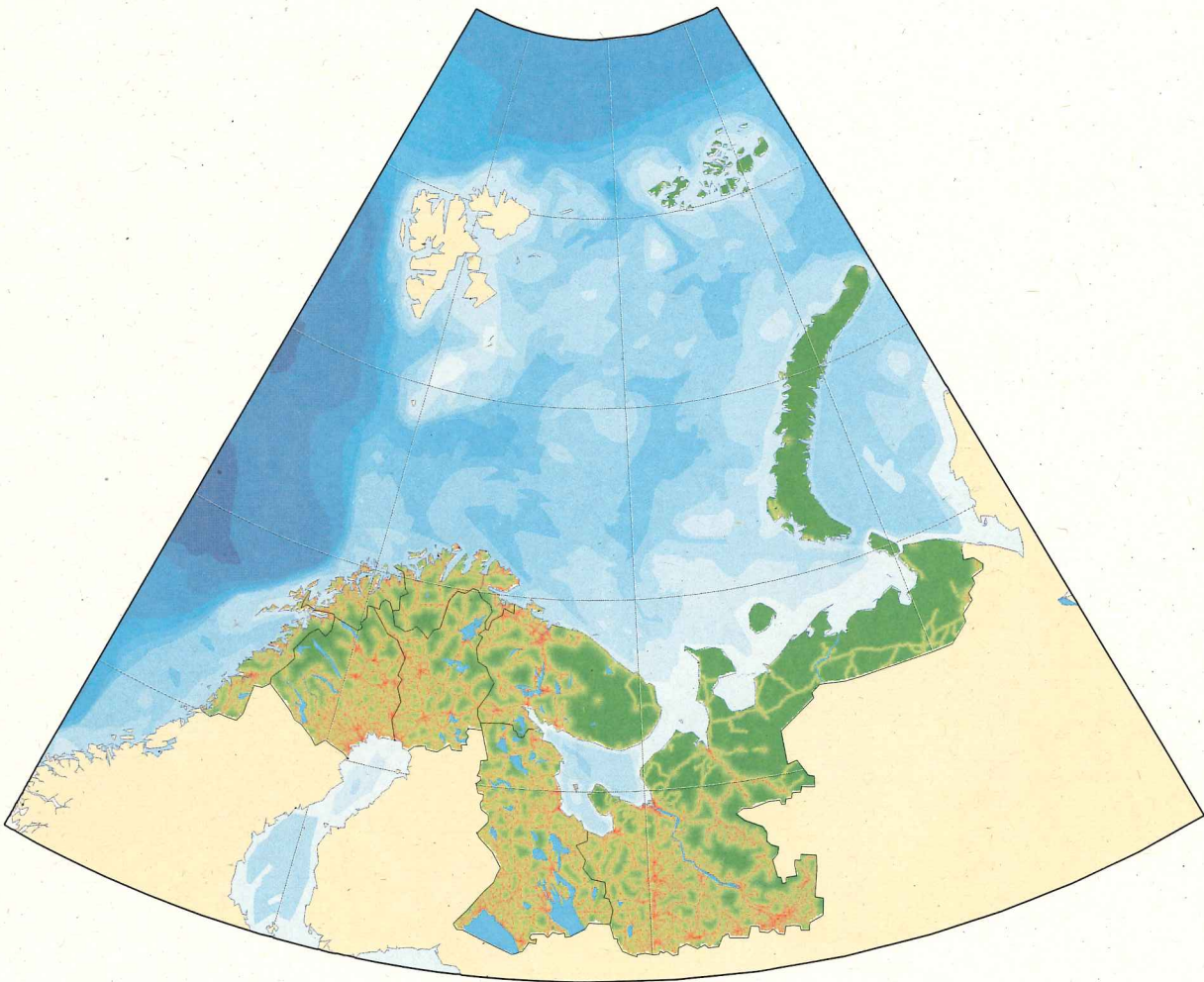


# GRID

## Arendal

ANNUAL REPORT • ÅRSMELDING 1994



UNEP



THE PRIME MINISTER



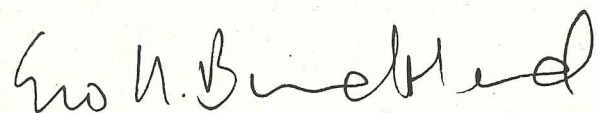
At the inauguration of GRID-Arendal in August 1989, I stated that the establishment of a GRID center in Norway was a follow up to the report of the World Commission on Environment and Development.

Now, five years later, and three years after the UN Conference on Environment and Development in Rio, I am pleased to see that GRID-Arendal has become an important partner of the UNEP Earthwatch program, thus also contributing to the implementation of the goals on information for decision-making, as set out in Agenda 21.

There is, however, a long way to go to build a satisfactory data foundation for sound management of the world's environment and natural resources. "Bridging the gap" should still be a vision for GRID, not only for the transmission of knowledge between scientists and decision-makers, but also in assisting developing countries to improve their capacity to collect, evaluate and disseminate environmental information.

The need for a Global Research Information Database will not decrease. We are still at the beginning of an era where institutions like GRID will have to play an increasingly important role.

It is the hope of the Norwegian government that GRID-Arendal will continue to strengthen its participation in improving information for sustainable development.



Gro Harlem Brundtland

Front page map: Wilderness Quality Index for the Barents Region. Pilot study developed by UNEP/GRID-Arendal in cooperation with the Norwegian Directorate for Nature Management and National Remote Sensing Centre Ltd., UK.



## Introduction

During 1994, several important events took place which will have positive impact on the development and strategy of GRID-Arendal:

- within UNEP, the global GRID program was integrated into the broader Environment Assessment Programme (EAP),
- UNEP strengthened its European office in Geneva,
- the European Environment Agency (EEA) was opened in Copenhagen on October 31, 1994.

These events have reinforced directions included in GRID-Arendal's strategic plan. Our activities must always remain effectively integrated into UNEP's overall programs. In order to meet user needs, this integration must combine database management and information dissemination with user-friendly methodologies, assessments and capacity-building efforts. UNEP's European activities must also be linked with the EEA.

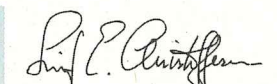
GRID-Arendal's activities during the year have emphasized a further strengthening of our Arctic work. Collaborative arrangements are under preparation with a distinguished scientific center in New Zealand regarding our Antarctic program.

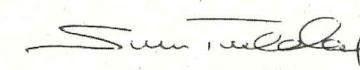
In cooperation with UNEP's headquarters and UNEP's European Office, we have started the development of an environmental information network in 27 countries in the former Soviet Union and Eastern Europe. Through our Stockholm office, we have contributed to important preparatory work for a Baltic Sea Watershed Programme (Baltic-GIS).

Our information efforts have increased substantially. A strong user focus is pursued in all of our activities.

We would like to express our appreciation to a distinguished and effective Board and a competent and motivated staff at GRID-Arendal. The team spirit we have emphasized and the encouraging productivity evidenced in this annual report bode well for the future. The 1994 results speak for themselves. We believe that there is considerable scope for further growth in the years ahead.



  
Leif E. Christoffersen  
Chairman of the Board

  
Svein Tveitdal  
Director



## Introduksjon

I løpet av 1994 fant flere viktige hendelser sted som vil få en positiv innvirkning på utviklingen og strategien for GRID-Arendal.

- Innen UNEP ble det verdensomspennende GRID-programmet integrert i det bredere "Environment Assessment Programme" (EAP),
- UNEP styrket sitt europeiske kontor i Geneve,
- EU's miljøagentur (EEA) ble åpnet i København 31. oktober 1994.

Disse hendelsene har forsterket retningslinjene i GRID-Arendals strategiplaner. Våre aktiviteter må alltid være effektivt integrert i UNEPs generelle program. For å møte brukernes behov, må denne integreringen kombinere databaseutvikling og informasjonsspredning med brukervennlige teknikker, analyser og kompetanseoppbygging. UNEPs arbeid i Europa må også ha forbindelser med EEA.

I årets løp har GRID-Arendal lagt vekt på en ytterligere styrking av arbeidet i Arktis. Vi er også i ferd med å etablere et samarbeid med et framstående forskningscenter i New Zealand i forbindelse med vårt arbeid i Antarktis.

I samarbeid med UNEPs hovedkontor og UNEPs europeiske kontor, har vi begynt utviklingen av et miljøinformasjonsnettverk i 27 land i det tidligere Sovjet og i Øst Europa. Gjennom vårt Stockholmskontor har vi bidratt til et viktig forberedende arbeid for å etablere et program for Østersjøens avrenningsområde. (Baltic-GIS)

Våre informasjonsaktiviteter har økt kraftig. En sterk brukerfokusering vektlegges i alle våre aktiviteter.

Vi setter stor pris på et framstående og effektivt styre og en kompetent og motivert stab i GRID-Arendal. Lagånden vi har lagt stor vekt på og produktiviteten som synliggjøres i denne årsrapporten, tyder godt for framtiden. Årets resultater snakker for seg selv. Vi tror det er stor mulighet for videre positiv utvikling i årene framover.

