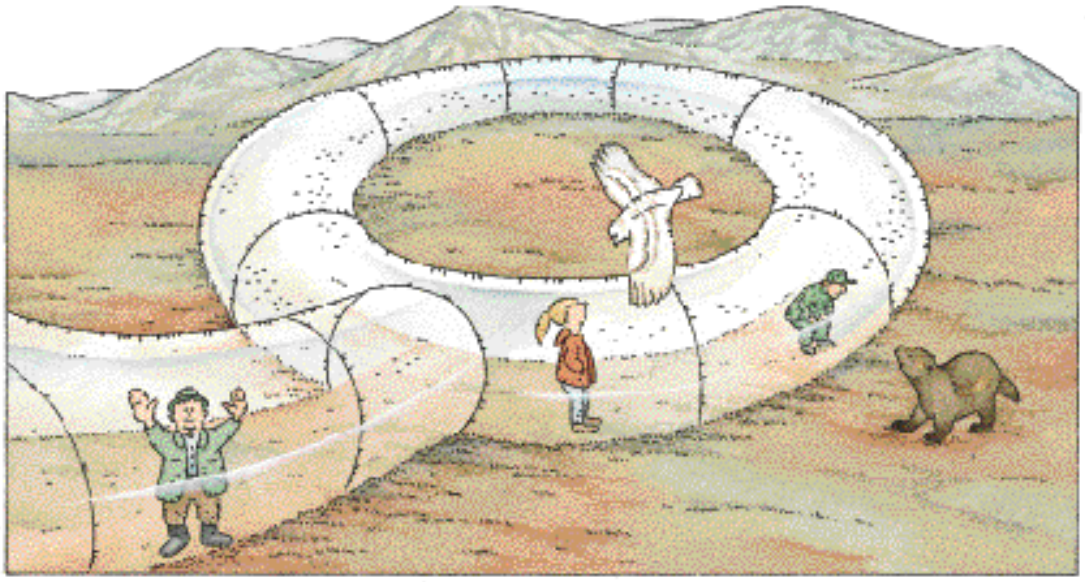
Monitoring should include a follow-up on the impacts, a verification of the predictions and feedback on the mitigation and project operations, as appropriate to domestic EIA practices. The environmental conditions in the Arctic make monitoring a demanding task requiring careful planning.

What is monitoring?

Monitoring is the systematic observation or tracking of an activity to determine whether it is proceeding or functioning as expected. Through monitoring, the accuracy of environmental impact predictions are also assessed. A good monitoring program will provide adequate information to measure environmental change and assess the effectiveness of procedures employed to mitigate adverse impacts. This information should be the basis for modifying the activity or mitigation measures. If necessary, those responsible for the activity are required to further reduce environmental effects, protect resources, or improve the efficiency of the activity.

Why is monitoring considered in the EIA process?

A good EIA describes the proposed activity in sufficient detail to predict with some degree of specificity the nature, magnitude, and duration of significant environmental impacts. However, the extent to which the descriptions and predictions are accurate can only be determined through post-project monitoring. Therefore, the EIA provides a basis for designing a monitoring program. The monitoring verifies the environmental effects and the effectiveness of mitigation.



Public concern for projects often includes questions about follow-up on the project activities once a decision to proceed is made, and the need for assurances that problems will be identified and corrected. A good monitoring program, developed during the EIA process, can be an important step to address this concern effectively.

■ **Planning for the Kiruna border highway, nr 98, in Swedish Lapland started in 1974, and the final section was opened for traffic in 1982. The road is 132 kilometres long and includes 26 bridges. For most of its length, the road follows a mining railway. Monitoring has shown that land use has changed because of the road. The infrastructure (towns, rest stops, etc.) covers as large of an area as the actual road, and has required an equal amount of investment. Vegetation planted next to the roadside has not thrived, and planted ground vegetation has not done well. Banks higher than 2 metres were still without vegetation 10 years after the construction of the road.**

Bäck, L., Jonasson, C. and Strömquist, L. Environmental impact studies of the highway construction between Kiruna and Riksgränsen, Long term impact 1985-1987. UNGI Report Nr 75, VIII+78 pp, Uppsala. Abstract in English.

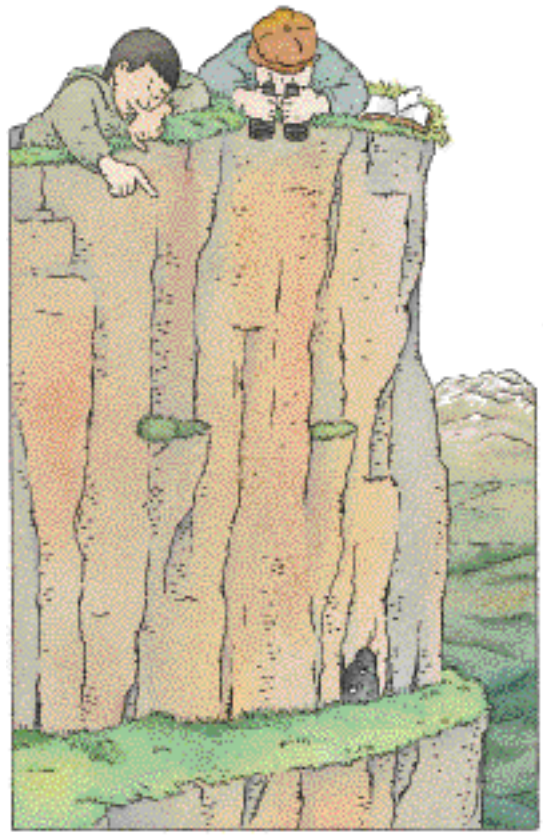
What should be monitored?

