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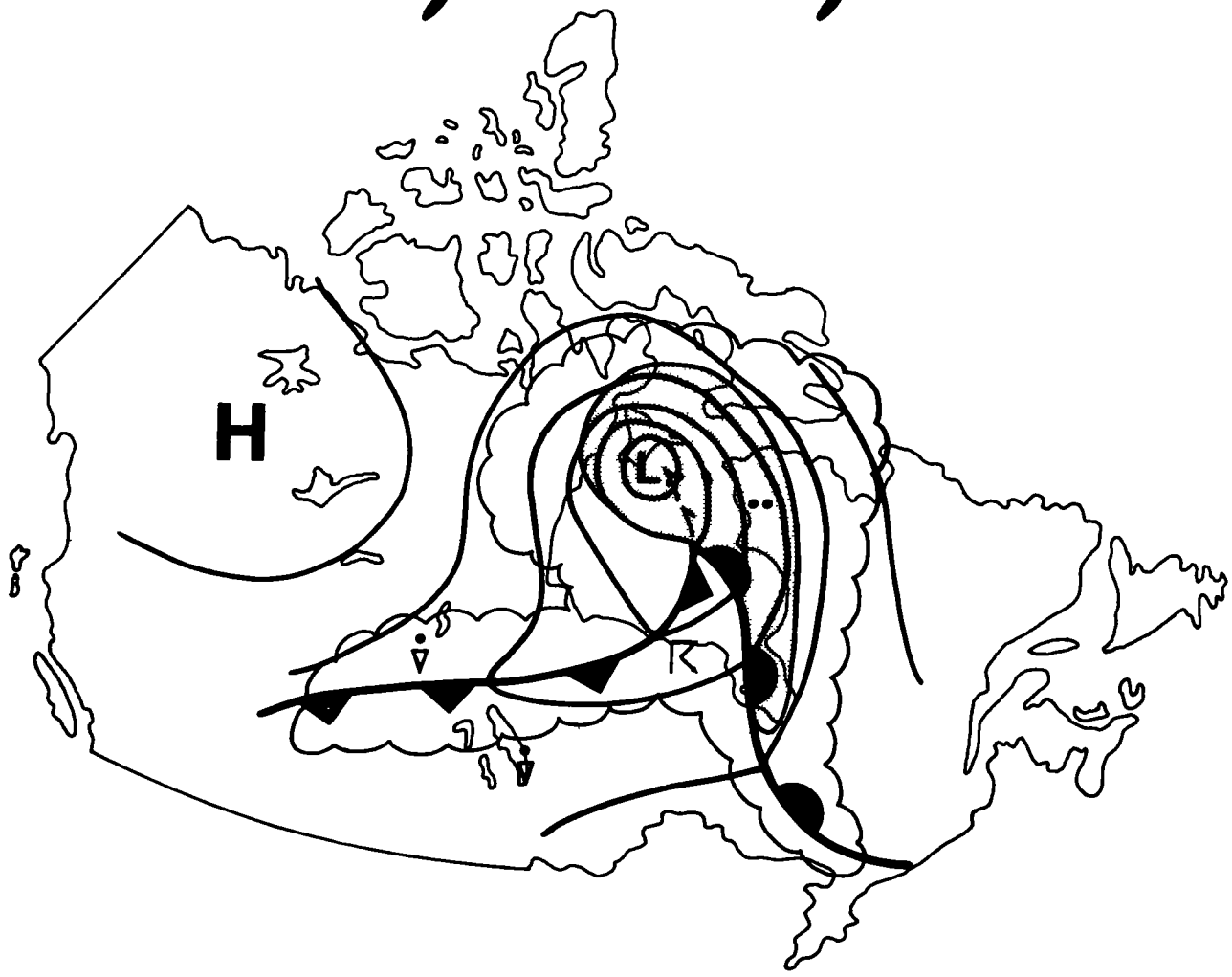
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 Environment Canada
Environnement Canada
Atmospheric Environment Service
Service de l'environnement atmosphérique

ATMOSPHERIC ENVIRONMENT SERVICE

Program Digest



1990 - 1991

AES MANAGEMENT SERIES

AES: SERVICE TO THE PUBLIC

As the Atmospheric Environment Service (AES) enters a new decade, it can be proud of its achievements and results. As reflected in its mission, AES provides essential information on the atmosphere, sea-state and ice conditions for the personal and economic well-being of Canadians. In recent years, the monitoring of the changing atmospheric and climatic conditions has become of global importance with the threat of Global Warming and the effect of Acid Rain on our lakes and forests. AES conducts basic and applied atmospheric research in order to inform policy- and decision-makers of the nature of these and other environmental problems, and to find solutions. AES has an impressive record of achievement in providing quality information and well-respected services to the Canadian public. This record of achievement has been accomplished despite fiscal restraint, increasing demands for existing services and the redirection of some of our efforts towards resolving new environmental problems.

AES's future activities will include the implementation of the Federal Government's proposed Green Plan. The Green Plan will enhance AES' ability to deal with Climate Change, Severe Weather, Environmental Emergencies, Urban Air Pollution and Acid Rain through improvements to its atmospheric monitoring capabilities, and to its Atmospheric Research component. AES will continue to provide information and services essential to enhance Canadians' quality of life into the the 21st century, meeting Canadians' changing needs and responding to future environmental challenges.

TABLE OF CONTENTS

	<u>Page</u>
FOREWORD	v)
TABLE OF CONTENTS	111)
LIST OF MAPS	vi)
PREFACE	1x)
1 INTRODUCTION	
1 1 Purpose	3
1 2 Material Presented in the Program Digest	3
2 THE DEPARTMENT OF THE ENVIRONMENT	
2 1 Departmental Program Structure	7
2 2 Department Legal Mandate and Responsibilities	7
3 OBJECTIVES PRIORITIES AND HIGHLIGHTS	
3 1 Objective of Environment Canada	11
3 2 Objective of Environmental Services Program	11
3 3 Objective of the Atmospheric Environment Service	11
3 4 AES Priorities 1990-95	11
3 5 1990-1991 Highlights by Program Areas	13
4 BUDGET BY PROGRAM ACTIVITY	
4 1 <u>AES Budget By Sub-Activity</u>	
4 1 1 Program Activity Structure	19
4 1 2 Chart - AES Budget by Sub-Activity	22
4 1 3 Diagram - AES Total Budget by Sub-Activity	23
4.1 4 Diagram - AES Person-Years by Program Sub-Activity	23
4 1 5 Diagram - AES Salary and O&M by Program Sub-Activity	24
4.1 6 Diagram - AES Capital by Program Sub-Activity	24
4 1 7 Diagram - AES Budgets 1981 to 1990	25
4 1 8 Diagram - AES Person-Years 1981 to 1990	26
4 2 <u>WEATHER SERVICES Sub-Activity</u>	
4 2 1 Objectives	27
4 2 2 Budget by Sub-Sub-Activity	27
4 2 3 Description	27
4 2 3 1 Public, Marine, Aviation, Economic and Canadian Forces Weather Service Sub- Sub-Activities	27
4 2 3 2 Data Sub-Sub-Activity	31
4 2 3 3 Weather Services Support Systems Sub-Sub-Activity	33

	<u>Page</u>
4 3 <u>CLIMATE SERVICES AND RESEARCH Sub-Activity</u>	
4 3.1 Objectives	34
4 3 2 Budget by Sub-Sub-Activity	34
4 3 3 Description	34
4 4 <u>ICE SERVICES Sub-Activity</u>	
4 4 1 Objectives	36
4 4 2 Budget by Sub-Sub-Activity	36
4 4 3 Description	36
4 5 <u>AIR QUALITY SERVICES AND RESEARCH Sub-Activity</u>	
4 5 1 Objectives	38
4 5 2 Budget by Sub-Sub-Activity	38
4 5 3 Description	38
4 6 <u>MANAGEMENT AND COMMON SUPPORT SERVICES Sub-Activity</u>	
4 6 1 Objectives	42
4 6 2 Budget by Sub-Sub-Activity	42
4 6 3 Description	42
5 <u>AES FUNCTIONS AND BUDGETS BY ORGANIZATION</u>	
5 1 <u>Atmospheric Environment Service</u>	
5 1 1 AES Organizational Structure	67
5 1 2 Chart - AES Total Budget by Program Activity and Organization	70
5 1 3 Chart - AES Person-Years by Program Activity and Organization	71
5 1 4 Chart - AES Salary by Program Activity and Organization	72
5 1 5 Chart - AES O&M by Program Activity and Organization	73
5 1 6 Chart - AES Capital by Program Activity and Organization	74
5 1.7 Chart - AES G&C by Program Activity and Organization	75
5 1 8 Chart - AES Total Budget by Organizational Unit	76
5 1 9 Chart - AES Reconciliation to Main Estimates and Net Reference Level	77
5 1 10 Chart - AES Main Estimates by Organization and Input Factor	78
5 1 11 Chart - Vote Netted Revenue Allocations	79
5 1 12 Chart - AES Person-Years by Organization and by Location	80

	<u>Page</u>
5 2 <u>Office of the Assistant Deputy Minister (ADMA)</u>	
5 2 1 Functions	85
5 2 2 Chart - Budget by Sub-Activity and Sub-Sub-Activity	86
5 3 <u>Policy, Planning and Assessment Directorate (APDG)</u>	
5 3 1 Functions	87
5 3 2 Chart - Budget by Sub-Activity and Sub-Sub Activity	88
5 4 <u>Weather Services Directorate (WSD)</u>	
5 4 1 Functions	89
5 4 2 Chart - WSD Budget	92
5 4 3 Chart - Office of the Director General (WSD) Budget	93
5 4 4 Chart - Weather Services Program Branch Budget	94
5 4 5 Chart - Canadian Meteorological Centre Budget	95
5 4 6 Chart - Pacific Region Budget	96
5 4 7 Chart - Western Region Budget	97
5 4 8 Chart - Central Region Budget	98
5 4 9 Chart - Ontario Region Budget	99
5 4 10 Chart - Quebec Region Budget	100
5 4 11 Chart - Atlantic Region Budget	101
5 4 12 Chart - Canadian Forces Weather Service Budget	102
5 4 13 Chart - WSD Budget by Organizational Unit	103
5 5 <u>Atmospheric Research Directorate (ARD)</u>	
5 5 1 Functions	104
5 5 2 Chart - ARD Budget	106
5 5 3 Chart - Office of the Director General (ARD) Budget	107
5 5 4 Chart - Environmental Integration Services Branch	108
5 5 5 Chart - Air Quality and Inter-Environmental Research Branch Budget	109
5 5 6 Chart - Meteorological Services Research Branch Budget	110
5 5 7 Chart - ARD Budget by Organizational Unit	111
5 6 <u>Canadian Climate Centre (CCC)</u>	
5 6 1 Functions	112
5 6 2 Chart - CCC Budget	114
5 6 3 Chart - Office of the Director General (CCC) Budget	115
5 6 4 Chart - Climatological Applications Branch Budget	116
5 6 5 Chart - CCC Budget by Organizational Unit	117
5 7 <u>Central Services Directorate (CSD)</u>	
5 7 1 Functions	118
5 7 2 Chart - CSD Budget	123
5 7 3 Chart - Office of the Director General (CSD) Budget	124
5 7 4 Chart - Computing and Telecommunications Service Branch Budget	125
5.7 5 Chart - Data Acquisition Branch Budget	126
5 7 6 Chart - Ice Services Branch Budget	127
5 7 7 Chart - Training Branch Budget	128
5 7 8 Chart - CSD Budget by Organizational Unit	129

	<u>Page</u>
5 8 <u>Finance and Administration Branch</u>	
5 8.1 Functions	130
5 8 2 Chart - AABD Budget	132
5 9 <u>Human Resources Management Branch</u>	
5 9 1 Functions	133
5 9 2 Chart - AHRD Budget	136

LIST OF MAPS

Location of Weather Offices	43
Weatheradio Network	44
Weatheradio Network (Eastern Canada)	45
Public Forecast Regions (West) (No cities)	46
Public Forecast Regions (East) (No cities)	47
Airport Forecasts	48
Aviation Weather Forecast Regions (Issued by Vancouver/ Whitehorse/Edmonton/Winnipeg)	49
Aviation Weather Forecast Regions (Issued by Edmonton (Arctic))	50
Aviation Weather Forecast Regions (Issued by Toronto, Montreal, Halifax or Gander)	51
Marine Forecast Areas (West)	52
Marine Forecast Areas (East)	53
Hourly Stations With AES Observers	54
Hourly Stations With Non-AES Observers	55
Hourly Automatic Stations	56
Aerological Stations	57
AES Weather Radar Network	58
CAPMoN	59
AES Satellite Readout Stations	60
Ice Services Areas of Coverage (Seasonal)	61
AES Radioactive Fallout Network	62
AES Regions and Weather Centres	63

PREFACE

ATMOSPHERIC ENVIRONMENT SERVICE

The Atmospheric Environment Service

Canada's Weather Service (Much More Than The Weather)

The Atmospheric Environment Service (AES), which is part of the federal Department of the Environment (Environment Canada), is best known for providing Canadians with timely weather information through broadcasts on television and radio, weather reports in newspapers, or through direct inquiries to its offices

The primary goal of AES is to ensure the safety of Canadians and the protection of their property. This is met by providing warnings of approaching severe storms and through regular weather forecasts. In addition, AES monitors sea ice and predicts its motion to protect ships and drill rigs in the Arctic and Atlantic, and determines the movement of atmospheric pollutants to help safeguard environmental quality and health.

AES also contributes to the competitiveness of the Canadian economy, both nationally and internationally, by providing weather and climate information to sectors which are particularly weather-sensitive, and by supporting companies in the provision of a variety of services and in the development of specialized technological systems associated with atmospheric sciences.

In addition, AES ensures that Canada meets its domestic and international obligations to civil aviation and military alliances by providing weather data and forecasts for Canadian territory and air space. Its presence and activities in the north help strengthen Canadian sovereignty.

In order to meet its goals, AES carries a solid research program and maintains environmental databases to answer questions on climatic applications. Research addresses chemical alterations to the atmosphere including major aspects of acid rain, toxic air pollutants, the high level ozone layer, and anticipated changes in climate associated with increasing "greenhouse" effect.

In recent years, AES has been the Departmental lead in the development of a peacetime emergency response policy, including the development and implementation of emergency plans, arrangements and facilities to fulfill the department's mandate when emergency events occur.

Over 100 Years of Service

In Canada, official weather observations were introduced when the British government established an observatory in Toronto, Ontario in 1839-40. The observatory was taken over by the Canadian government in 1853, and in 1871, an additional \$5,000 was allocated "for meteorological observations with a view to ultimately establishing storm-signals". Over the next decade, professor G T Kingston of the observatory proceeded to establish a national meteorological service serving the original Eastern provinces.

The weather observing station network spread West with the telegraph system and weather forecasts were issued daily for all provinces by about 1900. With the development of technology in the 1920s, and the increasing population and mobility of Canadians, the network spread into the sub Arctic, and after World War II, into the far Arctic. During these decades, the original public and maritime services were expanded to agriculture and forestry and then to the fast-growing aviation sector. In the mid-1950s, ice observing and forecasting were introduced for the Arctic in summer, and along the Atlantic coast and the Gulf of St. Lawrence in winter. In the 1970s, air quality services were added to the Service's responsibilities and the Canadian Climate Centre was established to reflect the increasing load of climate data management and the needs of climate research and applications. In 1990, two new branches within AES will be established to strengthen on AES' ability to develop a Canadian response to the growing challenges of atmospheric change. An Environmental Integration Services Branch will be established within Atmospheric Research Directorate to continue the role of coordination of acid rain and associated LRTAP issues, eventually expanding other air quality problems and the socio-economic consequences of air pollution. Within the Canadian Climate Centre, a Response Strategies Branch will work on developing national action plans associated with climate change.

