

Bodø

”Hazardous, exposed they build the city”



Jan Wasmuth, Pskov 26. oktober 2010



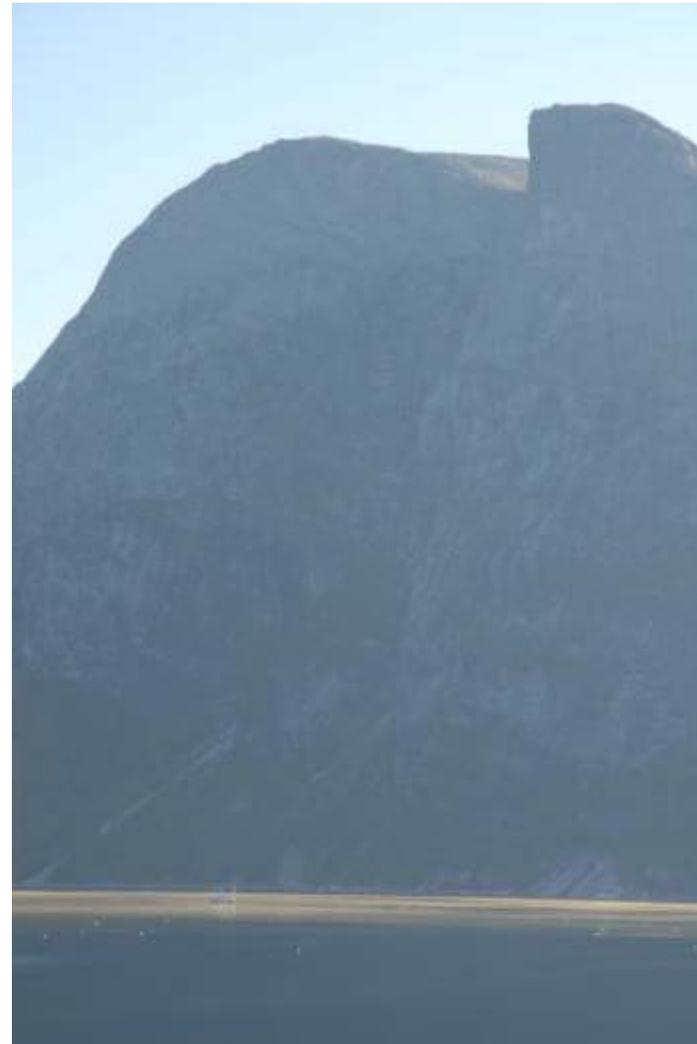
HOW DO WE THINK, WHAT HAVE WE DONE?

- Nature conservation areas in Bodø, what we have and how we take care of them?
- Climate planning, how far have we come?
- Garbage sorting, how do we do it in Bodø?
- If we have time enough: How do we deal with shops, factories and business