A determination as to what to monitor should be done selectively, based on the nature of the proposed activity and the results of the EIA.

What are the basic elements of successful monitoring?

A good monitoring program should include:

- clearly defined objectives;
- an environmental baseline for measuring change;



- environmental criteria, if available and applicable, for certain environmental components such as water or air;
- a method to measure the amount of change to an environmental resource occurring over a specific period of time, the change should be measured quantitatively if possible;
- a method to determine the extent to which the activity in question contributes to the environmental change;
- a method to assess the effectiveness of mitigation measures adopted with the action;
- regular review and revision, when necessary, to ensure that the program objectives are being met as cost-effectively as possible; and

- standardized methodologies that are comparable with those used elsewhere in the Arctic as well as internationally.

Who is responsible for monitoring?

Monitoring may be performed by the project operator, a contractor, an independent monitoring institute or a government agency. Monitoring responsibilities and procedures should be described in the documentation giving approval for the project. Government agencies responsible for project approval or regulation must ensure that any monitoring program adopted with the proposal is conducted as planned.

Are there aspects of monitoring specific to the Arctic?

The greater year-to-year variability in arctic biological resources (i.e. species population) compared with non-arctic regions, and the high degree of uncertainty in measurements of environmental components and in predicting impacts in the Arctic, requires that a longer period of time to establish baseline conditions for monitoring be considered.

The costs of monitoring programs, as with other research, may be greater in the Arctic than in other regions because of the remoteness of many areas and the extreme environmental conditions. Monitoring programs should take into account that the Arctic is particularly vulnerable to disturbance because it is a natural sink for water- and airborne pollutants.

Indigenous and local communities should be consulted about the design and implementation of monitoring programs that directly or indirectly affect their life. Their traditional knowledge should be incorporated into these programs along with standard scientific data.

What should be reported from monitoring?

All monitoring reports should be published and made available to administrators, proponents, people affected by the project, and the public.

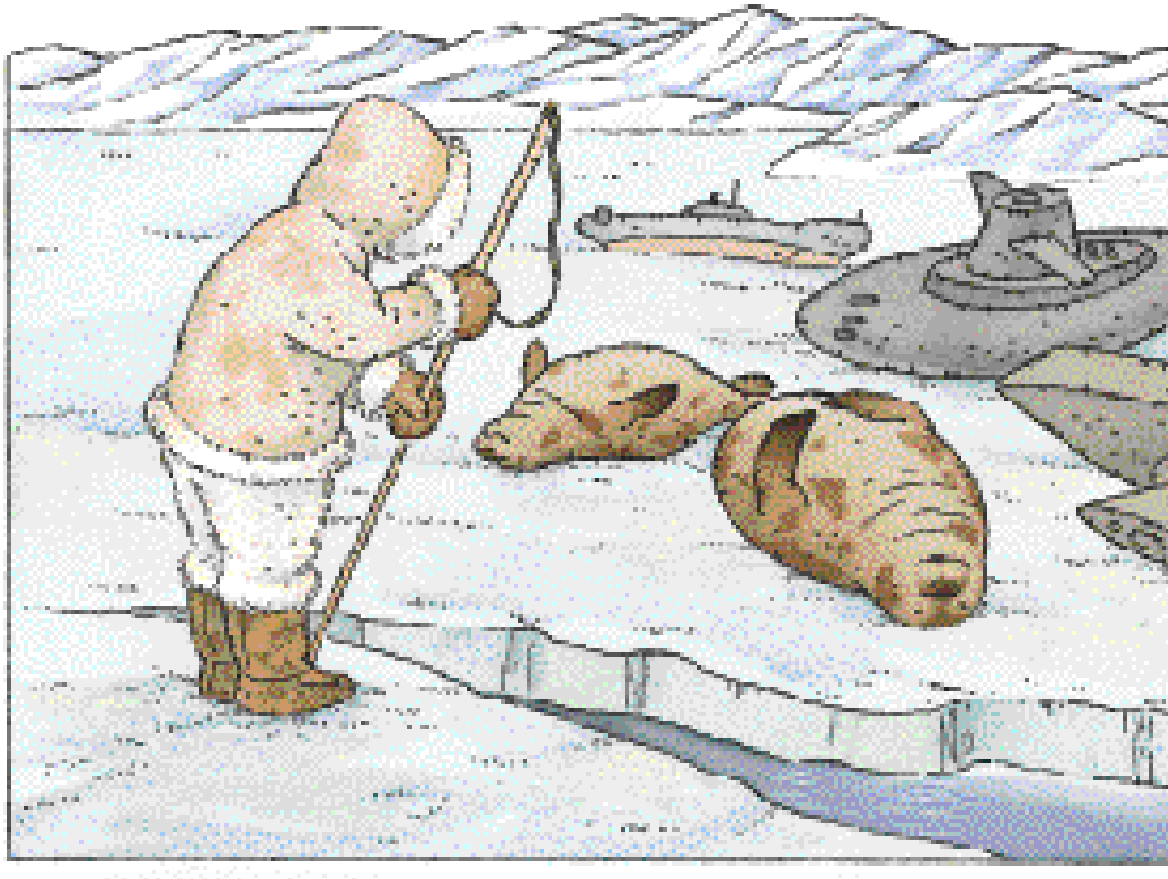
8 The environmental impact assessment document

An environmental impact assessment document should be prepared and provided to all involved parties. The document describes the project and the likely impact upon the environment of the proposed activity.

