

Sustained Arctic Observing Networks (SAON) Phase II:

Inventory of observing sites, systems and networks in Norway



Compiled by

Norwegian Pollution Control Authority

September 2009

Arctic Observing Networks (SAON) Phase II:

Inventory of Observing Sites, Systems & Networks

The Arctic Council has agreed to establish a formal body, in partnership with IASC and WMO, to continue the development of Sustained Arctic Observing Networks (SAON). This body – the SAON Steering Group (SAON SG) – was formed in May 2009 and consists of national coordinators representing the eight Arctic countries, permanent participants in the Arctic Council, and representatives of the Arctic Council working groups. With the inclusion of representatives from IASC and WMO, the SAON SG is also connected to the Arctic science, observing and data management activities and interests of the non-Arctic countries, as well as to global observing systems.

The SAON SG is the successor to the SAON IG (Initiating Group), which organized a consultative process during International Polar Year 2007-2009 that culminated in a set of recommendations for the development of Sustained Arctic Observing Networks. This survey continues the process of gathering information that will assist the SAON SG as it strives to facilitate the development of SAON and the realisation of Arctic and global value-added services and benefits. The SAON SG relies on information and advice from those who operate observing sites, systems and networks, provide data and information management services, and use the observing data and information.

The survey consists of two questions and an inventory form requesting some basic information about your Arctic observing site, system or network, or data and information management activity. Please take the time to complete the survey and help the SAON SG to best serve the Arctic observing community of operators and users. The questions are:

1. How can the SAON SG best assist you, and what do you see as the role of the SAON SG?
 2. What are the critical issues facing your observing program or data and information management program? Please limit your response to a brief description of no more than 3 critical issues.
- The answers are included in the fact sheets, but so far there are few answers. We can come back with further information on these matters later in the SAON process

The form is intended to register basic information about observing sites, systems and networks, and data and information management archives/centres, that are interested in contributing to the development of Sustained Arctic Observing Networks (SAON). The information will later become available at the SAON Web site - www.arcticobserving.org The inventory focusses on existing and planned observing sites and networks that are, or have the potential to become, pan-Arctic in scope.

The Norwegian approach

Norwegian Pollution Control Authority (NPCA) has coordinated and compiled the information on Norwegian monitoring programmes and networks that can deliver data to SAON. Both institutions serving under the Ministry of Environment, other ministries and research institutes have participated.

For the different monitoring programmes and networks we have generally presented the activity in the whole country, not only north of the arctic circle. This makes it possible to use the Norwegian data in assessments in gradients, long range transport, regional trends etc. Most of the monitoring presented in this report is part of a national programme run by the same operator. This enhances comparability of the data, in some cases over a distance of 2000 kilometers or more from south to the north.

We have in most cases presented a map showing the localities observed in the programmes. The maps show the recent activities in a programme. They do not show changes in approach or stations. A large part of these data are coming from monitoring programmes established twenty five to fifteen years ago, sometimes longer, and they are still running.

Our systems for environmental data will follow the standards and principles of SEIS and INSPIRE

NPCA and the Norwegian Directorate of Nature Management are at the moment establishing a database for limnic and marine environmental data in cooperation with. This base is developed to serve the implementation of the EU Water Framework directive in Norway, and it will be available through Internet within the end of 2009. It will contain chemical and biological data, including metadata, and improve the practical availability of our data for different reporting obligations, including AMAP. The database is part of a cooperation on information technology between agencies and directorates across several ministries. Through this co-operation data will be shared for use and assessments related to the national water management plans.

When the limnic and marine database is well established we will focus on making our air and soil monitoring data available through Internet in the same way.

The Norwegian observing sites and monitoring programs in this survey are for a large part public services, funded by the involved ministries: Ministry of the Environment, Ministry of Fisheries and Coastal Research and Ministry of Education and Research. To some extent the research institutes involved get supplementary money for specific projects of shorter duration from the Research Council of Norway or similar institutions in EU or internationally. The fact-sheets in this survey have information on contact persons in the different institutions that can provide further information. You may also contact Ola Glesne in NPCA (ola.glesne@sft.no) on this matter.

Information from NILU on availability of air monitoring data

All nations with atmospheric monitoring sites operate national and official repositories where data are available upon request. For parameters required by international monitoring programmes, there is further reporting to specified databases. Such programmes include AMAP, OSPAR and EMEP, as well as the WMO-GAW programme. NILU act as the chemical coordination centre of EMEP, and has also responsibilities to operate the data centre for AMAP, OSPAR and HELCOM. Since 2009, NILU will also be the World data centre for Aerosols under the WMO-GAW programme. In addition, NILU has on a service contract from the European commission developed a global database where also access to North-American and Asian data is possible. The database can be accessed at <http://ebas.nilu.no>, but only public datasets are available without login. The site also provides information about the projects from where data originate as well as the procedures on how to get access to data with restrictions. The EBAS database also forms one of the key infrastructures in the GEOMON One-Stop-Shop for atmospheric composition data (www.geomon.eu).

SAON: Inventory of Interested Networks

Name and acronym: Synoptic meteorological observations, including radiosonde observations.

Contact person at The Norwegian Meteorological Institute (met.no): Cecilie Stenersen (cecilie.stenersen@met.no).

Web site: <http://eklima.met.no/>

Main objective of the network: Weather forecasting.

Member/connected to global network: WMO GTS.

Type of activity:

- Theme: Atmosphere

Main variables:

- Jan Mayen
 - Synoptic weather station (upgraded 2008)
 - Hourly automatic observations: Temperature, Pressure, Wind, Humidity
 - Manual observations every 3 hour: Precipitation, Snow depth, Clouds, Weather, Visibility
 - Radiosonde observations.
- Bjørnøya
 - Synoptic weather station
 - Manual observations every hour: Temperature, Pressure, Humidity, Precipitation, Snow depth, Clouds, Weather, Visibility
 - Radiosonde observations.
- Hopen
 - Synoptic weather station
 - Manual observations every third hour: Temperature, Pressure, Humidity, Precipitation, Clouds, Weather, Visibility
- Edgeøya, Verlegenuken og Karl XII
 - Automatic station with observations every third hour: Temperature, Pressure, Wind, Humidity. Stations are currently not active due to budget constraints.
- Ny-Ålesund AWS
 - Synoptic weather station
 - Automatic observations every third hour: Temperature, Pressure, Wind, Humidity, Precipitation
 - Manual observations every third hour: Precipitation, Snow depth, Clouds, Weather, Visibility
 - Radiosonde station.
- Svea air port (Owned by Store Norske Spitsbergen Kulkompani AS)
 - Automatic observations: Temperature, Pressure, Wind, Humidity.
- Svalbard air port (Owned by Avinor).
 - Synoptic station.

- Automatic observations every hour: Temperature, Pressure, Wind, Humidity
 - Manual observations every third hour: Precipitation, Snow depth, Clouds, Weather, Visibility
- Hornsund (Owned by Geophysical institute, Poland.)
- Synoptic station Manual observations every third hour: Temperature, Pressure, Humidity, Precipitation, Snow depth, Clouds, Weather, Visibility

In addition data from vessels in the area are reported and AMDAR from SAS aircrafts serving Longyearbyen are reported.

Geographical coverage: Norway, various islands within the Greenland Sea and Barents Sea.

Data archive/center: Norwegian Meteorological Institute (<http://www.met.no/>).

Data availability: Data are available on WMO GTS and through public electronic interfaces at METNO.

Main gaps: These observations are operational observations of METNO.

SAON: Inventory of Interested Networks

Name and acronym: Monitoring of broadband longwave and shortwave radiance at METNO Arctic stations.

Contact person at the Norwegian Meteorological Institute, Øystein Godøy (o.godoy@met.no).

Web site: <http://dokipy.met.no/projects/iaaos-norway/radflux.html>

Main objective of the network:

1. Provision of algorithm tuning and validation data for EUMETSAT OSISAF radiative fluxes products (<http://saf.met.no/>).
2. Provision of validation data for numerical weather prediction models.
3. Generation of time series for use in time series analysis of atmospheric radiative conditions within the framework of the IPY projects iAOOS-Norway and IPY-THORPEX.
4. Validation data for studying ocean and atmosphere heat exchange processes using bulk parameterisations.

Member/connected to global network: Data are quality controlled and made available on regular basis through the Norwegian contribution to IPY Data and Information Service using the METNO node which is available at <http://dokipy.met.no/>.

Type of activity:

- Theme: Atmosphere
- Location(s): See attached map.

Main variables: Downward broadband shortwave and longwave radiance at the surface is measured using Kipp and Zonen CMP21 and CGR4 sensors. Data are transmitted in real time to Oslo, Norway for quality control and reformatting into NetCDF/CF. Instruments are located at the Arctic meteorological stations operated by METNO and the radiance values can be collocated with standard synoptic weather measurements.

Geographical coverage: Norway, islands within the Greenland Sea and Barents Sea.

Data archive/center: Norwegian Meteorological Institute (<http://www.met.no/>).

Data availability: Metadata and data are published regularly through <http://dokipy.met.no/>, metadata are exposed using OAI-PMH through IPYDIS (<http://www.ipydis.org/>). Data are quality controlled and formatted in NetCDF/CF.

Main gaps: These observations are funded through IPY projects (iAOOS-Norway and IPY-THORPEX). No longterm funding is available. The observations at Bjørnøya started April 2008, Jan Mayen October 2008 and Hopen is scheduled 2009.

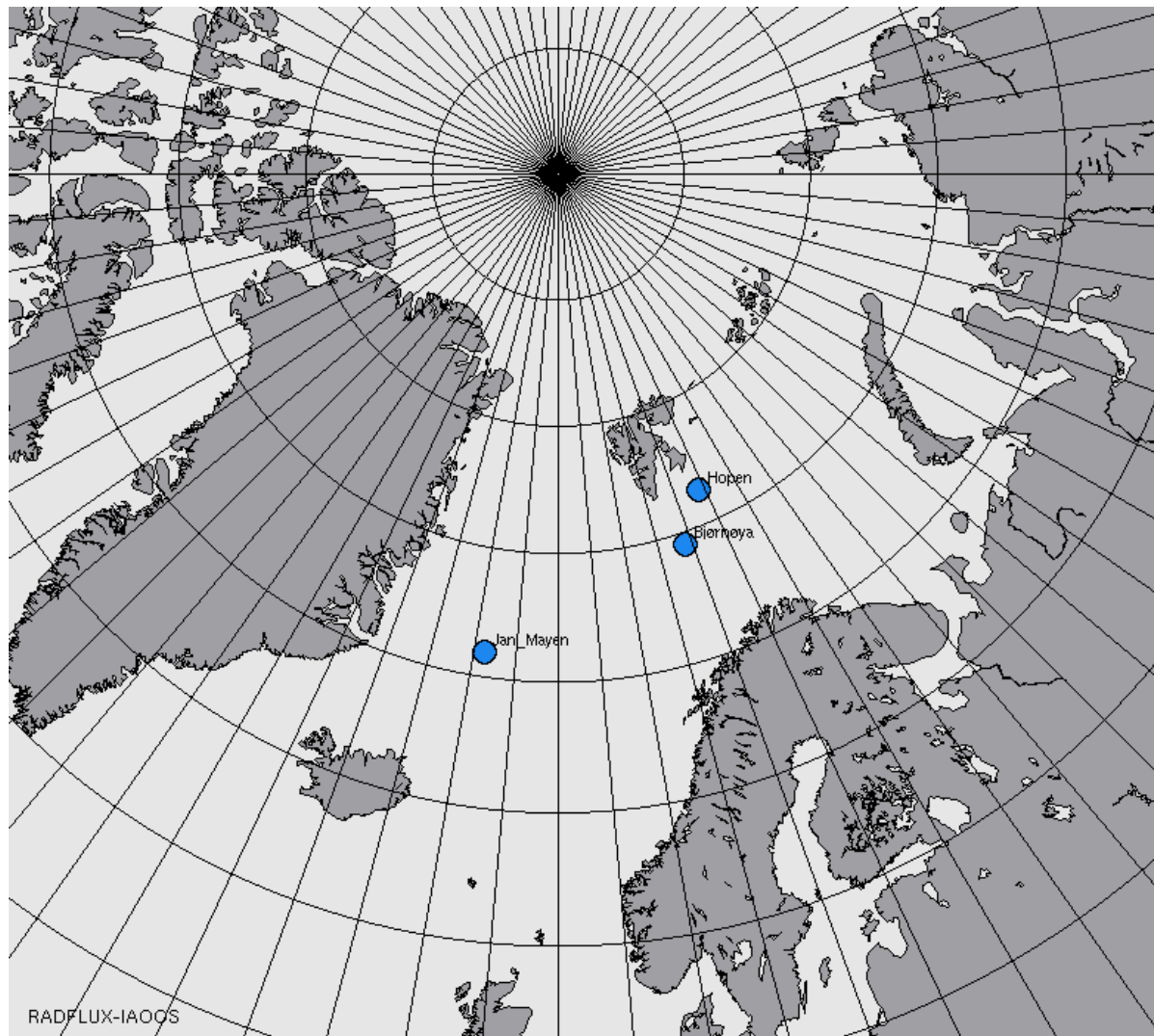


Figure: Arctic stations in Monitoring of Broadband Longwave and Shortwave Radiance at METNO.