## UNEP

In 1972, the UN Conference on Human Environment took place in Stockholm, Sweden. The conference was in response to the realization by decision-makers and policy planners of all nations that increasing environmental hazards and degradation threatened human health and economic development, even the very survival of the planet. During the conference the United Nations Environment Programme (UNEP) was created.

One of the important roles of UNEP through these past 22 years has been to supply accurate and reliable environmental information as a basis for comprehensive assessments of environmental issues. UNEP's Environment Assessment Programme (EAP) has made significant contributions to Earthwatch. Earthwatch is a coordinating mechanism through which UN bodies gather environmental data and information in collaboration with governments and scientists.

Continuously endeavoring to be at the forefront to meet current environmental information needs, UNEP's Environment Assessment Programme aims to: provide the world community with improved access to meaningful environmental data and information, and to help increase the capacity of governments to use environmental information for decision-making and action-planning for sustainable human development.

## GRID

UNEP/EAP is supported by the Global Resource Information Database (GRID), one of the elements of UNEP's Environment Assessment Programme. GRID is a global network of cooperating centers



Longum Park Technology Center, Arendal

GRID-Arendal er en del av Longum Park Teknologi- og Kompetansesenter. (Photo: Per Lunden)

providing environmental information for decision- and policy-making. There are GRID centers in Brazil, Canada, Denmark, Japan, Kenya, Nepal, Norway, Poland, Switzerland, Thailand and the USA. GRID provides data distribution, data cataloguing, archiving and analytical services, using GIS, remote sensing, database and telecommunication technologies. GRID holds a total of more than 2000 environmental and natural resource data sets and provides its users with up-to-date and reliable geo-referenced environmental information, as well as offering a unique international database service.

## GRID-Arendal

As part of the global GRID network of cooperating centers, GRID-Arendal seeks to be a center of excellence for improving the accessibility and the application of scientific knowledge about the environment to policy formulation and decision-making processes. GRID-Arendal concentrates its efforts on the collection, integration, analysis and dissemination of environmental data from existing sources. GRID-Arendal's role within this global system focuses on the two polar areas, on the Nordic countries and their adjacent seas, and on strengthening the global environmental information system of UNEP.

### GRID-Arendal Location

GRID-Arendal was established in 1989 by UNEP and the Norwegian Ministry of Environment as a foundation subject to Norwegian laws and regulations.

GRID-Arendal is located in the Longum Park Technology Center in Arendal, a city on the southern coast of Norway. Longum Park is a unique center housing hi-tech capacity and promoting cooperation and network potential among its 20 firms and 130 employees. This is enhanced by Longum Park's GIS and Remote Sensing Center which creates an in-house synergetic effect.

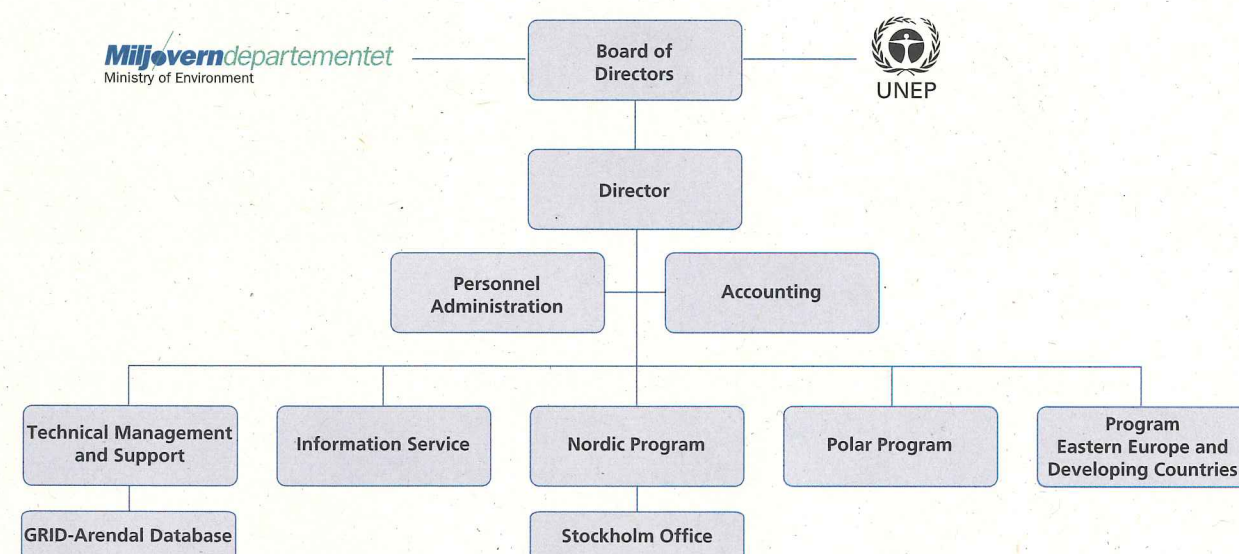
GRID-Arendal's branch office for Nordic/Baltic activities is located at the Department of Systems Ecology, University of Stockholm, Sweden.

## GRID-Arendal Organization

A major task for GRID-Arendal during the year has been to develop the internal organization to meet further expansion and increase productivity. The new organization plan reflects the long-term strategy of the Board through division into program areas. In January 1995, the management of GRID-Arendal was expanded to five persons. In addition to his main responsibilities, Director Svein Tveitdal will also lead the program area of Norway/the Nordic Countries. Arnt Brox will still have supervision of the technology and development of the database. Lars Kullerud

is the manager of the Polar program, while Otto Simonett is responsible for the programs in Eastern Europe and in developing countries. A new addition to the management team is information manager Aake Bjørke. He is responsible for the dissemination of environmental data and information to our users.

GRID-Arendal's Board of Directors is appointed by the Norwegian Ministry of Environment in cooperation with UNEP.



### UNEP

UNEP, "FNs miljøprogram", ble opprettet som et resultat av FN's miljøkonferanse i Stockholm i 1972. UNEPs rolle har vært å skaffe nøyaktig og troverdig miljøinformasjon som utgangspunkt for en omfattende vurdering av miljøproblemer. UNEPs "Environment Assessment Programme", EAP, skaffer verdenssamfunnet økt tilgang til informasjon om miljø, og støtter utbyggingen av myndighetenes evne til å bruke miljøinformasjon i forvaltningen og i planleggingen av en bærekraftig utvikling.

### GRID

UNEP/EAP støttes av "Global Resource Information Database", GRID. GRID er et verdensomfattende nettverk av samarbeidende sentra som skaffer miljøinformasjon til forvaltning, allmenhet og til politikere. GRID sørger for data-distribusjon, data-katalogisering, arkivering og analytiske tjenester. I dette arbeidet brukes GIS, fjernanalyse, databaser og telekommunikasjonsteknologi.

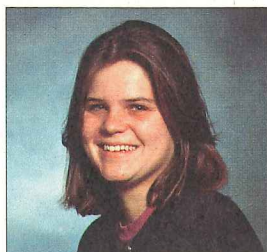
### GRID-Arendal

Som en del av det globale nettverket av samarbeidende sentra, søker GRID-Arendal å være et spisskompetanse-senter som fokuserer på de to polarområdene, på de nordiske land med tilhørende havområder, og på generelt å styrke UNEPs informasjonssystemer.

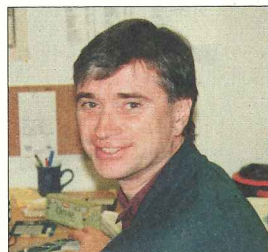
### GRID-Arendal Organisasjon

For å håndtere videre ekspansjon og økt produktivitet har GRID-Arendal fått en ny organisasjonsstruktur med delegerte ansvarsområder.

## GRID-Arendal Staff



Hazel J. Baxendale  
M.Sc., Geography  
GIS/Database Analyst



Aake Bjørke  
B.Sc. Biology, Lawyer (BLL)  
Information Manager



Bente Brekke  
M.Sc., Biology  
GIS/Database Analyst



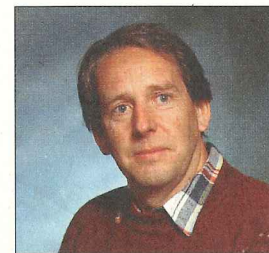
Arnt W.K. Brox  
B.Sc., Biology  
Systems Manager



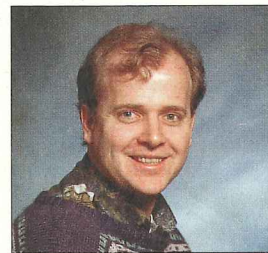
Karen Folgen  
B.A., Literature  
Adm./Personnel Manager



Dawn Marie Freund  
B.A., Business Mgmt/French  
Assistant secretary



Øystein Halvorsen  
M.Sc., Physics  
Software engineer



Even Husby  
M.Sc., Geography  
GIS/Database Analyst



Ingrid Høgeli  
Technical Assistant



Lars Kullerud  
M.Sc., Geology  
Program Manager



Sindre Langaas  
M.Sc., Geography  
GIS/Database Analyst



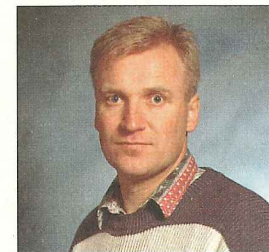
Wenche Lien  
Assistant secretary



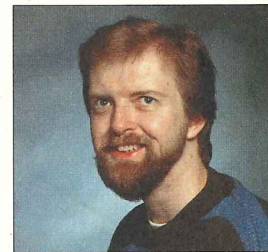
Andrus Meiner  
Ph.D., GIS, Research Fellow  
(May - September)



Margaret Ohldieck  
Accountant



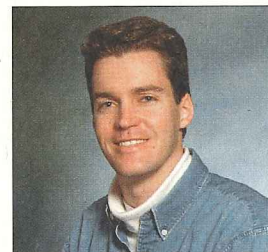
Torstein Olsen  
M.Sc., Cartography  
(Norwegian Mapping Auth.)