The information should include:

1. *A description of the proposed project and its alternatives, including information about the location and the design and size or scale of the project*. This includes physical, technical and engineering characteristics of the proposed development, and land use requirements during the construction and operational stages. It should state the main characteristics of the development processes proposed, including the type and quantity of resources to be used;

2. *A description of the environment* that could be affected by the proposed project or alternatives. This should also include a description of the baseline state with

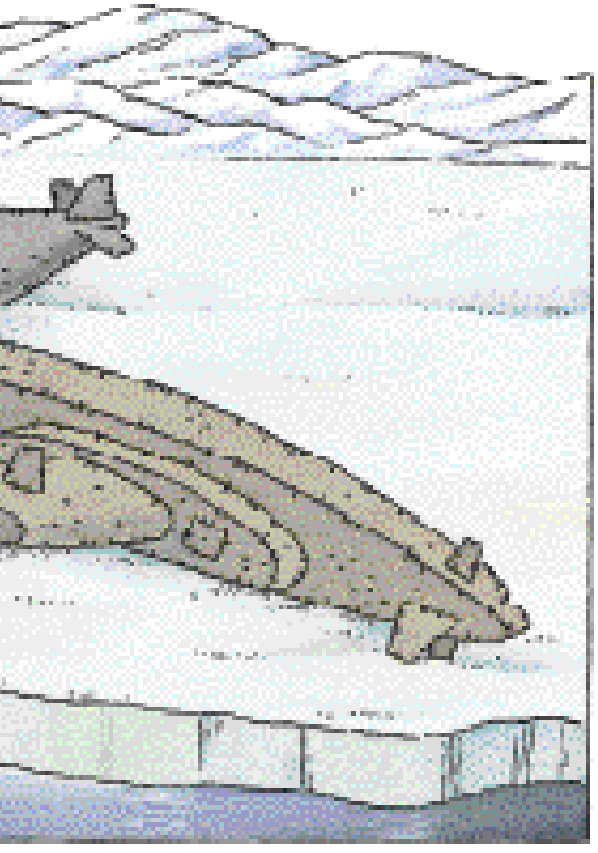


which predicted changes are to be compared;

3. *The data and other information that have been used to identify and assess the main effects* which the project is likely to have on the environment, including a description of the traditional knowledge incorporated into the EIA. The documentation of traditional knowledge should be carried out in cooperation with the community;

4. *The estimated type and quantity of expected impact factors* resulting from the proposed project when in operation;

5. *The methods used in the assessment such as identification and forecasting of any effects on the environment, descriptions of the use, assessment and evaluation of available traditional knowledge, and methods used to compare alternatives.* Difficulties such as uncertainties or problems in compiling specified data, should also be reported;



6. Based on the above, *an identification of the impact area;*

7. *The likely significant impacts* (see definition in section 5.1, page 18) on the environment of the proposed activity and its alternatives. The effects may result from activities including the use of natural resources, the emission of pollutants, the creation of nuisances, and the elimination of waste;

8. Where significant adverse effects are identified, *a description of the measures proposed to avoid, reduce or rectify these effects* taking into consideration the slow recovery and regeneration factors in the Arctic. This should also include a description of monitoring programs to detect unforeseen impacts, and that could provide early warning of any adverse effects, in addition to dealing promptly and efficiently with accidents;

9. *An evaluation of the different alternatives, including the alternative of no action;*

10. A description of *the integration of EIA, public participation and public consultation* into planning and decision-making throughout the process; and

11. *A summary in non-technical language*, assisted with figures and diagrams, of the information specified above. If need be, other means of displaying this information should be based on the cultural heritage of the local and indigenous people. The non-technical summary should be presented in national and local language(s).

9 Public participation

An EIA should ensure effective public participation and consultation. Unique features such as culture, socio-economic and remoteness factors should be considered in planning and carrying out public consultations in the Arctic.

Who is the public?

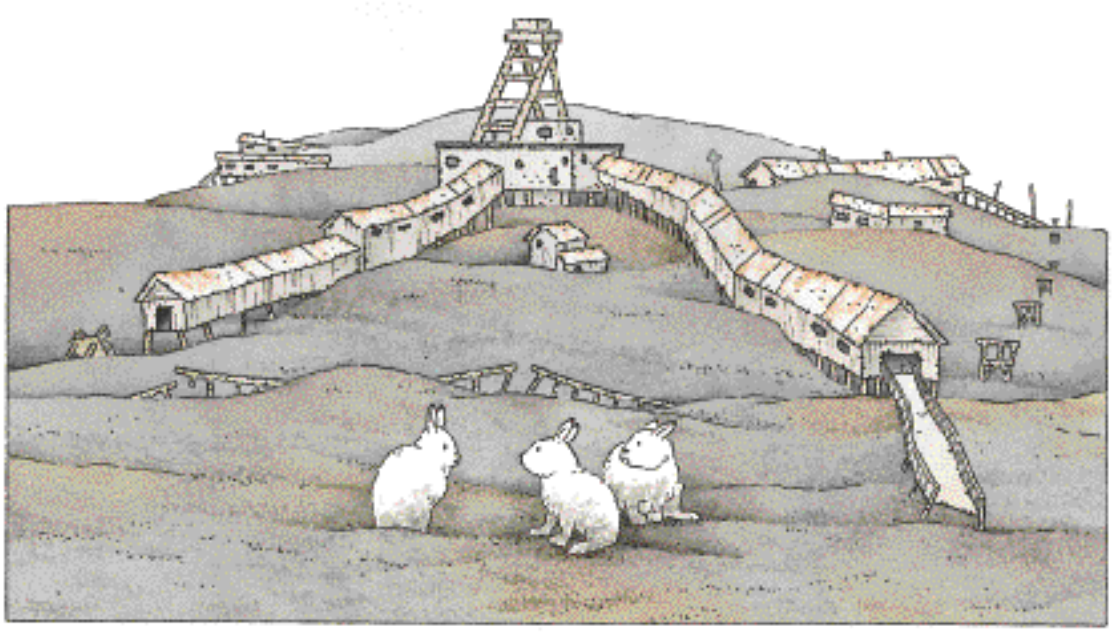
When used in the context of the EIA process, the "public" means the individuals, indigenous people, groups, organizations, or communities that have an interest in or could be affected by the proposed action.

