Climate, Lakes and Rivers

SPECIAL EDITORS

Birgitta Raab

Haldo Vedin

THEME MANAGER

Swedish Meteorological and Hydrological Institute

National Atlas of Sweden

SNA Publishing will publish between 1990 and 1997 a government-financed National Atlas of Sweden. The first national atlas, Atlas över Sverige, was published in 1953-71 by Svenska Sällskapet för Antropologi och Geografi, SSAG (the Swedish Society for Anthropology and Geography). The new national atlas describes Sweden in seventeen volumes, each of which deals with a separate theme. The organisations responsible for this new national atlas are Lantmäteriverket, LMV (the National Land Survey of Sweden), SSAG and Statistiska centralbyrån, SCB (Statistics Sweden). The whole project is under the supervision of a board consisting of the chairman, Sture Norberg, and Thomas Mann (LMV), Staffan Helmfrid and Åke Sundborg (SSAG), Frithiof Billström and Gösta Guteland (SCB) and Leif Wastenson (SNA). To assist the board and the editors there is a scientific advisory group of three permanent members: Professor Staffan Helmfrid (Chairman), Professor Erik Bylund and Professor Anders Rapp. For this theme Professor Malin Falkenmark and Ph. D. Björn Holmgren have been coopted to the advisory group as specialists. A theme manager is responsible for compiling the manuscript for each individual volume. The National Atlas of Sweden is to be published in book form both in Swedish and in English, and in a computer-based version for use with personal computers.

The English edition of the National Atlas of Sweden is published under the auspices of the Royal Swedish Academy of Sciences by the National Committee of Geography with financial support from Knut och Alice Wallenbergs Stiftelse and Marcus och Amalia Wallenbergs Stiftelse.

The whole work comprises the following volumes (in order of publication):

MAPS AND MAPPING

THE FORESTS

THE POPULATION

THE ENVIRONMENT

AGRICULTURE

THE INFRASTRUCTURE

SEA AND COAST

CULTURAL LIFE, RECREATION AND TOURISM

SWEDEN IN THE WORLD

WORK AND LEISURE

CULTURAL HERITAGE AND PRESERVATION

GEOLOGY

LANDSCAPE AND SETTLEMENTS

CLIMATE, LAKES AND RIVERS

MANUFACTURING, SERVICES AND TRADE GEOGRAPHY OF PLANTS AND ANIMALS

THE GEOGRAPHY OF SWEDEN

CHIEF EDITOR

Leif Wastenson

Staffan Helmfrid, Scientific Editor

Märta Syrén, Editor of Climate, Lakes and Rivers

Ulla Arnberg, Editor Margareta Elg, Editor

PRODUCTION
SPECIAL EDITORS

LM Maps, Kiruna Birgitta Raab

Haldo Vedin Michael Knight

TRANSLATOR

Håkan Lindström

GRAPHIC DESIGN

Typoform/Gunnel Eriksson, Stockholm

LATOUT

LM Repro, Luleå

REPRODUCTION

Bokstaven Text & Bild AB, Göteborg

COMPOSITION

Almqvist & Wiksell International, Stockholm

COVER ILLUSTRATION

Printed in Italy 1995

Sven Samelius, Norrköping

First edition © SNA

ISBN 91-87760-04-5 (All volumes)

ISBN 91-87760-32-0 (Climate, Lakes and Rivers)

853 8569 TS

Contents

A Green Interlude	6	Humidity and Evaporation BJÖRN BRINGFELT AND ARNE FORSMAN	66	Lakes TORBJÖRN LINDKVIST Lakes and Lake Landscapes 13	130 2
Weather and Water MALIN FALKENMARK AND ALF NYBERG Meteorology, Climatology and Hydrology? 9	8	Clouds and Fog TAGE ANDERSSON AND WEINE JOSEFSSO Cloud Cover Maps 72 Fog 74	70 N	Water Temperature and Ice	136
A Global Perspective BERT BOLIN AND MALIN FALKENMARK The Global Climate System 14 Atmospheric Water Flow 16 Amount of Water and Drainage Basins 19 Climatic Changes 20	14	Precipitation and Thunderstorms HANS ALEXANDERSSON AND TAGE ANDERSSON Precipitation Maps 80 Thunderstorms 88	76	Air and Water Transport Material STEN LAURIN, AKE SUNDBORG AND HANS BERTIL WITTGREN Ion Composition in Swedish Lakes 147	142
From the Ice Age to Our Age HANS ALEXANDERSSON, WIBJÖRN KARLÉN AND JÖRGEN NILSSON	22	Snow Cover BENGT DAHLSTRÖM Snow Cover Maps 92	91	Lakes and Rivers as Living Environments	150
The Climate during the Past 1,500 Years 24 Water and Ice in Long Series of Observations 28		Local Climate JAN O. MATTSSON AND ROGER TAESLER	98	Lake Drainage, Canal and Log Floating	s 154
Our Knowledge Grows OLOV LÖNNQVIST AND GUN ZACHRISSON The Stockholm Temperature Series 36	30	Agricultural Landscapes 100 Forest Landscapes 100 Urban Landscapes 102 Runoff TORBJÖRN JUTMAN	106	Water Power and Lake Regulation GÖRAN SPRINCHORN Energy in Lakes	158
Solar Radiation WEINE JOSEFSSON Sunshine Duration 43	40	Runoff Maps 107 The Movement of Water	112	Conflicting Water Claims LARS EDENMAN	164
Air Temperature HALDO VEDIN The Seasons 47 Temperature Maps 50	44	Water Systems in Sweden	116	Malaren—a Lake for Millions Climate and Water in the Future	168 170
Air Pressure and Wind	58	River Discharge MARTIN GOTTHARDSSON Annual Variation of Discharge	124 128	BERT BOLIN AND MALIN FALKENMARK	