Forecasting The Weather

Weather forecasting is beneficial and often extremely important to Canadians. Not only does weather forecasting help us to plan our daily activities such as dressing for the outdoors, driving to work, farming and fishing, but it also provides us with warnings about the possibility of severe weather that could threaten our lives and property.

The weather forecasting service provided by AES is publicly funded to ensure the safety of all Canadians and the security of their property, to contribute to the efficiency of the economy, and to help safeguard environmental quality. The services to Canadians include timely warnings of such events as winter storms, tornadoes, extreme cold, frost in the growing season and strong winds. Almost every Canadian is also interested in the more common weather forecasts, predicting such elements as maximum and minimum temperatures, precipitation occurrence and cloudiness, not only for the present day, but for the following four days as well. The AES also prepares forecasts and warnings suitable to meet the particular needs of the marine, aviation, agriculture and forestry sectors which are major components of the Canadian economy. In total, AES issues forecasts for 436 urban, rural, aviation and marine areas.

Weather forecasts and warnings are distributed to users in Canada mainly through mass communications methods such as the commercial media, Weatheradio Canada, and tape-recorded telephone messages. The Canadian Coast Guard Marine radio system and the aviation radio system broadcast AES weather information in conjunction with navigation safety information. Consultation on current and forecast weather and its impact on various activities is available to the public by telephone or in person at 62 weather offices across Canada.

The Basic Components of Weather Forecasting

Providing weather forecasts is a three-step process

Step one is collecting all the available information about current weather. A large observing network does this job. In Canada, some 467 stations take hourly weather observations, 32 additional stations sample the upper atmosphere twice daily using instrumented balloons, 10 satellite centres receive continuous measurements and 14 weather radars cover most of the populated area of southern Canada. Selected data, Canadian and international, are then sent on a Canada-wide telecommunications network to all AES forecasting centres. These data give the forecaster a "snapshot" of the world's weather at one point in time.

Step two is forecast production. At the Canadian Meteorological Centre (CMC) in Montreal, weather forecast models are run on a CRAY supercomputer. These models can simulate or project how the atmosphere is most likely to evolve over the next few days, from the information streaming in from Canada and around the globe. These projections of atmospheric conditions are then transformed by highly trained and experienced weather forecasters into predictions of regional conditions. Meteorologists at nine regional Weather Forecast Centres use these computer-produced weather maps along with satellite and radar weather data, and other information, to produce the detailed forecasts and weather warnings for their own regions.

Step three is delivery. AES provides these forecasts and warnings through a national communication system and through 62 Weather Offices, to radio, television, and newspapers throughout Canada. They are also made available on tape for telephone callers and through continuous broadcasts on Environment Canada's Weatheradio system.

Climate Services and Research

Besides observing and forecasting current weather, the AES also pursues an active climatology program. It maintains detailed records, analyses patterns and trends, and uses these as a basis for short-term applications and long-term climate predictions.

The Canadian Climate Centre and the regional climate offices respond to inquiries regarding climate data and information. These inquiries normally involve the provision of compiled data (digital, microfilm and in printed format), maps, atlases, guides, manuals, bibliographies, climate analyses and/or climate studies. These services and the long-term success of climatology in Canada require the maintenance of national, quality-assured climate archives.

The AES is also actively involved in climate-related scientific activities such as marine applications, remote sensing of hydrometeorological parameters, and analysing the impacts of climate and its variability on agriculture, forestry, industry and arctic environments. The research and development activities include research on the water resources of Canada and research related to the production of monthly and seasonal forecasts of temperature and precipitation, as well as the development of a Canadian General Circulation Model for long term climate prediction.

Of particular interest is the investigation of long-term climate warming caused by the "greenhouse" effect. In June 1988, an international conference, "The Changing Atmosphere: Implications for Global Security", was held in Toronto. Policy-makers and senior scientists from around the world had the opportunity to examine the credible evidence concerning atmospheric change and its effects, and to discuss and develop policy positions and make recommendations for further actions. In February 1989, Environment Canada and External Affairs co-ordinated and hosted a meeting, in Ottawa, of legal and policy experts from 25 countries to develop principles for inclusion in an umbrella convention for the protection of the atmosphere. This was followed by the Environmental Summit in The Hague in March 1989, and in November 1989, the Environment Ministers of 70 nations met in the Netherlands and passed a Declaration which agreed on the need to stabilize the production of carbon dioxide, the most damaging of greenhouse gases.

An Army of Volunteers

An army of more than 2,000 volunteer climate observers collect information on weather and climate on land and at sea. The land-based network is more than a century old and is operated by a cross-section of Canadians, including farmers, homemakers, pensioners and teachers, all taking temperature and precipitation readings twice a day in their backyards or gardens. These observations provide much of the statistics essential to our national climate archives.

In addition, 3,500 severe weather watchers serve their fellow citizens by quickly reporting thunderstorms, tornadoes and hailstorms to the regional centres.

Furthermore, around 420 ships are registered with the AES to take volunteer marine weather observations. In a year, more than 120,000 of these observations are transmitted by ship officers and are used for the preparation of marine forecasts. These observations, taken mostly over the Great Lakes and along the coastlines, are also archived and used for marine climatology studies. Since 1986, with the inception of the volunteer Marine Reporting (MAREP) Program, AES annually receives reports of near-shore weather reports from thousands of small-craft operators.

Keeping Watch on Offshore Ice

AES is also responsible for monitoring and forecasting ice movements along Canada's coastlines and on inland waterways. Ice reconnaissance aircraft use

advanced radar equipment to observe sea ice along the Atlantic coast, the Great Lakes/St Lawrence system and in the Arctic. Icebergs in the Newfoundland and Labrador coastal areas are also surveyed. The Ice Centre in Ottawa combines this aircraft information with satellite observations and weather data and forecasts to produce detailed ice charts and ice forecasts so that ships can plot a safe course through ice-infested waters. These are used by fishermen, shipping companies and offshore oil and gas exploration companies to prevent marine accidents that could endanger both lives and the fragile marine environment.

Research and Development

AES is a scientific organization and depends on research and development to improve its services, and to be at the forefront of the environmental sciences.

As experts on atmospheric processes, the AES scientists play a vital role in advising the government and industrial decision-makers on such key issues as acid rain, toxic chemicals and climate change. This expertise is backed by painstaking research from the ground up to the borders of space and from the chemistry lab to the computer room. Monitoring programs are maintained to determine changes and trends in the quality of Canada's air and rain. Through cooperation with the United States and the provinces, a national archive of atmospheric pollution data began operation in 1989. The archive is being used to provide information on the acid level of precipitation across the country and will be the main source of data for setting acid rain control standards.

AES has had major successes. It helped to pioneer the techniques which permit computer forecasting of weather up to 5 and 6 days. These are now in use worldwide. Processing systems developed in co-operation with Canadian industry deliver weather satellite data across Canada. The AES is recognized as a world leader in the science of acid rain and long-range transport of pollution, including arctic haze. Its research on climate change is recognized internationally as first-rate. In collaboration with Canadian industry, the AES has developed sophisticated instrumentation to measure the high-altitude ozone layer both from the ground and from space. The ground based instrument, the Brewer Spectrophotometer, has been designed in AES laboratories and has been sold in 11 countries to date. This modern instrument, with its computer-controlled solar tracker (also of AES design), is capable of more accurate measurements of ozone than the classical instrument used in the world network for over 40 years.

The future looks exciting. Satellites and supercomputers present opportunities to provide more accurate and timely weather warnings as our understanding of the atmosphere improves. Very long-range forecasts of general weather conditions up to months in advance seem possible. At the same time, the details of the transport and transformation of acidic and other pollutants are emerging from research efforts.

AES can't do it alone. It works with Canadian industry, with universities, with provincial agencies, other federal departments and other countries. Many atmospheric issues are global in nature and the AES is a leader in contributing to world-wide advances in atmospheric sciences and drawing on the efforts of other countries. In collaboration with AES and the Natural Sciences and Engineering Research Council, Canadian Universities are also strengthening their role in atmospheric research.

Partnerships in Canadian Meteorological Services

The Atmospheric Environment Service is the major player in meteorology in Canada. However, an increasing demand for meteorological services has compelled the AES to look to others for the provision of some of these services. The growing Canadian private meteorological sector is seen as an important player and, with continuing development, could be relied upon to assist in meeting these demands.

The AES, in consultation with representatives from the private sector, has developed a five year plan to encourage private sector firms to take over provision of specialized services where appropriate and to develop new markets and new services. The intent of this plan is not to privatize the provision of basic meteorological services already paid for by the taxpayer. The plan recognizes that by providing new services and expanding markets, the private sector will provide greater economic benefits to the country by the judicious application of atmospheric science to a wide range of specific problems.

In 1989, AES established a satellite-based facility for relaying information to the private sector, the university community and provincial agencies. In addition, the AES supported the establishment of Canada's Cable Television Weather Channel. In February 1990, AES, along with Environment Canada and other government departments was among the sponsors of the Globe 90 international conference and trade fair held in Vancouver. This initiative was, in part, to assist environmental industries to identify and capture domestic and international market opportunities.

Partners in Global Weather

Weather knows no frontiers. The World Meteorological Organization (WMO), a United Nations agency based in Geneva, co-ordinates the global distribution and exchange of weather information among 160 countries.

Canada both benefits from and contributes to the world meteorological community by sharing its data and participating in joint programs such as the World Climate Program and in WMO training programs.

In addition, Canada is an active partner in global research programs that deal with drought, carbon dioxide emissions and climate change, protecting the ozone layer and efforts to improve weather forecasting on a world-wide basis. This involvement is exemplified in the contribution of Canada to the development of the Montreal Protocol for the Protection of the Ozone Layer which was signed by 25 countries in September 1987. In 1988, in response to growing public and

political interest in climate warming induced by greenhouse gases and in related atmospheric problems, Canada participated in the formation of the United Nations Intergovernmental Panel on Climate Change (IPCC). The objectives of the IPCC center on three specific tasks: the assessment of the available scientific information on climate change, the assessment of environmental and socio-economic impacts of climate change, and the formulation of response strategies. The IPCC's interim report is expected to be released at the Second World Climate Conference to take place in Geneva in November 1990, and in which Canada will be a participant.

CHAPTER 1
INTRODUCTION

ATMOSPHERIC ENVIRONMENT SERVICE

1. INTRODUCTION

1 1 PURPOSE

"The Program Digest" is an annual publication that describes

- the Atmospheric Environment Service (AES), as well as its objective, mandate and responsibilities, and
- the AES budget by program sub-activity (SA 1) and program sub-sub-activity (SA 2)

"An Addendum to the Program Digest" is also issued in conjunction with the Program Digest This publication describes

- sub-sub-sub-activity (SA 3) and the program activity element (SA 4) level definitions of the program activities,
- the relationship between responsibility centres and SA 3 program activities, and
- the AES financial and human resource allocations at the SA 3 and SA 4 levels by organizational unit

1 2 MATERIAL PRESENTED IN THE PROGRAM DIGEST

The preface gives the reader an introduction to the Atmospheric Environment Service (AES) and the activities it pursues Chapter 2 describes AES responsibilities and its mandate within Environment Canada Chapter 3 discusses its most current objectives and priorities Information relating to AES program activities and organizational units is provided in Chapters 4 and 5 respectively.

(Note On the maps contained in Chapter 4, some detail on forecast areas may have been omitted due to space limitations)

Any comments or suggestions for amendments to this document should be forwarded to the Policy, Planning and Assessment Directorate, Program Development and Evaluation Branch (APEC)

CHAPTER 2
THE DEPARTMENT OF THE ENVIRONMENT

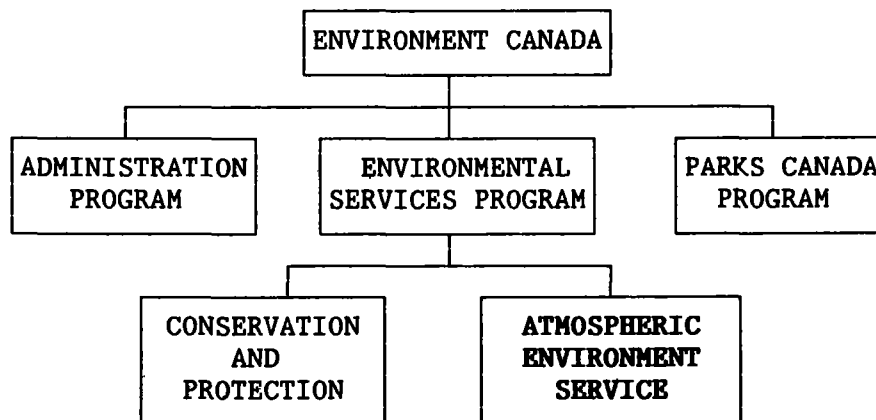
ATMOSPHERIC ENVIRONMENT SERVICE

2 THE DEPARTMENT OF THE ENVIRONMENT

2.1 DEPARTMENTAL PROGRAM STRUCTURE

Environment Canada has grouped its activities into three Programs (as shown below)

- the **Environmental Services Program** which is divided in two activities **Conservation and Protection (C&P)** and the **Atmospheric Environment Service (AES)** This Program provides information on weather, climate, ice, sea state and air quality (AES) It also promotes the conservation and protection of inland waters, lands and wildlife, and develops preventive or corrective measures for maintaining and improving environmental quality (C&P)
- the **Parks Program** which establishes, develops and manages national parks, national historic parks and sites, heritage canals and co-operative heritage areas
- the **Administration Program**, which provides corporate management, strategies, policy and planning, guidance on priorities issues, corporate finance, personnel and administrative support services to the Department It also includes the administration of the Environmental Assessment and Review Process (EARP)



2.2 DEPARTMENT LEGAL MANDATE AND RESPONSIBILITIES

The Department of the Environment came into being in June, 1971 following proclamation of the Government Organization Act, 1970. Known now as Environment Canada, the Department was created from components within the federal structure that relate to the natural environment. Subsequent organizational adjustments were effected through the Government Organization Act of 1979 which separated the fisheries and marine component, by Order-in-Council PC-1979-1617 which added Parks Canada to the Department's structure, and by Order-in-Council PC-1984-3200 which transferred the Canadian Forestry Service to Agriculture Canada.

The Government Organization Act (GOA), 1979 and the subsequent Miscellaneous Statutes Law Amendment Act (June 1984) and Order-in-Council PC-1984-3200 which modified the effect of the Act, state that the duties, powers and functions of the Minister of the Environment extend to and include

- (1) all matters over which Parliament has jurisdiction not otherwise assigned to other federal departments, boards and agencies relating to
 - the preservation and enhancement of the quality of the natural environment, including water, air and soil quality,
 - renewable resources including migratory birds and other non-domestic flora and fauna,
 - water,
 - meteorology;
 - the enforcement of rules and regulations made by the International Joint Commission relating to boundary waters, and questions arising between the United States and Canada insofar as they relate to the preservation and enhancement of the quality of the natural environment,
 - the co-ordination of the policies and programs of the Government of Canada respecting the preservation and enhancement of the quality of the natural environment,
 - the protection and presentation of national parks, national historic sites and historic canals, and
 - the National Battelfields Commission

- (11) such other matters over which Parliament of Canada has jurisdiction relating to the environment as are by law assigned to the Minister

The GOA recognizes that preserving and improving Canada's environmental quality is a responsibility of all federal departments, the provincial governments and the public. The Act gives to the Minister of the Environment broad responsibilities to promote practices that lead to the improvement and preservation of environmental quality. It also enables the Minister to co-operate with provincial governments and their agencies and any other program or organization having similar environmental objectives. As well, the GOA empowers the Minister to establish guidelines and advise heads of departments, boards and agencies of the federal government in all matters pertaining to preserving and improving the quality of the natural environment. Finally, it allows the Minister to enter into agreements with other governments or agencies for the purpose of carrying out programs for which the Minister is responsible.