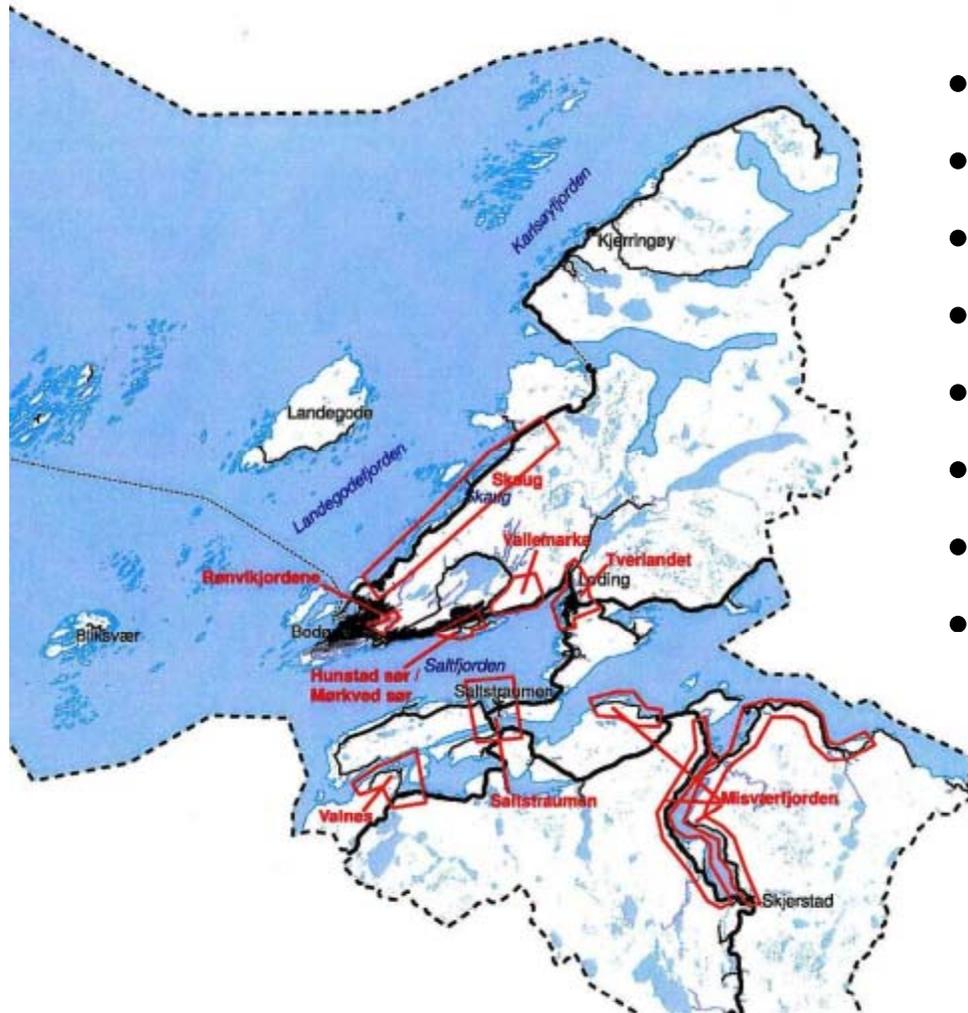


Nature conservation areas in Bodø, what we have and how we take care of them

- 2 national parks
- More than 20 counties of protected areas -Government secured
- Many areas are protected because of biotopes
- Little attention, but the small population of people means that wear is negligible
- Norway has a coastline that is important to take care of



Climate planning and our vulnerability



- Coastal environment
- Sea will rise by 60 cm.
- More wind
- More precipitation
- Warmer climate
- New species
- Increased growing season
- Failures in fisheries

Bodø in the wind



- We're used to a variable climate (we think)
- In Bodø there is always blowing. How did we "Narve"? (Strong storms will get more and more often.)
- When the sea rises. Have we allowed for the establishment of the port area? (Spring will become increasingly larger and occur more often)
- High rainfall results in low power prices and full water reservoir (Soil and rock falls can break quality of drinking water and create problems for power plants and sewage systems.)

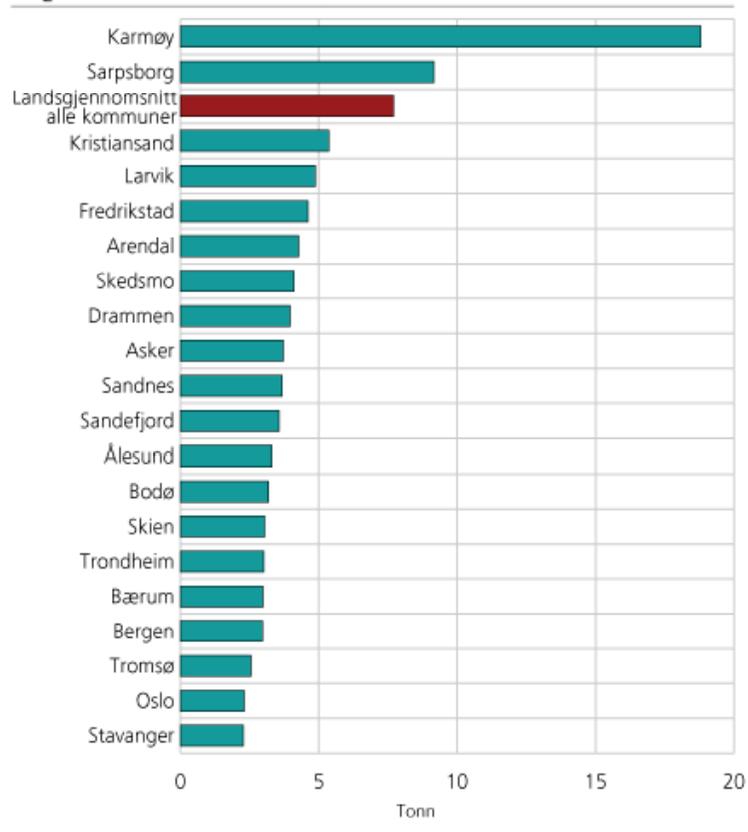
Climate change- and energy planing



- The municipality's environmental message came spring -07
- The first climate plan was completed in spring -08
- Vision for the Bodø: "In the environmental policy Bodø will our share of responsibility for contributing to sustainable development."