SAON: Inventory of Interested Networks

Name and acronym: Greenhouse gas monitoring¹

Contact person (e-mail): At Norwegian Protection Control Authority (NPCA): Ola Glesne (ola.glesne@sft.no). The programme is operated by Norwegian Institute for Air Research (NILU) on behalf of NPCA. Contact person: Cathrine Lund Myhre (clm@nilu.no)

Web site: http://www.sft.no/artikkel_37039.aspx.

Reports from the programme: http://www.sft.no/program_37058.aspx

Main objective of the network: Continuous measurements of green house gasses and particles to report changes in the atmosphere.

Member of or connected to a global network: Data from the monitoring activities are processed and used as input data to the Kyoto and the Montreal protocols. The measurements are a part of the AGAGE network.

Type of activity:

- Theme: Atmosphere
- Location: New Aalesund, Spitsbergen (see map).
- Community-based: No
- Coordination: NILU is directly involved in sampling, analyses and reporting

Main variables: The measurement programme includes 4 CFCs, 3 HCFCs, 3 HFCs, 2 halons, 7 other hydrogenated hydrocarbons SF₆, CO, N₂O, CH₄, H₂, O₃, wind, temperature, RH, aerosol optical depth (AOD). These observations are partly included in the national monitoring programme, and partly activities financed and performed on the initiative of NILU.

Also measurements of carbon dioxide (CO₂), aerosol number and size distribution, light attenuation ("black carbon"), light scattering are performed at the observatory. These measurements are under the responsibility of ITM, University of Stockholm.

When operational: 1999. Operated by Norwegian Institute of Air Research (NILU) on behalf of Norwegian Pollution Control Authority (NPCA)

Geographical coverage (countries): Situated at the Zeppelin mountain close to Ny-Ålesund at Svalbard. The station is a major contributor of data on a global as well as a regional scale.

Data archive (data center): Norwegian Institute of Air Research (www.nilu.no). The main database is ebas.nilu.no

Data availability: All Norwegian data, including metadata are public after their release through annual reporting in SFT data reports.

¹ Norwegian name: Overvåking av klimagasser



Figure: Location of the New Ålesund greenhouse gas monitoring

SAON: Inventory of Interested Networks

Name and acronym: Monitoring of the atmospheric ozone layer and natural ultraviolet radiation²

Contact person (e-mail): This is a cooperation between Norwegian Radiation Protection Authority (NRPA) and Norwegian Protection Control Authority (NPCA). Contact person at NRPA: (anne.rudjord@nrpa.no). Contact person at NPCA: Ola Glesne (ola.glesne@sft.no). The UV monitoring network is operated by Norwegian Institute of Air Research (NILU) on behalf of NPCA and NRPA. NRPA is responsible for the quality calibration and the quality control of the UV monitoring instruments. Contact person at NILU: Cathrine Lund Myhre, clm@nilu.no.

Web site (Norwegian only): At NPCA: http://www.sft.no/artikkel_37042.aspx At NRPA: <http://www.nrpa.no/index.asp?startID=&topExpand=&subExpand=&strUrl=/applications/system/publish/view/showobject.asp?infoobjectid=1000141&context=15&menuid=1000084>
 Reports from the programme: http://www.sft.no/program_37062.aspx

Main objective of the network:

- Provide continuous measurements of high scientific quality of total ozone and solar ultraviolet radiation, to be used in assessments related to health- and environmental issues.
- Provide data that can be used for short term forecasting and assessments of long term changes of total ozone and UV radiation.
- Provide information to the public and scientific community on the status and the development of the ozone layer and UV radiation
- Provide information to the public on sun protection when episodes of high UV Index may occur.

Member/connected to global network: Data are reported to the World Ozone and Ultraviolet Radiation Data Centre (WOUDC) and available for the evaluation of the Montreal Protocol.

Type of activity:

- Theme: Atmosphere
- Location(s): See attached map.
- Community-based: No
- Coordination: NRPA and NILU are directly involved in sampling, analyses and reporting.

Main variables: The monitoring programme UV radiation measurements (UVI and daily doses) at nine locations from 58 to 78 degrees North, measurements of total ozone at two locations and ozone profiles measurements at one location. There are two monitoring stations north of the Arctic circle: Andøya (69 degrees North) and Ny-Ålesund (78 degrees North). The station at Andøya measures all mentioned parameters. Data from the UV monitoring instrument in Ny-Ålesund is officially no longer reported, but data is collected and quality assurance and quality control routines are maintained.

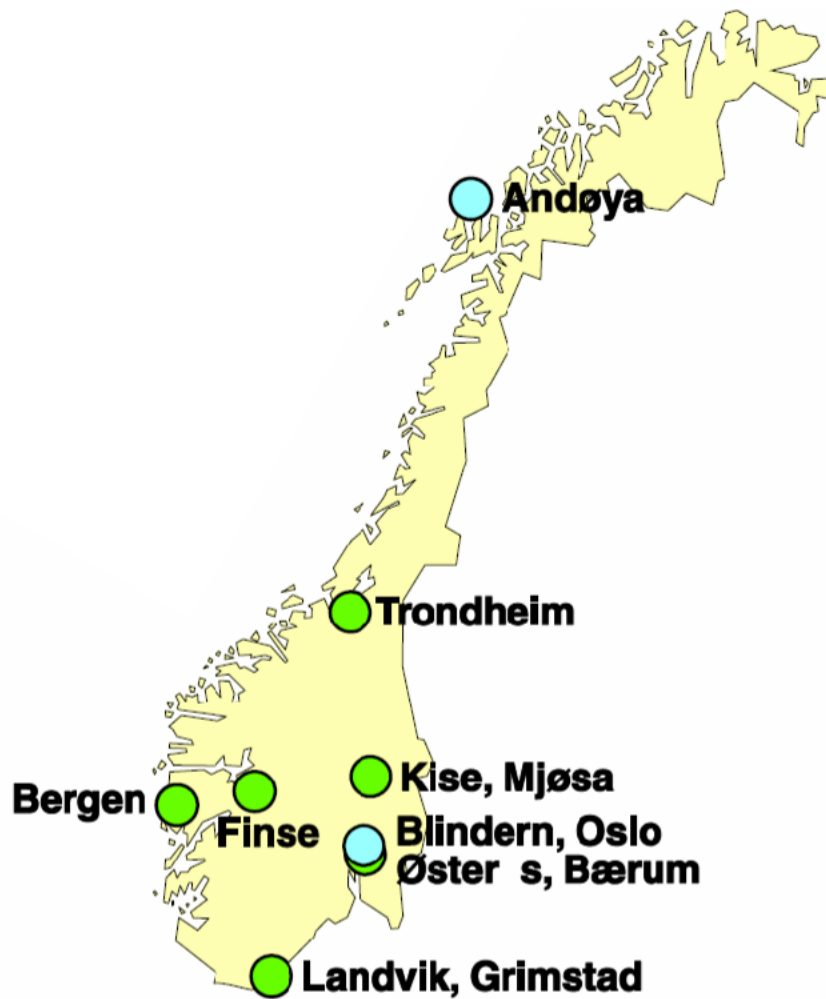
When operational: The national ozone monitoring, from 1995 supplemented with UV monitoring instruments, was established in 1990, which at that time included measurements of total ozone only (Oslo and Tromsø/Andøya). In 1995/96 a national UV monitoring network of seven stations were established, including the two existing ozone stations. The network was later extended with two more stations (1999 and 2002), whereas the UV monitoring in Tromsø was terminated and restarted at Andøya from 2000. Two sites have trend analyses of total ozone (Oslo from 1979 and Andøya from 1994).

² Norwegian name: Overvåking av ozonlaget og naturlig UV-stråling

Geographical coverage: Northern and Southern Norway.

Data archive/center: Norwegian Institute of Air Research: <http://www.nilu.no> and Norwegian Radiation Protection Authority <http://www.nrpa.no/index.asp>, and <http://www.nrpa.no/uvnett/>

Data availability: All data, including meta-data.



*Figure: Sites in the Norwegian monitoring of the atmospheric ozone layer and natural ultraviolet radiation. Blue dots: Operated by Norwegian Institute of Air Research
Green dots: Operated by Norwegian Radiation Protection Authority*

SAON: Inventory of Interested Networks

Name and acronym: Monitoring of long range transboundary air pollution.³

Contact person (e-mail): At Norwegian Protection Control Authority (NPCA): Ola Glesne (ola.glesne@sft.no). The programme is operated by Norwegian Institute for Air Research (NILU) on behalf of NPCA. Contact person (e-mail): Wenche Aas (waa@nilu.no)

Web site: http://www.sft.no/artikkel_37041.aspx

Reports from the programme: http://www.sft.no/program_37060.aspx

Main objective of the network: To watch trends in concentrations of long range transboundary pollution in air and precipitation and report the results.

Member of or connected to a global network: The UN-ECE convention on long range transboundary air pollution and the UN Stockholm protocol.

Type of activity:

- Theme: Atmosphere
- Locations: See attached map. This also shows what is measured on each station.
- Community-based: No
- Coordination: NILU is directly involved in sampling, analyses and reporting. NILU is also data centre for EMEP, AMAP and OSPAR CAMP

Main variables in air: Inorganic compounds (SO₄, sNO₃, sNH₄, Na, Mg, Ca, K), ground level ozone, heavy metals (As, Cd, Co, Cr, Cu, Hg, Pb, Ni, V, Zn). POPs in air: Heksahlorcykloheksane (HCH, 2 isomers), chlordanes (4 isomers), heksachlorbenzene (HCB), DDT (6 isomers), polychlorinated biphenyls (PCB, 32 congeners) and polycyclic aromatic hydrocarbons (PAHs, 38 components).

Main variables in precipitation: Inorganic compounds (SO₄, NO₃, NH₄, Na, Mg, Ca, K, Cl, pH, conductivity)

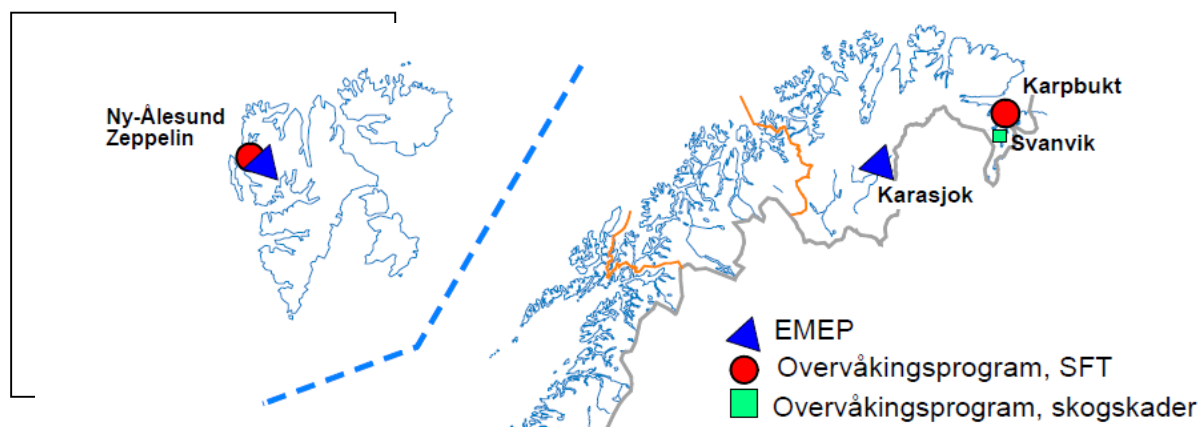
When operational: For some parameters data exist back to 1973. continuous long term monitoring data are available from 1908 and onwards. The programme has gradually had some changes during the years.

