

Contaminated  
areas  
– a pure  
opportunity!



Environmental Focus Västernorrland – vision and reality

# Västernorrland

## creates opportunities and diversity in the environment

*'Vision 2005, looking towards 2010' has been drawn up at the initiative of County Governor Gerhard Larsson. The vision will contribute to make a good county even better. It constitutes a foundation on which to build further, with joint efforts, in order to reach the county's seven development objectives. One of these objectives is to place Västernorrland at the European front line of ecologically sustainable development. This work is an important part of regional growth in Västernorrland.*

### Investing in future belief

In the county's environmental strategy, which was adopted in 2003, the County Administrative Board has converted the 15 national environmental quality objectives into regional environmental objectives. Work dealing with contaminated areas is included in the environmental objective *A Non-toxic Environment*, and in this context it has been highlighted as being one of the county's main issues, requiring special measures. As well as the obvious aim to protect people and the environment, the work is also about being able to re-use contaminated areas. There are many valuable shore and industrial areas that can regain an important role as places for companies to establish, for housing and for outdoor recreation.

Work concerning contaminated areas offers development potential for many local companies in the environmental technology industry. Individual consultants and contractors can gain experience and specialist knowledge that lead to new challenges. By stimulating these companies and thus getting more people to realize the possibilities of environmentally driven growth, the County Administrative Board recently started the *Environmental Focus Västernorrland* project. The idea of the project is to use the environment as a driving force and to be a natural part of all activities. There is also a significant long-term benefit at a purely human and environmental level. This is a necessary investment in a future belief and in future generations.

### The influence of industry and geology

Most of the contamination in the county was caused by industrial development in the 20th century. No particular consideration was given to the environment until the 1960's, consequently many areas were contaminated as a result of ignorance. Hazardous substances were handled carelessly and large amounts of process waste were discharged into water, ended up on refuse dumps or were used as landfill. Enhancing the threat in the county is the hilly landscape with its steep river valleys and a steep coastal zone. Since many industries have set up by the coast and in river valleys, there is significant risk of contamination being spread by waves or by landslides.

### Increased interest in the environment raises requirements

In the early 1990's, attention was drawn to the need for measures in contaminated areas. As a result of pressure from environmental authorities, the media and the general public, increasingly stringent requirements have been imposed regarding investigations and remedies. Contaminating companies have also voluntarily agreed to clean up polluted sites. In recent years the Swedish government has increased fundings for the Swedish Environmental Protection Agency to take measures in areas where no one can be held responsible. Attention has been drawn to the initiatives and efforts of the County Administrative Board and the municipalities, and Västernorrland County has received a large part of these fundings.

### Regional environmental objectives for work on contaminated areas

1. By 2005 all contaminated areas must be mapped and at least 15 of the prioritized areas must have been investigated. The situation with regard to eight of them must also have been remedied.
2. All contaminated areas must be investigated by 2020, and action must have been taken if necessary.

### Who is responsible?

According to the regulations of the Swedish Environmental Code, a company bears responsibility for its contaminated areas if operations ceased after 1969. When there is nobody responsible the municipalities can apply for governmental funds from the County Administrative Board.



# Implemented and planned measures

Certain measures have already been implemented in Västernorrland, both through voluntary measures on the part of companies and through use of governmental subsidies. At the same time planning is in progress regarding new measures in affected areas throughout the county. In a unique collaboration the County Administrative Board, the municipalities concerned and the companies AssiDomän and SCA have helped one another in bringing about remedies in three industrial areas. A total of over SEK 200 million is being invested in Köpmanholmen, Svartvik and Kramfors.

## **Köpmanholmen**

In the Köpmanholmen industrial area in Örnsköldsvik Municipality there used to be an alkali chloride factory and a pulp industry. The area is mainly contaminated by mercury and turpentine. High levels of oil and heavy metals have also been detected. Buildings in the area have been demolished and the contaminated soil will be removed and taken care of elsewhere. Soil contaminated by oil and turpentine is remedied on site.

