

# AMAP

## Preliminary Swedish Implementation Plan

### *Trend monitoring programme in Arctic areas 2000*

#### 1. Fresh Water

Swedish reference lakes are measured yearly to give a representative picture of the status situation in Sweden. Localities and parameters are selected to be representative and statistical relevant. Fish and benthic macroinvertebrates are measured together with several chemical supportive indicators.

Media	Parameters	Frequency	Location of sampling
Lake water (3 levels)	O <sub>2</sub> , Temperature, pH, conductivity, NH <sub>4</sub> , NO <sub>2</sub> -NO <sub>3</sub> , total nitrogen, total phosphorus, PO <sub>4</sub> -P, TOC, Si, Absorbance, Fe, Mn, Al, Ca, Mg, K, Na, alkalinity, SO <sub>4</sub> , Cl, F	8 times per year	Abiskojaure (Main river system: Torne Älv) High mountain region of Lapland
Lake water (1 level)	Al, Ca, Mg, K, Na, alkalinity, SO <sub>4</sub> , Cl, F, chlorofyll, transparency	8 times per year	Abiskojaure
Lake water (1 level)	Cu, Zn, Cd, Pb, Cr, Ni, Co, As, V	2 times per year	Abiskojaure
Arctic char (muscle: POP and Hg, liver: metals) Start: 1981	PCB (7 congeners), HCH (a- and lindane), HCB, sDDT, Hg, Pb, Cd, Ni, Cr, Cu, Zn, PBDE	1 time per year	Abiskojaure
Lake water	Temperature, pH, conductivity, NH <sub>4</sub> , NO <sub>2</sub> -NO <sub>3</sub> , total nitrogen, total phosphorus, PO <sub>4</sub> -P, TOC, Si, Absorbance, Fe, Mn, Al, Ca, Mg, K, Na, alkalinity, SO <sub>4</sub> , Cl, F, chlorofyll, transparency	4 times per year	Louvvajaure and Pahajärvi
Groundwater	Temp, Ph, EC, NO <sub>2</sub> +NO <sub>3</sub> , NH <sub>4</sub> , tot N, tot P, PO <sub>4</sub> , TOC, Si, Mn, Fe, Al, Ca, Mg, Na, F, SO <sub>4</sub> , Cl, Alk/anc	4 times per year	Nattavaara, Abisko, Svappavaara and Pälkem

#### 2. Atmospheric

The objectives of the national monitoring programmes are

- to follow and describe the state of air and precipitation quality and identify the changes caused by human activities;
- to provide a basis for identifying and assessing environmental threats from local to the global level and identify the sources of pollutants, internationally and nationally;
- to provide a basis for actions designed to ensure a sustainable development of society;
- to follow up the effects of measurements and actions that are introduced by central agencies and regional and local authorities

The national programme is more directly designed to satisfy the monitoring within international agreements and convention, for example AMAP.

<b>Media</b>	<b>Parameters</b>	<b>Frequency</b>	<b>Location of sampling</b>
Air/aerosol	SO <sub>2</sub> , NO <sub>2</sub>	Daily	Esränge
Air/aerosol	Ozone	Continuous	Esränge
Air/aerosol	SO <sub>2</sub> -S (gas), SO <sub>4</sub> -S (part), sot (part), NO <sub>2</sub> -N (gas)	Daily	Esränge
Air/aerosol	SO <sub>2</sub> -S (gas), NO <sub>2</sub> -N (gas)	Monthly	Pålkem
Bulk precipitation	Wet deposition, pH, H <sup>+</sup> , Cl, NO <sub>3</sub> -N, SO <sub>4</sub> -S, ExSO <sub>4</sub> -S, NH <sub>4</sub> -N, Ca, Mg, Na, K	Monthly	Abisko, Ammarnäs, Pålkem, Reivo, Ammarnäs
Bulk precipitation and air/aerosol	PAH (11 substances), PCB (7 congeners), α-, γ-HCH, HCB, DDE, DDT, chlordane, trans-nonachlor,	1 week/month	Pallas
Air/aerosol	Hg (particulate)	Every other week	Pallas
Air/aerosol	Hg (gaseous)	1 day / week	Pallas
Bulk precipitation	Hg	Monthly	Pallas
Mosses	As, Cd, Cr, Cu, Fe, Pb, Ni, V, Zn,	Every 5th year	Several location in Northern Sweden
Air/aerosol	CO <sub>2</sub> , particle concentration, soot, light dispersion capacity, MSA (methane sulphonate), NO <sub>3</sub> , SO <sub>4</sub> , Cl, Na, NH <sub>4</sub> and K		Svalbard

### 3. Terrestrial ecosystems

The aim is to monitor changes over time.

<b>Media</b>	<b>Parameters</b>	<b>Frequency</b>	<b>Location of sampling</b>
Reindeer (liver: metals, muscle: Hg) Start: 1981	Al, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, V, Zn, Hg	1 time per year	Abisko area

#### Effects Media and Parameters

The aim is to monitor forest damage and site quality for sustainable forestry

<b>Media</b>	<b>Parameters</b>	<b>Frequency</b>	<b>Location of sampling</b>
Forest (Acidification)	Defoliation	Every 10th year	systematic sample grid
Forest (Acidification)	Discoloration	Every 10th year	systematic sample grid
Forest (Acidification)	Easily identifiable damage	Every 10th year	systematic sample grid
Forest (Acidification)	Foliar analyses	Every 10th year	systematic sample grid
Forest (Acidification)	Ground vegetation	Every 10th year	systematic sample grid
Forest (Acidification)	Increment	Every 10th year	systematic sample grid

## 4. Radioactivity

Media	Parameters	Frequency	Location of sampling	Programme and/or responsible institute
Atmospheric (air/aerosol)	Gammanuclides	continuous	Riksgränsen (Katterjåkk), Kiruna, Pajala, Jokkmokk (Tjåmotis)	SSI
Atmospheric (precipitation/fallout)	Gammanuclides		Kiruna	FOA
Milk	<sup>90</sup> Sr, <sup>137</sup> Cs		Hedenäset	SSI