Geographical coverage: Norway, including Spitsbergen

Data archive/centre: NILU (www.nilu.no)

Data availability: All data, including metadata.

Main gaps, e.g., geographic coverage, variables: There are new, hazardous organic substances that should be covered by air monitoring.



Tungm. = heavy metals, *Organisk* = Organic, hazardous compounds.

SAON: Inventory of Interested Networks

Name and acronym: Air deposition of heavy metals in Norway – Monitoring in mosses⁴

Contact person (e-mail): At Norwegian Protection Control Authority (NPCA): Ola Glesne (ola.glesne@sft.no). The programme is operated by Norwegian University of Science and Technology (contact person: torunn.berg@chem.ntnu.no) in cooperation with Norwegian Institute for Air Research (NILU) on behalf of NPCA.

Web site: http://www.sft.no/artikkel_37053.aspx

Reports from the programme: http://www.sft.no/program_37072.aspx

Main objective of the network: Survey trends in deposition of long range transported heavy metals and other elements in Norway. For this purpose concentrations in mosses are measured. In year 2000 and 2005 extra samples were taken in areas with metallurgic industry to map the local level of deposition.

Member of or connected to a global network: Results are reported to UN ECE LRTAP, and to the Stockholm convention when relevant.

Type of activity:

- Theme: Atmosphere, Terrestrial ecosystem, including fresh water.
- Locations: In 2005 464 locations were sampled.
- Community-based: No
- Coordination: Norwegian University of Science and Technology is directly involved in sampling, analyses and reporting in cooperation with NILU.

Main variables: Vanadium, chrome, iron, cobalt, nickel, copper, zinc, gallium, arsenic, cadmium, mercury, lead, antimony. In addition 42 other elements in 2005.

When operational: The survey is performed in 1977, 1985, 1990, 1995, 2000 and 2005.

Geographical coverage: Norway. For some of the years a Nordic cooperation has ensured Nordic data sampling from the same year.

Data archive/centre: NPCA (contact person ola.glesne@sft.no)

Data availability: All data, including metadata

⁴ Norwegian name: Overvåking av tungmetaller i mose

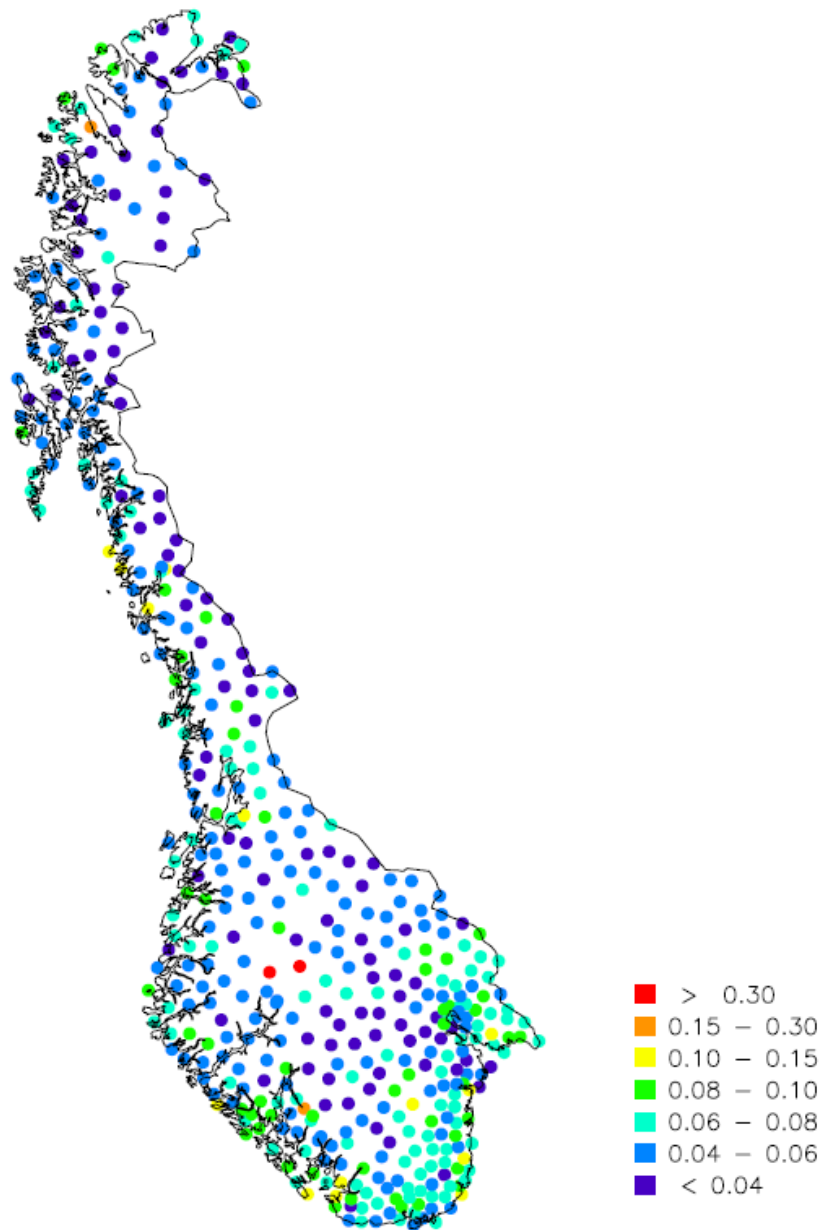


Figure: Sites inselected for mapping of atmospheric deposistion og hevvy metals and other elements in Norway. The example shows the concentrations of mercury.

SAON: Inventory of Interested Networks

Name and acronym: The Terrestrial Ecosystems Monitoring Programme (TOV)⁵

Contact person at the Directorate for Nature Management (DN): Reidar Hindrum
(reidar.hindrum@dirnat.no)

Web site (if any) <http://www.dirnat.no/content.ap?thisId=1838&language=0> and <http://www.nina.no/>

Main objective of the network: TOV shall provide knowledge about long-term changes of nature and if possible to link changes and pressures from:

- acid precipitation (sulphur and nitrogen)
- long-range transboundary pollution (metals and organic)
- climate change
- land-use
- cumulative effects of pressures

TOV has a focus on common habitats and species, mainly in forest and mountain areas.

Member of or connected to a global network; if yes, which: partly reported to the Convention of Biological Diversity (CBD) and European Environmental Agency (EEA).

Type of activity:

- Theme: Terrestrial ecosystem, including freshwater
- Location(s): See attached map.
- Community-based: No.
- Coordination: NIVA is directly involved in sampling, analyses and reporting

Main variables: Vegetation mapping and analysis, topography, soil chemistry, soil physics, rodent censuses, breeding success of selected raptors, population density of willow grouse, population density of passerine birds, extensive monitoring of breeding terrestrial birds, quicksilver and organic pollutants in raptors (egg analysis).

When operational: Since 1988, annually.

Geographical coverage: Northern and Southern Norway.

Data archive/centre, including Web site: Directorate for Nature Management www.dirnat.no and Norwegian Institute for Nature Research www.NINA.no

Data availability: All data, including meta-data.

⁵ Norwegian name.: Terrestrisk naturovervåking (TOV)



Figure: Geographical locations of the intensive study sites of the Norwegian Terrestrial Monitoring Programme TOV

SAON: Inventory of Interested Networks

Name and acronym: Radiocativity in air.

Contact person in Norwegian Radiation Protection Authority (NRPA): Bredo Møller
(bredo.moller@nrpa.no)

Web site (if any) <http://radnett.nrpa.no/>

Main objective of the network: To monitor radioactivity in the air

Member of the CBSS network for data exchange. (CBSS: Council for Baltic Sea States)

Type of activity:

- Theme: Atmosphere
- Locations: 28 stations in Norway
- Community-based: No
- Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP):

Main variables: Radioactivity in air

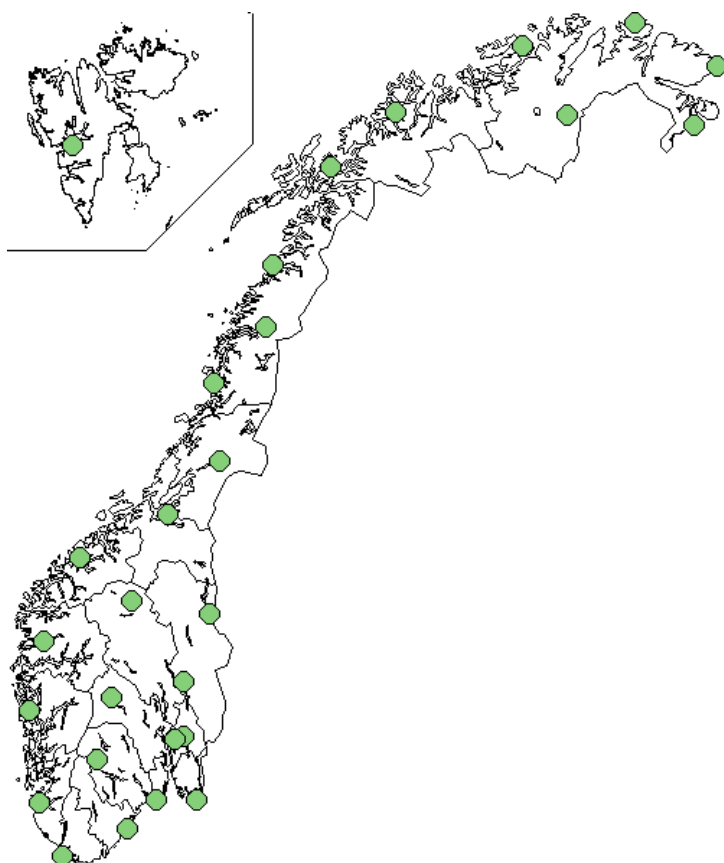
When operational (year): Operating since 1986, upgraded in 2006

Geographical coverage (countries) Norway

Data archive/centre, including Web site: <http://radnett.nrpa.no/>

Data availability: All data, including meta-data.

See map of the activity in Norway on the next page.



Name and acronym: Monitoring of long-range transboundary air pollution, effects in water⁶

Contact person (e-mail): At Norwegian Protection Control Authority (NPCA): Ola Glesne (ola.glesne@sft.no). The programme is operated by Norwegian Institute for Water Research (NIVA) on behalf of NPCA. Contact person: Brit Lisa Skjelkvåle (bls@niva.no)

Web site: http://www.sft.no/artikkel_37041.aspx
 Reports: http://www.sft.no/program_37060.aspx

Main objective of the network: To detect changes in concentrations of chemical parameters in surface waters (rivers and lakes) related to changes in anthropogenic deposition input from long-range transboundary air pollution, in particular sulphur and nitrogen. The results are used as a basis to understand the biological responses to changes in acid deposition input.

Member/connected to global network: UNECE Convention of long-range transboundary air pollution. Data reports to ICP Waters, ICP IM and ICP Modelling and mapping and the EU Water Framework directive.

Type of activity:

- Theme: Lakes and rivers
- Locations: See attached map.
- Community-based: No, only data on concentrations and effects.
- Coordination: NIVA is directly involved in sampling, analyses and reporting

Main variables: The monitoring programme includes measurements of:

- Cations: Ca, Mg, Na, K, NH₄, Al (reactive Al, Inorganic and organic bound)
- Anions: Cl, SO₄, NO₃, PO₄
- Other: Organic Carbon (TOC), Total N

When operational: The programme was established in 1980. Today (2009) 2 rivers sampling 12-16 per year), 7 calibrated catchments (sampling one time per week) and about 80 lakes (sampling one time per year in the autumn) are included in the monitoring programme.

Once every 10 year a larger number of lakes are included (1986:1000 lakes, 1995:1500 lakes, 2004/06: 300 lakes)

Geographical coverage (countries): Norway.

Data archive/center: Norwegian Institute for Water Research: <http://www.niva.no>

Data availability: All data, including meta-data.