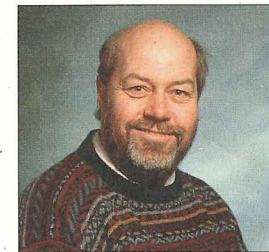
Kjell B-E. Olsson  
B.A., Geography  
GIS/Database Analyst



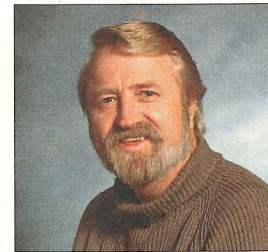
Otto G. Simonett  
Ph.D., Geography  
Program Manager



Christopher G. Smith  
B.A., Geography  
GIS/Database Analyst



Morten Sørensen  
M.Sc., Geography  
Project Consultant



Svein Tveitdal  
M.Sc., Photogrammetry  
Director

## GRID-Arendal Selected Projects

### ARCTIC

#### Wilderness Quality Mapping in the Euro-Arctic Barents region

(see front cover map)

The Wilderness Quality mapping project was initiated on request from the Norwegian Directorate for Nature Management (DN). The two main goals of the project were to develop a methodology for wilderness quality mapping in Northern areas, and to make an environmental assessment of the Barents region using available data.

It was decided to apply a methodology developed by the Australian Heritage Commission (AHC) as a framework. For the last 15 years, AHC has been assessing wilderness quality for the whole of Australia. A somewhat adjusted version of their methodology was implemented using the Digital Chart of the World as the data source. Four maps were developed. Three of these were indicators focusing on different aspects of wilderness quality: Remoteness from Access, Remoteness from Settlement, and Apparent Naturalness. The three indicators were summarized into an index of Wilderness Quality (see front page).

The project was developed as a joint effort between GRID-Arendal and the National Remote Sensing Centre Ltd. (NRSC) in UK. Data sets and maps are available from GRID-Arendal.

#### The International Northern Sea Route Program (INSROP)

The INSROP project has established over 50 research initiatives to evaluate the effects of increased commercial navigation through the Northeast passage. The INSROP program links key institutions from Norway, Russia, and Japan together. Jointly, they sponsor research to create a foundation of knowledge for decision-makers to assess the usability of this remote trade route.

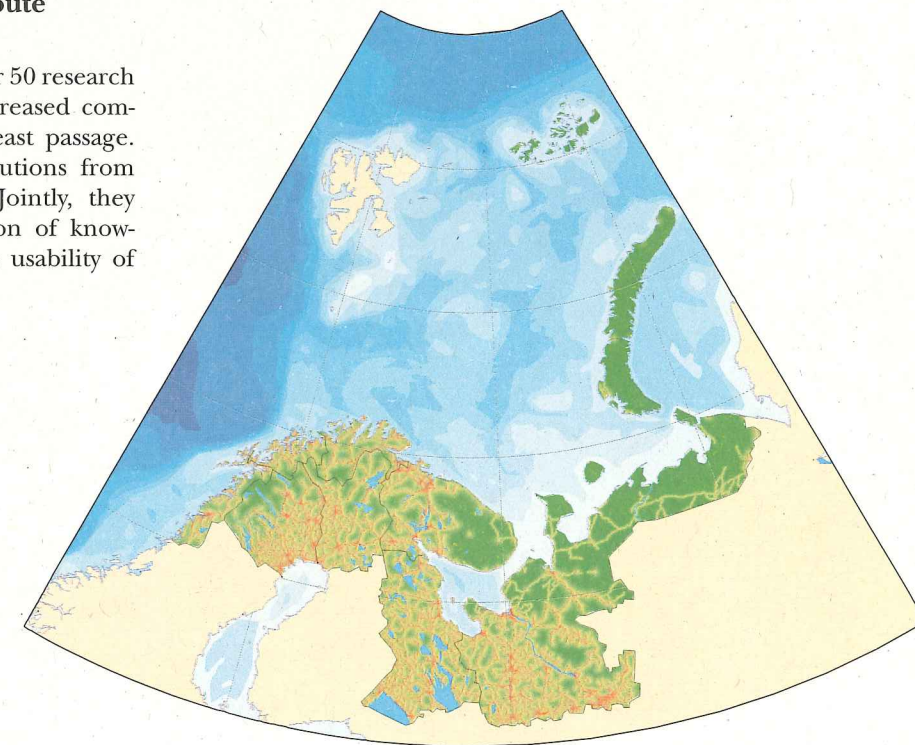
Wilderness Quality Index for the Barents Region (v1)  
Based on information related to human access and modification of nature.

Villmarks kvaliteten for Barentsregionen  
Basert på informasjon om menneskeskapt tilgang til og endring av naturen.

During the second year of this five year program, GRID-Arendal has supported work on the design and implementation of a GIS database. Funded by SINTEF-NHL and the Norwegian Polar Institute, a prototype database and an information system were developed along with utilities to examine spatial and temporal data. The final result of the INSROP information system will provide a common framework for the maintenance of data sets and utilities for scientists and decision-makers to assess the environmental impact of increased commercial traffic through the Russian Arctic.

#### AMAP support

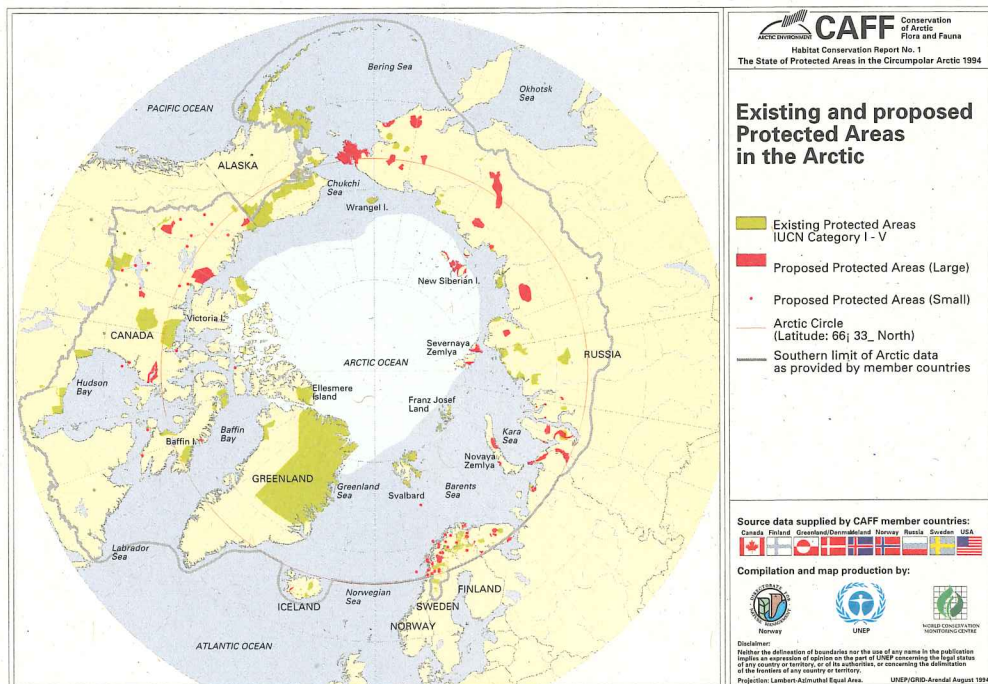
GRID-Arendal has also in 1994 made contributions to the Arctic Monitoring and Assessment Programme (AMAP). The main activity has been development and maintenance related to AMAP's Project Directory, a computerized catalogue of AMAP-related monitoring activities within the different countries participating in AMAP. A revised version of the Project Directory database software has been developed. A substantial effort has been put into software development, data conversion and further updating of the database contents. The database can be accessed by users of the World Wide Web (WWW) via <http://www.grida.no/amap/amap.html>



## Conservation of Arctic Flora and Fauna (CAFF)

CAFF, the Program for the Conservation of Arctic Flora and Fauna, is one of the four programs of the AEPS, the Arctic Environmental Protection Strategy. CAFF addresses the special needs of the Arctic species and their habitats. GRID-Arendal produced maps for the CAFF report on the State of Protected Areas in the Arctic, in cooperation with the CAFF secretariat, the Directorate of Nature Management and the World Conservation Monitoring Center. The maps were based on input from CAFF member countries.