CHAPTER 3
OBJECTIVES PRIORITIES AND HIGHLIGHTS

ATMOSPHERIC ENVIRONMENT SERVICE

3 1 OBJECTIVE OF ENVIRONMENT CANADA

- to foster harmony between society and the environment for the economic, social and cultural benefit of present and future generations of Canadians

3 2 OBJECTIVE OF THE ENVIRONMENTAL SERVICES PROGRAM

- to promote and undertake programs to protect and enhance the quality of the environment, and programs designed to improve the management and sustained economic utilization of the wildlife and inland water resources of Canada

3 3 OBJECTIVE OF THE ATMOSPHERIC ENVIRONMENT SERVICE

- to ensure that Canada has adequate information on the atmosphere, ice and sea state for the safety of life, the security of property, the greater efficiency of economic activities and for the maintenance and enhancement of environmental quality

3 4 ATMOSPHERIC ENVIRONMENT SERVICE'S PRIORITIES 1990 - 1995

In recognition of Canadians' growing needs for weather services, the Atmospheric Environment Service has developed a strategic plan for improving these services over the next twenty years. This plan provides the framework to guide AES activities in support of government priorities, (especially the Green Plan), development of services, interdepartmental, federal-provincial, private sector and international agreements, and good management practices. It also recognizes that these changes are desirable, and in some cases inevitable, if the Atmospheric Environment Service is to meet Canadians' needs in the future.

Priorities

Over the next five years, AES' efforts will focus on

- 1 Ensuring that Canada has the knowledge and information required to develop sound domestic and international policies and practices to respond to the changing atmosphere by
 - monitoring and researching the composition of the atmosphere and the environmental impacts resulting from changes to its composition to provide information and advise to the public and both Canadian and international decision-makers,

- enhancing the awareness of both the public and decision-makers of the potential socio-economic implications of these environmental impacts and potential response strategies,
 - enhancing interdepartmental, intergovernmental and international co-operation in this field, and
 - supporting the development of national and international law, regulation and practices to sustain a healthy and secure atmosphere
- 2 Delivering high quality environmental warnings and to maintain a high state of preparedness to respond to environmental emergencies both natural and man-made by
- exploiting advances in weather radar science and technology to improve the usefulness, timeliness and accuracy of weather forecasts, watches and warnings,
 - improving the detection, prediction and communication of critical weather, sea state, ice, climate and air quality information,
 - complementing regional and national capabilities in the area of emergency response by acquiring specialized data acquisition systems, implementing computer models designed for local conditions and maintaining a high level of preparedness through training and exercise of staff,
 - taking the departmental lead with organizations involved in emergency planning at all levels of government, to achieve effective and well coordinated plans, and
 - supporting increased public awareness and understanding of the full range of natural and man-made environmental hazards and actions to be taken for their mitigation
- 3 Strengthening the relationships between the environment and the economy for the benefit of both by
- communicating the importance of environmental considerations including climate, ice, sea-state and air quality, both for short-term economic decisions and for sustainable development over the long term,
 - taking advantage of the full spectrum of Canadian and international capabilities in meteorological services and atmospheric science research through partnership initiatives with the Canadian private meteorological sector, universities, other government departments and provincial agencies, and
 - researching client needs, monitoring of client satisfaction and delivering AES products and services in an environment-economy context

4 Ensuring the efficiency and effectiveness of AES operations and management by.

- continuing to take advantage of advances in science and technology to improve productivity and efficiency,
- actively seeking external partners, and creating opportunities to multiply AES investments through external leverage,
- increasing the regional capabilities to represent all AES programs,
- better integrating ice, weather, climate and air quality services,
- developing a motivated and adaptable workforce that is more representative of the Canadian population in composition,
- providing opportunities for employees to enhance their professional qualifications and redirect their careers to keep pace with new program initiatives, and
- fostering the efforts of Canadian academic institutions to attract students to careers in the atmospheric and environmental sciences

3 5 1990 - 1991 HIGHLIGHTS BY PROGRAM AREAS

1 Weather Services

- Introduce new weather radar data processing technology for faster and more accurate severe storm detection and warning,
- Install new radar equipment in New Brunswick for the improved detection and warning of severe weather,
- Improve marine weather forecast and warning services through the installation of more weather buoys on both coasts and the implementation of shoreline automatic weather stations for the Queen Charlotte Islands and South Moresby
- Enhance the effectiveness of marine weather services through the development of education materials in the form of videos and pamphlets for both coasts, the St Lawrence, the Manitoba Lakes, Lake Athabaska and the Arctic,
- Expand Weatheradio coverage by adding one repeater to the Weatheradio network in Saskatchewan and Manitoba, two in Quebec, four on the British Columbia Coast, as well as repeaters near Thunder Bay and on the Bruce Peninsula, and installing Weatheradio studios for Peterborough, Kenora, Nipigon, London, and North Bay,
- Increase participation in the Environmental Assessment and Review Process (EARP),
- Continue implementation of the AES Strategic Plan with the operation and evaluation of the test-bed Weather Services Offices at Toronto and Halifax, and undertake the initial phases of the Southern Interior B C Weather Services Office prototype, and
- Complete implementation of the new data telecommunication system

2 Climate Services and Research

- Develop a Canadian climate change response strategy,
- Continue the development of an improved capability to forecast long-term climate change based on scenarios about the chemical alteration of the atmosphere,
- Continue Canada's membership on the Intergovernmental Panel on Climate Change and co-ordinate Canada's participation at the Second World Climate Conference at Geneva in November 1990,
- Assess the potential socio-economic impacts of climate warming on the agriculture, energy, forestry, recreation and transportation sectors, and publish these assessments in the Climate Change Digest Series, and
- Develop and implement a Climate Extremes Reporting and Prediction System to issue weekly bulletins on climate and, when required, special bulletins on Prairie drought

3 Ice Services

- Complete implementation of the ice reconnaissance data network and climatological ice data archiving system,
- Complete implementation of the Expanded Ice Information Services Program including the ice information communication system, at the Ice Centre facility, to provide for faster dissemination of current and new products and ice information,
- Focus ice research on the use of remote sensing equipment to detect ice and icebergs, and
- Participate in the International Space Year initiatives related to global ice monitoring with the European Space Agency

4 Air Quality Services and Atmospheric Research

- Upgrade and evaluate environmental emergency response models and begin implementation of an emergency weather station system to provide representative atmospheric data during an emergency,
- Continue participation in a joint Canada-United States major field experiment which will examine how NO_x and SO_x change chemically in the atmosphere, how they are transported and where they are deposited,
- Participate in the joint Canada-U S Northern Wetlands Project to study the contribution of the wetlands to the generation of methane, a greenhouse gas,
- Upgrade the monitoring of nitrogen and sulphur oxides, expand the national archive of atmospheric pollution data and perform an intercomparison of computerized air pollution models,
- Contribute to the development of the NO_x/VOC control program,

- Increase monitoring of ozone through the addition on one ozone station and three radiation stations and undertake an Arctic experiment on ozone depletion,
- Report on international progress on the implementation of the 1987 Montreal Ozone Protocol, continue atmospheric ozone measurements in Canada and publish an analysis of ozone trends from Canadian data, and
- Assess the significance of the atmospheric transport and deposition of toxic chemicals to the Great Lakes through the establishment, with U S co-operation, of an integrated atmospheric deposition monitoring network

5 Management and Common Support Services

- Continue implementation of the AES Strategic Plan, (e g , continue development and implementation of improved automation and science and technology applications),
- Promote and participate in the development of a suitable international convention for the protection of the atmosphere,
- Continue to foster the development of the capacity and expertise of the Canadian private sector and universities in the delivery of specialized weather, climate, ice and air quality services,
- Revise and sign Memoranda of Understanding relative to meteorological and associated services, with the Departments of Fisheries and Oceans and Transport, and
- Complete implementation of the Departmental Office Technology System (DOTS) across AES

CHAPTER 4
BUDGET BY PROGRAM ACTIVITY

ATMOSPHERIC ENVIRONMENT SERVICE

4 1 AES BUDGET BY SUB-ACTIVITY

4 1 1 PROGRAM ACTIVITY STRUCTURE

Environment Canada has three Main Estimates Programs as described in Section 2 1 Administration, Environmental Services and Parks Canada. The Environmental Services Program is divided into two activities, one of which is AES, as indicated below.

As a service, AES provides

- 1) past, present and future weather, climate, sea state and ice information for all areas of Canada and contiguous waters,
- 11) advice on the impact of these elements on human activities and on the application of the atmospheric sciences to weather sensitive operations in such activities as forestry, agriculture, aviation and national defense,
- 111) research on chemical and physical processes of the atmosphere to improve the prediction of environmental elements, and co-operation with emergency response organizations in the prediction of the dispersion of substances accidentally released into the atmosphere,
- 1v) assessments of the impacts of human activity on the atmospheric environment, including the provision of information and policy advice on the atmospheric aspects of greenhouse gases, acid rain, toxic chemicals and the depletion of the stratospheric ozone layer,
- v) participation in international programs and negotiations related to the above elements, and
- vi) promotion and/or co-ordination of scientific programs in these areas including the scientific leadership of the Canadian Long Range Transport of Airborne Pollutants program

The diagram on the following page, called "A Single Service", demonstrates the distribution of the services and resources of AES.

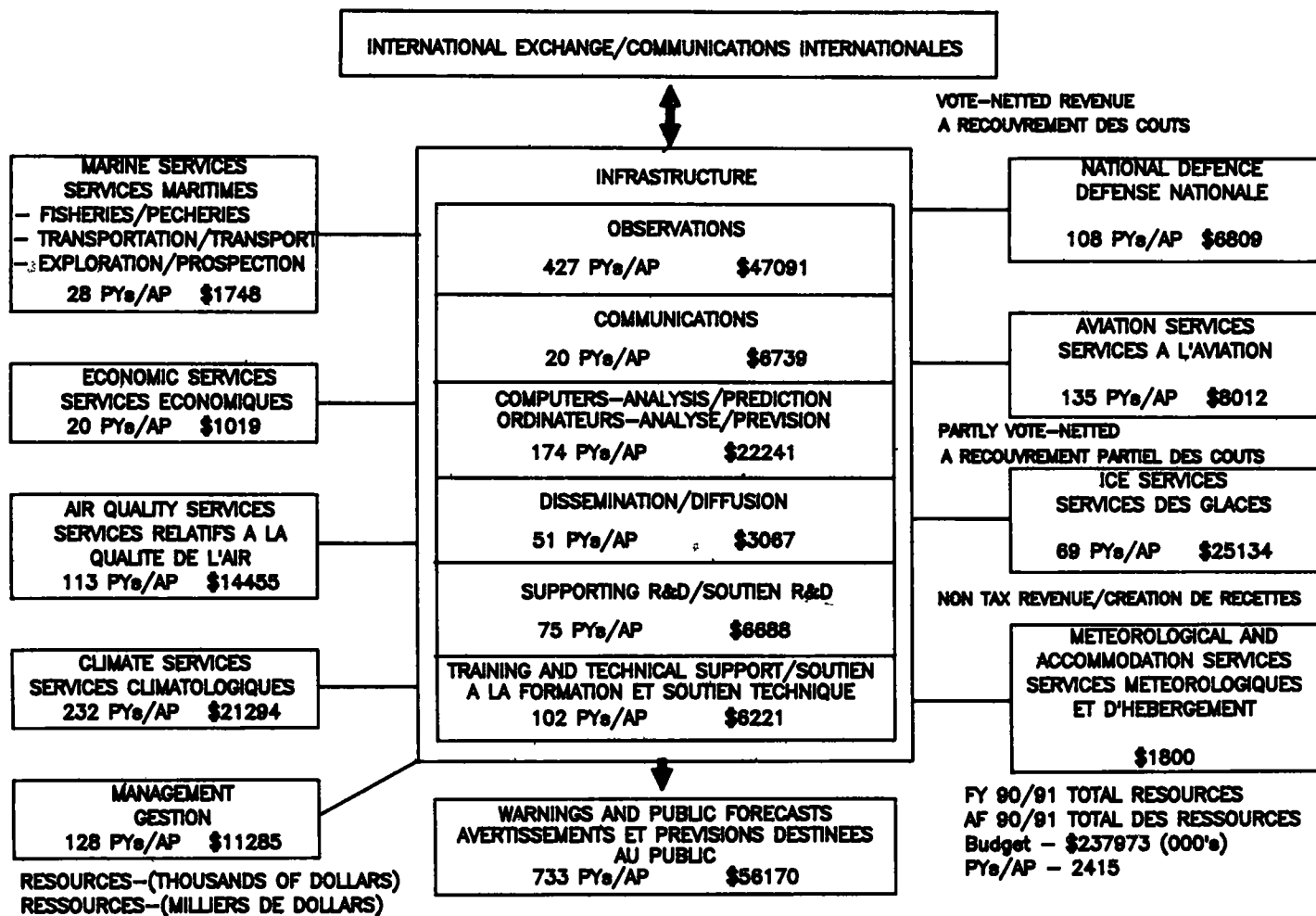
The Atmospheric Environment Service has four different program activity levels to depict and describe budgets and program information in varying degrees of detail with the program activity element providing the most detail. They are

Sub-Activity	SA 1 Level
Sub-Sub-Activity	SA 2 Level
Sub-Sub-Sub-Activity	SA 3 Level
Program Activity Element	SA 4 Level

For fiscal year 1990/91 the AES program activity structure will consist of 5 sub-activities, 21 sub-sub-activities, 48 sub-sub-sub-activities, and 160 program activity elements.

ATMOSPHERIC ENVIRONMENT SERVICE
 SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE
 1990-1991

"A SINGLE SERVICE" / "SERVICE POLYVALENT"



The AES budget and programs are given by the following sub-activity (SA 1) and sub-sub-activity (SA 2) later in this chapter

<u>Sub-Activity (SA 1)</u>	<u>Sub-Sub-Activity (SA 2)</u>
1000 Weather Services	1100 Public Weather Services 1200 Marine Weather Services 1300 Aviation Weather Services 1400 Economic Weather Services 1500 Canadian Forces Weather Service 2000 Data Acquisition 3000 Weather Services Support Systems
4000 Climate Services & Research	4100 Climate Services 4500 Climate Research and Development 4600 Climate Services Support Systems 4700 Canadian Climate Program
5000 Ice Services	5100 Ice Reconnaissance and Data Acquisition 5200 Ice Analysis and Forecasting 5300 Ice Climate Services 5400 Ice Services Support Systems 5500 Ice Services Research and Development
6000 Air Quality Services and Atmospheric Research	6100 Air Quality Services 6300 Air Quality Research 6700 Air Quality and Research Support Services
0800 Management and Common Support Services	0810 Management 0830 Common Support Services

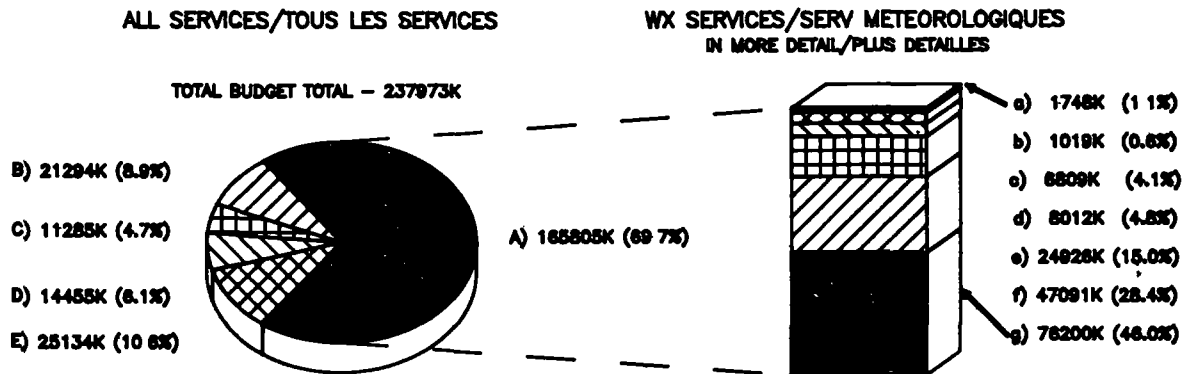
The Addendum of the Program Digest contains the AES sub-sub-sub-activity (SA 3) and program activity element (SA 4) structures and the corresponding budget information.