⁶ Norwegian name: Overvåking av langtransportert forurenset luft og nedbør effekter i ferskvann

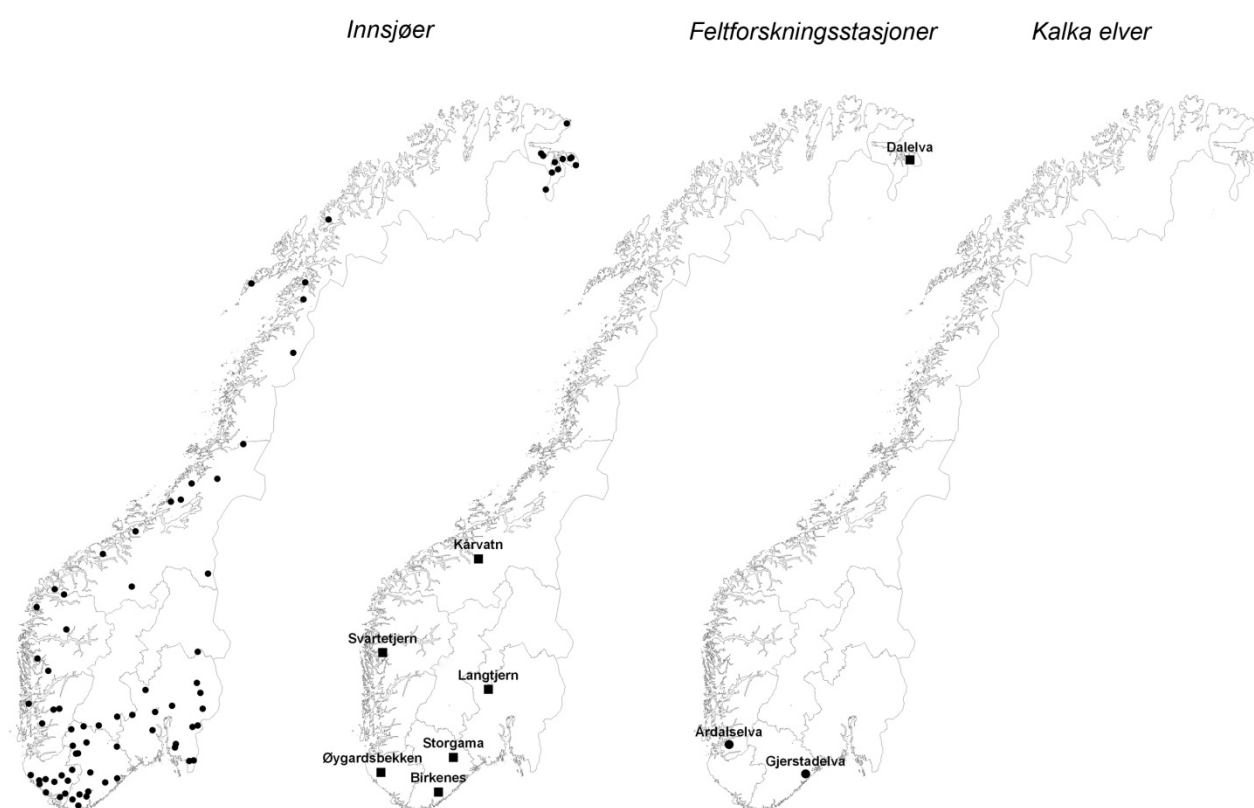


Figure: Locations in the surface water monitoring programme 2008.
Dictionary: Innsjøer = lakes, Feltforskningsstasjoner = Intensive monitoring of small watersheds, Kalka elver = Acidified rivers treated with lime.

SAON: Inventory of Interested Networks

Name and acronym: Monitoring of long-range transboundary air pollution, hazardous substances in lakes⁷

Contact person (e-mail): At Norwegian Protection Control Authority (NPCA): Ola Glesne (ola.glesne@sft.no). The programme is operated by Norwegian Institute for Water Research (NIVA) on behalf of NPCA. Contact person: Sigurd Rognerud (sro@niva.no)

Web site (if any): http://www.sft.no/artikkel_37050.aspx

Reports: http://www.sft.no/program_37069.aspx

Main objective of the network: To detect changes in concentrations of metals and POPs in lake sediments

Member/connected to global network: UNECE Convention of long-range transboundary air pollution. Data reports to ICP Waters, ICP Modelling and mapping.

Type of activity:

- Theme: Lakes
- Locations: See attached map.
- Community-based: No, only data on concentrations.
- Coordination: NIVA is directly involved in sampling, analyses and reporting

Main variables: The monitoring programme includes measurements of approximately 50 metals and and some few POPs (mainly PAH, PCB)

When operational (year): The programme was established in 1986.

1986/87: 210 lakes - Pb, Hg, Cd, Ni in surface and reference sediments

1996/97: 235 lakes – 25 metals in surface and reference sediments

2004/06: 274 lakes – approx 50 metals and PCB and PAH in surface and reference sediments.

Geographical coverage (countries): Norway, including Bear Island and Spitsbergen

Data archive/center: Norwegian Institute for Water Research: <http://www.niva.no>

Data availability: All data, including meta-data.

⁷ Norwegian name: Overvåking av langtransportert forurensset luft og nedbør, miljøgifter

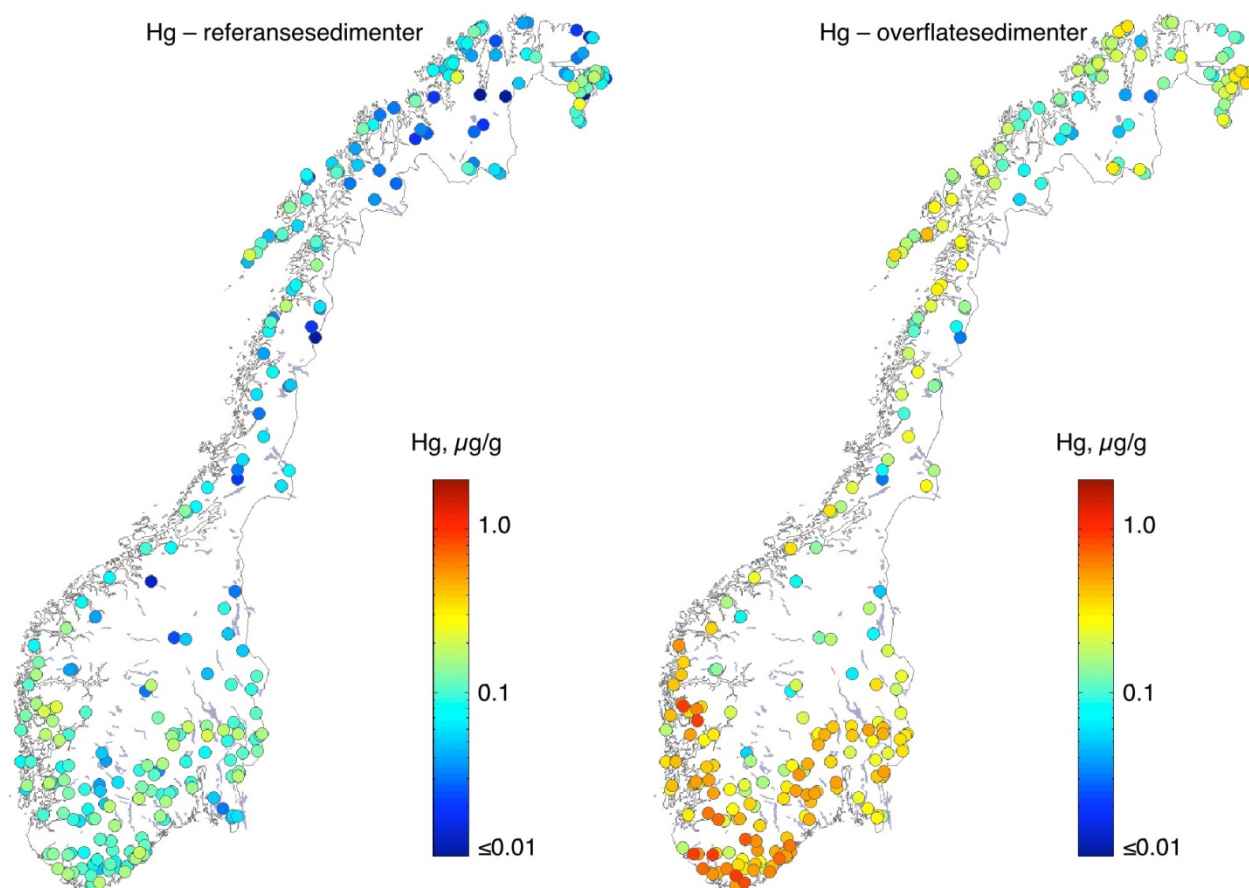


Figure: Locations of lakes in mainland Norway for sediment sampling in 2004/06. Reference sediments to the left and surface sediments at right. Locations in Spitsbergen and Jan Mayen were also included.

SAON: Inventory of Interested Networks

Name and acronym: Monitoring environmental pollutants in freshwater fish in Norway⁸

Contact person (e-mail): At Norwegian Protection Control Authority (NPCA): Ola Glesne (ola.glesne@sft.no). The programme is operated by Norwegian Institute for Water Research (NIVA) on behalf of NPCA. Contact person: Eirik Fjeld (efj@niva.no)

Web site (if any): http://www.sft.no/artikkel_37051.aspx

Reports: http://www.sft.no/program_37069.aspx

Main objective of the network: To detect changes in concentrations of POPs in freshwater fish due to changes in atmospheric or local anthropogenic input.

Member/connected to global network: UNECE Convention of long-range transboundary air pollution. Data reports to ICP Waters.

Type of activity:

- Theme: Lakes
- Location(s): See attached map.
- Community-based: No, only data on concentrations.
- Coordination: NIVA is directly involved in sampling, analyses and reporting

Main variables: PCB, DDT, Toxaphene, Chlordane, HCB, HCH, Dioxins, MeHg, PBDE ++

When operational (year): There is no regular monitoring of environmental pollutants in fish. However results from different projects funded by SFT are systematically orginies at NIVA from the first projects since the beginning of the 1990's. approx 100 lakes are cuurently in the database with analytical results from one or several years.

Geographical coverage (countries): Norway, including Bear Island and Spitsbergen

Data archive/center: Norwegian Institute for Water Research: <http://www.niva.no>

Data availability: All data, including meta-data.

⁸ Norwegian name: Overvåking av miljøgifter i ferskvannsfisk

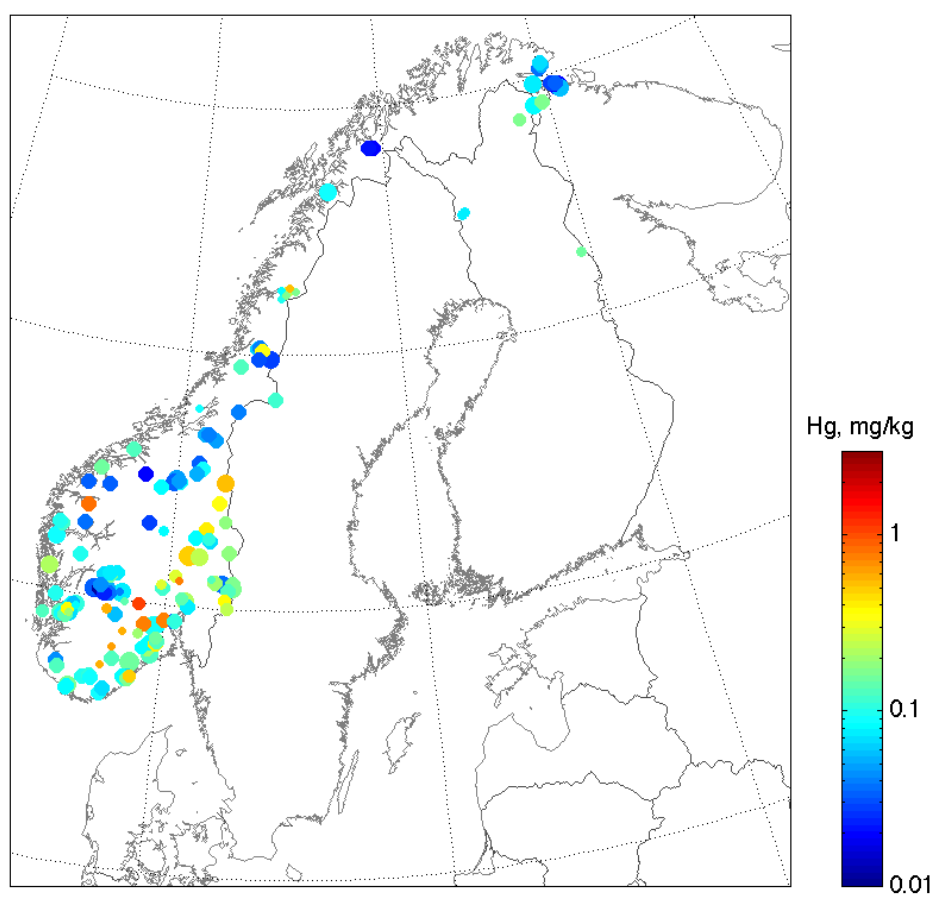


Figure: Locations of lakes for investigation of mercury in fish.