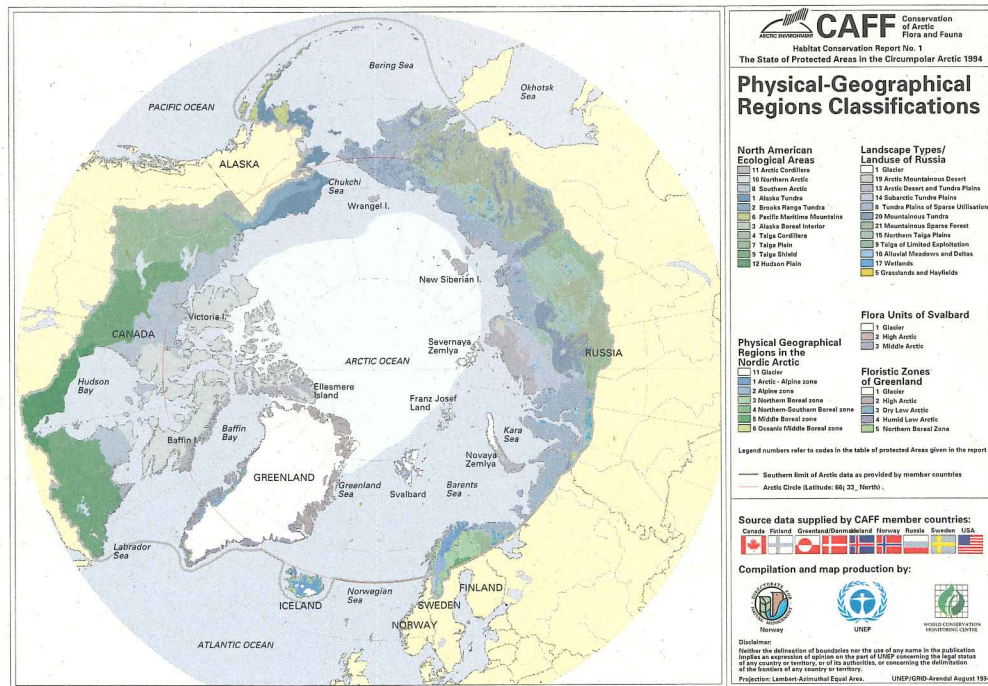
During 1994, GRID-Arendal completed the compilation of a circumpolar GIS database for CAFF on protected areas. To take this one step further, an analysis was prepared by integrating a set of ecosystem data. This analysis identified regions with ecosystems characterized by a low degree of protection. Data sets, maps and overheads are available from GRID-Arendal upon request.



CAFF (Vern av arktisk flora og fauna), er en del av miljøsambeidet mellom de 8 landene rundt Nordpolen.

Kartet viser eksisterende (grønn) og foreslått (rød) vernede områder i Arktis.

Kartet viser variasjon i naturforholdene i Arktis. Grønne områder i sør er typisk barskogsregioner mens det blågrå i nord er tundra.



## GLOBAL

### Environmental Information Networks in Countries with Economies in Transition in Central and Eastern Europe

On behalf of UNEP's Environmental Assessment Programme, GRID-Arendal is implementing the project to develop UNEP's Environmental Information Network in Central and Eastern Europe. The main goal of this project is to provide preparatory assistance to the countries in the region by formulating project proposals to strengthen their capacities for information management and environmental assessments.

The activities focus on systematic networking with Ministries of Environment, regional programs, international organizations with similar mandates, as well as bilateral and multilateral donors. Standardized Terms of Reference for country assessments, feasibility studies and implementation have been developed to encourage participation from a wide audience.

The long-term goal of the project is an operational network of institutions with improved capacities for data and information management which provides the information needed for environmental decision-making at national and regional levels. The network will also contribute to the next UNEP State of the Environment Report to be issued by the year 2002.

### The Establishment of an Environmental Information System for Hungary

Under the umbrella of UNEP's Networking Program, GRID-Arendal has been conducting a feasibility study for the establishment of a GRID-compatible environmental information network in Hungary. The study has been commissioned by the Norwegian Ministry of Environment.

The main activities in 1994 were assessing the needs and capacities within Hungary, participation in workshops focusing on Environment, Health and Land Cover Data, as well as consultations held with representatives of the Hungarian Ministry of Environment at GRID-Warsaw. The main results of the feasibility study will include a report on the environmental status in Hungary, and a proposal for a three year implementation project leading to an operational GRID-compatible environmental information network in Hungary.

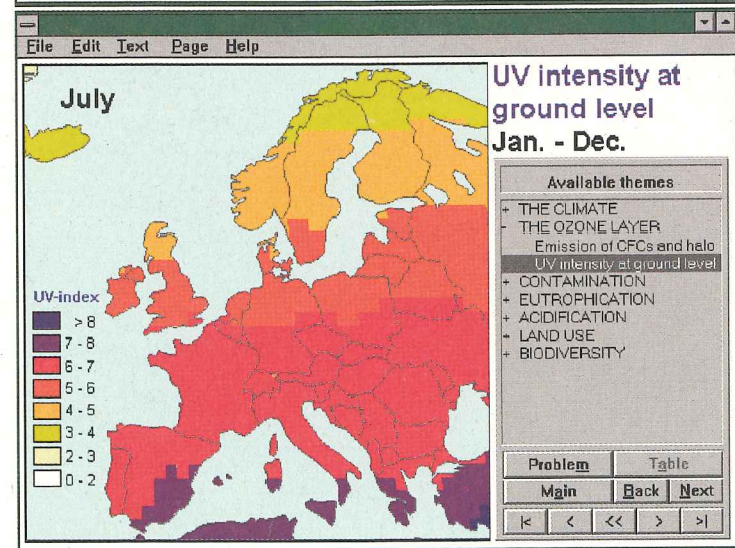
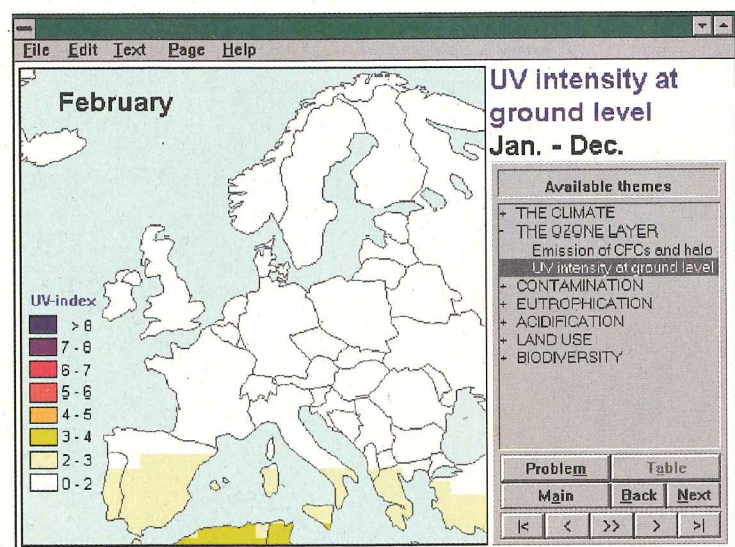
Land i Øst- og Sentraleuropa preget av overgang fra planøkonomi til markedsøkonomi



### Support to the Consultative Group for International Agricultural Research (CGIAR)

GRID-Arendal has been designated as the Implementing Agency for a UNEP project entitled "Use of Geographic Information Systems in Agricultural Research Management". This project had its beginnings in a workshop in Arendal in September 1992 when representatives of the International Agricultural Research Centres (IARCs), GRID and international experts convened to discuss the centers' data requirements. The main objectives of the project are to establish long-term cooperative links between UNEP and the centers to effectively integrate natural resource and socio-economic information into agricultural research activities at all levels, and to develop the required high quality data sets.

There are now 17 centers located throughout the world, supported by the Consultative Group for International Agricultural Research. The centers cooperate with National Agricultural Research Institutes. Through a variety of extension services,



the centers are working towards the transfer of sustainable agricultural technologies.

The 3 year project will be initiated with a new workshop to be held in Arendal during May 1995.

### Palestinian Environmental Information and Decision Support System

GRID-Arendal has been given the responsibility to follow up the UNEP Governing Council Decision of April 1993 concerning support to the Palestinian Authorities. The overall project goal is to help the Palestinian people acquire the necessary capacity and systems needed for sound environmental decision-making, as well as education and public environmental awareness. The first preparatory phase of the project will be finished in June 1995. This phase will provide an overview of the Environmental Information and Decision Support System's needs and existing capacity in the Palestinian territories. A feasibility study for a 3-5 year implementation plan will be prepared in close cooperation with the new Palestinian Environmental Planning Directorate. The preparatory phase has been funded by the Norwegian government.

In another project related to the Middle East peace process, GRID-Arendal is assisting WFED (World Foundation for Environment and Development) in Oslo in the compilation of a Regional Water Resources Atlas and Database to be used by the Negotiating Parties.

### UV-Intensity

GRID-Arendal has implemented a system for the production of UV-Intensity maps using satellite data from NASA (TOMS ozone spectrometer) and a model developed by NILU. This product allows the user to compare the potential sun intensity at different locations during different seasons and to take precautions against excessive UV radiation. The information has been used as a basis for articles in major Norwegian newspapers. An interactive version will be made available in the updated State of the Environment report which will be offered on diskette. UV-Intensity maps can be prepared on request.