■ **In 1981, the federal government established an intervenor funding program to provide financial assistance to those wishing to present their views to the Panel. Intervenor funding enabled many participants to prepare briefs and to travel to public sessions to present the briefs. Although this program was independent of the Panel's review responsibilities, nevertheless, the Panel concludes that the review process was materially assisted and that intervenor funding enhanced the quality and substance of interventions from northern residents whose interests would be most directly affected if the development were to go ahead. The Panel recommends that intervenor funding be made available for all future public reviews, and that funding be restricted to those participants who would be significantly affected by the proposal under review.**

Beaufort Sea Hydrocarbon Production and Transportation, Review Panel Report, 1984.

What is public participation?

In EIA, public participation provides the affected and interested public an opportunity to influence planning, assessment and monitoring of projects. Public parti-



cipation includes public hearings, public meetings, public access and public right to comment.

It is an effective way to integrate environmental, cultural, social, economic, and technological considerations. It provides a forum for the expression, discussion, analysis and evaluation of issues, information, values, perspectives, and interests. It facilitates the fair and reasonable resolution of conflicts through mediation, negotiation, and public review.

Why involve the public in the EIA process?

There are several reasons to involve the public in the planning and analysis of proposed activities that could affect people's environment and quality of life, including:

- To provide a means for those who may be affected by a project to provide input into the planning, assessment and monitoring of the project.
- To inform people about the characteristics, location, and design of the proposed activity. People need information about a project to lessen anxiety and to plan accordingly.
- To determine the scope of the EIA. People who will be affected by an activity have a stake in identifying the important issues or concerns and alternatives to be analyzed, and in setting the temporal boundaries of the EIA.
- To acquire information. The individuals and communities affected are a primary source of information for the EIA.
- To establish mutually agreed rules and procedures for conducting public meetings and consultations.

Public participation ensures the openness of the EIA and, ultimately, the acceptability, accountability, and credibility of EIA decision-making.

Effective community involvement is critical to successful public participation. Understanding and trust must be established among the public, project proponents, and regulators, if affected communities are to accept and contribute positively to a proposal. This requires a sincere commitment by all parties to work cooperatively throughout the EIA process and once the project is implemented.

When does public participation occur in the EIA process?

Public participation occurs before and throughout the EIA process and continues afterwards if the project is implemented. Participation should be as continuous as possible to avoid the loss of interest from the participating parties. Specific points for scheduling public participation include:

- The public should be informed when a project is first proposed (application of EIA), and given information on how to get involved. An early plan should be made for incorporation of traditional knowledge.
- The public should participate in the scoping and baseline monitoring phases during the initial EIA planning when the environmental issues, and, in some cases, mitigation measures are identified.
- The public should have the opportunity to review and comment on each phase of the EIA.
- After the EIA is completed, the public should be able to review the final analysis and recommendations, and submit comments to the acting agency or party before project implementation.
- Once a project is implemented, the public should be routinely informed about the activity, including having access to information about any environmental effects, monitoring programs and the effectiveness of mitigation.

■ In 1989, the State Committee for Natural Resources and Ecology conducted an EIA on the technical and economic plan for the extraction of natural gas at Bovanankovo and Kharasavey (the Yamal peninsula). Experts from, among others, the State Committee for Natural Resources, the Academy of Sciences, the State Sanitary Service, the Ministry of Health, and the State Hydrometeorological Service, as well as local authorities and representatives of indigenous peoples living in the area of possible impact participated in the procedure. The assessment concluded that the following sensitive natural features would be affected: permafrost, coastal zone, wet tundra, reindeer pastures and migration routes. Two indigenous settlements were located nearby. The assessment led to a negative decision on the project. The expert commission did, however, allow for new studies to find adequate technical solutions to the problems. At present, these studies are underway. A program for social support of the indigenous population has also been put forward.

More information: Marianna Novikova, the State Environmental Review of the State Committee of the Russian Federation for Environmental Protection, ul. Kedrova, 8/1, Moscow.

What are the important elements of effective public participation?

Clear rules and procedures for conducting meetings and consultations should be established, for example, who is able to participate, by which means and on which terms. Public participation and awareness will be increased through easy access to EIA documentation and clear, concise communication of information.

A variety of methods can be used by government agencies or project proponents to involve the public. In addition to traditional means of informing the public through letters and media announcements, public participation may be encouraged by:

- visits to communities by government staff or project proponents, or the establishment of local offices;
- public hearings held by panels, commissions or advisory committees, which include members of the public; and
- teleconferences to allow participation in meetings when travel is not possible.

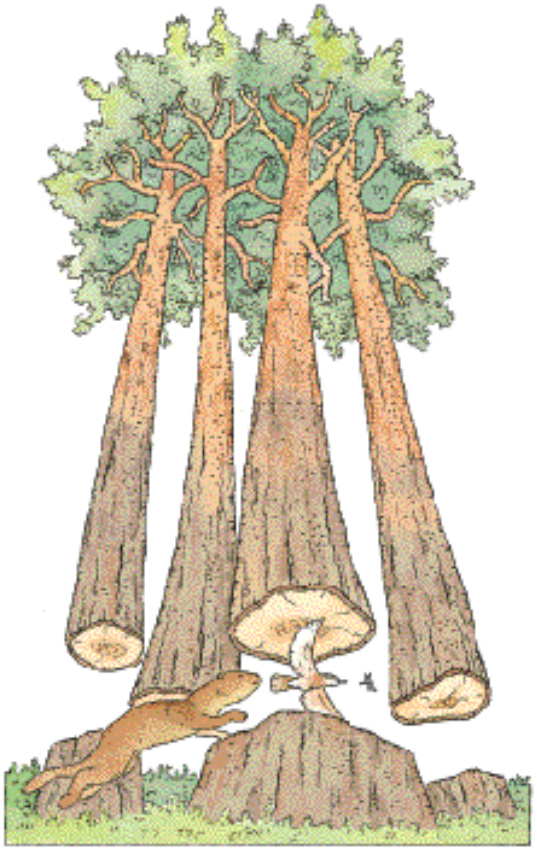
The methods of communicating with the public should be tailored to each stage in the EIA process, and should accommodate the needs and preferences of those segments of the public involved at each stage.