SAON: Inventory of Interested Networks

Name and acronym: Riverine inputs and direct discharges to Norwegian coastal waters (RID)⁹

Contact person (e-mail): At Norwegian Protection Control Authority (NPCA): Ola Glesne (ola.glesne@sft.no). The programme is operated by Norwegian Institute for Water Research (NIVA) on behalf of NPCA. Contact person (e-mail): Øyvind Kaste (oka@niva.no)

Web site (if any): http://www.sft.no/artikkel_37045.aspx

Reports: http://www.sft.no/program_37064.aspx

Main objective of the network: The main objective of the RID monitoring programme is to monitor and assess the riverine and direct inputs of selected pollutants to the Norwegian part of OSPAR's Maritime Area. The entire study area (i.e. main Norwegian land area) is divided into the following four coastal areas/sub-regions: Skagerak, North Sea, Norwegian Sea, and Barents Sea.

Member/connected to global network, if yes which: OSPAR commission and the EU Water Framework directive.

Type of activity:

- Theme: Monitoring of river export
- Location(s): See attached map.
- Community-based: No, only data on concentrations.
- Coordination: NIVA is directly involved in sampling, analyses and reporting

Main variables:

- Six fractions of nutrients (total phosphorus, orthophosphates, total nitrogen, ammonium, nitrate + nitrite and silicate)
- Eight heavy metals (copper, zinc, cadmium, lead, chromium, nickel, mercury and arsenic)
- One pesticide (lindane)
- Seven PCB compounds (CB28, CB52, CB101, CB118, CB138, CB153, CB180)
- Four general parameters; suspended particulate matter (S.P.M.), pH, conductivity and total organic carbon (TOC).

When operational: Annual monitoring since 1990.

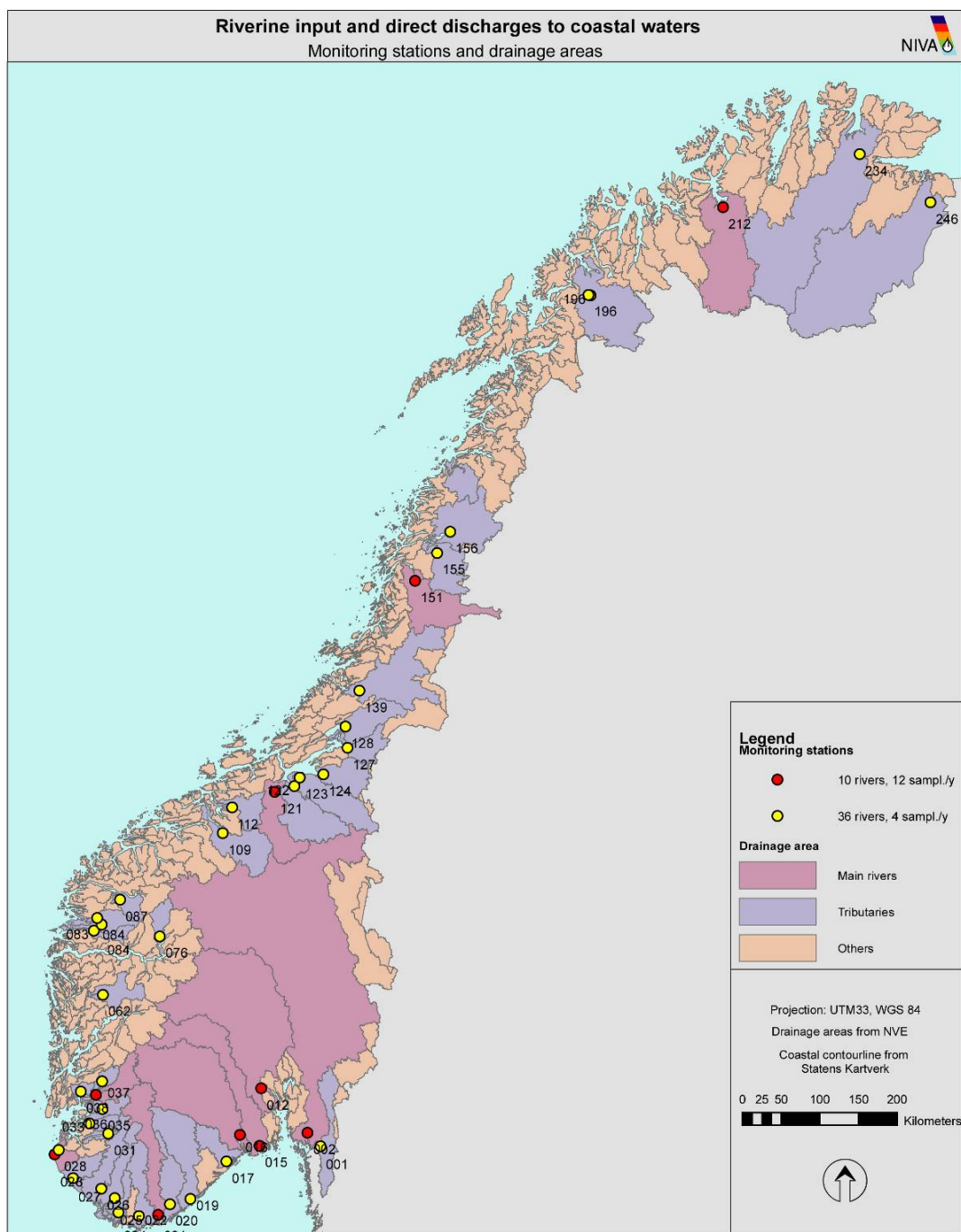
Geographical coverage (countries): Northern and Southern Norway (see attached map)

The monitoring in rivers is carried out in 10 so-called 'main rivers' with monthly sampling; and 36 so-called 'tributary rivers' with sampling 4 times a year. The catchment areas of these 46 rivers constitute about 50% of the Norwegian area draining to the Convention waters. The inputs from the remaining areas are estimated by the Teofil model. This includes direct discharges from wastewater treatment plants, industry and fish farming.

Data archive/center: Norwegian Institute for Water Research: <http://www.niva.no> and Norwegian Pollution Control Authority <http://www.sft.no/>

Data availability: All data, including meta-data.

⁹ Norwegian name: Overvåking av elvetilførsler til norske havområder



River sampling sites in the Norwegian RID programme. Red dots represent the 10 main rivers. Yellow dots represent the 36 'tributary' rivers. Numbers next to the dots refer to the national river register (REGINE; www.nve.no).

SAON: Inventory of Interested Networks

Name and acronym: Coordinated Environmental Monitoring Programme (CEMP)¹⁰

Contact person (e-mail): At Norwegian Protection Control Authority (NPCA): Ola Glesne (ola.glesne@sft.no). The programme is operated by Norwegian Institute for Water Research (NIVA) on behalf of NPCA. Contact person: Norman Green (norman.green@niva.no).

Web site: http://www.sft.no/artikkel_37048.aspx

Main objective of the network: To assess the effects, levels and trends of hazardous substances in marine sediment and biota. The indicator organisms include blue mussel, dogwhelk, cod and plaice. The monitoring sites are mostly coastal and the frequency of sampling is mostly annually for biota and every 10-15 years for sediment.

Member of or connected to a global network; if yes, which: The results are forwarded to OSPAR, via ICES and the EU Water Framework directive.

Type of activity:

- Theme: Coastal
- Locations: See attached map. Above the arctic circle 45 sites – sediment (12), blue mussel (14), dog whelk (13), plaice (2) and cod (4).
- Community-based: No.
- Coordination: NIVA is directly involved in sampling, analyses and imposex investigations.

Main variables: Substances include heavy metals, organo-tin compounds and persistent organic pollutants including PCBs, PAHs, HCB, DDTs, pesticides, and to a lesser degree PFC, BFR and degree dioxins.

When operational (year): Since 1992

Geographical coverage (countries): Norwegian coast, and from 2009 some islands in the Barents Sea.

Data archive/centre, including Web site: SFT: www.sft.no and ICES.

Data availability: All data, including existing metadata.

Main gaps, e.g., geographic coverage, variables: Protected areas and offshore monitoring are generally not included under the CEMP but offshore monitoring is somewhat covered by IMR/NIFES programmes. Not all substances under EU's Water Framework Directive and Marine Strategy Directive are monitored regularly. Biological effects monitoring is lacking except for IMPOSEX investigations.

¹⁰ Norwegian name: Overvåking av miljøgifter langs kysten.

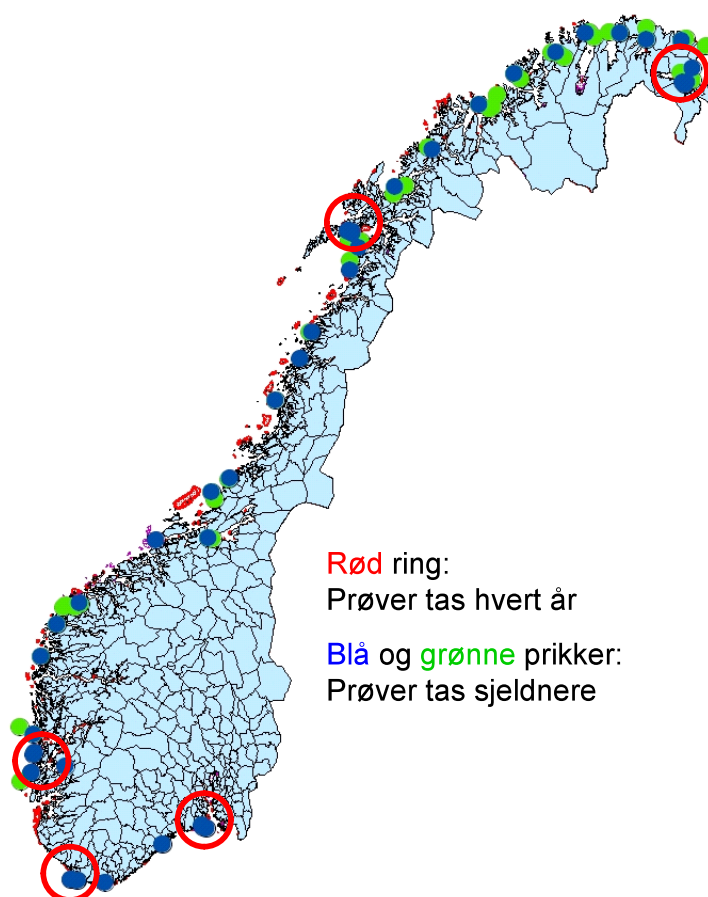


Figure: Location of monitoring sites. Red circle shows localities sampled each year. Blue and green dots are sampled less frequently.

Inventory of interested Networks

Name and acronym: Radioactivity in the Marine Environment (RAME) and Monitoring of terrestrial and freshwater systems

Contact person at Norwegian Radiation Protection Authority (NRPA): Anne Liv Rudjord
(anne.rudjord@nrpa.no)

Web site: www.nrpa.no

Main objective of the network:

- To document levels and trends of radioactivity in the environment
- Basis for reports to international organisations (mainly OSPAR)
- Inform authorities, media and the public in general about status of radioactive contamination

Member of or connected to a global network; if yes, which: Marine data are reported to OSPAR
Radioactive Substances Committee

Type of activity:

- Themes: Terrestrial ecosystem, including freshwater, Marine ecosystem and abiotic samples (sea water and sediments), Coastal and Ocean
- Location(s): Reference areas in the terrestrial environment in Northern Norway (Finnmark, Troms), Coastal stations (see map), Open sea stations Barents Sea, Norwegian Sea, North Sea , each area surveyed every 3.rd year
- Community based: No
- Coordination: NRPA

Main variables:

Radioactivity in terrestrial environment: (Mainly Cs-137) in soil samples, freshwater fish, plants, lichen and mushrooms, reindeer and other mammals.