## **Svartvik**

A sulphite factory was once located in Svartvik in Sundsvall Municipality. The contamination largely comprises raw materials and residues from pulp production, i.e. pyrite ash, sulphur pyrite and sulphur. The old quay area needs reinforcing to prevent landslides and dispersal of contamination. Strongly contaminated soil will be removed and taken care of elsewhere. The area will eventually be sealed and covered with clean soil.

## **Stockvik**

At the Stockvik industries in Sundsvall there has been a chemical industry for a long time. Akzo Nobel remedied the old Kattvik Tip in the 1990's, and started the clean-up of mercury-contaminated soil during 2005.

## **Kramfors**

A large area has been remedied adjacent to the place where the Kramfors Sulphite Factory used to be situated. Large amounts of pyrite ash were contaminating the area causing an exposure risk for people and animals. The area is geotechnically unstable, and the risk of landslides occurring was substantial. Rain and waves contributed to the dispersal of heavy metals from the area. To reduce water throughflow, the area was sealed and given an even gradient. An erosion protection barrier was set up along the entire coastline. The remedies were completed in autumn 2003.

## **Forsmo**

An area in Forsmo in Sollefteå Municipality has been contaminated by impregnation liquid from a former pole-impregnator. This is a high risk area, as it is immediately adjacent to a housing area. The high arsenic content in soil causes extremely scarce vegetation, even though operations ceased more than 50 years ago. Over 20,000 tonnes of contaminated soil is being removed and replaced with clean soil. In order not to disturb the environment and nearby living people, most of the transportation is carried out by train.

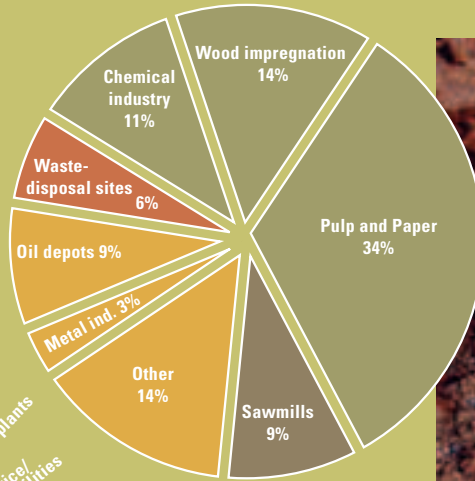
## **Fagervik**

A large sulphite factory used to be located in the Fagervik industrial area in Timrå Municipality. Some other operations were also carried out, e.g. scrapping and storage of hazardous wastes. A large amount of pyrite ash has been washed into the sea and deposited in fibre banks on the seafloor. A small part of the industrial area was remedied in 1996, giving place to new football fields. Investigations show that the remaining area also requires measures.

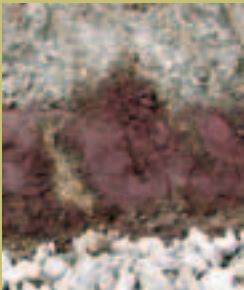
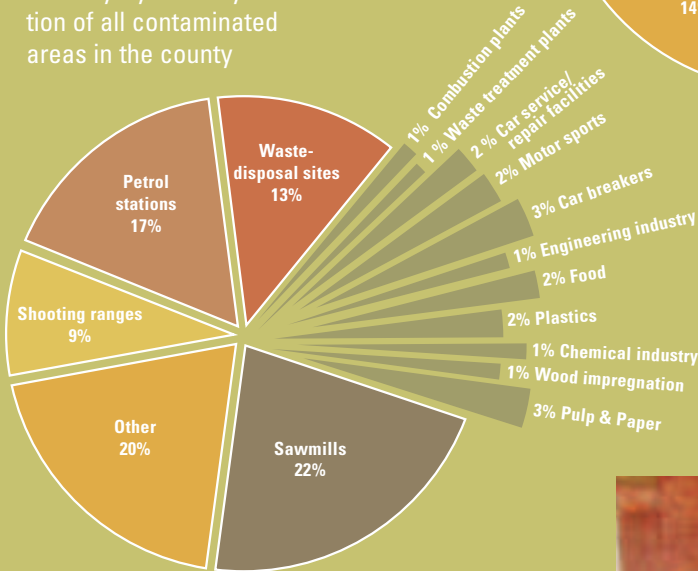


Contaminated areas – a pure

Industry-by-industry distribution of the most contaminated areas in the county



Industry-by-industry distribution of all contaminated areas in the county



### What is pyrite ash?

When pulping liquor was produced at the sulphite factories, sulphur or the mineral sulphur pyrite was refined in a so-called pyrite furnace. When using sulphur pyrite, a residual product of ferric oxide was formed, which is called pyrite ash. Pyrite ash often contains high quantities of heavy metals.