■ **With the implementation of land claim agreements in the Canadian Yukon and Northwest Territories, new environmental impact assessment processes have been and will be established. Environmental assessment processes pursuant to the Western Arctic (Inuvialuit) Claim (1984) and the Nunavut Land Claim Agreement (1993) are already in place. Legislation is being developed to implement the Gwich'in (1992) and Sahtu (1993) land claim agreements, and it is anticipated that the proposed Mackenzie Valley Resource Management Act (MVRMA) will be passed by Parliament in 1997. The MVRMA will establish an integrated system of land and water management and environmental assessment throughout the Mackenzie Valley (that portion of the Northwest Territories that does not include the Inuvialuit Settlement Region and Nunavut). The MVRMA will establish the Environmental Impact Review Board, which will be appointed by the government of Canada through equal nomination of government officials (federal and territorial) and indigenous groups. Legislation is also being developed to implement in the Yukon the environmental assessment process included in the 1995 Umbrella Final Agreement.**

Indian and Northern Affairs Canada

Which aspects of public participation demand special attention in the Arctic?

The Arctic is culturally and socio-economically a non-uniform and complex area. Therefore, the participation of Arctic communities is needed to resolve conflicts and disputes between people with different values, perceptions, and goals, and frequently exhibiting a lack of mutual trust and understanding. A successful EIA process should acknowl-



edge different opinions, perceptions and perspectives fairly to foster common understanding.

Government agencies, project proponents, and researchers need to develop an understanding of indigenous people, their culture and socio-economic structure, and need to work together with their community leaders. Methods of communication should not be intrusive and should be sensitive to indigenous peoples' customs and lifestyles. The use of translators and interpreters who master local languages is often essential.

Indigenous people should be provided with the opportunity to contribute their traditional knowledge throughout the process. Requests for information and documents should recognize the differences between science and traditional knowledge. Contacts within communities should be established early so that indigenous people who are experts in traditional knowledge can be identified and liaisons established.

Time frames for EIA in arctic environments are often longer than for a non-arctic EIA. This is to take into consideration the cultural and socio-economic factors and the remoteness of towns and communities. Therefore, sufficient time, within reasonable limits, is needed by the public to review and respond to the information.

When scheduling meetings, the remoteness of many arctic communities should be taken into consideration, and community activities should be accommodated whenever possible. Additional funding may be needed to enable people from isolated locations to participate in public meetings. Meetings should be planned imaginatively with cultural differences in mind. The standard hearing format, with a hearing panel and testimony read into the record by individuals under time constraints, may not be appropriate, in most cases, in indigenous communities.

10 Traditional knowledge

In the EIA process, traditional knowledge should be used for understanding the possible consequences of the predicted impacts and for reducing the uncertainties. Traditional knowledge is commonly referred to as knowledge held by indigenous people. Local knowledge, non-indigenous or indigenous, also has an important role to play in EIA. Nevertheless, in recent years, indigenous people have upheld traditional knowledge in international fora.

What is traditional knowledge?

Traditional knowledge has been defined in many ways and is an evolving concept. For the purposes of these guidelines, traditional knowledge is defined as accumulated knowledge held by indigenous people on the arctic environment, and the management of its resources for present and future generations. This knowledge is passed down to younger generations through activities of actual resource use, and by storytelling, dance, songs and legends. It ensures the survival and integrity of the indigenous people in the arctic regions. Traditional knowledge is the intellectual property of indigenous communities and the holders of this knowledge.

Traditional knowledge is recognized by the newly formed Arctic Council as a key element in the sustainable development of arctic resources and is rapidly gaining global recognition as an essential component in the management of natural resources. It is now included in the Convention on Biological Diversity.

What is the role of traditional knowledge in environmental impact assessment?

Traditional knowledge is recognized as a vital source of information in the environmental impact assessment process. It has become a key component in current research on arctic ecology and the environment, and is intended to complement and support scientific and ecological findings.

Traditional knowledge is used to gain a better understanding of the consequences of predicted impacts, to reduce uncertainties in predictions, and to assist in establishing baseline conditions and monitoring programs.

■ The Minerals Management Service (MMS) integrated the Inupiat Elders' statements about sea ice, fish, birds, polar bears, marine mammals, bowhead whales, caribou, and subsistence into the text of the September 1966 Beaufort Sea lease sale Environmental Impact Statement (EIS) and other decision documents. These statements came from lease sale public hearings and workshops conducted in North Slope Borough communities, and from village outreach trip report notes, synthesis meetings, and a variety of other written sources. At community workshops conducted in August 1995 in Barrow, Kaktovik, and Nuiqsut, MMS asked for each community to identify people who were considered local authorities on particular subsistence practices and biological resources, and whose input would be included in the Final EIS. Then, prior to publication, MMS asked Tom Albert, biologist for Alaska's North Slope Borough, and others to review the EIS analysis sections on subsistence, bowhead whales, marine mammals, and marine and coastal birds where indigenous knowledge had been incorporated.