GRID-Arendal har laget et system for utarbeidelse av UV-intensitetskart ved hjelp av satellittkart fra NASA og en modell utviklet av NILU. The state of the Environment-Norway-diskette is available at GRID-Arendal Information Service.

### UNEP Telecommunication and Information Systems Project

UNEP is revising its organization, and one of the major challenges is to handle environmental information more efficiently. To address these issues, UNEP established a Task Force, and later the Telecommunication and Information Systems Project. The objective is to establish modern computer-based information systems in order to integrate the geographically distributed regional and outpost offices, as well as to improve user- and constituent-

access to UNEP services and programs. GRID-Arendal, in cooperation with the Norwegian computing center SINTEF/RUNIT, established the first Internet node at UNEP's headquarters in Nairobi, Kenya. GRID-Arendal and UNEP organized an Expert Advisory Committee meeting in Nairobi which contributed further expertise on computer-based environmental information systems.

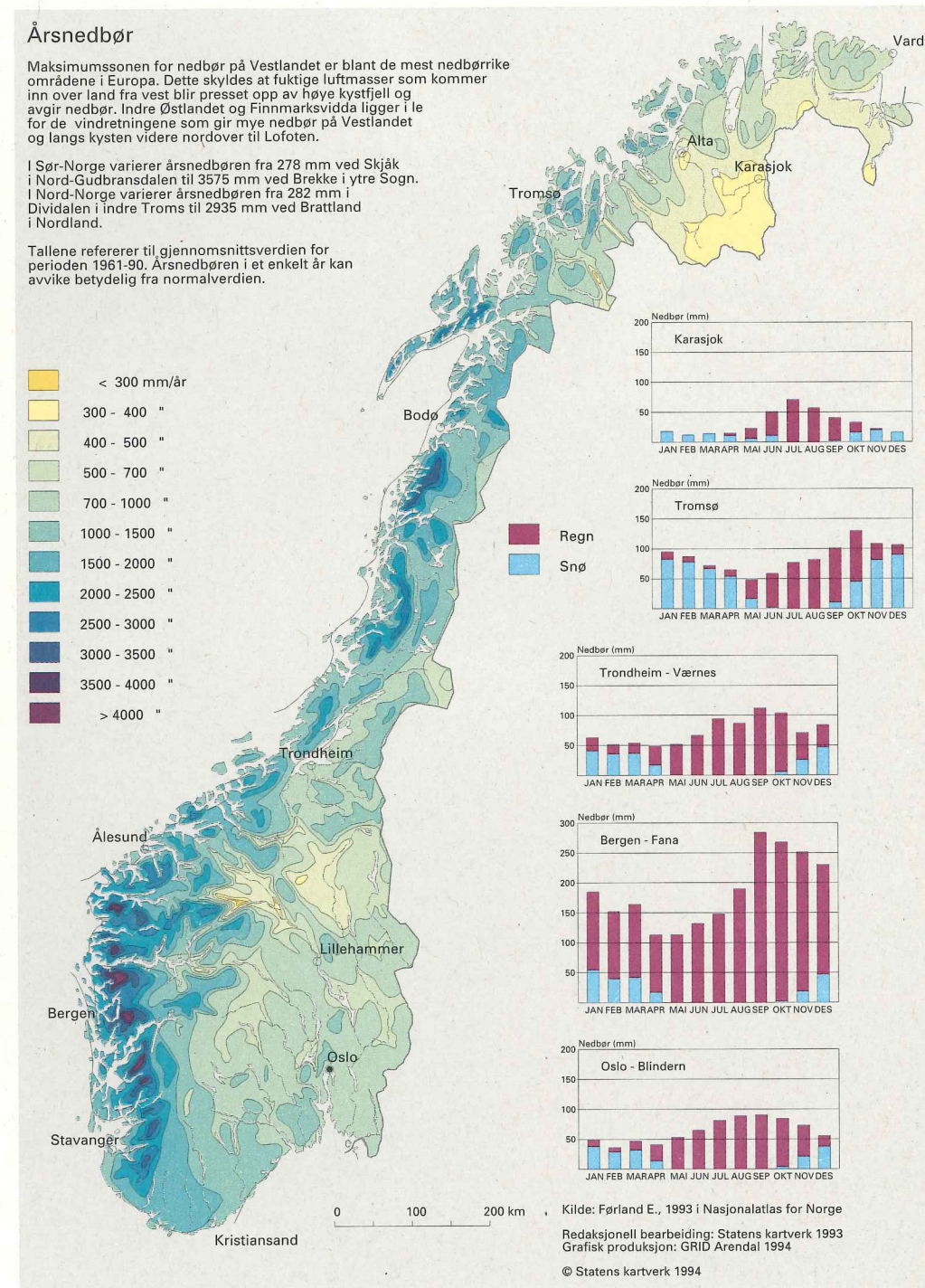
## NORWAY NORDIC BALTIC

### Environment in Figures 1994

In cooperation with The Norwegian Mapping Authority, we have produced 40 environmental maps and figures which have been published in the book "Naturmiljøet i tall 1994". This book gives a comprehensive survey of important data available on the subjects concerning natural resources, pollution and the State of the Environment in Norway. It has been edited by the Central Bureau of Statistics, Directorate of Natural Resources and the Norwegian Pollution Control Authority. It contains 431 pages supplying facts on the environment and the influences affecting it. The book is available at "Universitetsforlaget", Oslo. One of the maps was awarded First Prize in the ARC/INFO User Conference held in Oslo in the autumn of 1993.

Annual precipitation and distribution of precipitation at selected monitoring stations. The western part of Norway ranks among the highest precipitation areas in Europe.

Årsnedbør og nedbør på utvalgte målestasjoner.



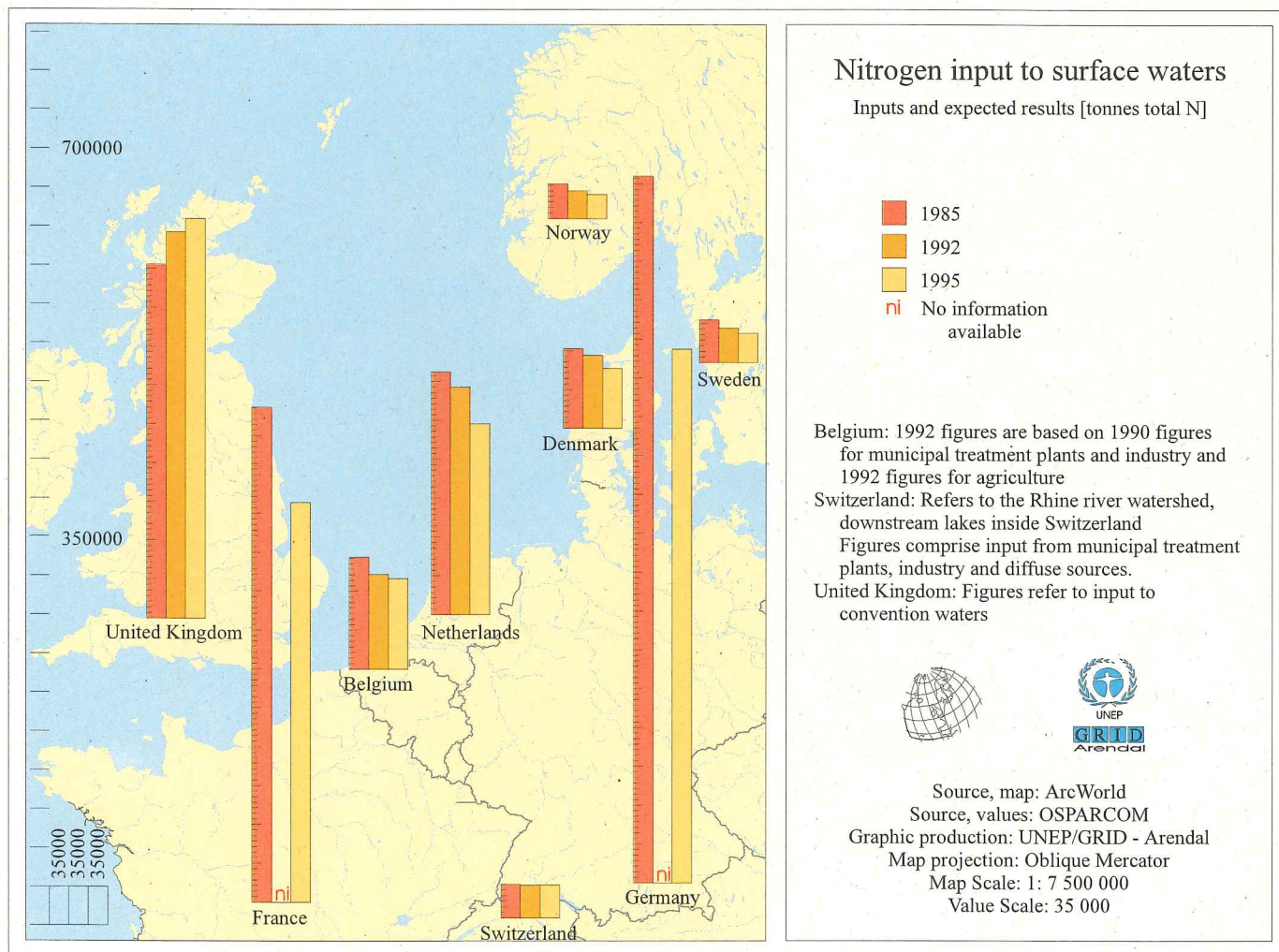
### Support to the Oslo and Paris Commissions (OSPARCOM)

GRID-Arendal has contributed by developing the use of multimedia in the presentation of environmental data for OSPARCOM. In cooperation with the Norwegian State Pollution Control Authority (SFT), GRID-Arendal has produced several maps for the report "Nutrients in the Convention Area". This is a report related to the follow-up of the commitment to

reduce nutrient pollution. The production of these maps resulted in a GIS production line facilitating the capability to produce updated maps on very short notice for several OSPARCOM meetings. These maps will be included in the report available from SFT during the spring of 1995. Based on these maps, a pilot PC information system is under development.