City Council decision in climate plan

Utslipp av klimagassene CO₂, metan og lystgass. 2005. Tonn CO₂-ekvivalenter per innbygger



- Bodø will work actively to reduce their emissions and contribute to the national and global responsibility to preserve the environment.
- The climate and energy plan for Bodø municipality forms a good basis for further efforts to reduce greenhouse gas emissions in Bodø.
- As the goal in 2012, greenhouse emissions will not exceed the 1990 level + 1%.

Overarching strategies in climate plan



- Car traffic is one of the largest sources of greenhouse gases in Bodø. An improvement of public transport to make it a better alternative to the car will therefore be crucial for achieving objectives.
- Transit
Implementation of measures adopted in the common plan should be prioritized:
 - better bus services with the right connections
 - higher performance speeds, assessment of prices and frequent departures
 - improvement of rail services as "light rail" should be upgraded with the establishment of stopover Løding,
 - several crossover tracks,
 - upgrading of the stop at Mørkved and more departures.
- In developing areas or rezoning of the existing public transport should be included as part of the assessment.

Three important factors in our climate planning



To help reduce the need for energy, thereby reducing emissions for energy production, an active policy and awareness of the development will be important. This means that a continuous evaluation of the measures.

Three important factors:

Combustion and heating

It announced the ban on landfilling of organic waste, this waste must be handled in a different way. An incinerator that converts trash to energy should be established. The heat from the plant, combined with utilization of heat exchange at sea should be used for heating homes in the central parts of the municipality. Ownership of the facilities should be rooted in Bodø Energi.

Heating Solutions for public buildings, businesses and families on

In densely populated parts of the municipality shall be considered to facilitate the hot-water heating or other eco-friendly heating solutions. (Potential energy reduction of 15%)

Selection of energy efficient solutions in new buildings

There shall be assessed which requirements can and should be asked to choose energy efficient solutions for new buildings. The assessment must include both requirements for the design, selection of materials and heat sources. It should be considered a pilot project, such as a "plus-field" may be appropriate in cooperation with a developer, to try out the current solutions

Bodø municipality as an organization in the climate planning

- “Bodø municipality shall be an organization that has high ambitions and implementing measures to limit the impact on the environment.
- The following measures should therefore have special attention:
 - By purchasing the municipal fleet vehicle emissions should be a criterion that is given weight.
 - Where you choose vehicles with higher emissions than the alternatives, this should be justified.
 - It shall be considered to install heat pumps in all municipal buildings.
 - All proceedings shall have an assessment of climate and environmental consequences of the case.
 - The municipality shall provide free energy efficiency advice

Our vulnerability, - risk and vulnerability associated with municipal



- Road system, including bridges
- Plants for extinguishing water supply
- Natural Areas
- Cultural heritage
- Drinking Water Sources
- Drain Power
- Electricity supply
- Information and communications (fiber networks, radio / TV)
- Hospitals / clinics
- Retirement
- Kindergartens
- Schools

Events included in the ROS assessment



After reviewing the various events, the following is considered as particularly interesting to further assess the risk and vulnerability analysis:

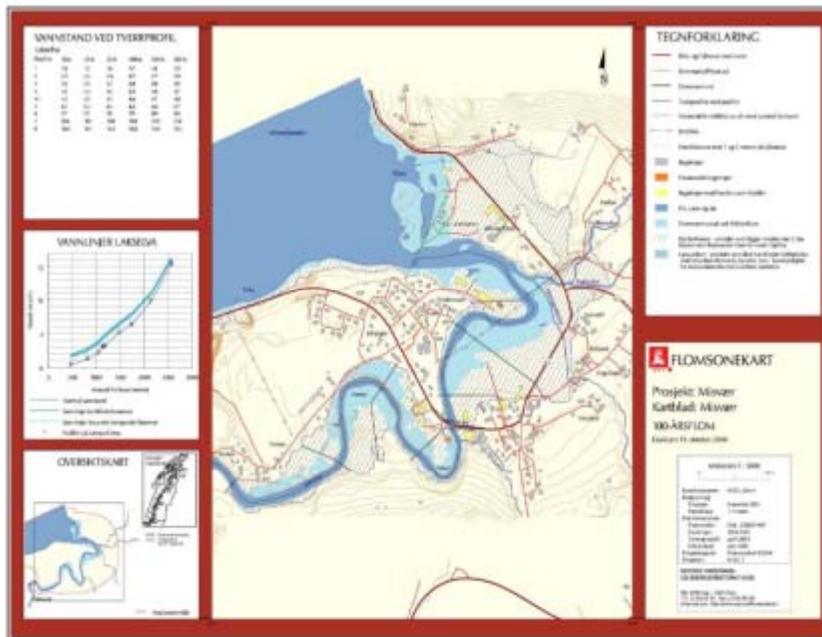
- Floods and ice
- Avalanches and landslides
- Radon Radiation
- High voltage wires and electromagnetic radiation
- Fire and explosions
- Traffic accidents
- Extreme weather
- High water levels

Likelihood ratio

- Unlikely = Less than one per event. 100.år
- Less likely = 1 time between each 50 and 100 years
- Probable = At least 1 time between each 10 and 50.år
- Very likely = At least 1 time between each year and 10.år
- Very likely = At least 1 time per. years



Flood and ice



- The only area where there is a flood zone maps from NVE is Misvær
- Flood zone maps for 10 -, 100 -, 200 - and 500-year flood for the lower 2.5 km of the Salmon River
- Salmon River is channeled and flood secured along much of the stretch (NGU)
- In Misvær center is built dikes along the West Bank and the erosion long interlocking parts of both banks. Flood control facility to the bridge was built after the flood damage in 1989.

"It is easy eroderbare masses and high terraces with sediment deposits in the area by Mohus. Damage to the interlocking and erosion in these terraces could lead to landslides in the river sediment. It has also arisen damage erosion control facilities below the bridge on several occasions. This damage has been caused by both floods and ispåkjenning. Damage potential terms. erosion is greatest around the bridge. Flood Zone maps can be used directly by the planning overview to identify areas that should not be built on without further assessment of the danger and possible action. "