Radioactivity in the marine environment: (A range of manmade and naturally occurring radionuclides) in sea water, sediment, fish, seaweed and other marine biota.

When operational (year): 1999 and 2001 for the marine and terrestrial part of the programme respectively.

Geographical coverage: Norway

Data archive/centre, including Web site: www.NRPA.no

Data availability: Results are presented in annual reports, NRPA.no and Miljostatus.no

How can the SAON SG best assist you? What do you see as the role of the SAON SG?
Promote coordination and harmonization of environmental monitoring in the arctic region

What are the critical issues facing your observing program or data and information management program?

- available research ships – suitable platforms for sampling
- norwegian-russian cooperation
- further development of suitable GIS and database systems



Figure: Coastal sampling stations in RAME

SAON: Inventory of Interested Networks

Name and acronym: Monitoring of ocean climate of the Barents Sea

This is a cooperation between Institute of Marine Research (IMR) in Norway (Contact person Randi Ingvaldsen, randi.ingvaldsen@imr.no) and Polar Research Institute of Marine Fisheries and Oceanography (PINRO) in Russia.

Main objective of the network:

1. Describe water mass distribution and properties
2. Document ocean climate variability as part of long time series
3. Relate ocean climate variability to variation in recruitment, growth, condition and size of commercial fish stocks

Type of activity:

Theme: Marine ecosystem

Location: Southern and central Barents Sea – mainly in Norwegian sector (see map below).

Community-based: No

Coordination: Coordinated under the Joint Norway-Russia Fisheries Commission.

Main variables: CTD profiles. Measurements at fixed hydrographic transects (Fugløy-Bjørnøya; Vardø N) and as areal surveys in winter and fall. Current measurements from moorings at the transect Fugløy – Bjørnøya.

When operational: In order to ensure the comparability of observation results and to estimate seasonal and year-to-year variations in oceanographic variables, it was suggested in Stockholm as early as 1899 that measurements should be made at standard depths and on standard sections. At the beginning of the 20-th century observations commenced on the Kola Section in the Barents Sea (Knipovich 1906), and by the 1930s, a network of such sections had been developed in the area, see joint PINRI/IMR report, State of the Barents Sea Ecosystem in 2007, Stiansen et al. 2008: http://www.imr.no/publikasjoner/andre_publicasjoner/imr-pinro_samarbeidsrapporter/nb-no

In the last decades also zooplankton is sampled at some of these sections. An overview of length, observation frequency and present measured variables for the standard sections in the Barents Sea is given in the table below.

Table: Overview of the standard sections monitored by IMR and PINRO in the Barents Sea, with observed parameters. Parameters are: T-temperature, S-Salinity, N-nutrients, chl-a-chlorophyll, zoo-zooplankton.

Section	Institution	Time period	Observation frequency	parameters
Fugløy-Bear Island	IMR	1977-present	6 times per year*	T,S,N,chla,zoo
North cape-Bear Island	PINRO	1929-present	1-26 times pr year	T,S
Bear Island-East	PINRO	1936-present	1-15 times per year	T,S
Vardø-North	IMR	1977-present	4 times pr year**	T,S,N,chla
Kola	PINRO	1900-present	2-30 times pr year	T,S,O,N, zoo
Kanin	PINRO	1936-present	1-11 times pr year	T,S
Sem Islands	IMR	1977-present	Intermittently***	T,S

* Taken once per year back to 1953, ** Taken once per year back to 1964, *** The Sem Island section is not observed each year

Operation: Observations are taken by IMR from research vessels. The programme is carried out in cooperation with Russia (PINRO) coordinated under the Joint Norway-Russia Fisheries Commission. The current meter moorings are shifted once a year.

Geographical coverage: Norwegian EEZ of Barents Sea including waters around Svalbard. The joint programme with Russia covers much of the Barents Sea (southern, central, and much of northern part in fall).

Data archive/centre: Norwegian Data Centre (at IMR)

Data availability: All data, including meta-data.

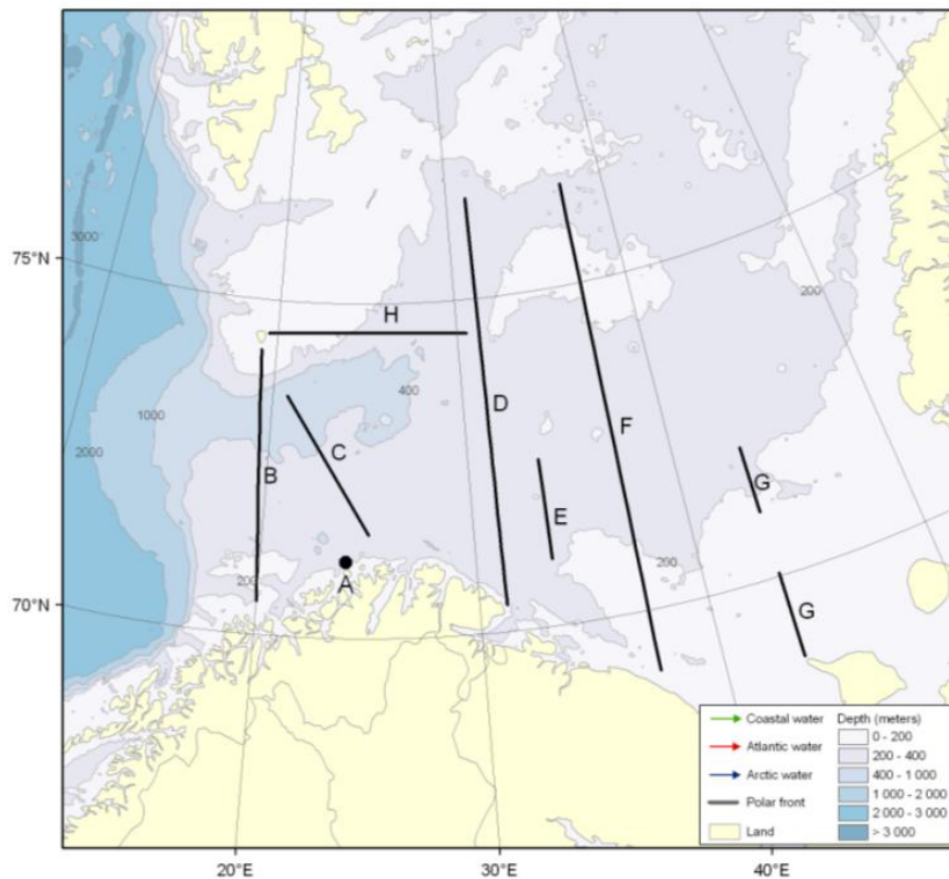


Figure: Positions of the standard sections monitored in the Barents Sea. B is Fugløy-Bear Island, C is North cape-Bear Island, D is Vardø-North, E is Kola, F is Sem Island-North, G is Kanin section and H is Bear Island-East section.

SAON: Inventory of Interested Networks

Name and acronym: Monitoring of zooplankton biomass and composition in the Barents Sea

This is a cooperation between Institute of Marine Research (IMR) in Norway (contact person Tor Knutsen, tor.knutsen@imr.no) and Polar Research Institute of Marine Fisheries and Oceanography (PINRO) in Russia.

Main objective of the network:

1. Determine amount and distribution of zooplankton biomass (in three size fractions).
2. Describe abundance of dominant zooplankton species.
3. Determine annual variation in zooplankton biomass and feeding conditions of plankton-feeding fishes.

Type of activity:

- Theme: Marine ecosystem
- Location: Southern and central Barents Sea – mainly in Norwegian sector. (See example of results below)
- Community-based: No
- Coordination: Coordinated under the Joint Norway-Russia Fisheries Commission.

Main variables: Zooplankton collected with two types of nets (vertical and depth-stratified. Samples split in two parts, for determination of biomass and species composition, respectively. Biomass determined as dry weight in 3 size fractions (<1, 1-2 and >2 mm (mesh size in screen)). Species composition determined in selected samples; the rest is stored in a sample archive for retrospective analyses (e.g. of major ecosystem changes such as collapse of capelin stock). Sampling at fixed hydrographic transects (Fugløy-Bjørnøya; Vardø N) and as areal survey in fall.

When operational: Programme started in 1987.

Operation: Observations are taken by IMR from research vessels. The programme is carried out in cooperation with Russia (PINRO).

Geographical coverage (countries): Norwegian EEZ of Barents Sea. The joint programme with Russia covers much of the Barents Sea (southern, central, and much of northern part in fall).

Data archive/centre: Norwegian Data Centre (at IMR)

Data availability: All data, including meta-data.

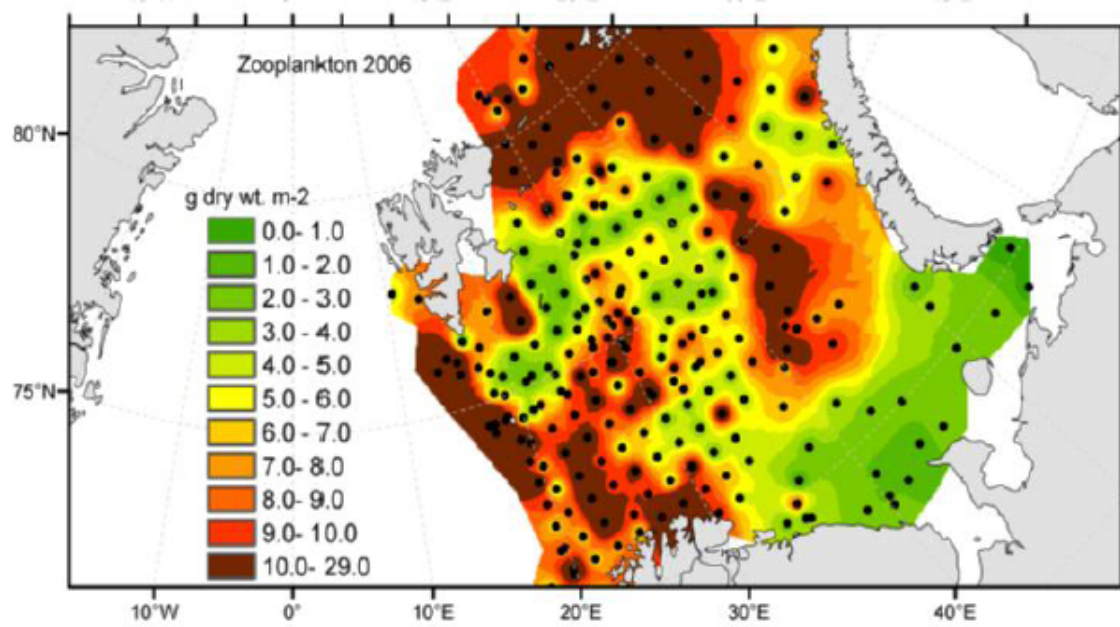


Figure: Example of results - Distribution of zooplankton in the Barents Sea 2006

SAON: Inventory of Interested Networks

Name and acronym: Monitoring of commercial fish stocks in the Barents Sea

This is a cooperation between Institute of Marine Research (IMR) in Norway (contact person Ingolf Røttingen, ingolf.rottingen@imr.no) and Polar Research Institute of Marine Fisheries and Oceanography (PINRO) in Russia.

Main objective of the network:

- Determine amount and distribution of commercial fish stocks
- Describe abundance of biodiversity (benthos, fish, whale, zooplankton, phytoplankton, shellfish)
- Determine annual variation in commercial fish biomass and feeding conditions for these fish species.

Type of activity: Surveys, annual stock assessments

- Theme: Marine ecosystem
- Location: Southern and central Barents Sea – mainly in Norwegian sector.
- Community-based: No
- Coordination: Coordinated under the Joint Norway-Russia Fisheries Commission.

Main variables: CTD profiles. Measurements at fixed hydrographic transects (Fugløya-Bjørnøya; Vardø N) and as area surveys in winter and fall.

Table: Overview of conducted monitoring surveys by IMR and PINRO in the Barents Sea, with observed parameters and species. Species in bold are target species. For zooplankton, mammals and benthos abundance and distribution for many species are investigated. Therefore, in the table it is only indicated whether sampling is conducted or not. Parameters are: T-temperature, S-Salinity, N-nutrients, chla-chlorophyll.