ATMOSPHERIC ENVIRONMENT SERVICE

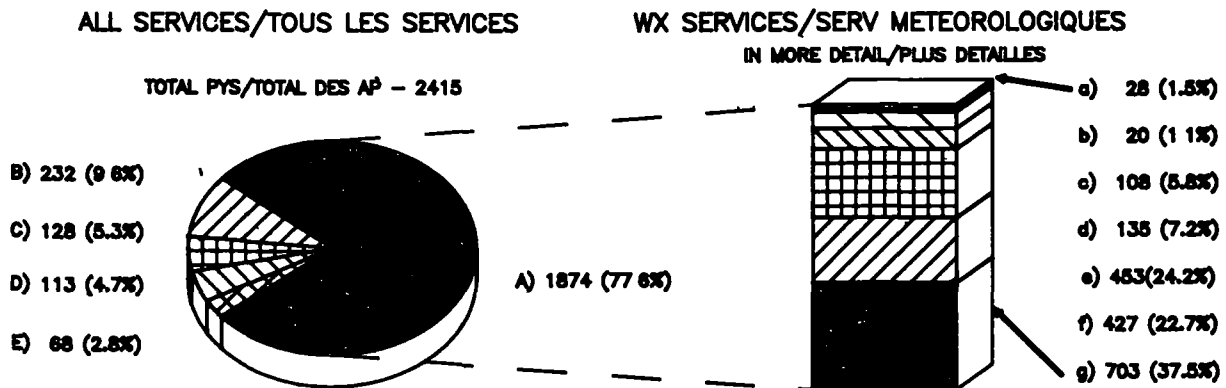
4 1 2		1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)					
SA1	SA2	(\$000)					TOTAL
		PY	SALARY	O&M	CAPITAL	G&C	
0800	MANAGEMENT & COMMON SUPPORT SERVICES						
	0810 MANAGEMENT	29 0	1551 3	660 7	58 0		2270 0
	0830 COMMON SUPPORT SERVICES	99 0	4224 5	3247 4	1543 0		9014 9
	TOTAL	128 0	5775 8	3908 1	1601 0		11284 9
1000	WEATHER SERVICES						
	1100 PUBLIC WEATHER SERVICES	452 9	22812 5	1816 3	297 1		24925 9
	1200 MARINE WEATHER SERVICES	28 0	1470 3	277 8			1748 1
	1300 AVIATION WEATHER SERVICES	135 5	6899 5	1112 5			8012 0
	1400 ECONOMIC WEATHER SERVICES	19 7	900 6	118 6			1019 2
	1500 CANADIAN FORCES WEATHER SERVICES	108 0	6263 8	545 0			6808 8
	2000 DATA ACQUISITION	427 0	20290 2	17797 2	9003 9		47091 3
	3000 WEATHER SERVICES SUPPORT SYSTEMS	703 1	35302 4	29848 7	9427 0	1622 0	76200 1
	TOTAL	1874 2	93939 3	51516 1	18728 0	1622 0	165805 4
4000	CLIMATE SERVICES & RESEARCH						
	4100 CLIMATE SERVICES	120 9	5402 4	2076 8	1033 9	9 0	8522 1
	4500 CLIMATE RESEARCH AND DEVELOPMENT	52 2	2929 7	1093 6	1445 0	316 5	5784 8
	4600 CLIMATE SERVICES SUPPORT SYSTEMS	57 0	2928 2	2607 3	432 0		5967 5
	4700 CANADIAN CLIMATE PROGRAM	1 5	78 8	940 8			1019 6
	TOTAL	231 6	11339 1	6718 5	2910 9	325 5	21294 0
5000	ICE SERVICES						
	5100 ICE RECONNAISSANCE AND DATA ACQUISITION	25 0	1533 3	12442 4	3576 9		17552 6
	5200 ICE ANALYSIS AND FORECASTING	31 5	1695 8	3616 0	194 0		5505 8
	5300 ICE CLIMATE SERVICES	3 5	245 8	184 0	45 0		474 8
	5400 ICE SERVICES SUPPORT SYSTEM	4 0	170 0	244 5	5 0		419 5
	5500 ICE SERV RESEARCH AND DEVELOPMENT	4 5	285 4	389 0	507 0		1181 4
	TOTAL	68 5	3930 3	16875 9	4327 9		25134 1
6000	AIR QUALITY SERVICES & RESEARCH						
	6100 AIR QUALITY SERVICES & RESEARCH	19 4	1018 2	952 2	868 8		2839 2
	6300 AIR QUALITY RESEARCH	83 3	4623 7	4057 4	1780 4	131 5	10593 0
	6700 AIR QUALITY & RESEARCH SUPPORT SERVICES	10 0	498 4	439 0	85 0		1022 4
	TOTAL	112 7	6140 3	5448 6	2734 2	131 5	14454 6
GRAND TOTAL		2415 0	121124 8	84467 2	30302 0	2079 0	237973 0

ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE
1990-1991

4 1 3 TOTAL BUDGET BY SUB-ACTIVITY
BUDGET TOTAL PAR SOUS-ACTIVITE



4 1 4 PERSON YEARS BY PROGRAM SUB-ACTIVITY
ANNEES-PERSONNES PAR SOUS-ACTIVITE

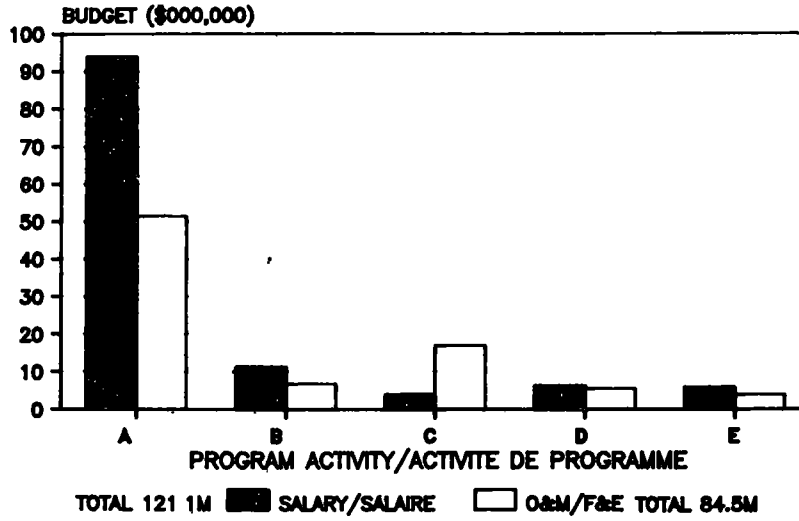


- A) WEATHER SERVICES/SERVICES METEOROLOGIQUES
- B) CLIMATE SERVICES/SERVICES CLIMATOLOGIQUES
- C) MANAGEMENT/GESTION
- D) AIR QUALITY SERVICES/SERVICES RELATIFS A LA QUALITE DE L'AIR
- E) ICE SERVICES/SERVICES DES GLACES

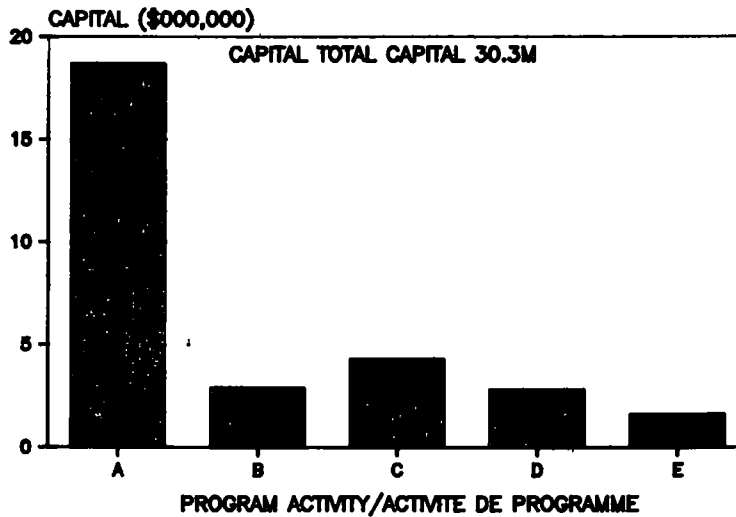
- a) MARINE/MARITIMES
- b) ECONOMIC/ECONOMIQUE
- c) CPWS/SMFC
- d) AVIATION
- e) PUBLIC WEATHER SERVICES/SERVICES METEOROLOGIQUES AU PUBLIC
- f) DATA/DONNEES
- g) WEATHER SERVICES SUPPORT/SOUTIEN DES SERVICES METEOROLOGIQUES

ATMOSPHERIC ENVIRONMENT SERVICE
 SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE
 1990 - 1991

4 1 5 SALARY AND O&M
SALAIRES ET FRAIS DE F&E



4 1 6 CAPITAL

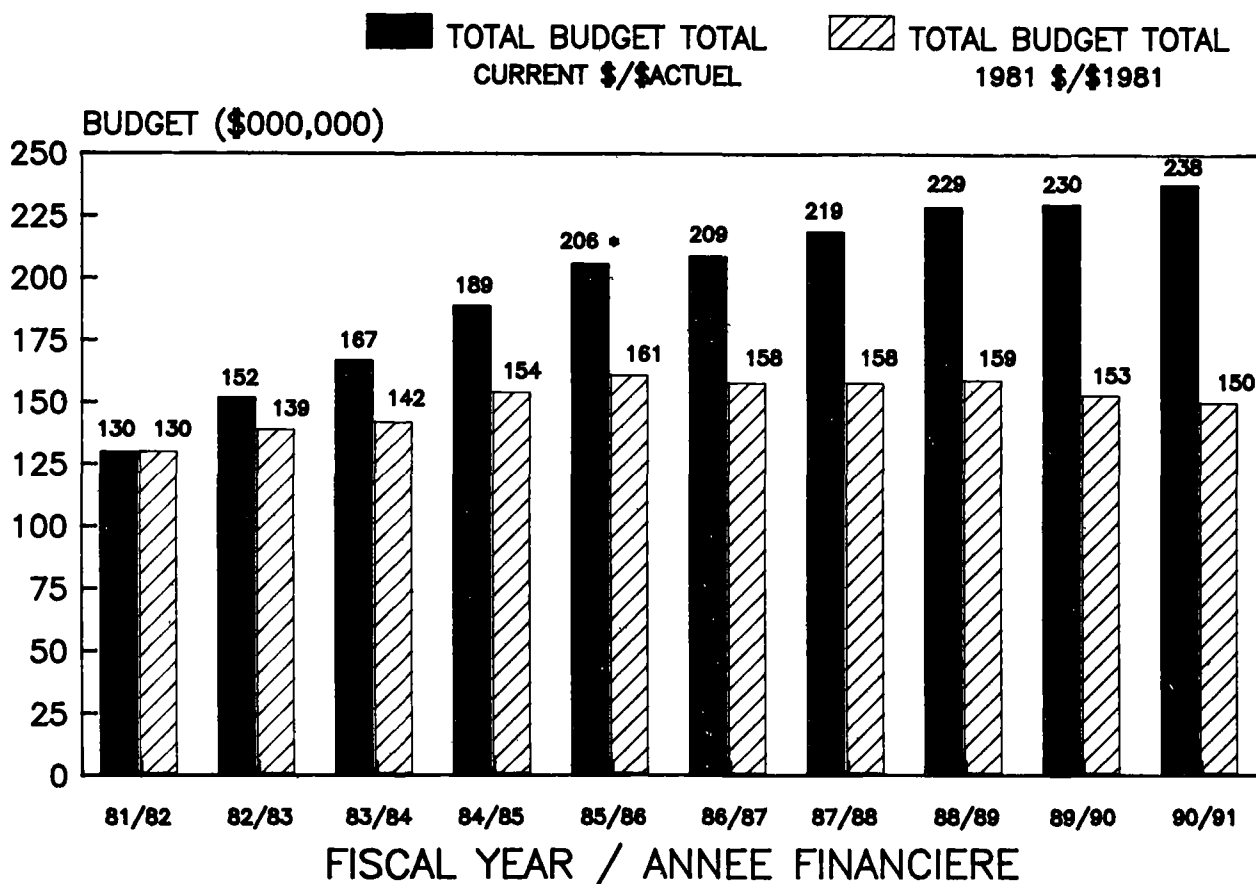


- A) WEATHER SERVICES
SERVICES METEOROLOGIQUES
- B) CLIMATE SERVICES AND RESEARCH
SERVICES ET RECHERCHE CLIMATOLOGIQUE
- C) ICE SERVICES/SERVICES DES GLACES

- D) AIR QUALITY SERVICES & ATMOS RES
SERVICES RELATIFS A LA QUALITE DE L'AIR
ET RECHERCHE ATMOSPHERIQUE
- E) MANAGEMENT & COMMON SUPPORT
SERVICES/SERVICES DE GESTION ET
DE SOUTIEN GENERAL

ATMOSPHERIC ENVIRONMENT SERVICE SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE 1990 - 1991