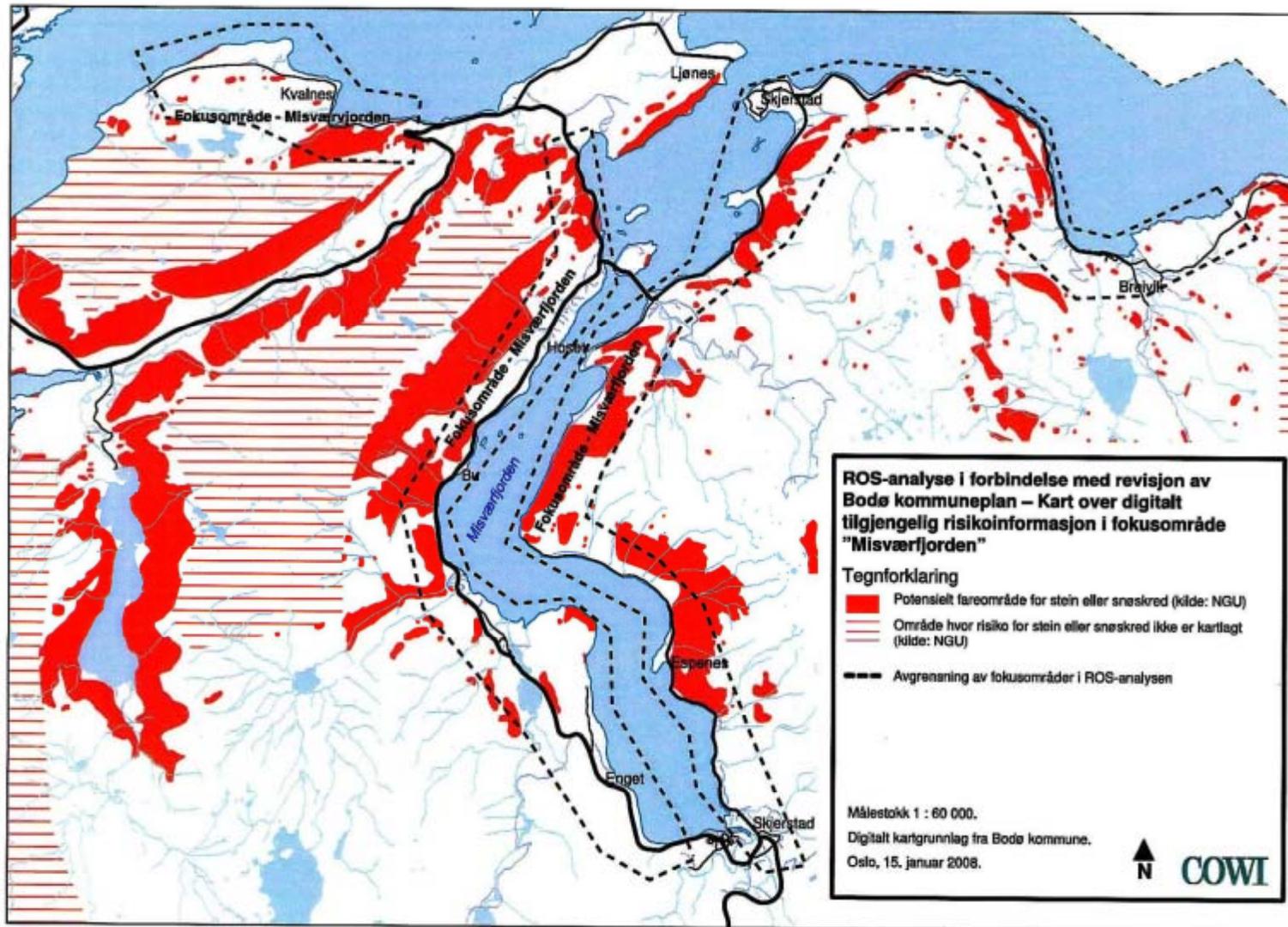
Other areas where flooding is possible

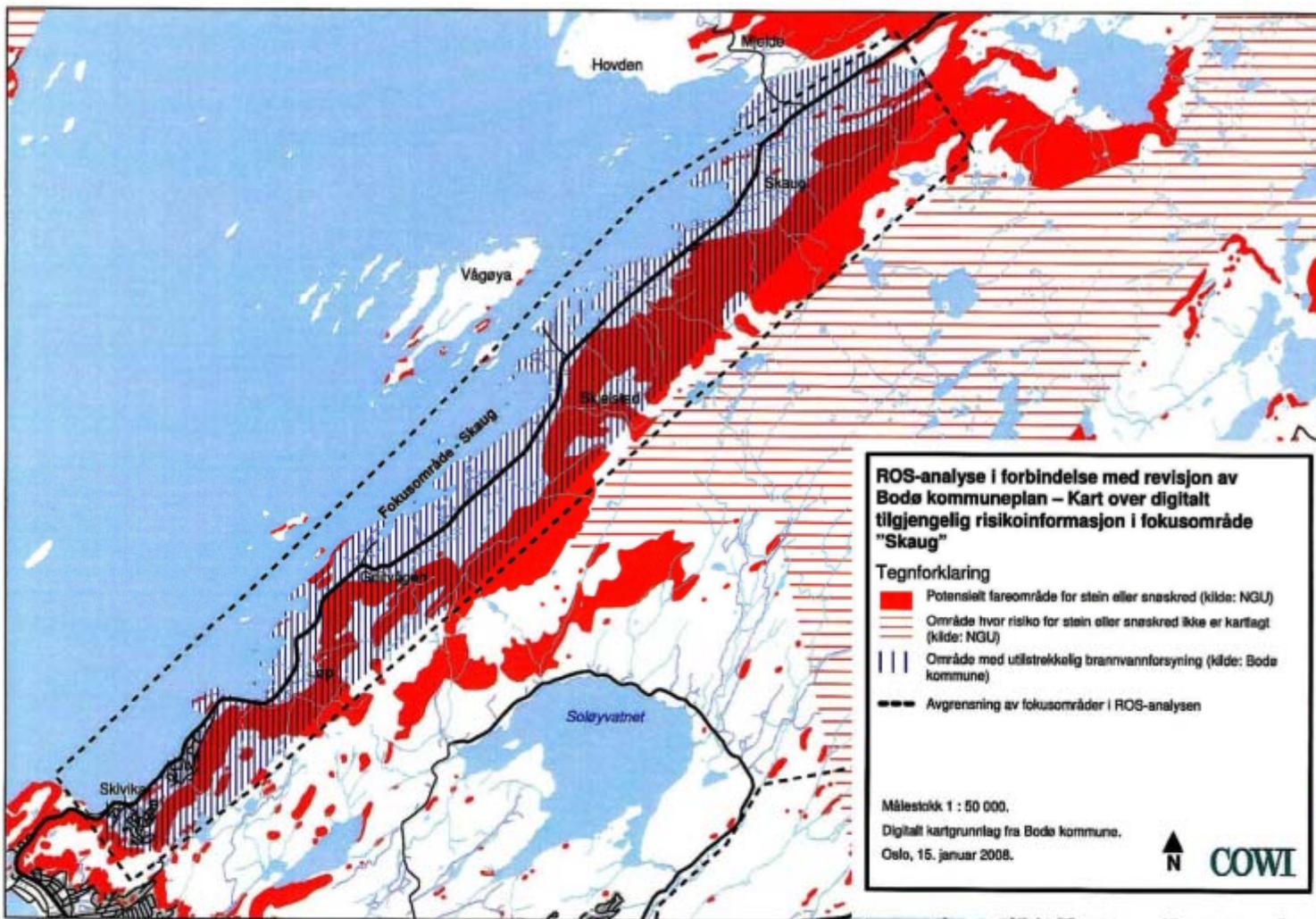


- Futelva
 - Fjæreelva
 - Bodøelva
 - Valneselva
 - Falkflaugelva
-
- These rivers will not cause major problems. Futelva closes year at another Soløy vannsveien, but otherwise does little damage

Avalanches and landslides

- Data about the avalanche danger is obtained from the Norwegian Geotechnical Investigations (NGU), and historical events from the Geological Survey's landslide database www.skrednett.no.
- Many areas in Bodø municipality who are registered as potential risk areas for stone or avalanches.
- In Valle forest, much of the eastern areas as well as some smaller areas further west also registered as a potential danger area for rocks and avalanches.
- On Skaug are registered large areas as potential hazard areas for stone or avalanches, which are used by highway 834 in several places. The proposed development area on Skaug do not, or is to be little affected by landslides.
- On the north side is the one registered rashendelse. It took place at the Race in 1977 without casualties and without touching the road.
- For Misvær area has been recorded several rasutsatte areas, which may affect both hyttebygging and road traffic along Misvær area.





Årstall – Sted - Type skred – Personskade eller død – Skade på vei

- 1700 Urdsett, fjellras, no injury, no damage to the road or construction
- 1735 Stolpe, avalanches, 2 killed no damage to the road or construction
- 1809 Bowman, avalanches, 4 killed no damage to the road or construction
- 1924 Outer Høgset, landslides, no damage to the road or construction