Survey	Institution	Period	Climate	Phyto-plankton	Zoo-plankton	Juvenile fish	Target fish stocks	Mammals	Benthos
Norwegian/Russian winter survey	Joint	Feb-Mar	T,S	N, chla	intermittent	All commercial species and some additional	Cod, Haddock	-	-
Lofoten survey	IMR	Mar-Apr	T,S	-	-		Cod, haddock, saithe	-	-
Ecosystem survey	Joint	Aug-Oct	T,S	N,chla	Yes	All commercial species and some additional	All commercial species and some additional	Yes	Yes
Norwegian coastal surveys	IMR	Oct-Nov	T,S	N,chla	Yes	Herring, sprat, demersal species	Saithe, coastal cod	-	-
Autumn-winter trawl-acoustic survey	PINRO	Oct-Des	T,S	-	Yes	Demersal species	Demersal species	-	-
Norwegian Greenland halibut survey	IMR	Aug	-	-	-	-	Greenland halibut, redfish	-	-

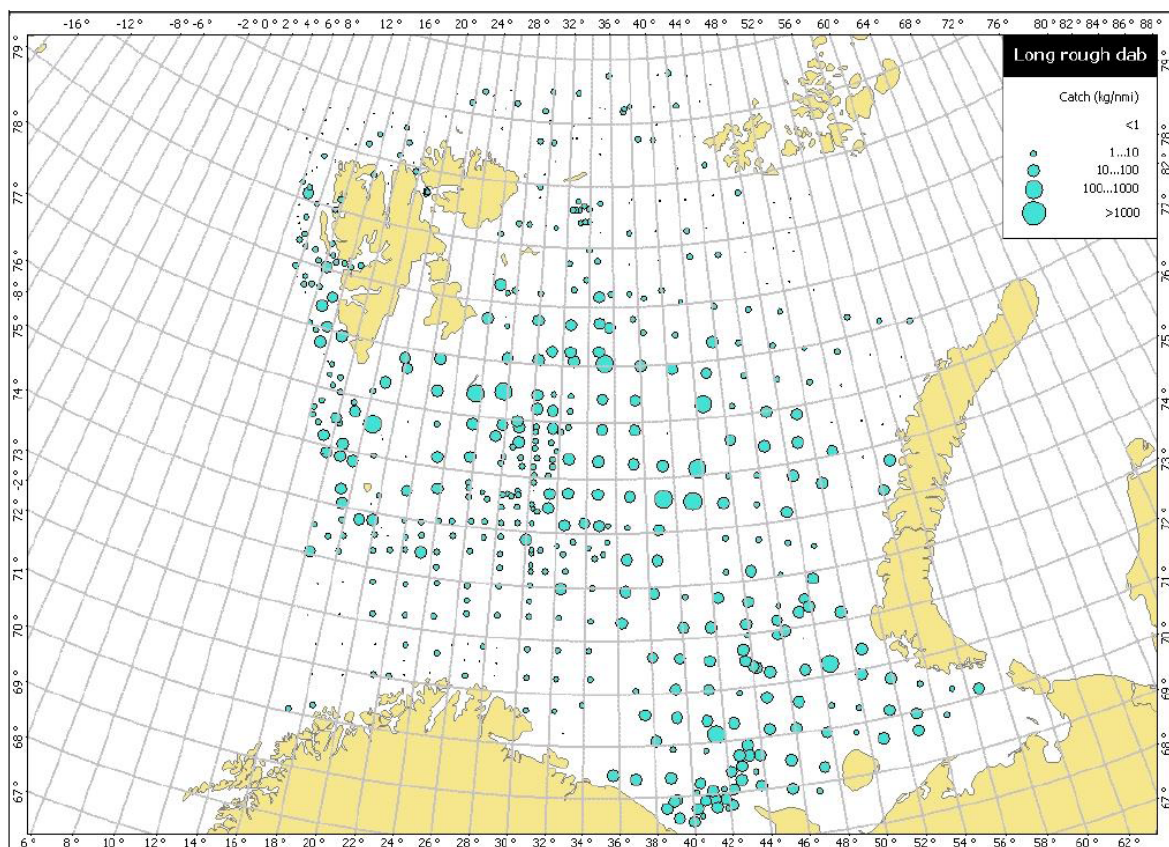
When operational: Area surveys are conducted throughout the year. The number of vessels in each survey differs, not only between surveys but may also change from year to year for the same survey. However, most surveys are conducted with only one vessel. It is not possible to measure all ecosystem components during each survey. Effort is always put on measuring as many species as possible on each survey, but available time put restrictions on what is possible to accomplish. Also, an investigation should not take too long time in order to give a synoptic picture of the conditions. Therefore the surveys must focus on a specific set of species. Other measured species may therefore not have optimal coverage and thereby increased uncertainty, but will still give important information. An overview of the measured species on each main survey is given in the table above.

Operation: Observations are taken by IMR from research vessels. The programme is carried out in cooperation with Russia (PINRO) coordinated under the Joint Norway-Russia Fisheries Commission. Assessment of commercial stocks are conducted through ICES.

Geographical coverage: Norwegian EEZ of Barents Sea including waters around Svalbard. The joint programme with Russia covers much of the Barents Sea (southern, central, and much of northern part in fall).

Data archive/centre: Norwegian Data Centre (at IMR)

Data availability: All data, including meta-data.



Example of results: Distribution of long rough dab, from ecosystem survey in August – September 2007

SAON: Inventory of Interested Networks

Name and acronym: Monitoring of oil and hazardous substances transport into and status in Norwegian coastal and oceanic waters¹¹

Contact person at Norwegian Pollution Control Authority (NPCA): Erik Syvertsen (erik.syvertsen@sft.no). The programme is operated by Norwegian Institute for Water Research (NIVA) on behalf of NPCA in cooperation with Norwegian Institute of Air Research (NILU), Norwegian Institute of Marine Research (IMR), The National Institute of Nutrition and Seafood Research (NIFES) and Norwegian Radiation Protection Authority (NRPA).

Web site: <http://www.sft.no/Aktuelt/Nyheter/2009/Juni/Mer-helhetlig-overvaking-av-kyst-og-hav/?cid=10607>

Main objectives of the network:

1. Monitor transport of oil and hazardous substances from all sources into Norwegian coastal and oceanic waters through modelling, calculations and measurements.
2. Monitor contaminant status in selected indicators (biota, sediments, water, air, acidification).
3. Collect samples for the Norwegian Environmental Sample Bank.
4. Supply data for the Norwegian Integrated Management Plans

Member of global network: LRTAP (EMEP), OSPAR (CAMP), AMAP, RAME.

Type of activity:

- Themes: Atmosphere, marine ecosystem, coastal, ocean
- Locations: Norwegian marine waters (see attached map).
- Community-based: No
- Coordination: Norwegian Institute of Water Research (NIVA).

Variables measured in air:

- Main components: SO₂, SO₄²⁻, Sum (NO₃⁻+HNO₃), Sum (NH₄⁺+NH₃), CO, NO₂, Na⁺, Cl⁻, K⁺, Ca⁺⁺, Mg⁺⁺
- Hazardous organic substances, gas + particulate: PAH (minimum PAH-16), α-Heksaklorsykloheksan (HCH), γ-heksaklorsykloheksan (HCH), tr-chlordane, cis-chlordane, tr-nonachlor, cis-nonachlor, HCB, PCB-7, polybromated diphenyl ethers (PBDE, minimum included BDE-47,99,100,153,154,183,196, 206, 209)
- Hazardous organic substances, particulate: PFOS, 6:2 FTS, PFOSA, PFBS, PFHxS, PFDcS, PFBA, PFHxA, PFHpA, PFOA, PFNA, PFDcA, PFUnA,
- Heavy metals: Pb, Hg, Cd, Zn, Cu, Ni, Cr, Co, As, Mn, V
- Measured by passive sampling at Andøya, Bjørnøya and Jan Mayen: PAH-16, α-HCH, γ-HCH, HCB, PCB-7, PBDE (Minimum included BDE-47,99,100,153,154,183,196,206,209)

Variables measured in precipitation:

- Main components: pH, Conductivity, SO₄⁻, NO₃⁻, NH₄⁺, Na⁺, Cl⁻, K⁺, Ca⁺⁺, Mg⁺⁺
- Hazardous organic substances: α-HCH, γ-HCH, HCB, PCB-7

Variables measured in cod (Gadus morhua):

- Heavy metals: Fat weight, Cd, Pb, Cu, Zn, Ni, As, Hg,
- Hazardous organic substances: Fat weight, PCB (CB-28,-52,-101,-105,-118,-138,-153,-156,-180), 5-CB, α-HCH, γ-HCH, HCB, DDT, DDD, DDE, PBDE (minimum included: BDE-28, 47, 99, 100, 153 154, 183, 196, 206 and 209), PFOS, 6:2 FTS, PFOSA, PFBS, PFHxS, PFDcS, PFBA, PFHxA, PFHpA, PFOA, PFNA, PFDcA, PFUnA.
- Radioactivity: Cs-137, Po-210

Variables measured in water:

¹¹ Norwegian name: Tilførselsprogrammet for norske havområder

- Radiocativity: Ra-226, Po-210, Pu-239/240, Am-241, Ra-228, PB-210, Sr-90, Tc-99, Cs-137
Variables measured in sediments:

- Main components: Dry matter, total organic carbon,
- Heavy metals: Cd, Pb, Cu, Zn, Ni, As, Hg, Al (as normalisation parameter)
- Hazardous organic substances: PCB (CB-28,-52,-101,-105,-118,-138,-153,-156,-180), α -HCH, γ -HCH, HCB, DDT, DDD, DDE, THC, PBDE (minimum included: BDE-28, 47, 99, 100, 153 154, 183, 196, 206 og 209), PFOS
- Radioactivity: Cs-137, Pu-239/240, Am-241, Ra-226, Pb210

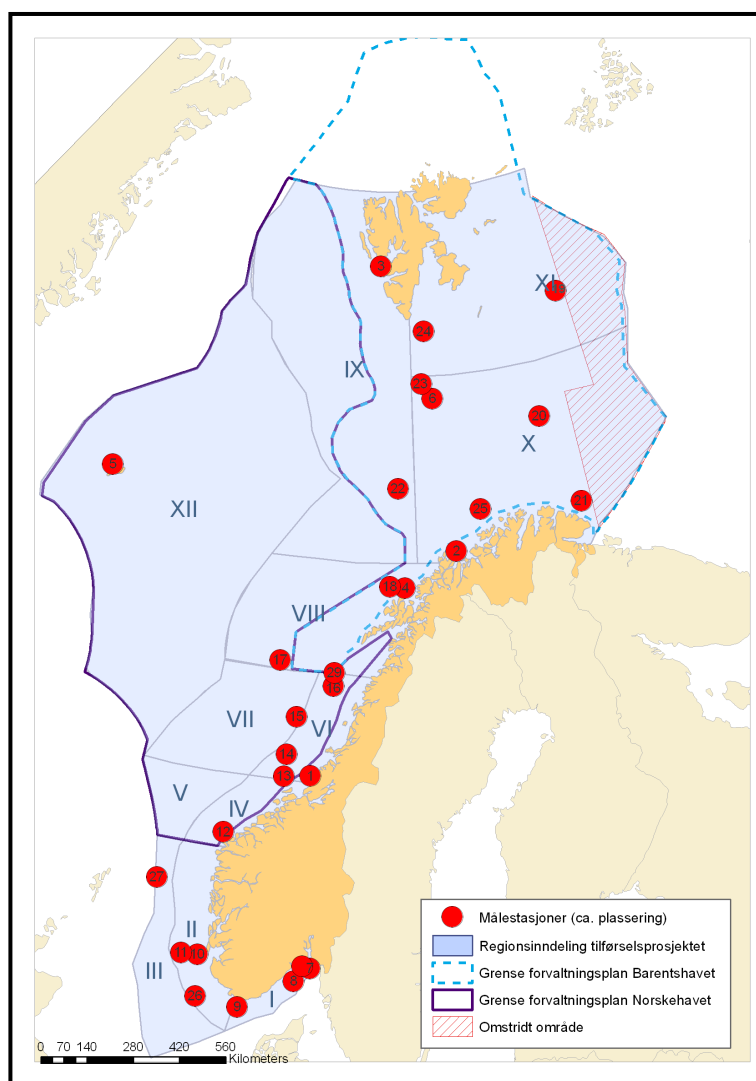
Some additional parameters are included in the programme certain years.