Due to its high iron content pyrite ash is re-usable for iron production, and has been exported to Germany for a number of years. Pyrite ash is encountered at stacking areas and harbours adjacent to sulphite factories all over the county. Since the environmental and health-hazard properties of pyrite ash haven't been completely known in the past, pyrite ash has also been used as landfill.



opportunity!

# How can the environmental objectives be met?

Efforts from all field areas are required to reach the objectives.

## Mapping of contaminated areas

All contaminated areas are mapped and registered in a database. The County Administrative Board is responsible for this work and gathers material through archive studies, interviews with former employees, photos, maps and site visits. The mapping will ultimately lead to a risk based classification of the contaminated areas. Classification is of value for the prioritizing of which areas to investigate.

## Supervision

Where responsible companies are still operating, it's up to the environmental authorities to demand that necessary investigations are carried out. The authorities are also responsible to make sure that the companies are careful during remediation of the contaminated areas. Responsible authorities for these matters are the County Administrative Board or the municipality's Environment Office.

## Governmental financing

For areas where no company can be held responsible, the municipalities may receive governmental funding for investigation and, if so necessary, remediation. If governmental financing continues at the present level, it has been estimated to take at least 45 years before all areas placed in the highest risk class have been investigated and remedied. In order to reach the environmental objectives of Västernorrland other financing possibilities are now being looked into.

## National programmes

In Västernorrland special organisations within national programmes, for example SPIMFAB (remedies petrol stations), the Swedish Armed Forces and the Swedish National Rail Administration, are also investigating and remedying their own contaminated areas.

## Exploitation/development

There is a growing interest in developing contaminated areas. This applies especially to former harbours and coastal areas. Other contaminated areas might be affected indirectly, e.g. in the event of major infrastructure projects such as the Bothnia Railway Line. In such events, developers can contribute with valuable financing in situations where governmental funding otherwise would have been necessary.

## Spatial planning

Municipalities must have a strategy on how to utilise contaminated areas in the municipal comprehensive plans. Before a municipality accepts a detailed development plan for such an area, the pollution problem must be remedied.

## Cooperation

The County Administrative Board has signed agreements with the Geological Survey of Sweden and the Swedish Geotechnical Institute. In this way the County Administrative Board and the municipalities receive governmental specialist help. Furthermore there is collaboration with Mid Sweden University, other county administrative boards and within the Swedish Clean Soil Network.

## Information

Successful results can only be achieved by a broad knowledge and support from politicians, authorities, organisations, companies and the general public. It is necessary to allocate resources and to disseminate information and knowledge efficiently.

## Follow-up and evaluation

Every year the County Administrative Board draws up a regional programme for the work with contaminated areas. The programme contains valuable background information and describes in detail how the work is being carried out in the county. As a result of the programme gradually being updated and developed, production of the programme has also become a good tool for evaluating and developing the work with contaminated areas.





## Västernorrland – at the front line for environmentally driven growth

During the coming years, the County Administrative Board, the municipalities and companies will have to contribute significantly to meet the environmental objectives concerning contaminated areas. Awareness and willingness, combined with economic prerequisites, will ensure that Västernorrland will continue to maintain its position as a pioneer in environmentally driven growth in Sweden. The investments are big but the benefits are far bigger – both in the short and in the long term.

For further information, please visit our website [www.y.lst.se](http://www.y.lst.se)

There you will find (in Swedish) the regional programme for working with contaminated areas plus the county vision, the regional growth programme and the regional environmental objectives for Västernorrland.

**ENVIRONMENTAL FOCUS**  
VÄSTERNORRLAND



**COUNTY ADMINISTRATIVE BOARD  
OF VÄSTERNORRLAND**

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