Nitrogen-avrenning til overflatevann i Europa.

GRID-Arendal har vært delaktig i utviklingen av multimedia for å presentere miljødata for OSPARCOM (Oslo-Paris kommisjonen, bedre kjent som "Nordsjøavtalen"). Utarbeidelse av kart over tilførsel av næringsstoffer i konvensjonsområdet har skjedd i samarbeid med SFT.



### Baltic Drainage Basin Project

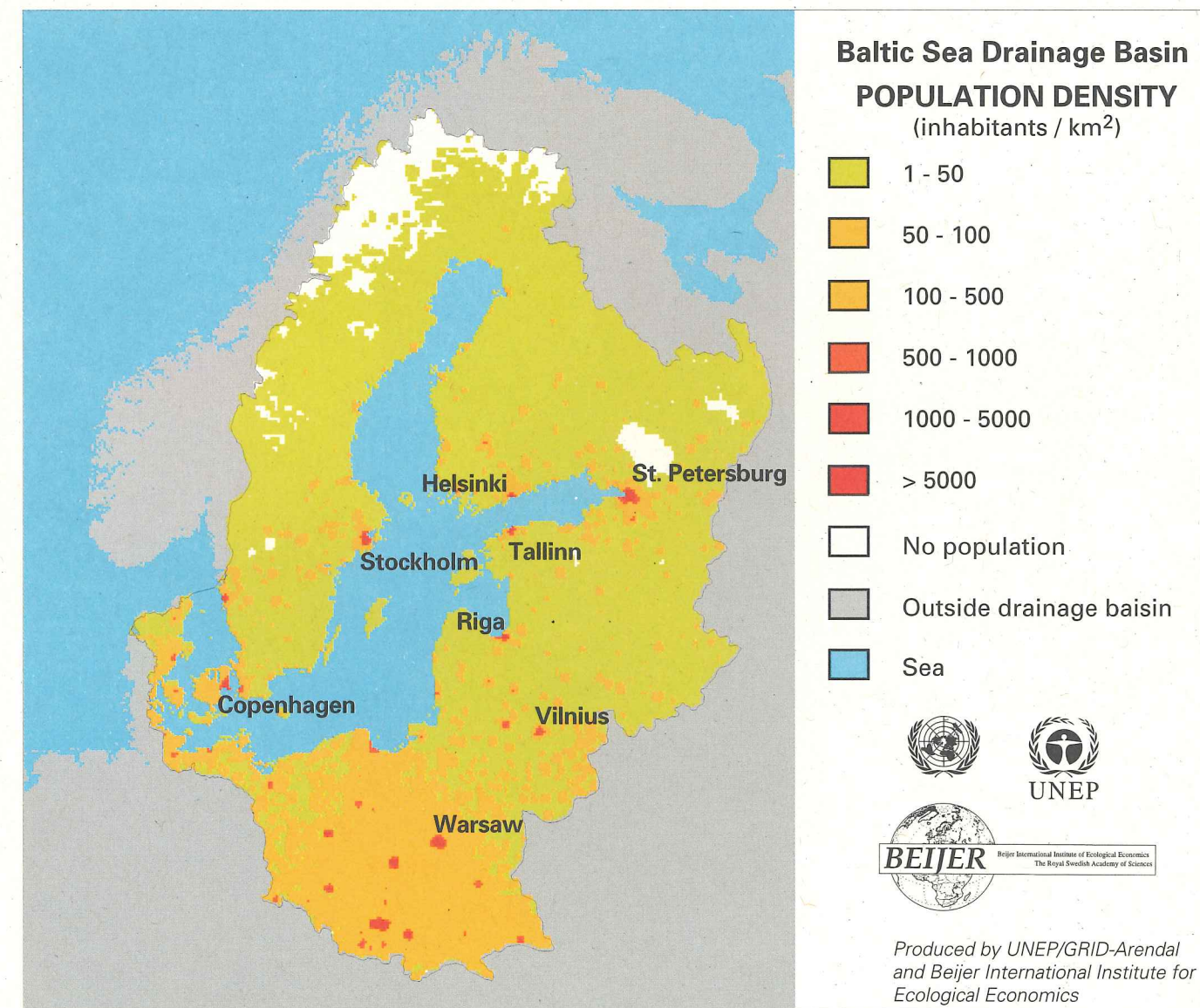
This international research project under the European Union's Environmental Research Program 1991-1994 has the overall objective to identify sustainable development patterns and strategies for the Baltic Drainage Basin. The significance of the region's ecosystems must be taken into account and efficiently managed in an economic and ecological sense. GRID-Arendal has, together with the Beijer Institute of Sweden, developed a comprehensive GIS database for the Baltic Sea Drainage Basin to be used for the purpose of analysis. This database has been released as public domain by GRID-Arendal.

### Basic Geographic Information of the Baltic Drainage Basin (BGIS) Project

The Helsinki Commission (HELCOM), the Environmental Data Centre (Finland), the Swedish Space Corporation, the Swedish Hydrological and Meteorological Institute (Sweden), GRID-Warsaw (Poland) and GRID-Arendal have jointly prepared a feasibility study for the realization of a 1:1 mill. seamless and consistent GIS database for use in environmental visualization, assessment and analysis. The Nordic Council of Ministers funded this study. The initiative has gained considerable attention and support. GRID-Arendal is coordinating the further development of the project.

Befolkningstetthet i Østersjøens avrenningsområde

GRID-Arendal har sammen med Beijer Instituttet i Sverige utarbeidet en omfattende GIS database over Østersjøens avrenningsområde. Overordnet mål er å finne fram til modeller for bærekraftig utvikling i området.



## Workshops/Meetings arranged by GRID-Arendal



UNEP's first high level regional user consultation on Earthwatch took place in Arendal May 2-4, 1994. Thirty politicians, public administrators and experts from Pan-European countries met with representatives from UNEP's headquarters and the European office to discuss strategy for UNEP's new Environment Assessment Programme in Europe. Among the recommendations to be followed up by GRID-Arendal is support to Eastern European countries with capacity building in Environmental Information Systems. The importance of close cooperation with EEA was also emphasized. A report from the meeting is available from GRID-Arendal.

UNEPs første ekspertmøte for europeiske brukere av Earthwatch



7th committee meeting on the Environmental Information System (EIS) program for Sub-Saharan Africa took place in Arendal. August 31-September 2, 1994. Thirty high level Environmental Information System (EIS) experts, bilateral donors, representatives from UN Agencies, the World Bank, the African Development Bank and African governments attended. The GRID-Arendal Board Chairman, Leif Christoffersen, acted as the workshop facilitator. One of many important conclusions from the meeting was to move the program secretariat from the World Bank in Washington to South Africa. Meeting reports and program information are available from GRID-Arendal.

7. ekspertmøte for utviklingen av et miljøinformasjonssystem i Afrika sør for Sahara



The Russian Arctic Environmental Data Workshop, arranged by GRID-Arendal, took place at Svanhovd Environmental Centre November 7-9, 1994. The workshop was held in connection with the pilot phase of the project: "An Arctic Environmental Database for Europe and Asia." There were thirty-seven participants from Russia, Norway and international programs dealing with Arctic Environmental Data. The workshop recommended that priority be given to the establishment of a reference database of Russian institutions and Russian data.

Arbeidsmøte for utviklingen av en russisk arktisk miljødatabase

## Accessing Environmental Data and Information at GRID-Arendal

There are various ways of accessing environmental data and information at GRID-Arendal.

To access the database on-line, use either Internet or modems connected to the telephone network. The diagram below provides an overview of these on-line access options.

The more traditional method of contacting the GRID-Arendal Information Service is also recommended, either by telephone, telefax or letter.

## Hvordan få tilgang til miljødata og informasjon ved GRID-Arendal?

Man kan få tilgang til GRID-Arendals informasjon og miljødata på flere måter.

Ønsker du å komme inn på databasen "on-line", brukes enten Internet eller modem tilkoblet telefonnettet.

Figuren nedenfor gir en oversikt over disse alternativene. - Ønsker du ytterligere informasjon om bruk av "on-line"-tjenester, kan du kontakte informasjonstjenesten.

Forøvrig kan du selvsagt også bruke den mer tradisjonelle metoden: Kontakt GRID-Arendals informasjonstjeneste gjennom telefon, telefax eller post.