When operational: Start up in 2009, with focus on Lofoten-Barents Sea,

Geographical coverage: Norwegian marine waters (see map)

Data archive/centre, including Web site: Not decided. Data availability: All data, including metadata

Main gaps, e.g., geographic coverage, variables: New stations/indicators/parameters will be included when needed in the integrated management plans



Question 1: How can the SAON SG best assist you? This will be assessed later.

Question 2: What are the critical issues facing your observing program or data and information management program? Securing long time financing and cooperation between participants.

SAON: Inventory of Interested Networks

Name and acronym: Circumpolar Biodiversity Monitoring Program (CBMP), Marine Expert Monitoring Group (MEMG)

Contact person in Norway: Mr. Reidar Hindrum at the Directorate for Nature Management: (reidar.hindrum@dirnat.no) and US: Dr. Kathleen Crane (Kathy.Crane@noaa.gov)

Web site (if any) <http://cbmp.arcticportal.org/>

Main objective of the network: CBMP is an international network of scientists, government agencies, Indigenous organizations and conservation groups working together to harmonize and integrate efforts to monitor the Arctic's living resources. The MEMG is preparing an Integrated Monitoring Plan (IMP) for the marine environment.

Member of or connected to a global network: AC/CAFF

Type of activity:

- Theme: Marine ecosystem, Coastal, Ocean, Cryosphere, Human and socio-economic.
- Location(s): Atlantic Arctic Gateway, Pacific Arctic Gateway, Beaufort Sea/Amundsen Gulf/Viscount Melville/Queen Maud, Arctic Basin, Hudson Complex, West Greenland Arctic Gateway (see also table attached)
- Community-based: yes
- Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP): CAFF and CBMP Secreariate

Main variables: biodiversity and biodiversity related data from existing national and international programmes.

When operational: MEMG since 2008; monitoring program not operational yet.

Geographical coverage (countries): focal marine sea areas(ecosystems in the Arctic. Countries involved: US, Canada, Greenland, Russia and Norway (Iceland joining soon).

Marine Ecosystems	Areas included
Atlantic Arctic gateway	Barents Sea incl. selected fjords west and east of Spitsbergen, Greenland Sea, Fram Strait
Pacific Arctic Gateway	Chukchi-East Siberian Sea, Beaufort Sea, Northern Bering Sea
West Greenland Arctic Gateway	Baffin Bay, Davis Strait, Lancaster Sound
Arctic Basin/North Pole	
Hudson Complex	Hudson Bay, Foxe Basin, Hudson Strait
Beaufort Sea – Amundsen Gulf – Viscount Melville – Queen Maud Gulf	

SAON: Inventory of Interested Networks

Name and acronym: Screening of potential new hazardous substances in Norway¹².

Contact person (e-mail): At Norwegian Pollution Control Authority (NPCA): Ola Glesne (ola.glesne@sft.no).

Web site (if any): http://www.sft.no/artikkel_37051.aspx

Reports: http://www.sft.no/program_37069.aspx

Main objective of the network: The aim of the programme is to obtain a snapshot of the occurrence of potentially hazardous substances in the environment, both in regions most likely to be polluted as well as in some very pristine environments. The focus is on little known, anthropogenic substances and their derivatives, which are either used in high volumes or are likely to be persistent and hazardous to humans and other organisms. If substances being screened are found in significant amounts this may result in further investigations or monitoring on national level. The results from the screening can be used when analysing possible environmental effects of the selected substances, and to assess whether they pose a risk to the environment or not.

Member/connected to global network: No, but the data are used as input to EU chemical evaluation processes and to the UN Stockholm convention. The screening results are valuable when data on chemicals are needed within the REACH-system in Europe.

Type of activity:

- Theme: Coastal, Freshwater, Atmosphere, Human
- Locations: Varying, according to properties of the substances. Samples from both hot-spot and remote sites are included.
- Community based: In some occasions human samples are measured.

Main variables: Concentrations in several types of media, varying according to properties of the substances. Examples of substances screened: Octylphenol, Bisphenol-A, PFOS, PFOA, PFOSA, Methylated volatile siloxanes, Sucralose, Nitro- and polycyclic musks, Resorcinol, Dodecylphenol, PBDE, Bronopol, HBCD, TBBPA, SCCP, Triklosan, DEHP, Dikloretane, Pentachlorophenol, Chlorobenzenes, Pharmaceuticals, Narcotics.

When operational: The programme started in 2001.

Geographical coverage (countries): Norway, including Bear Island and Spitsbergen and Norwegian seas. The Nordic countries are cooperating on screening information exchange and studies, see net site and brochure:

<http://nordicscreening.org/>

<http://nordicscreening.org/index.php?module=Pagesetter&func=viewpub&tid=10&pid=1>

Data archive/center: Norwegian Institute for Water Research: <http://www.niva.no>

Data availability: All data, including meta-data.

¹² Norwegian name: Kartlegging av potensielle miljøgifter i Norge

SAON: Inventory of Interested Networks

Name and acronym: Environmental Monitoring System for Svalbard and Jan Mayen¹³

Contact person (e-mail): At NPI: Birgit Njåstad (njaastad@npolar.no)

Web site (if any): <http://mosj.npolar.no>. Note, the website is under reconstruction, and will within reasonable time also be made available in English.

Reports:

- SANDER, G., HANSSEN-BAUER, I., BJØRGE, A. & PRESTRUD, P.: Miljøovervåking av Svalbard og Jan Mayen - MOSJ. En dokumentasjon av systemet og den første vurderingen av miljøstatus. Tromsø 2005
- A number of trend reports available on <http://mosj.npolar.no>

Main objective of the network:

- Collect and process data on elements impacting the environment and on the status of the environment and cultural remains
- Interpret the data in order to assess trends and developments in the environment
- Give advice to the authorities on needed actions, research or better monitoring.

Member/connected to global network: Some of the indicators in the system is likely also reported to global networks.

Type of activity:

- Themes: Atmosphere, terrestrial ecosystem, including freshwater, marine ecosystem, coastal, ocean, cryosphere, human & socio-economic
- Locations: Varies from indicator to indicator (see table on the next pages)

Main variables: See attached list of identified indicators for MOSJ – Norwegian Polar Institute's own contribution highlighted in blue.

When operational: The programme was established in 1999. Some indicators have time series that extend further back than 1999, while some indicators are yet to be implemented in the monitoring system.

Geographical coverage (countries): Svalbard, Jan Mayen and surrounding waters (Norway)

Data archive/center: Varies from indicator to indicator. The attached list shows which institute/organization is responsible for each indicator.

Data availability: Varies from indicator to indicator.

Main gaps: The main weakness of MOSJ is the fact that not all identified indicators are actively monitored. All indicators have been as they are considered important to achieve the aims of the system, but some are not yet in action due to financial and practical constraints.

¹³ Norwegian name: Miljøovervåking på Svalbard og Jan Mayen

Attachment:**Indicators in Environmental Monitoring System for Svalbard and Jan Mayen**

Below is an overview of indicators presently in the system. Information about the status of the indicators (ongoing monitoring or under development) is provided. More information available on <http://mosj.npolar.no>.

Abbreviations:

NILU: Norwegian Institute for Air Research

SSV: The Norwegian Radiation Protection Authority

NP: Norwegian Polar Institute

HI: Norwegian Institute for Marine Research

NIFES: The National Institute of Nutrition and Seafood Research

SMS: Governor of Svalbard

AWI: Alfred Wegener Institute

MI: Norwegian Meteorological Institute

1. Pollution

Indicator	Status	Responsible institution
Air pollution in Ny Ålesund	Ongoing	NILU
Climate gasses in Ny Ålesund	Under development	NILU and the University of Stockholm
Radioactivity in air and water	Ongoing	SSV
PCB in bottom sediments	Ongoing	Akvaplan-NIVA
Garbage on the beach	Ongoing	SMS
Environmental contaminants in polar bear	Ongoing	NP
Environmental contaminants in Arctic fox	Ongoing	NP
Environmental contaminants in ringed seal	Ongoing	NP
Environmental contaminants in walrus	Under development	NP
Environmental contaminants in bearded seal	Under development	NP
Environmental contaminants in beluga	Under development	NP
Environmental contaminants in Glaucous Gull	Ongoing	NP
Environmental contaminants in Thick-billed Guillemot	Ongoing	NP
Environmental contaminants in ivory gull	Under development	NP
Environmental contaminants in polar cod	Ongoing	HI and NIFES
Environmental contaminants in capelin	Ongoing	HI and NIFES
Environmental contaminants in zoo plankton	Under development	
Environmental contaminants in Svalbard ptarmigan	Ongoing	NP
Environmental contaminants in Svalbard char	Under development	

2. Activity/Traffic

Indicator	Status	Responsible institution
Site landings: cruise tourism	Ongoing	SMS
Site landings: other tourism (non-cruise)	Under development	SMS
Overnight stays in Longyearbyen	Ongoing	SMS

Number of registered snow scooters	Ongoing	SMS
Helicopter activities in protected areas	Under development	SMS
Individuals in areas where notification is required	Ongoing	SMS
Number of registered small boats	Under development	SMS
Wear and tear on vegetation due to activity/traffic	Under development	NP

3. Catch, fishing and hunting

Indicator	Status	Responsible institution
Taking of Svalbard reindeer	Ongoing	SMS
Taking of Svalbard ptarmigan	Ongoing	SMS
Taking of Arctic fox	Ongoing	SMS
Taking of Svalbard char	Under development	SMS
Effects of trawling on bottom fauna	Under development	AWI
Catch of capelin in Barents Sea	Ongoing	HI
Catch of herring	Ongoing	HI
Catch of North-East Atlantic cod	Ongoing	HI
Catch of Norwegian-Arctic Greenland halibut	Ongoing	HI
Catch of ocean perch	Ongoing	HI
Catch of deepwater redfish	Ongoing	HI
Catch of harp seal	Ongoing	HI
Catch of hooded seal	Ongoing	HI

4. Other impacts

Indicator	Status	Responsible institution
Large technical structures	Ongoing	SMS
Area of protected area	Ongoing	SMS
Introduced species (sibling vole)	Ongoing	University of Tromsø

5. Climate

Indicator	Status	Responsible institution
Air temperature	Ongoing	MI
Precipitation	Ongoing	MI
Ozone and UV-radiation	Ongoing	NILU
Atmospheric radiation	Ongoing	NP
Sea ice	Ongoing	NP
Sea temperature, salinity and current	Ongoing	NP
Sea level	Under development	NP
Glacier mass balance	Ongoing	NP
Snow cover on land (duration)	Under development	MI
Average albedo	Under development	
Temperature in permafrost	Under development	MI

6. Marine fauna and flora (population or community data)

Indicator	Status	Responsible institution
Sea ice as habitat	Under development	NP
Polar bear	Ongoing	NP
Walrus	Ongoing	NP
Ring seal	Ongoing	NP
Harbor seal	Under development	NP
Bearded seal	Under development	NP
Harp seal	Ongoing	HI
Hooded seal	Ongoing	HI
Beluga	Ongoing	NP
Bowhead whale	Ongoing	NP
Narwhale	Ongoing	NP
North-East Arctic cod	Ongoing	HI
Herring	Ongoing	HI
Capelin	Ongoing	HI
Polar cod	Under development	HI
Greenland halibut, ocean perch and deepwater redfish	Ongoing	HI
Zoo plankton	Ongoing	NP
Plant plankton	Under development	NP
Microbial fauna	Under development	
CTD	Under development	NP
Benthos	Under development	
Macro algae	Under development	
New species in the marine environment	Under development	
Thick-billed Guillemot	Ongoing	NP
Common Guillemot	Ongoing	NP
Kittiwake	Ongoing	NP
Glaucous Gull	Ongoing	NP
Little auk	Under development	NP
Common eider	Ongoing	NP
Ivory gull	Under development	NP

7. Terrestrial fauna and flora (population data)

Indicator	Status	Responsible institution
Svalbard reindeer	Ongoing	NP
Arctic fox	Ongoing	NP
Svalbard ptarmigan	Ongoing	NP
Vegetation	Under development	
Geese	Under development	
Wading birds	Under development	
Svalbard char	Under development	