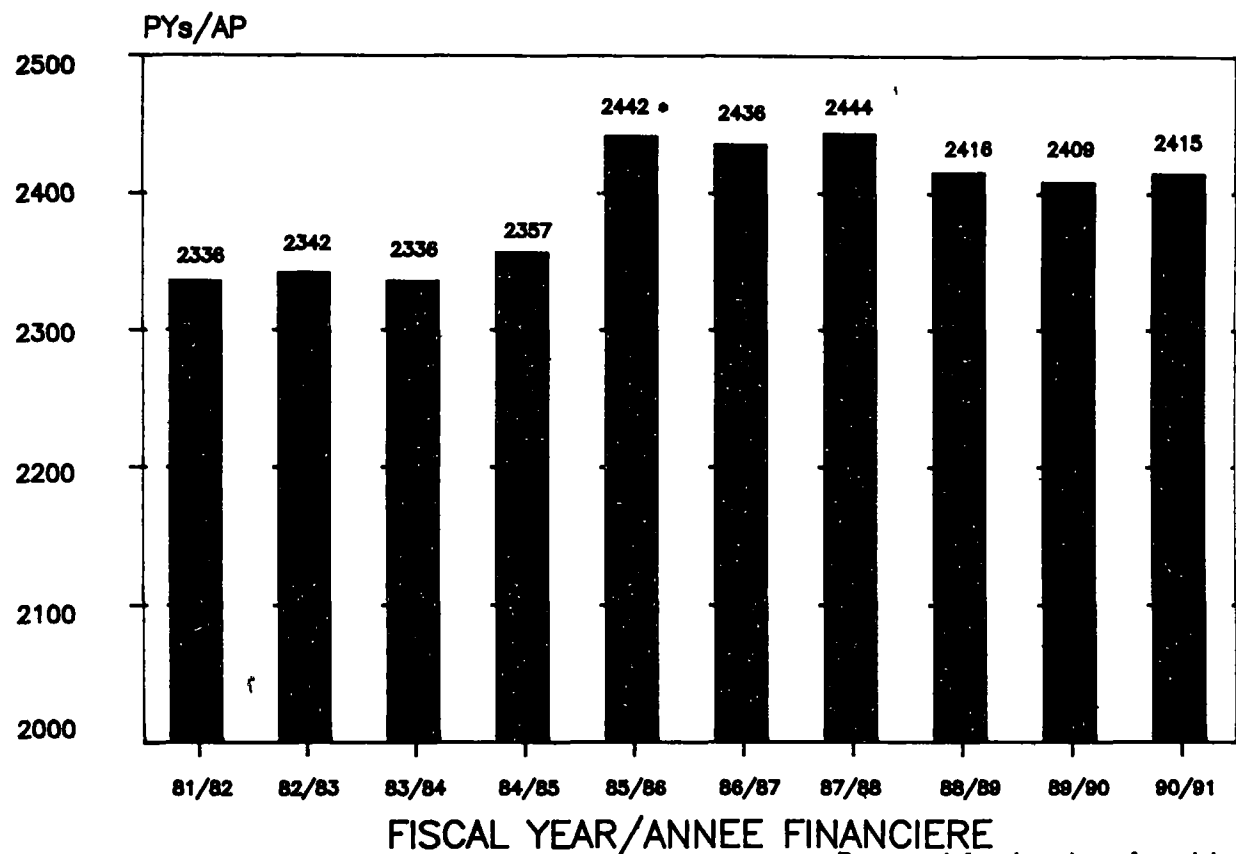
4 1.7 BUDGETS 1981-1990



* Personnel function transferred to AES
Fonction du personnel transférée au SEA

ATMOSPHERIC ENVIRONMENT SERVICE SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE 1990 - 1991

4.1.8 PERSON YEARS/ANNEES-PERSONNES 1981-1990



* Personnel function transferred to AES
Fonction du personnel transférée au SEA

4 2 WEATHER SERVICES Sub-Activity (1874 2 PY, \$165,805 4 K)

4 2 1 Objectives WEATHER SERVICES

- to provide present and predicted weather and marine data and advice for the safety of Canadians, the security of their property, the support of economic activities and the protection of environmental quality in Canada, and
- to acquire the basic understanding of atmospheric properties and behaviour needed to maintain and enhance such services

4 2 2 Budget WEATHER SERVICES 1990-91 Budget by Sub-Sub-Activity (SA 2)

For further details on the Weather Services 1990-91 Budget by Sub-Sub-Activity refer to p 22, chart 4 1 2

4 2 3 Description WEATHER SERVICES

4 2 3 1 Public, Marine, Aviation, Economic and Canadian Forces Weather Service Sub-Sub-Activities (744 1 PY, \$42,514 0 K)

The functions of these sub-sub-activities include the commitment to provide information, on a 24 hour per day basis on current and predicted weather for all land areas of Canada and the adjacent waters. The information provided includes weather warnings, forecasts, and sea state conditions for the Atlantic and Pacific Oceans, particularly within the 200 mile economic zone. When compiled, the information is offered to the public and to users in marine transportation, aviation, fishing, agriculture and forestry. AES, in accordance with a Memorandum of Understanding, also provides support to the Department of National Defense to meet its meteorological and oceanographic service requirements.

Across Canada, there are nine Weather Forecast Centres which are supported by the Canadian Meteorological Centre in Montreal. These offices carry out analysis and prediction activities and then prepare the warnings, forecasts and other bulletins for users in their respective geographical areas (see map on page 63). There are another 62 smaller Weather Offices located across Canada which serve as distribution and consultation points for the forecasts and warnings issued by the Weather Forecast Centres (see page 43). Weather information can be obtained through telephone, automatic telephone answering devices, Weatheradio Canada, (see pages 44 and 45) broadcasts on local radio and television, Coast Guard marine radio and aviation radio. The number of contacts/requests by users is displayed on page 29.

The forecast service provided varies according to the needs of the user. The chart "Weather Forecast Centres/Weather Offices" on page 30 identifies each Centre and Office. The forecast service to the public includes emphasis on temperature and precipitation and the provision of warnings of extreme weather events. Marine forecast services are concerned with wind, sea-state, visibility and freezing spray. Services to aviation include weather conditions at airports, and significant en route icing, turbulence, winds and temperatures at flight levels. Services to the agricultural sector and forestry industry are directed toward the provision of guidance on the occurrence of frost, the timing of crop spraying and the severity of forest fire hazard. The Weather Centres and Offices and regional Scientific Services Divisions support air quality and climate services, as well as environmental assessment programs of the Department.

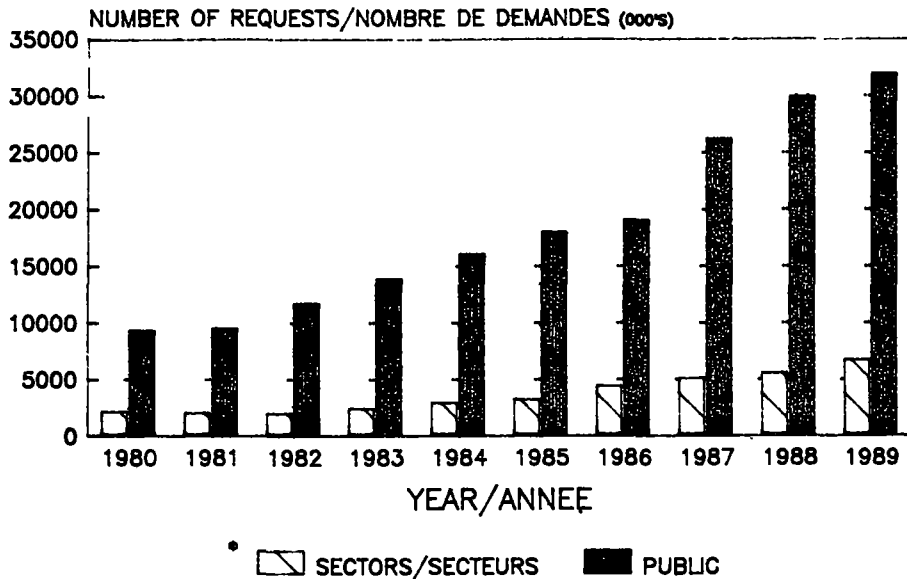
Maps which present the geographical coverage of forecasts for Canada and adjacent waters are located as follows:

- 1) Public forecast regions - pages 46 - 47,
- 2) Airport forecast locations - page 48,
- 3) Aviation weather forecast regions - pages 49 - 51,
- 4) Marine forecast regions - pages 52 - 53

In the second year of implementation of its long-term strategic plan the Weather Services Program will complete and evaluate the Toronto and Halifax Weather Services Office test-beds. The development of the Southern Interior B C Weather Services Office prototype will be initiated. In step with these efforts will be the further development of the regional computational and work station technologies. Significant attention will be given to the planning for improvements in severe weather detection systems, including Doppler radar technology. The efficiency and effectiveness of AES dissemination systems will be improved through the expansion of Canada's weatherradio network. The development and distribution of educational materials such as pamphlets and videos in the marine weather area, will enhance the public's understanding of severe weather and how to take mitigative action. All of these efforts will be coordinated and made consistent with the development of the Department's Green Plan.

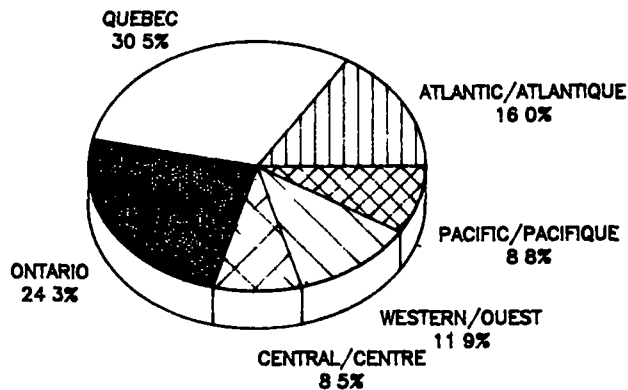
ATMOSPHERIC ENVIRONMENT SERVICE
 SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE
 1990 - 1991

WEATHER SERVICES CONTACTS
 CONTACTS DES SERVICES METEOROLOGIQUES



• (ECONOMIC, TRANSPORTATION ETC)
 (ECONOMIQUES, TRANSPORTS ETC)

WEATHER SERVICES CONTACTS
 CONTACTS DES SERVICES METEOROLOGIQUES
 BY REGION FOR 1989 / PAR REGION POUR 1989



WEATHER FORECAST CENTRES/WEATHER OFFICES
1990/91

REGION	PACIFIC	WESTERN	CENTRAL	ONTARIO	QUEBEC	ATLANTIC
TYPE						
AES Weather Forecast Centres 9	Pacific Weather Centre, Vancouver	Alberta, Weather Centre, Edmonton Arctic Weather Centre, Edmonton Yukon Weather Centre, Whitehorse	Prairie Weather Centre, Winnipeg	Ontario Weather Centre, Toronto	Quebec Weather Centre, Montreal	Maritimes Weather Centre, Halifax Newfoundland Weather Centre Gander
WO with Prof Consult 3	Victoria	Yellowknife	Regina			
Weather Offices 59	Castlegar Kamloops Kelowna Penticton Port Hardy Prince George Terrace Vancouver Fort St John Fort Nelson	Calgary Edmonton Int'l Airport Edmonton Municipal Airport Grande Prairie Inuvik Lethbridge Banff Edmonton Whitehorse	Brandon Dauphin Prince Albert Resolute Thompson Winnipeg Int'l Airport Saskatoon	Hamilton Kingston London St Catherines North Bay Ottawa Peterborough Sarnia Sault Ste Marie Sudbury Thunder Bay Toronto Waterloo- Wellington Windsor	Iqaluit Montreal/ Mirabel Montreal/ Dorval Quebec Sept-Iles Sherbrooke St Hubert Trois Rivieres Val D'Or	Charlottetown Fredericton Halifax Int'l Airport Moncton Saint John St John's Sydney Gander Halifax/ Dartmouth Yarmouth
Canadian Forces Forecast Centres 3		Edmonton		Trenton		Halifax
Canadian Forces Weather Office 17	Comox Exquimalt	Cold Lake	Moose Jaw Poige la Prairie Winnipeg	North Bay Ottawa Petawawa	Bagotville St Hubert	Chatham Gagetown Greenwood Shearwater Summerside Goose Bay
TOTAL 91	14	15	12	19	12	19

4 2 3 2 Data Sub-Sub-Activity (427 0 PY, \$47,091 3 K)

Data are gathered in Canada, in Canadian air-space and adjacent waters for weather, climate and research services. Outlined below are the various data gathered and the number of stations and locations involved

- 1) Surface weather observations are taken at 325 AES and 200 Other Government Department (OGD) weather observation stations (see maps on pages 54 - 56). Included in the above, there are 152 and 9 OGD automatic stations respectively. AES also has 30 buoys strategically located in Canadian waters and on the ice in the Arctic Ocean to provide weather data. The above are supplemented by voluntary observation programs undertaken by 420 ships operating on the Great Lakes and in the Atlantic, Pacific and Arctic Oceans,
- 2) Thirty-two Upper Air Stations measure temperature, pressure, relative humidity and wind velocity in the free atmosphere, from the surface to 35,000 metres (see map on page 57). In addition, AES operates an automated shipboard aerological program (upper air) on 3 volunteer commercial ships operating on the Pacific Ocean,
- 3) The above observations 1) and 2) are taken at regular intervals, are available in real-time and are used in the production of weather forecasts and weather warnings,
- 4) The position, and movement of severe storms and precipitation is provided by 14 AES weather radar stations (see map on page 58),
- 5) Satellite imagery of North American and oceanic weather systems and ice conditions in Canadian waters is provided by 10 weather satellite read-out stations (see map on page 60),
- 6) Climatological data are gathered by a network of 234 AES and 74 OGD synoptic weather stations and 2550 climatological stations run by volunteers;
- 7) Radioactive fallout is monitored at 23 AES and 3 OGD locations in Canada (see map on page 62),
- 8) Observations of total ozone and the vertical distribution of ozone are taken at 0 locations in Canada, and
- 9) Other programs conducted at weather stations include
 - i) seasonal freeze-up and break-up of water bodies, sunshine, soil temperatures and evaporation,
 - ii) seismic observations of tectonic events at 6 locations for the Department of Energy, Mines and Resources,
 - iii) air quality measurements are taken at 24 locations, and
 - iv) solar radiation measurements are taken at 50 locations

AES DATA ACQUISITION STATIONS BY TYPE AND LOCATION

1990-91

TYPE	REGION						AES TOTAL	OGD+	TOTAL
	PACIFIC	WESTERN	CENTRAL	ONTARIO	QUEBEC	ATLANTIC			
Automatic Stations	24	29	27	31	17	24	152	9	161
Upper Air Stations	5*	6	9	2	6	4	32	1	33
Synoptic Stations	33	49	43	42	31	36	234	74	308
Buoys	19	4***	0	4	0	3	30	0	30
Climate Stations	518	549	430	380	374	284	2535	15	2550
Weather Radar Stations	0	2	3	6	1	2	14	0	14
Satellite Stations	1	4	1	2	1	1	10	0	10
Air Quality Stations	1	2	3	8	5	5	24	0	24
Solar Radiation Program Locations	8	8	12	6	9	6	49	1	50
Seismic Program Locations	0	2	3	0	1	0	6	0	6
Radioactive Fallout Monitoring Program Locations	1	5	6	6	3	2	23	3	26
Ozone Program Locations	0	1	5****	1**	0	0	7	1	8

* Includes automated shipboard aerological program

** AES Headquarters (Downsview, Ontario)

*** Includes ice buoys

**** Brewer maker provides yearly data from rooftop location in Saskatoon

+ Other Government Departments

Voluntary ships = 420

Weather Reporting Stations· Total = 525 (AES = 325, OGD = 200)

4 2 3 3 Weather Services Support Systems Sub-Sub-Activity
(703 1 PY, \$76,200 1 K)

This sub-sub-activity provides support services necessary for the efficient functioning of a modern weather service. Some of these services are described below

- 1) The Canadian Meteorological Centre (CMC), in Montreal, uses very powerful computers and mathematical models of the atmosphere to create meteorological forecasts for periods of up to five days in advance. These forecasts are used as guidance by the Weather Forecast Centres and Weather Offices,
- 2) Research is conducted in both Downsview and Montreal. Its primary objective is to support AES operational weather and ice services, more specifically, to ensure that services and decisions are based on the best available scientific knowledge. The research program also provides a large body of knowledge and expertise that is available to support air quality and climate research activities,

Current priorities are to maintain a world class Numerical Weather Prediction group, to advance our knowledge of regional scale weather phenomena, to make better use of available satellite data, to enhance the utility of Doppler radar data for severe weather forecasting and to investigate technology that can increase production efficiency at Weather Services Offices,

- 3) The AES Communications System is required for the rapid collection and dissemination of national/international weather data and information. Text-based, graphical and imagery products are provided from this system. A major 6-year project to modernize the system is nearing completion,
- 4) The Training Branch develops and conducts advanced and refresher training courses in both official languages for professional meteorologists and technicians at training facilities in Downsview, Montreal, Cornwall and at major weather offices across the country. This Branch also has ongoing development programs in co-operation with Canadian universities to encourage university physics graduates to study meteorology through a one-year diploma course, and
- 5) The Data Acquisition Services Branch of the Central Services Directorate develops, designs and evaluates meteorological data acquisition systems to meet the requirements of the Weather Services sub-activity. It is also responsible for the procurement and testing of field systems as well as the standards for their installation and maintenance

4 3 CLIMATE SERVICES AND RESEARCH Sub-Activity (231 6 PY, \$21,294 0 K)

4 3 1 Objectives CLIMATE SERVICES AND RESEARCH

- to provide information and enhance our understanding of climate in order to promote economic and social development, protect the environment and advance knowledge of the atmosphere by

- 1) Assisting development of Canadian response strategies regarding climate change,
- 2) Maintaining the National Climate Archive and providing reliable, representative data,
- 3) Maintaining a lead role in atmospheric sciences research with emphasis on climate change,
- 4) Using climate data for the socio-economic benefit of Canada and as an aid to policy development, and
- 5) Improving the utility and delivery of operational climate services to internal and external users

- to contribute to better management of water resources by continuing a hydrometeorological research program at the National Hydrology Research Centre (NHRC) in Saskatoon on drought, evaporation, physical impacts of climatic variability/change and the applications of radar and satellite data to hydrology

4 3 2 Budget CLIMATE SERVICES AND RESEARCH 1990-91 AES Budget by Sub-Sub-Activity

For further details on the Climate Services and Research 1990-91 AES Budget by Sub-Sub Activity, refer to p 22, chart 4 1 2

4 3 3 Description CLIMATE SERVICES AND RESEARCH

The Canadian Climate Centre, located in Downsview, processes about 15,000 climate inquiries per year. The Centre deals with requests which are national in scope and assists the regional offices in answering their inquiries as required. The following table displays the total number of AES climate service contacts per year since 1980. The majority of these inquiries are received and processed at local and regional offices across Canada (i.e., Weather Services Directorate)

Recently observed weather data from a federal climate network of about 2,800 stations is available. This network will be maintained and operated according to established standards to ensure the collection, quality control and accessibility of the data.