### GRID-Arendal Environmental Database

- Data and information catalogues
- Access to environmental information and data
- Gateway to international environmental networks

Global Internet

Public Telephone Network

- Use the "TELNET gaia.grida.no" or "TELNET 128.39.148.5" command

Login as "guest", answer questionnaire, First-time users will have limited access, higher access rights will be given after verification.

Files are transferred using ftp.

- Use Anonymous FTP to gaia.grida.no.

Login as "Anonymous", use your e-mail address as password, and answer the simple questionnaire.

Download the data and information catalogue, filename: "catalogue", to get brief description of contents.

- Use World Wide Web to <http://www.grida.no>.

- Call Bulletin Board System (BBS) on telephone +47 370 35035

Communication setup:  
300 to 9600 baud  
No parity, 8 bit and 1 stop bit

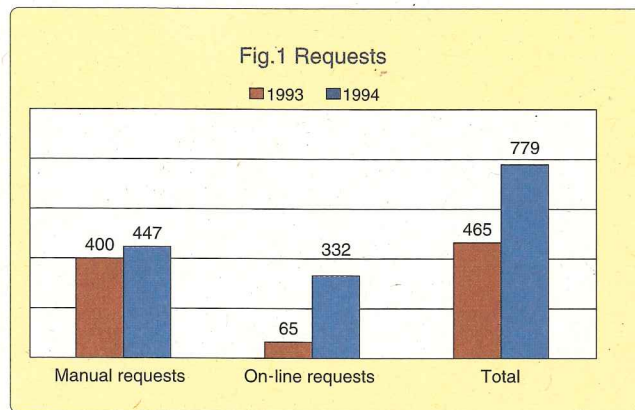
Files are transferred using the standard Xmodem or Zmodem protocols



## The GRID-Arendal Information Service

There has been a substantial increase in the number of requests to GRID-Arendal's Information Service. It is expected that the on-line access to the database with environmental data and environmental information products will significantly improve the possibilities to meet user demand.

Figure 1 Requests



## Looking Ahead

We will give high priority to a close integration of GRID-Arendal's activities into UNEP's environmental information programs.

In 1995, we expect the completion of a very promising operational agreement with the International Center for Antarctic Information and Research in Christchurch, New Zealand.

We wish to remain continuously up-to-date on technology development related to environmental information systems and telecommunications.

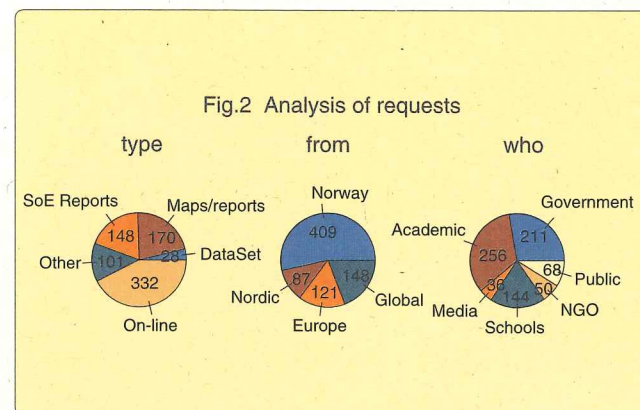
Furthermore, we seek to develop a broader spectrum of user products and to expand the effectiveness of our information services.

We are pleased with the expansion of GRID-Arendal's activities and the positive feedback we have received from many clients and users. However, we also want to make sure that we remain very open to external professional views on the products and services GRID-Arendal offers.

In this spirit the Board will initiate an external evaluation of GRID-Arendal's activities, based on completed projects. The results of the evaluation should be ready in late 1995. We would encourage our clients and all users of our products and services to send us directly any comments and suggestions on how we may continuously seek to improve the quality and usefulness of our work.

*Det har vært en markert økning i forespørslene til GRID-Arendals informasjonstjeneste. Det forventes at "on-line" tilgang til databasen med miljødata og miljøinformasjonsprodukter, vil mangedoble mulighetene til å imøtekomme brukernes behov. "On-line" tjenesten innebærer bruk av Internet eller PC med modem.*

Figure 2 Request Analysis



## Framtidsplaner

*Viktig i 1995 er å integrere GRID-Arendals aktiviteter i UNEPs miljøinformasjons-program.*

*Vi regner med å fullføre en lovende avtale med det Internasjonale senter for informasjon og forskning i Christchurch, New Zealand.*

*Vi ønsker å forbli løpende oppdatert på teknologiutvikling relatert til miljøinformasjonssystemer og telekommunikasjon.*

*Videre søker vi å utvikle et bredere spektrum av brukerprodukter, og å utvide vår effektivitet på informasjonstjenesten.*

*Vi er glade for utvidelsen av aktivitetene ved GRID-Arendal, og de positive tilbakemeldinger vi har fått fra mange brukere. Vi vil likevel forsikre oss om at vi holder oss åpne for profesjonelle synspunkter fra andre om GRID-Arendals produkter og tjenester.*

*I tråd med dette vil styret ta initiativet til en ekstern evaluering av GRID-Arendals aktiviteter basert på avsluttede prosjekter. Resultatet av evalueringen bør foreligge mot slutten av dette året. Vi vil være takknemlige for råd og kommentarer fra alle brukere om hvordan vi kan forbedre kvaliteten og nytten av vårt arbeid.*

## GRID-Arendal List of Publications 1994

### Scientific papers

- Kullerud, L., Dahlgren, S.H.: Sm - Nd geochronology of Sveconorwegian granulite facies minerals assemblages in the Bamble Shear Belt, South Norway, *Precambrian Research*, 64: 389 - 402.
- Johansson, L., Kullerud, L.: Late Sveconorwegian metamorphism and deformation in south-western Sweden. In: R. Gorbatshev (Editor), *the Baltic Shield. Precambrian Research*, 63: 347 - 360.
- August, P., Michaud, J., Labash, C., Smith, C.: GPS for Environmental Applications: Accuracy and Precision of Locational Data. *Photogrammetric Engineering and Remote Sensing*, 60: 41 - 45.
- Gabrielsen, G.W., Brekke, B.: Assimilation efficiency of adult Kittiwakes and Brünnich's Guillemots fed Capelin and Arctic Cod. *Polar Biology*, 14: 279 - 284.

### Project reports

- Løvås, S. M., Smith, C., Moe, K.: Design and Development of Information System, *INSROP Working Paper I.3.1 & II.3.1, No 4 - 1994, FNI*. 211 pages.
- Huberth Hansen, J.P., Baxendale, H., Kullerud, L., Lerkelund, H. E., Salberg, P. J., Smith, C.: Conservation of Arctic Flora and Fauna 1994 (The CAFF-Report) *The State of Protected Areas in the Circumpolar Arctic 1994*. 163 pages
- SSB, DN, SFT, SK and Olsen, T. G-A.: *Naturmiljøet i tall 1994*. SK and G-A have delivered the maps. 431 pages.
- Brox, A.: GRID-Arendal report No. 2, 3 and 4 to UNEP Task Force on Information Systems, on support and status of UNEP Information Systems Development.
- Brox, A.: UNEP/Expert Advisory Group on Information Systems. Report on UNEP overall Information Systems Design. *UNEP - Appendix 1. Presentation*. 12 pages.
- Langaas, S. in the BGIS Working Group: *The Basic Geographic Information of the Baltic Drainage Basin. The feasibility study report*. Environmental Data Centre Finland. 44 pages.

### Articles/Papers

- Baxendale, H.: Critical loads for acidification of surface water in Northern Fennoscandia, *Nordkalottkomiteens publikasjonsserie* 33.
- Husby, E.: Environmental data collection, integration and analysis in a global and regional context. Presented at the 20. FIG congress in Melbourne, Australia, March 5-12, 1994. 7 pages.
- Copeland, J., Smith, C.: United States EPA Monitors Coastal Environments, *GIS World Magazine*, 7 ( 8 ) : 44 - 47.
- Smith, C.: The UNEP/GRID Program, *Circumpolar Arctic Vegetation Mapping Workshop. Abstracts and Short Papers*, Univ.

- of Colorado, March 21-25, 1994, St. Petersburg, Russia.
- Løvås, S. M., Smith, C.: INSROP Information System - Specification and Design, *Proceedings of the IAHR International Symposium on Ice*, Norwegian Institute of Technology, August 23 - 26, 1994, Trondheim, Norway. 11 pages.
- Sweitzer, J., Langaas, S.: Modelling population density in the Baltic States using the Digital Chart of the World and other small scale data sets. Presented at the conference "Coastal Conservation Management in the Baltic Region", May 2-8 1994, Klaipeda, Lithuania.
- Olsson, K.: Terrestrial net primary production of the Baltic drainage basin based on Global Vegetation Index and local growing season estimates. *Proceeding of the 14th EARSeL Symposium in Gothenburg*, June 6-8, 1994. "Sensors and Environmental Applications". 8 pages.

- Tveitdal, S.: GRID-Arendal - A node in the Global UNEP GRID Network. *Norway Mapping - Norwegian National report to the 20. FIG congress in Melbourne, Australia*, March 5-12, 1994. 2 pages.
- Tveitdal, S.: IT as a tool to increase efficiency in environment reporting for decision-makers and the general public. September 1994.