How is traditional knowledge to be used in the EIA process?

The use of traditional knowledge in an arctic EIA requires careful planning. All parties have to know how and on what basis the traditional knowledge is to be used, and how it is to be evaluated. Modern scientists should recognize the various methods by which this knowledge is received, assessed, and evaluated. The holders of traditional knowledge must be given respect by the scientists researching traditional values. Once a liaison with those who possess traditional knowledge has been established, it should be sustained through continuous mutual consultations. Because traditional knowledge is the intellectual property of the people who hold it, it is essential to agree with those people on the rules for the use of traditional knowledge. Adequate compensation is to be provided for this information, based on terms and conditions agreed on by all parties involved. Researchers are to abide by the ethical research guidelines set out by the respective communities.

11 Transboundary impacts

In the EIA process, possible transboundary impacts should be considered, when appropriate. Assessments of transboundary impacts require project developers and authorities to make allowances for different legal systems, to provide translations when necessary, and to make special arrangements for public participation across jurisdictional borders.

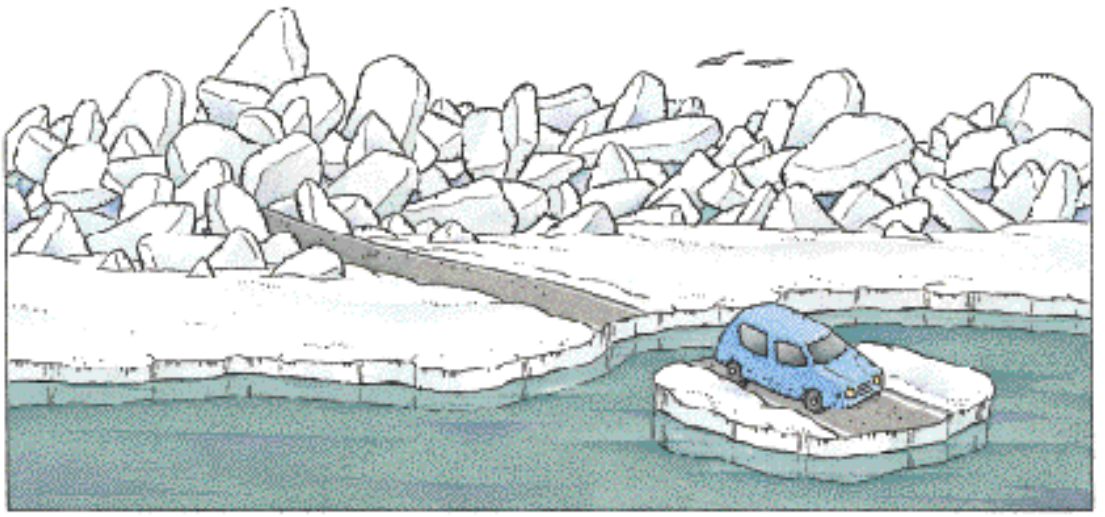
■ **The Outokumpu factories in Tornio, Finland, are major producers of ferrochrome and steel products. In 1996 the developer announced an EIA would be prepared on the proposed enlargement of the factories. The document describing the scope of the assessment was open to public inspection from 29 April to 17 May 1996 in municipal offices and in regional environment authority offices both in Finland and Sweden, since the factories are based only two kilometres from the Swedish-Finnish border. The Finnish regional environment centre that was overseeing the assessment publicly announced invitations to a hearing on the scope of the assessment in newspapers, both in Finland and Sweden. The announcement was also sent to the Norrbotten county administrators and Haparanda municipality, both in Sweden.**

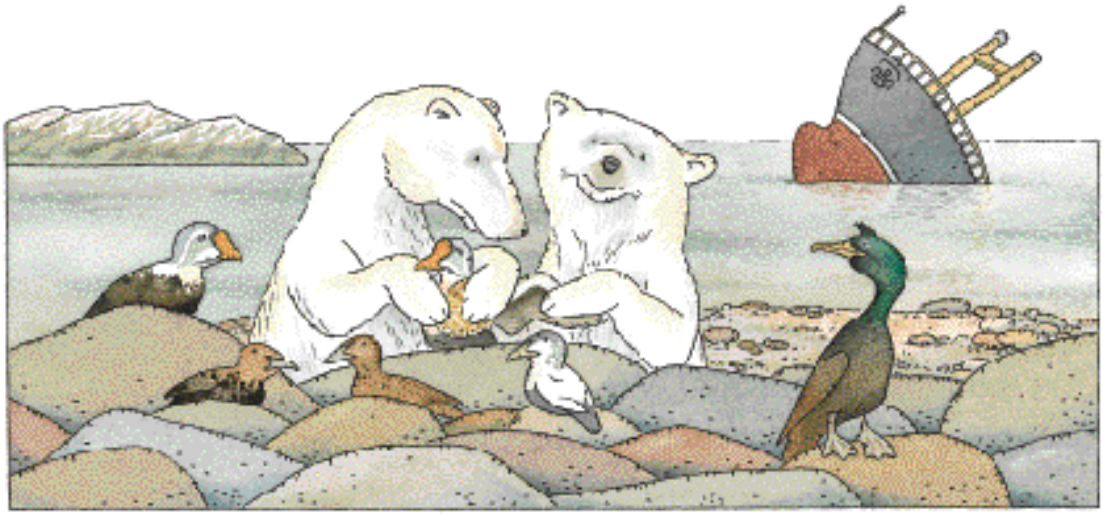
Further information: Outokumpu Polarit Oy, 95400 Tornio and Lapland Regional Centre, P.O. Box 8060, Rovaniemi, Finland.

What are transboundary impacts?

Transboundary impact means any impact within a country (the affected country) that is caused by an activity located in another country (the country of origin).