- 1940 Developers, avalanches, no injury, no damage to the road or construction
- 1946 Enghammaren, avalanches, 1 dead, damage to roads or facilities
- 1961 Shellac Brekke, avalanches, no personal injury, damage to roads or facilities
- 1961 Vika in Skjerstad, landslides no injury, damage to roads or facilities
- 1961 Karbøl, landslides, no injury, no damage to the road or construction
- Karbøl 1961, two landslides, no injury, no damage to the road or construction
- 1966 Avalanche River sørperas, no injury, damage to roads or facilities
- 1976 Misvær, leirras, no injury, damage to roads or facilities
- 1979 Nupen, rock fall, no injury, damage to roads or facilities
- 1989 Nupen, 2 rockslide, no injury, damage to roads or facilities
- 1989 Rognlie, landslides, no injury, damage to roads or facilities

Conclusion

Based on the statistical material is ras-/skredhendelser considered to pose a low to moderate risk. The highest risk is associated with traffic and buildings around Misvær area. A greater security will require special investigation.

Extreme weather



- Extreme weather is strong winds and rain.
- Bodø not particularly vulnerable to extreme weather, except possibly the lower Salmon River that seems highly susceptible to flooding during strong rain.
- Impacts of extreme weather will, in addition to direct damage to buildings and people, could be the triggering of landslides that can block such road, or wind conditions that lead to temporary closure of the bridge.
- Closing the communication connections will be able to lead such efforts that the time for emergency vehicles will be greater.