AES CLIMATE SERVICE CONTACTS
(000's)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
WEATHER SERVICES DIRECTORATE	173	179	204	254	316	218	195	224	301	400
CANADIAN CLIMATE CENTRE	15	15	15	15	15	14	15	13	13	16
TOTAL	188	194	219	269	331	232	210	237	314	416

Over 120 million data entries of meteorological, air quality, sea-state and ice information are maintained in a national archive. The archive contains data necessary to describe Canada's climate in accordance with World Meteorological Organization standards. It is planned to contain data not only from the federal network but also from provincial and other agencies. The archive includes summarized and derived data, including normals, extremes, frequencies and durations for various time scales.

Statistical summaries defining the climate of Canada and climatological data, studies and analyses in standard generalized form have been published. Information in the form of storm analyses, national and regional climate maps and statistics and studies of climate relating to various economic sectors is available. Guides and handbooks on hydrometeorological and climatological practices are maintained.

National and regional climatic trends and anomalies are monitored and predicted. The build-up of carbon dioxide and radiatively active gases are monitored and reported annually. The effects on our climate of the build-up are being defined and studied.

Research and development is carried out to support the climate service program, to increase our understanding of the climate as a physical system and to provide a sound basis for assessing and determining the responses of the climate to natural changes and human activities.

Response strategies are being developed and advice provided to the Canadian government when it deals with the national and international climate change issue.

4 4 ICE SERVICES Sub-Activity (68 5 PY, \$25,134 1 K)

4 4 1 Objectives ICE SERVICES

- to provide ice information (analyses, prognoses and warnings) for the safety of Canadians involved in fishing, marine transportation and offshore petroleum exploration, and for the protection of life and property such as ships and drilling platforms, and
- to protect the quality of the maritime environment by supporting the prevention of environmental disasters

4 4 2 Budget ICE SERVICES 1990-91 Budget by Sub-Sub-Activity (SA 2)

For further details on Ice Services 1990-91 Budget by Sub-Sub-Activity, refer to p 22, chart 4 1.2

4 4 3 Description ICE SERVICES

This sub-activity

- 1) operates, develops and maintains acquisition systems for ice data,
- 11) provides forecasts of ice formation, growth, deterioration and movement in Canada's major rivers, lakes and adjacent waters (see map page 61) These activities are in support of the Canadian Coast Guard, and offshore development and fishing industries, Canada Oil and Gas Lands Administration, the commercial shipping transportation industries and the public, and
- 111) includes ice research to develop remote sensing and improved ice forecast capabilities

Ice Observations

Ice observation programs are conducted from aircraft and ship and shore stations to support marine operations in the ice congested waters of Canada during the appropriate seasons. Aerial ice reconnaissance is carried out every month of the year in one or more areas of the Eastern Canadian Seaboard, Canadian Arctic Waters, Hudson Bay, Hudson Strait and Inland Waterways. Satellite observations are being integrated into the data acquisition system. About 3000 analyses and "nowcasts" are prepared in chart form annually.

Ice Forecasts

Ice and iceberg advisory and forecast services are provided from the AES Ice Centre in Ottawa. Approximately 1500 short-range tactical forecasts and bulletins and about 30 longer-range strategic forecasts are provided annually for the following areas

- Gulf of St. Lawrence,
- Coastal Waters of Newfoundland, and Hudson Bay and its approaches,
- Waters of the Canadian Arctic, including the Beaufort Sea,
- St. Lawrence River Seaway and Great Lakes

Iceberg Advisories

The latest spatial distribution of icebergs off the East Coast along with information on iceberg drift is available on request.

Ice and Iceberg Climatology

In response to about 2000 annual information requests, ice climatological services and information on ice climatology applications is provided to a wide variety of clients, including Canadian Coast Guard and Canada Oil and Gas Lands Administration (COGLA)

4 5 AIR QUALITY SERVICES AND RESEARCH Sub-Activity
(112 7 PY, \$14,454 6 K)

4 5 1 Objective AIR QUALITY SERVICES AND RESEARCH

- to provide the Canadian government and provincial agencies with adequate information and advice on the chemical and physical state of the atmospheric environment as a basis for informed policy decisions relating to environmental quality

4 5 2 Budget AIR QUALITY SERVICES AND RESEARCH
1990-91 AES Budget by Sub-Sub-Activity (SA 2)

For further details on Air Quality Services and Atmospheric Research 1990-91 by Sub-Sub-Activity, refer to p. 22, chart 4 1 2

4 5 3 Description AIR QUALITY SERVICES AND RESEARCH

The most important and publicly visible atmospheric change issues which we face today are climate change, stratospheric ozone depletion, long range transport of acidic or toxic substances (including accidental releases), and increasing ground-level ozone. Two other issues which are gaining importance are the atmospheric component of Global Change (i.e., the changing chemical composition of the atmosphere, not solely the increased concentration of greenhouse gases), and atmospheric interaction with the oceans.

This sub-activity provides

- 1) air quality services such as advice and support for response to environmental emergencies, and assistance to Regions and others in conducting environmental impact assessments,
- 2) long-term measurement as well as research in support of the Long Range Transport of Air Pollutants Program (LRTAP),
- 3) research on the atmospheric component of the Toxic chemicals problem, including support required under Annex 15 of the Canada-U S Great Lakes Water Quality Agreement (GLWQA),
- 4) long-term measurements and research related to the surveillance, understanding and prediction of stratospheric pollution, the ozone layer and atmospheric radiation and
- 5) co-ordination of the national scientific program on acid rain

Long Range Transport of Air Pollutants (LRTAP)

The LRTAP program was established within Environment Canada to co-ordinate and evaluate the federal research and monitoring efforts and to provide the air quality monitoring data and atmospheric processes and transport information required to reduce damaging pollution from the long-range transport of airborne pollutants to environmentally acceptable levels. Activities in the Department, underway since 1976, continue to form the basis for the implementation of control strategies negotiated with eastern provinces and to support the negotiation of a bilateral emission reduction agreement with the United States. AES is responsible for the co-ordination and provision of the information on the atmosphere to elected officials, the media and the general public.

AES maintains and is currently upgrading a national sampling network to monitor the atmospheric concentration and deposition of sulphur, nitrogen and other compounds with special emphasis on acidic precipitation. This includes the operation of the Canadian Air and Precipitation Monitoring network (CAPMoN) for sampling precipitation on a daily basis. This network, displayed on page 59 consists of 24 stations monitoring precipitation. Eleven of these stations also sample air daily. Extensive research is carried out by AES to improve the knowledge of physical and chemical processes involving LRTAP and to develop predictive models of the long-range transport, transformation and deposition of air pollutants in order to develop source-receptor relationships between emitting regions and sensitive receptor regions. The atmospheric LRTAP initiative, to a large extent, is directly supported by the A-Base sub-activity (6000) of Air Quality Services and Research.

Great Lakes Water Quality

The Great Lakes Water Quality Program has been designed to provide the information necessary to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin ecosystem. The objectives of the program are to provide environmental data for a better understanding of the Great Lakes Basin ecosystem and to develop measures to reduce the discharge of pollutants into the Great Lakes system.

The national program is led by Environment Canada's Ontario Region which chairs an interdepartmental committee. The AES component, which addresses Annex 15 of the Great Lakes Water Quality Agreement, is concerned with estimating the atmospheric input of certain organic contaminants and heavy metals into the Great Lakes Basin. AES is taking a lead role in the establishment of a Canada-U.S. Integrated Atmospheric Deposition Network for the measurement of selected chemicals. The first research grade Master Station has been established at Point Petre, Ontario. The second Master Station will be constructed during 1990-91 on Lake Huron. As well, research and modelling are used to examine the role of the atmospheric pathway and to assess the importance of various sources of toxic substances.

AES Toxics Program

The AES Toxics program focusses primarily on support to Annex 15 of the Great Lakes Water Quality Agreement and research into the environmentally sound aerial application of pesticides. AES pesticide research is studying the drift and eventual deposit of pesticides released from aircraft under varying conditions. Results will be valuable in assessing the validity of models used to determine off-target pesticide deposits and will assist in setting appropriate buffer zones for aerial applications.

Stratospheric Ozone

After many years of research and systematic ozone monitoring, there is now clear evidence of a thinning of the global ozone layer and that man-made chlorofluorocarbons (CFCs) are implicated as the essential cause. It is anticipated that this ozone depletion will increase the intensity of biologically damaging solar ultraviolet radiation at the earth's surface.

The AES activities include

- Monitoring ozone through the operation of the Canadian ozone measurement network with stations at Toronto, Saskatoon, Goose Bay, Edmonton, Churchill, Resolute and Alert. Automatic measurements of ozone have been carried out more reliably in the last few years with a new system, called the Brewer ozone spectrophotometer, an instrument as designed and developed by AES.
- Monitoring ultraviolet irradiance has been initiated in the Canadian Brewer network in order to detect increases in biologically damaging radiation due to ozone depletion.
- Managing the World Ozone Data Centre (WODC), a responsibility given to AES by the World Meteorological Organization (WMO). This task consists of carefully compiling, archiving, and publishing a daily summary of measurements from the global network.
- Developing a number of computer simulation models for predicting the effects of various changes to the ozone layer.

Stratospheric Research

Since 1974, with the start of Project STRATOPROBE, scientists at AES have also studied the altitude profiles of stratospheric gases that directly and indirectly affect the ozone layer. This research is carried out by means of remote-sensing apparatus carried aloft by high-altitude balloons. Data obtained on flights at different latitudes and in different seasons are valuable for detecting variability and trends in gases such as CFCs. Balloon flights made to coincide with similar flights conducted by other scientific groups, or with satellite overpasses, have led to a better understanding of the results obtained from the different measurement techniques and have facilitated validation of remote sensors on satellites. Most recently, in view of the alarming ozone reduction in the Antarctic spring, AES has launched its stratospheric balloon flights from Alert to study possible ozone depletion in Canada's high arctic.

Recently, high-altitude measurements have also been made with an AES instrument from a space shuttle by Canadian astronaut Marc Garneau. Currently three instruments are being developed for space shuttle flights starting in 1991.

4 6 MANAGEMENT AND COMMON SUPPORT SERVICES Sub-Activity (128 0 PY, \$11,284 9 K)

4 6 1 Objectives MANAGEMENT AND COMMON SUPPORT SERVICES

- to provide continuous policy guidance and leadership for the service including the establishment of objectives, goals and priorities,
- to provide management and administrative support to the Atmospheric Environment Service in the area of financial management, human resources management, management information and office technology systems, materiel management, policy and planning, facilities management, office services, health and safety, library services, official languages, and affirmative action,
- to co-ordinate participation in international programs in accordance with Canada's commitment to the World Meteorological Organization, and to contribute to the development of the AES scientific and technological base, and
- to promote the science and public awareness of meteorology and other environmental disciplines in Canada by
 - 1) supporting organizations concerned with the advancement of meteorology and other environmental disciplines,
 - 11) supporting meteorological and other environmental research in Canadian universities, and
 - i11) encouraging the development of meteorological and other environmental services in the private sector within Canada

4 6 2 Budget MANAGEMENT AND COMMON SUPPORT SERVICES 1990-91 Budget by Sub-Sub-Activity (SA 2)

For further details on Management and Common Support Services 1990-91 Budget by Sub-Sub-Activity, refer to p 22, Chart 4 1 2

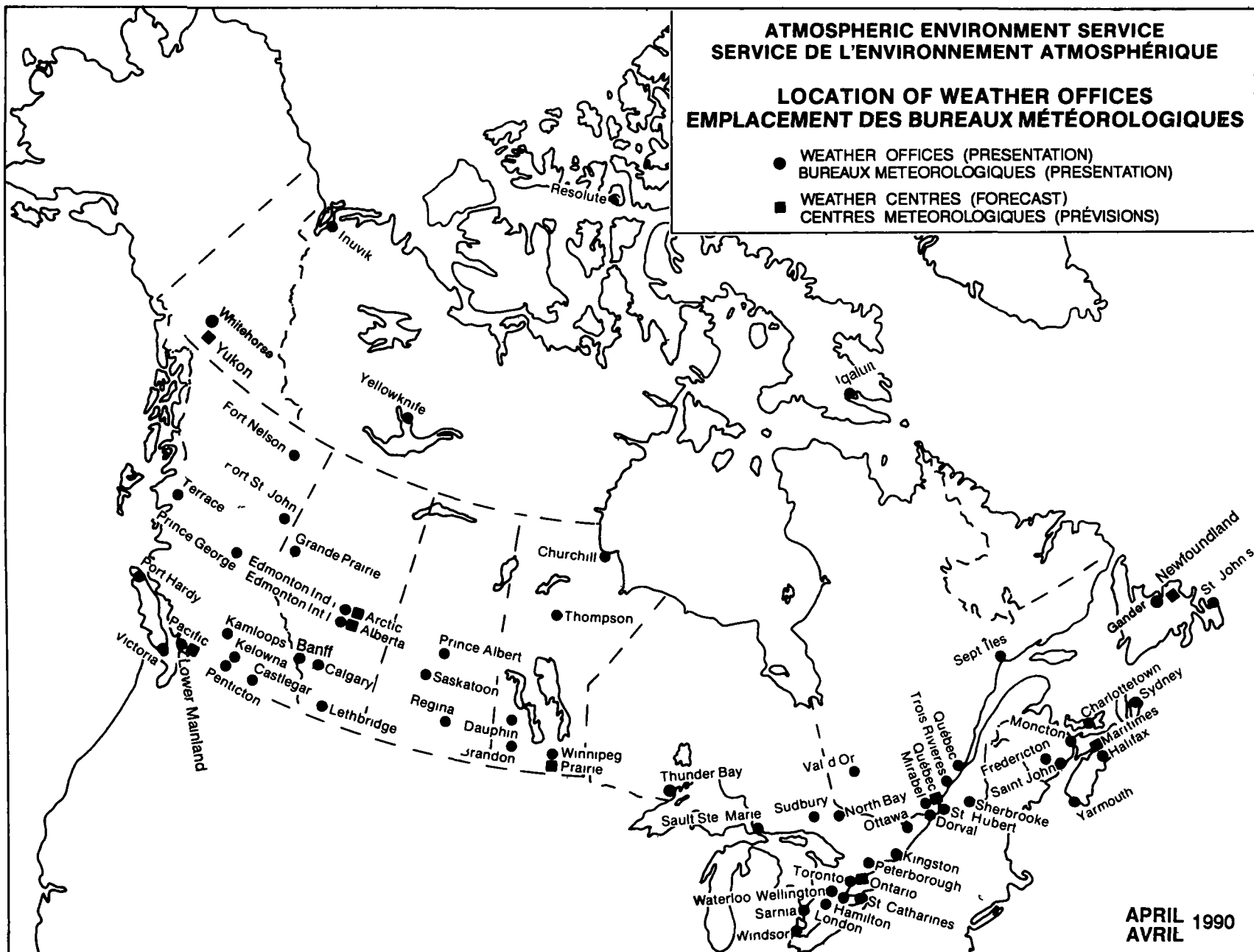
4 6 3 Description MANAGEMENT AND COMMON SUPPORT SERVICES

This sub-activity includes the executive direction of the AES, the management function related to the development and maintenance of overall goals and objectives for the AES, policies, and program development and evaluation, information services, and participation in international meteorological affairs. This also includes those common services which support AES in areas of administration, personnel, facilities, library, materiel, health and safety and financial management.

**ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHÉRIQUE**

**LOCATION OF WEATHER OFFICES
EMPLACEMENT DES BUREAUX MÉTÉOROLOGIQUES**

- WEATHER OFFICES (PRESENTATION)
BUREAUX MÉTÉOROLOGIQUES (PRESENTATION)
- WEATHER CENTRES (FORECAST)
CENTRES MÉTÉOROLOGIQUES (PRÉVISIONS)

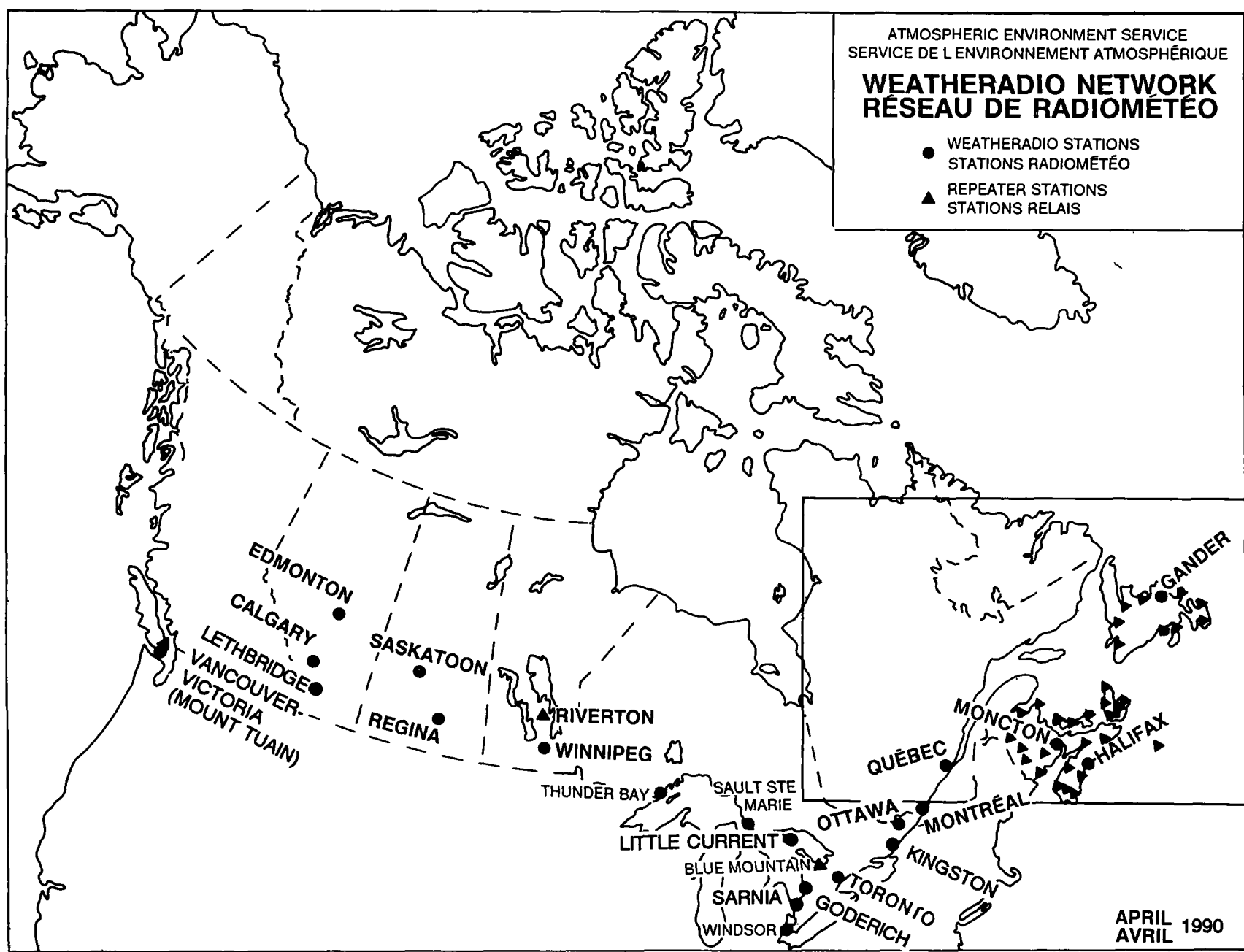


APRIL 1990
AVRIL

ATMOSPHERIC ENVIRONMENT SERVICE
 SERVICE DE L'ENVIRONNEMENT ATMOSPHÉRIQUE

**WEATHERADIO NETWORK
 RÉSEAU DE RADIOMÉTÉO**

- WEATHERADIO STATIONS
 STATIONS RADIOMÉTÉO
- ▲ REPEATER STATIONS
 STATIONS RELAIS

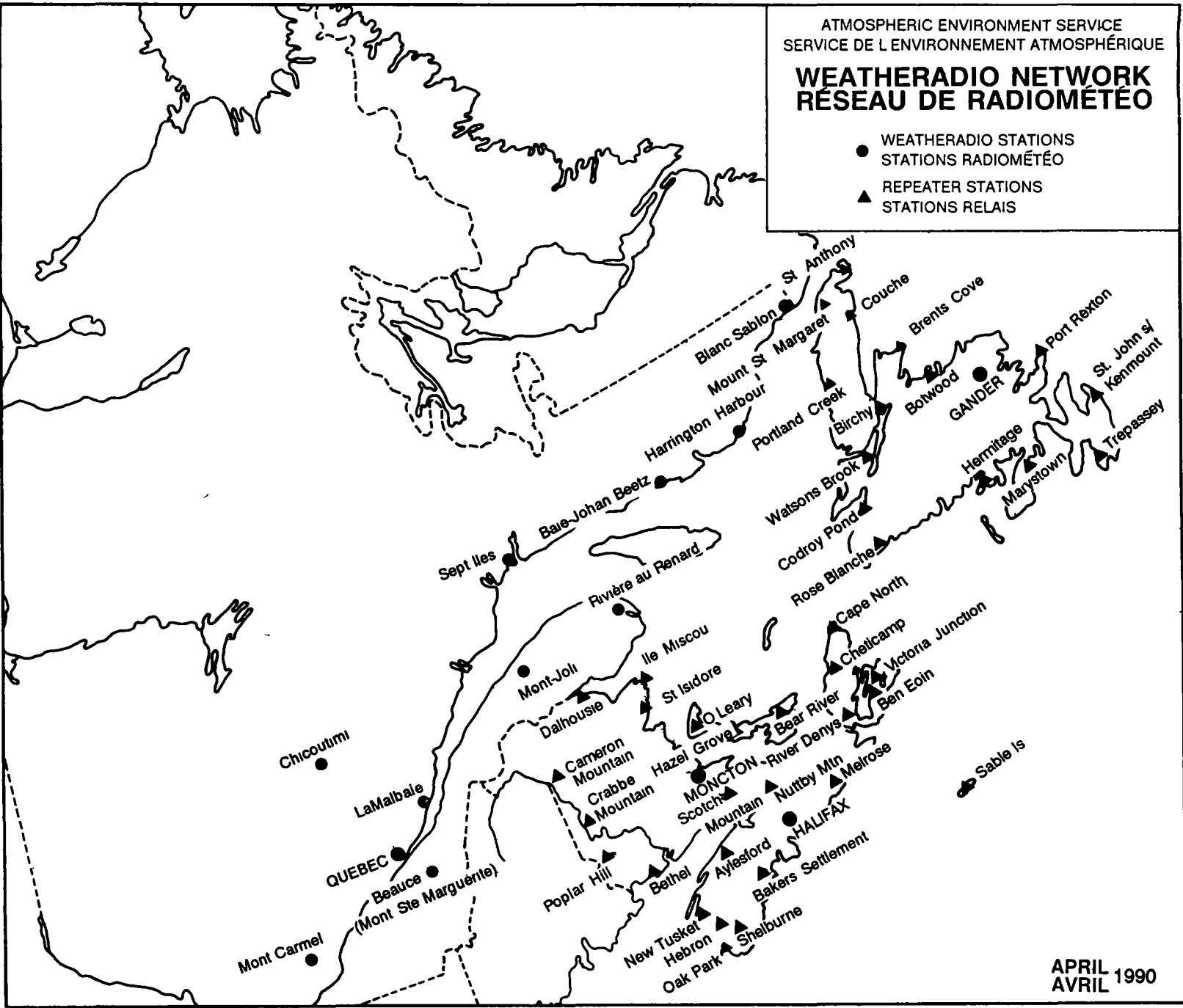


APRIL 1990
 AVRIL

ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHÉRIQUE

WEATHERADIO NETWORK RÉSEAU DE RADIOMÉTÉO

- WEATHERADIO STATIONS
STATIONS RADIOMÉTÉO
- ▲ REPEATER STATIONS
STATIONS RELAIS



APRIL 1990
AVRIL



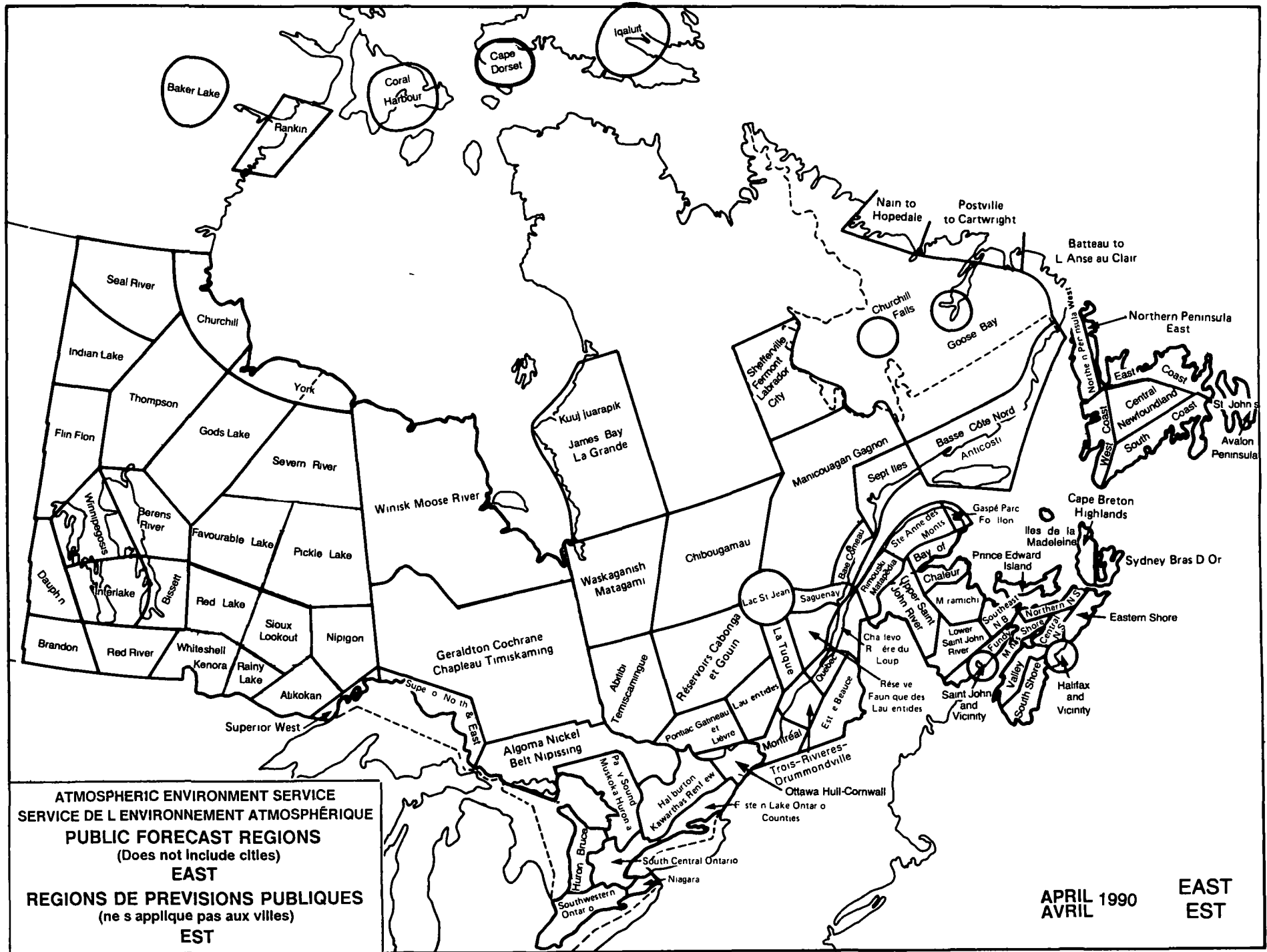
ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

PUBLIC FORECAST REGIONS
(Does not include cities)