Proposed projects that may cause impacts across provincial or municipal borders, and the assessment of these impacts, may have features in common with transboundary impacts and assess-





ments between countries. However, provincial or municipal border projects should be dealt with according to the national legislation or land claim agreements.

How should impacts across borders in the Arctic be dealt with?

When a proposed project may lead to impacts across jurisdictional boundaries, the country of origin and the project developer should ensure that the affected country and its citizens within the area of likely impact are given the opportunity to participate in the environmental impact assessment. The country of origin should thus provide information on the assessment at an early stage in the assessment process, when a decision to apply an EIA is made or when the scope of the assessment is determined. Open dialogue and information exchange should be established between the country of origin and the affected country or countries.

While determining the scope of the assessment, the potential transboundary impacts should be identified and the methods to be used for assessing them should be agreed upon. During the assessment, harmonization of baseline information, and assessment of approaches and assessment methodologies may be required to ensure compatibility between results of the assessment on both sides of the border. Joint study or steering groups may provide a forum for exchanges of information.

Public participation should be made available to the public in the areas of likely impact on both sides of the border. Everyone should receive the same information, and be given the same opportunity to participate in the assessment and comment on the results. Where necessary, translation of key documents should be provided for.

The UN ECE Convention on EIA in a Transboundary Context, the Espoo Convention (1991, entered into force in 1997), provides a comprehensive frame-

work for dealing with activities likely to have significant adverse transboundary impacts. Further details can be laid down in bi- or multilateral agreements or other arrangements to provide for an effective transboundary assessment in regions with special features such as the Arctic.

Which activities may cause transboundary impacts in the Arctic?

All activities assessed according to the national EIA legislation should be screened for the likelihood of transboundary impacts. The ECE Convention includes a list of activities for which transboundary impact assessment is mandatory. Bi- or multilateral agreements may also mandate activities to be covered by transboundary assessments. Because of the sensitivity of the Arctic environment, relevant activities requiring EIA, other than those listed in the ECE Convention, should be agreed upon for the Arctic region. In addition, for those activities already on the ECE Convention list, lower threshold levels may be needed for projects in the Arctic.

In the Arctic, the development of oil and gas resources, large-scale hydroelectric projects, and extensive mining and smelter works are activities that have already led to transboundary impacts. For these activities the scale of operation is often so large that transboundary impacts can occur even though the border is far away. In addition several smaller activities, such as forestry development, land drainage and road building have caused transboundary impacts, when these activities have occurred close to borders. Planned activities, for example, the opening of new sea routes in the high Arctic and their required port facilities are also likely to cause transboundary impacts. In many countries, detailed lists of activities that may cause adverse environmental impacts have been compiled. In the border areas in the Arctic, these lists should be compared and harmonised through bi- or multilateral agreements.

How should public participation be arranged for a transboundary EIA?

Communities in the area of anticipated impacts should be given an opportunity to participate, irrespective of their location relative to the border. The Inuit Circumpolar Conference, the Sami Council and the Indigenous Peoples Secretariat are accredited non-governmental organisations on the Arctic Council, and which are active in several arctic countries. They may thus provide useful links to the public on both sides of the border. Other international non-governmental organisations such as the WWF Arctic also have extensive transboundary networks in the Arctic region.

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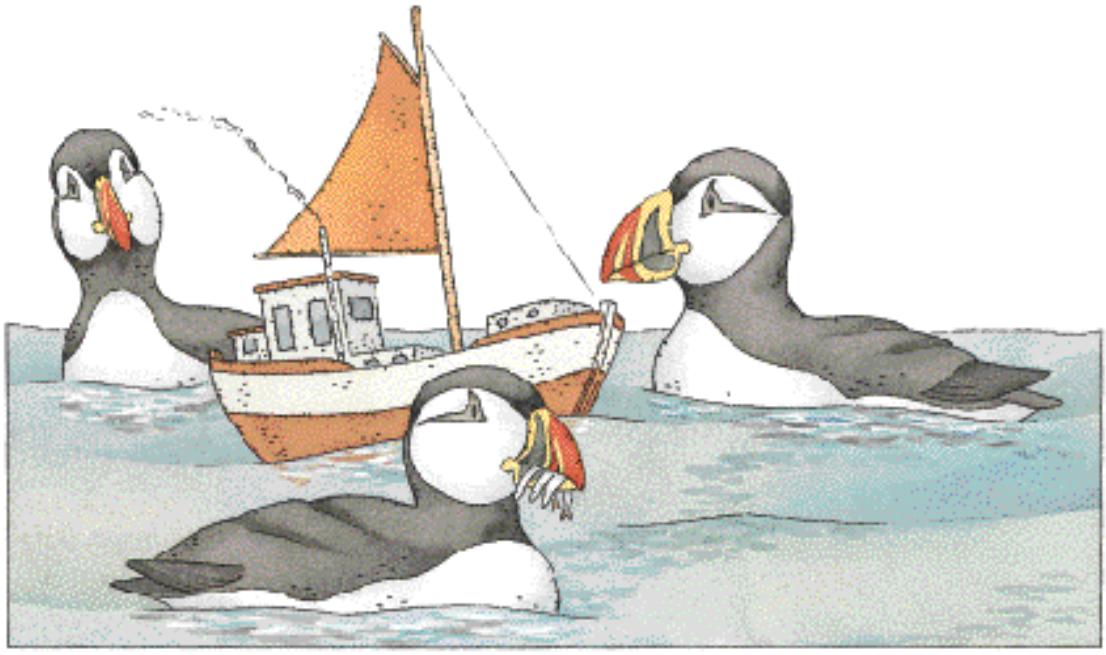