The fields of Rønvik



- The fields of Rønvik are now open and sometimes very windy at risk, especially with respect. east wind in winter.
- Similarly, wind-exposed areas are developed earlier in Bodø without significant problems.
- In the design of regulation and building plans, it should nevertheless be taken into account the special wind conditions so that the most sheltered living environment is achieved.

Difficult bridges



- Åslibrua and Salt Electricity bridge is most vulnerable. Åslibrua had been closed three times in the period 2003-2008. In the same period had Saltstraumen bridge was closed immediately. All closures were due to wind. It should also have occurred accidentally when the caravan has overturned unless the bridge was closed.
- There are schools and kindergartens in Saltstraumen serving the population of Straumøya, Tuv, Valnes etc..
- When the bridges are closed, this will prevent the ambulance, school bus, fire, emergency, etc.

Windfall on the North Side



- On Skaug, there are schools and kindergartens, which also serves the surrounding areas, including population Mjelle.
- School Transport etc. from Mjelle to Skaug happening over the pass on Mjelle where the road is narrow, steep and a fall breeze from the sea. The route must therefore be considered as transport-related vulnerable to the weather.

More extreme weather coming!



- It is not found in the ROS assay other consequences caused by extreme weather in Bodo.
- It must be assumed that global warming will lead to extreme situations may occur more frequently in the future (jmfr. RegClim). This is often associated with floods and high water in the area that lies near the sea or associated with rivers and major stream systems. Release of soil and rock falls may also occur more frequently

Drinking water supply may be vulnerable



- Bodø's main water supply is little affected by extreme weather.
- Flooding and landslides in råvannskilden will have consequences
- Potable water supply on the North Side from Run to Mjelle, including focus Skaug, consists of a number of small water utilities with limited capacity. Waterworks is not approved acc. current drinking water regulations.
- There is a resolution to extend the Bodø main waterworks until Mjelle.
- On Valnes water supply is limited, but it has started work on the performance of a new water pipeline.

Sewer



- When sea levels rise or we get storm surge, this could affect the drainage ensure flows.
- At the extreme precipitation may overflow problems with taking away the large amounts of water

Conclusion



- From climate plan to the masterplan
- In the harbour is taken into account that the sea will rise
- The emergency plan work, it is practiced in extreme winds, power outages and evacuations
- In all planning, risk and vulnerability are considered

Refuse and garbage disposal

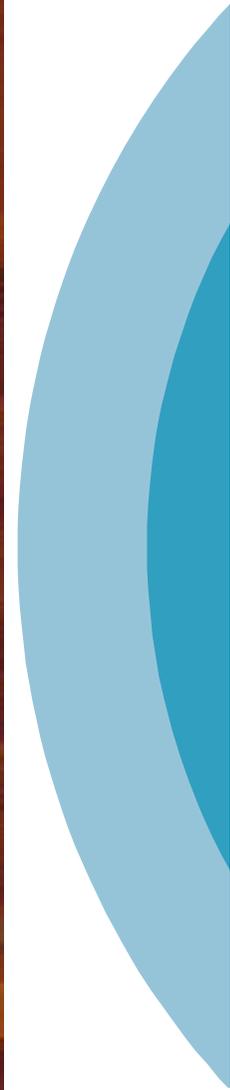
- Separate collection since 1992
- Sorted fractions of household:
 - Paper and paperboard
 - Table scraps
 - Plastic
 - Hazardous waste
 - Glass
 - Electronic Waste
 - Garden waste and wood
 - Metal
 - Waste



Sorted for recycling

- Cardboard and paper finsorters in the facility at Vikan
- Plastics are sent for recycling
- Glass used locally
- Food composted
- Garden waste mixed with compost
- Wood chips are ground up to
- Metal comes to metal recycling
- Electronics waste is sent for recycling and disposal
- Waste sent to Umeå in Sweden to the burning and energy. 14 trailers a week.





For the future

- Will reduce greenhouse gas emissions in Bodø by 10%
- Will reduce private vehicle use.
- Premiere public transport, pedestrians and cyclists
- Aiming to develop the city into a more compact city to reduce transport needs