- Meiner, A., Langaas, S.: Landscape complexity and generalisation of land cover data in a Baltic nutrient pollution analysis case. In: M. Baranowski and M. Machinko-Nagrabecka (Eds.), *GIS in Ecological Studies & Environmental Management*, GRID-Warsaw, Poland, pages 117-126.

- Kane, R., Langaas, S., Prevost, Y.: Le suivi des feux de brousse au Sénégal par télédétection. Ch. 15 in: *Télédétection de l'environnement dans l'espace francophone*, edited by F. Bonn, Presses de l'Université du Québec, pages 267-273.

- Simonett, O.: UNEP's Environmental Information Network Development in Countries of Central and Eastern Europe and the CIS. In: M. Baranowski and M. Machinko-Nagrabecka (Eds.), *GIS in Ecological Studies & Environmental Management*, GRID-Warsaw, Poland, pages 179 - 182.

- Simonett, O.: Environment and Natural Resource Information Networks. - Countries with Economies in Transition in Central and Eastern Europe - Information leaflet. 6 pages.

- Olsson, K.: The Sampling procedure of global vegetation index and its possible impacts on estimating Net Primary Production over Scandinavia. *Proceedings of the ULI AM/FM conference "GIS Experiences and Future"*, Kiruna, Sweden. October 26-28, 1994. 9 pages.

- Olsen, T., Brox, A.: Project- and datastructure at GRID-Arendal. Samples from GIS oriented project at GRID-Arendal. *Proceedings of the ULI AM/FM conference "GIS Experiences and Future"*, Kiruna, Sweden, October 1994. 7 pages.

GLOSSARY			
AEPS	Arctic Environmental Protection Strategy	INSROP	International Northern Sea Route Program
AHC	Australian Heritage Commission	MoE	Ministry of Environment
AMAP	Arctic Monitoring and Assessment Programme	NASA	National Aeronautical and Space Administration
BGIS	Basic Geographic Information of the Baltic Drainage Basin	NILU	Norwegian Institute for Air Research
CAFF	Conservation of Arctic Flora and Fauna	NRSC	National Remote Sensing Centre Ltd.
CGIAR	Consultative Group for International Agricultural Research	OSPARCOM	Oslo and Paris Commissions
EAP	Environment Assessment Programme	SFT	Norwegian State Pollution Control Authority
DN	Norwegian Directorate for Nature Management	SINTEF-NHL	The Foundation for Scientific and Industrial Research at the Norwegian Institute of Technology-Norwegian Hydrotechnical Laboratory
EEA	European Environment Agency	SINTEF/RUNIT	SINTEF/Computing Centre at the University of Trondheim
EIS	Environmental Information System	TOMS	Total Ozone Mapping Spectrometer
GIS	Geographic Information Systems	UN	United Nations
GRID	Global Resource Information Database	UNEP	United Nations Environmental Programme
HELCOM	Helsinki Commission	UV	Ultra-violet
IARC	International Agricultural Research Centre	WFED	World Foundation for Environment and Development
IASC	International Arctic Science Committee	WWW	World Wide Web

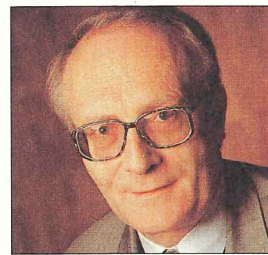
## GRID-Arendal Board of Directors



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Executive Secretary  
IASC



Øyvind Schreiner  
Head of Division  
SFT

Ole Hebin, Facility Manager, UNEP/GRID-Geneva (not pictured)

## GRID-Arendal Statement of Accounts

PROFIT AND LOSS ACCOUNT FOR THE PERIOD JAN. 1 TO DEC. 31 1994 RESULTATREGNSKAP 1.1. – 31.12.1994		
	1994	1993
OPERATING REVENUES / DRIFTSINNTEKTER	11 038 836	9 294 003
OPERATING EXPENSES / DRIFTSKOSTNADER	10 493 284	8 775 995
OPERATING RESULT / DRIFTSRESULTAT	545 552	518 008
NET FINANCIAL ITEMS / NETTO FINANSPOSTER	207 493	180 035
RESULT FOR THE YEAR / ÅRSRESULTAT	753 045	698 043
BALANCE SHEET AS PER DECEMBER 31, 1994 / BALANSE 31.12.1994		
CURRENT ASSETS / OMLØPSMIDLER	5 326 949	5 337 523
FIXED ASSETS / ANLEGGSMIDLER	196 313	402 354
TOTAL ASSETS / SUM EIENDELER	5 523 262	5 739 877
SHORT TERM LIABILITIES / KORTSIKTIG GJELD	2 714 710	3 684 370
EQUITY / EGENKAPITAL	2 808 552	2 055 507
TOTAL LIABILITIES AND EQUITY / SUM GJELD OG EGENKAPITAL	5 523 262	5 739 877

The above statement of accounts has been audited by State authorized Public Accountant Terje H. Holst, KPMG Peat Marwick, Arendal.

Regnskapet er revidert og godkjent av statsautorisert revisor Terje H. Holst ved KPMG Peat Marwick, Arendal.

Message from Harvey Croze, Director, Environment Assessment Programme, UNEP, Nairobi, Kenya

## Changing Times

For UNEP, 1994 has been a bit like trying to design an ice-cutter at the same time you are steering it through the ice floes: precarious, yet exciting and challenging. As the year finished, UNEP management had arrived at a corporate framework which, as we had anticipated, positions environment assessment and the related information management and servicing functions in important positions. If the 17th Session of UNEP's Governing Council in May 1995 agrees, there are to be three main divisions corresponding to the main thrusts of UNEP's response and delivery, namely, assessment, policy and management support.

The Program is to be issue- rather than sector-orientated, focusing in an integrated fashion on main threats to the environment: the increasing pressure and unsustainable demands on natural resources, the prevalence of unsustainable production and consumption patterns, the impact of environmental change on human health and well-being, and the impact of the globalization of the economy on the environment. A fifth main area of concern is more general or global in nature and is concerned with UNEP's on-going and overall responsibility to assess and generate knowledge on the state of the environment, to develop and promote the use of policies, methodologies and instruments, and to increase awareness and catalyze action in order to achieve the integration of environmental concerns in social and economic development.

This "framework for refocusing UNEP" is to draw heavily on the science community, to listen to the voice of the people as embodied in "major groups" to use the UN jargon, to rely on key partnerships with institutions of excellence around the world, and to manifest itself more prominently in the regions of the world, both for obtaining user views, as well as for delivering the goods.

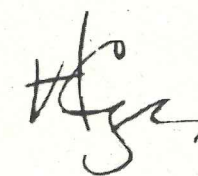


Harvey Croze (Photo: Per Lunden)

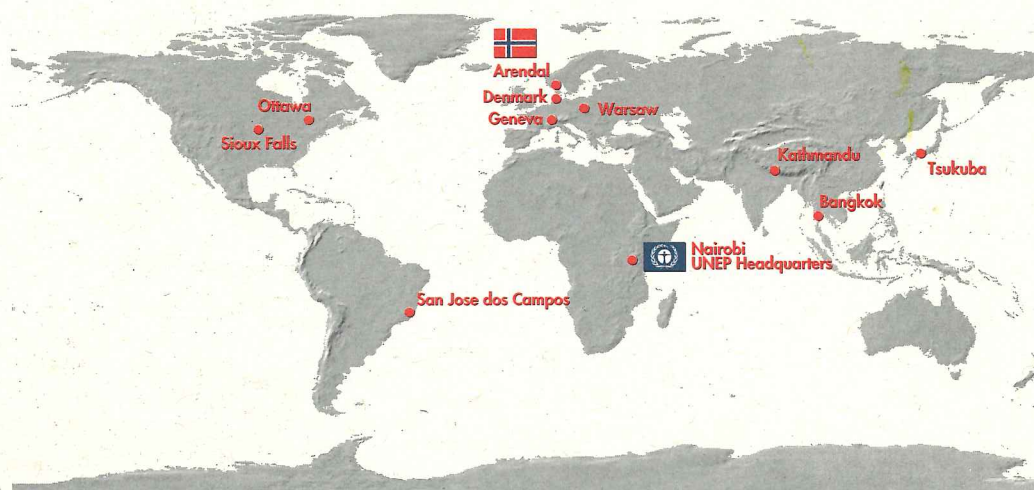
Where does GRID-Arendal fit in? Well, it's clear to those close to the work of GRID-Arendal that it is well down the road of expanding its activities from the "pure" data supply and servicing role implied in the acronym "GRID", to becoming both a notable regional entity, as well as an integrator of environmental information for environmental assessment, decision-making, policy-setting and the public.

This growth has stemmed from the enthusiasm, talent and dedication of the Director and his staff, and from the farsightedness of the Board to steer the growth of GRID-Arendal in a controlled, yet creative way. And already, we are considering the outputs from GRID-Arendal, by extension, as being outputs of the world-wide environmental assessment activities of UNEP. I have no doubt that the growth will continue throughout 1995.

And what will the future look like exactly? 1994/95 is still a biennium of transition, so let me save the answer for next year's message!



# GRID-network



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