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Appendix I

Common arctic features

Climate, geographic and geological features

- extent of ice-cover on waters
- typified by cold areas (cryosphere)
  - permafrost
  - periglacial features
  - glaciers/ice sheets
  - stored greenhouse gases such as CO_2, methane
  - stored fresh water
- ink for airborne/waterborne pollutants
- slow break down of contaminants
- large variations in conditions between years

Ecosystems and biological resources

- young ecosystems and numerous sensitive areas (see appendix II)
- sharp gradients in the environment and ecosystems both in time and space
- low productivity levels in general, but some areas of very high productivity
- short food chains
- slow recovery/regeneration rates
- risk of irreversible processes/cascades (e.g. as a consequence of erosion)
- low carrying capacity
- high concentration of stocks (groups of certain species)
- biodiversity at genetic and landscape levels
- unspoilt landscapes that are large enough to allow ecological processes and wildlife populations to fluctuate naturally

Socio-cultural and economic features

- cultural variability: indigenous/other local/settler population
- high percentage of local inhabitants are dependent on renewable resources
- extensive (vs intensive) patterns of land use – forestry, herding, hunting
- areas of very low to very high population densities
- growth of industrial development and exploitation of non-renewable resources

Knowledge of the systems

- lack of baseline environmental knowledge
- traditional knowledge

Appendix II

Areas demanding particular attention in the Arctic

Areas or sites of great sensitivity or unique geomorphological characteristics:

- permafrost terrains and insulating layers, especially unique permafrost land forms
- wet tundra
- coastlines
- thermoabrasion coastlines
- soils and waters prone to acidification, in some cases alkalinization
- continental dunes
- ice-edges, leads, polynyas
- glacier rivers
- glaciers, eskers
- timberline forests
- large deltas

Areas of special importance to wildlife:

- fish spawning and nursery areas
- nesting, rearing and staging areas for waterfowl and other birds
- migrating and calving areas for moose and caribou
- marine mammal migration routes
- denning areas for large predators and rearing areas for other animals
- seal pupping areas

Areas with valuable, sensitive and representative biotopes:

- palsa bogs
- snowbed habitats
- eutrophic, calcareous tundra heaths
- tundra steps
- vegetation on scree slopes
- calcareous rock walls

Areas of spiritual, cultural and other socio-economic value as well as areas of special importance for traditional resource use:

- sacred and spiritual places
- burial grounds
- reindeer round-up sites
- traditional fishing or hunting campsites
- traditional trails
- marine mammal harvest areas

Appendix III

Definitions

Cumulative environmental effects (CEEs) are additive (aggregate), synergistic, or antagonistic (neutralizing) environmental changes of multiple impacts from past, present, and future development activities that degrade valuable ecosystem components. The pathways of CEEs can be difficult to determine because direct and indirect impacts can crowd or lag in time and space or become apparent only after specific triggers or thresholds are exceeded.

Environment encompasses the natural (biological and physical) environment and the human (social, cultural and economic) environment. The conceptualization of the environment, from the point of view of each arctic country, can be found at the information site on the WWW or from the national EIA authorities (see appendix IV).

Environmental impact assessment (EIA) is a process for identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of proposed projects and physical activities prior to major decisions and commitments being made.

Strategic environmental assessment (SEA) is a process of prior examination and appraisal of policies, plans, and programs and other higher level or pre-project initiatives.

Sustainable development is, according to the Bruntland Commission (1987), a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance the current and the future potential to meet human needs and aspirations.

The precautionary principle used by the Rio Declaration on Environment and Development is as follows: *Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.*

Traditional knowledge (TK) is the accumulated knowledge of natural ecosystems, based on the spiritual health, culture, and language of the people, and which is passed to successive generations through stories, song, dance, and myths to ensure the survival of the people and the integrity of the socio-cultural and socio-economic systems of the people. Indigenous knowledge is dynamic, based upon an intimate understanding of the

components of the abiotic and biotic environments – land, water, snow, ice, weather, plants, and wildlife – and the interactions between them. TK systems are grounded in the practicality, reasoning, and logic of historical experiences, and provide guidelines and governance on the respect, use, and sharing of natural resources (from Roberts 1996). TEK = traditional ecological knowledge.

Appendix IV

Sources of information

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Boverket
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S-37123 Karlskrona, Sweden
tel: 46 455 53000
fax: 46 455 53121

USA

Council on Environmental Quality
Executive Office of the President
722 Jackson Place, N.W.
Washington, D.C. 20503, USA
http://www.whitehouse.gov/CEO

Internet sites:

Arctic links
http://www.urova.fi/~arktinen/pverkkot.htm

Canada
http://www.inac.gc.ca/nin/nin.html

Danish Polar Cente
dpc@pops.dpc.min.dk

Finnish Environment Institute
http://www.vyh.fi/fei/intercoo/arctic/index.htm

Iceland
http://www.mmedia.is/umhverfi/

International Arctic Environmental Data Directory (ADD)
http://www.grida.no/add/

International Legislation
http://sepac.ciesin.org/pidb/pidb-home.html

Polar pointers
http://www-bprc.mps.ohio-state.edu/polarpointers/PolarPointers.html

Environmental impact assessment aims at avoiding deleterious effects on the arctic environment, including all its fauna and flora, abiotic components, natural resources, and human health, security and well-being.

These guidelines aim at giving practical guidance for environmental assessments to all parties involved in development activities in the northern circumpolar areas, but especially to local authorities, developers and local people. The guidelines raise issues that are unique to arctic assessments – such as permafrost – but they also emphasize universal issues that are particularly important in the Arctic – such as public participation and the use of traditional knowledge.

These guidelines are the result of a truly international effort. All of the Arctic countries, representatives of indigenous peoples and the WWF Arctic Programme has taken part in producing these quidelines.

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