WEST

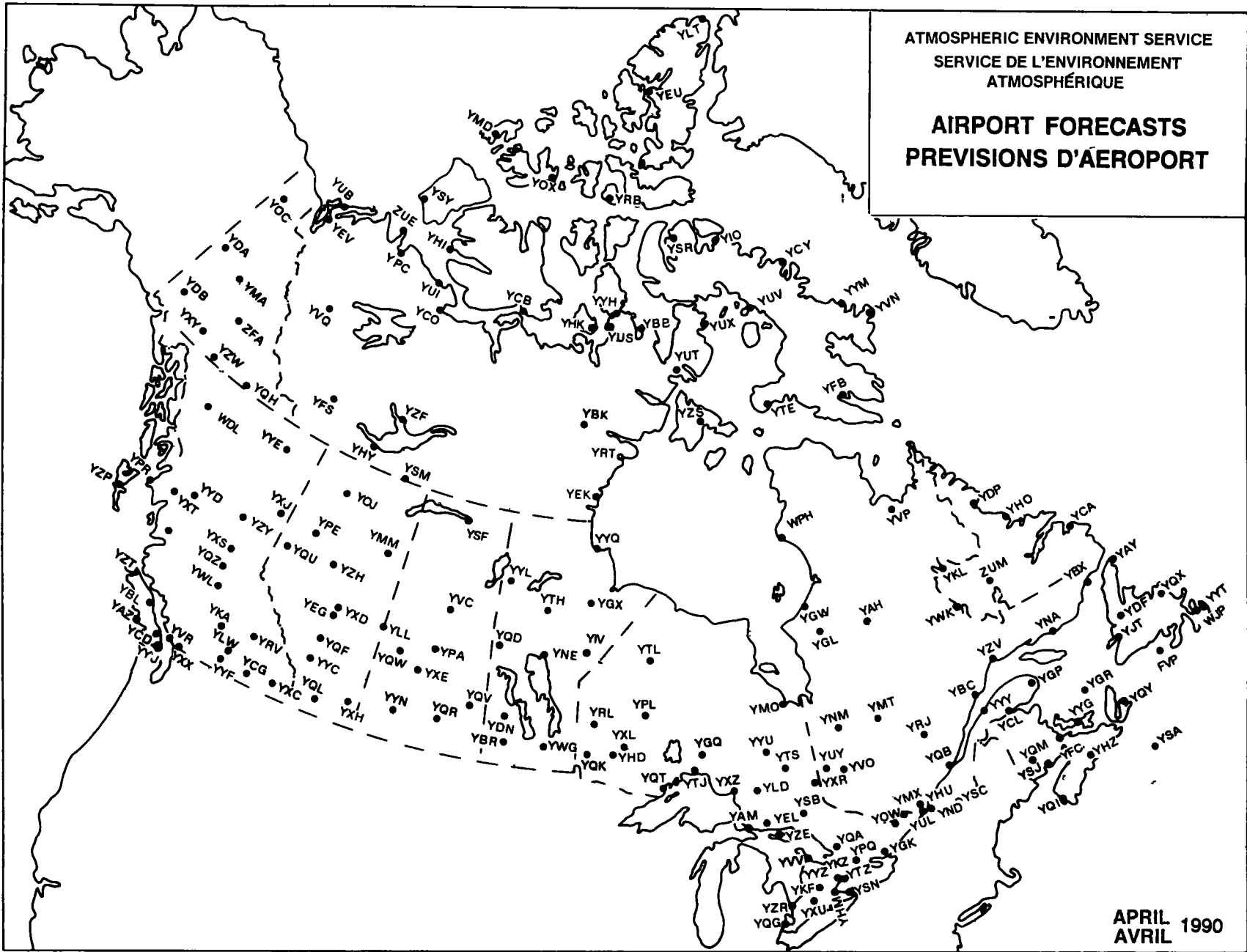
RÉGIONS DE PRÉVISIONS PUBLIQUES
(ne s'applique pas aux villes)

OUEST



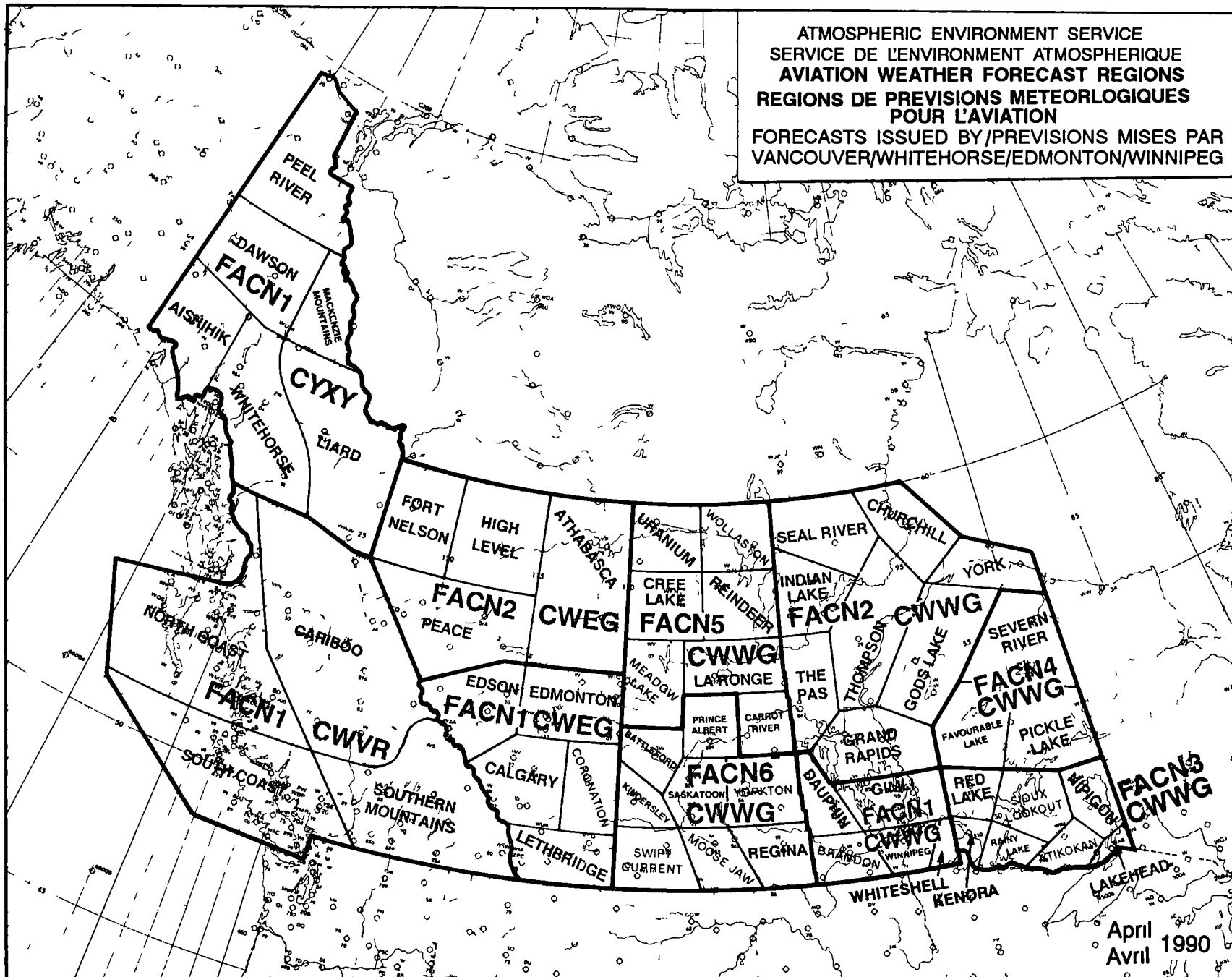
ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT
ATMOSPHERIQUE

**AIRPORT FORECASTS
PREVISIONS D'AEROPORT**



APRIL 1990
AVRIL

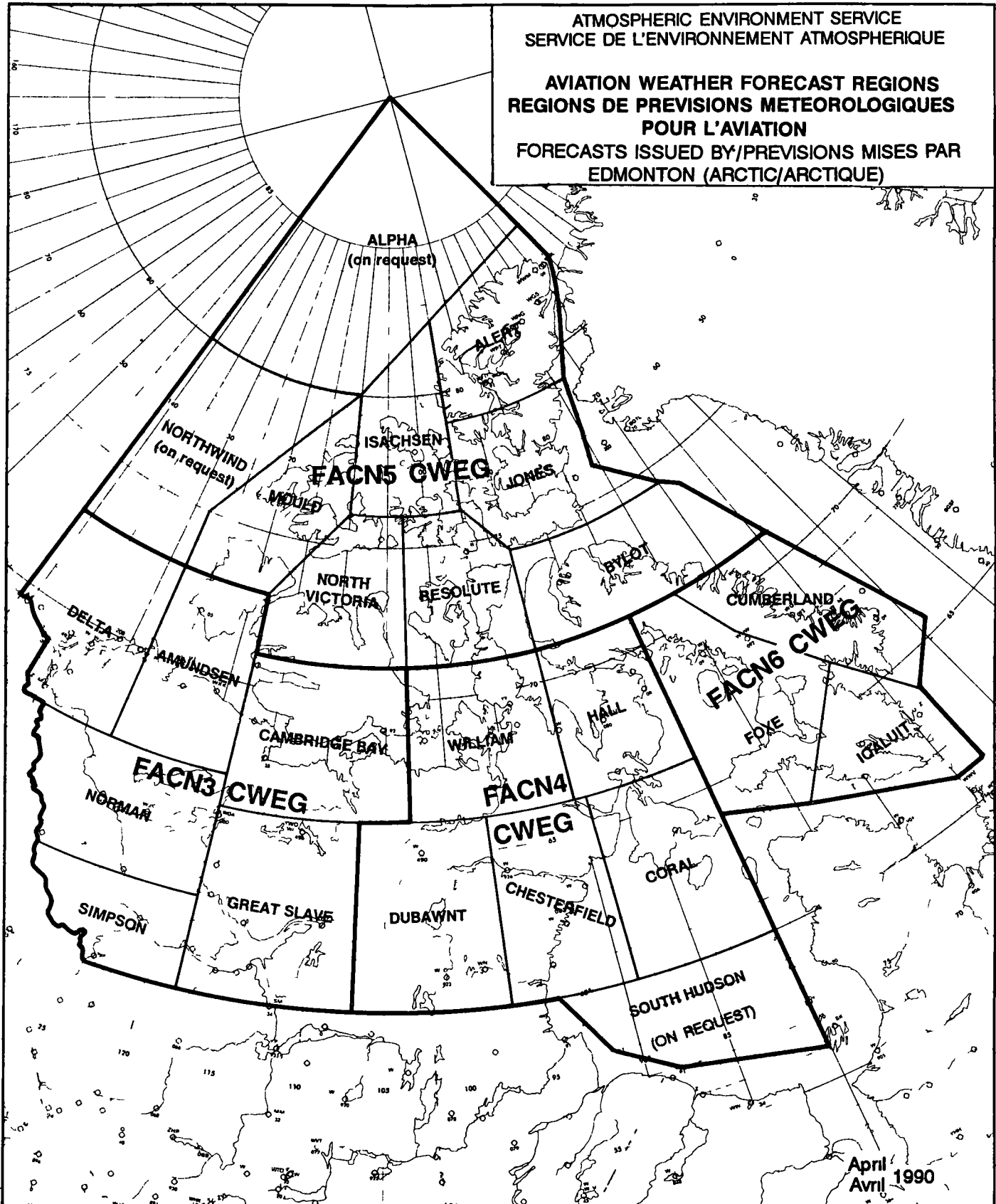
ATMOSPHERIC ENVIRONMENT SERVICE
 SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE
 AVIATION WEATHER FORECAST REGIONS
 REGIONS DE PREVISIONS METEOROLOGIQUES
 POUR L'AVIATION
 FORECASTS ISSUED BY/PREVISIONS MISES PAR
 VANCOUVER/WHITEHORSE/EDMONTON/WINNIPEG



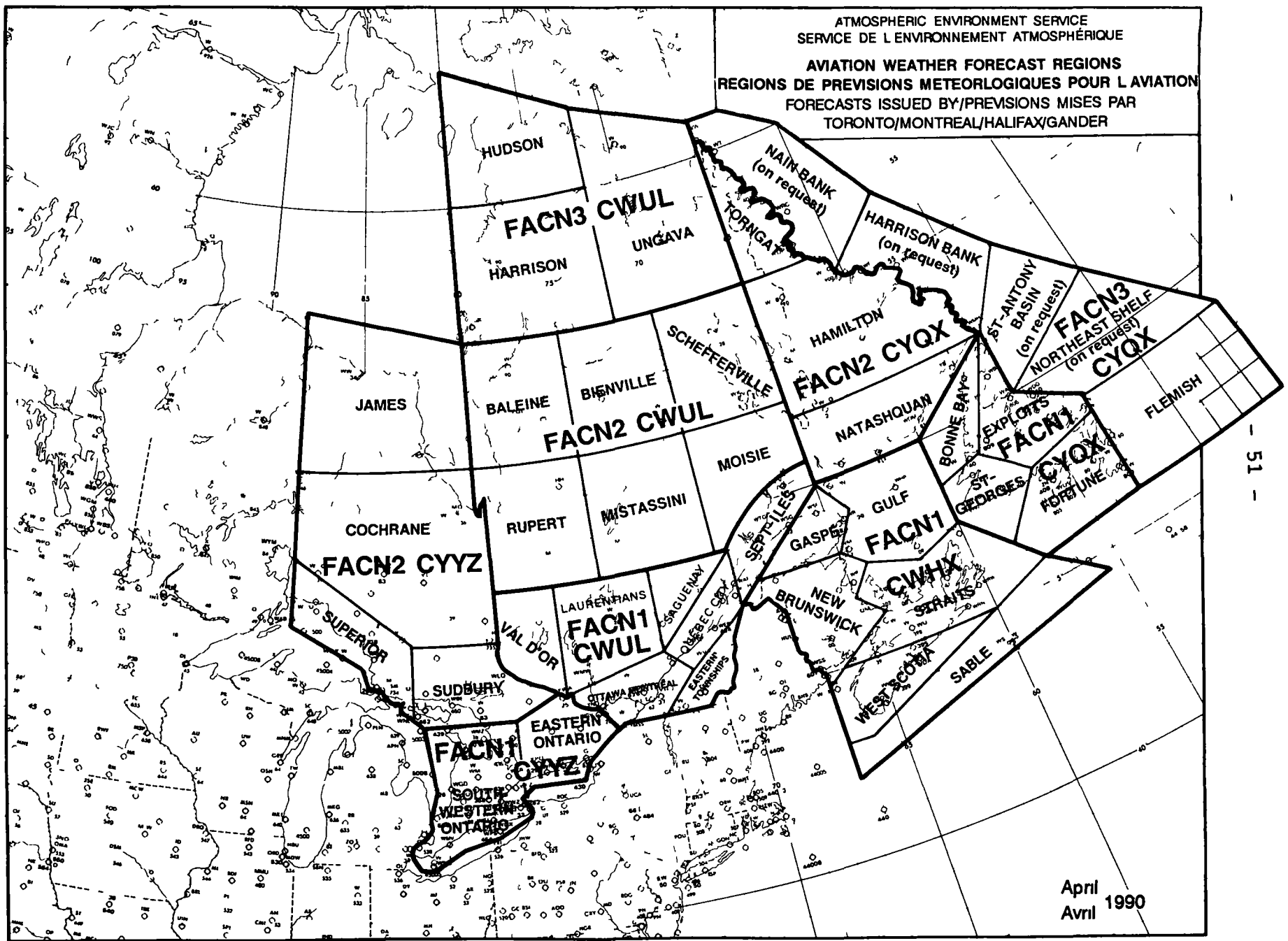
April 1990
 Avril 1990

ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

AVIATION WEATHER FORECAST REGIONS
REGIONS DE PREVISIONS METEOROLOGIQUES
POUR L'AVIATION
FORECASTS ISSUED BY/PREVISIONS MISES PAR
EDMONTON (ARCTIC/ARCTIQUE)



ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE
AVIATION WEATHER FORECAST REGIONS
REGIONS DE PREVISIONS METEOROLOGIQUES POUR L'AVIATION
FORECASTS ISSUED BY/PREVISIONS MISES PAR
TORONTO/MONTREAL/HALIFAX/GANDER





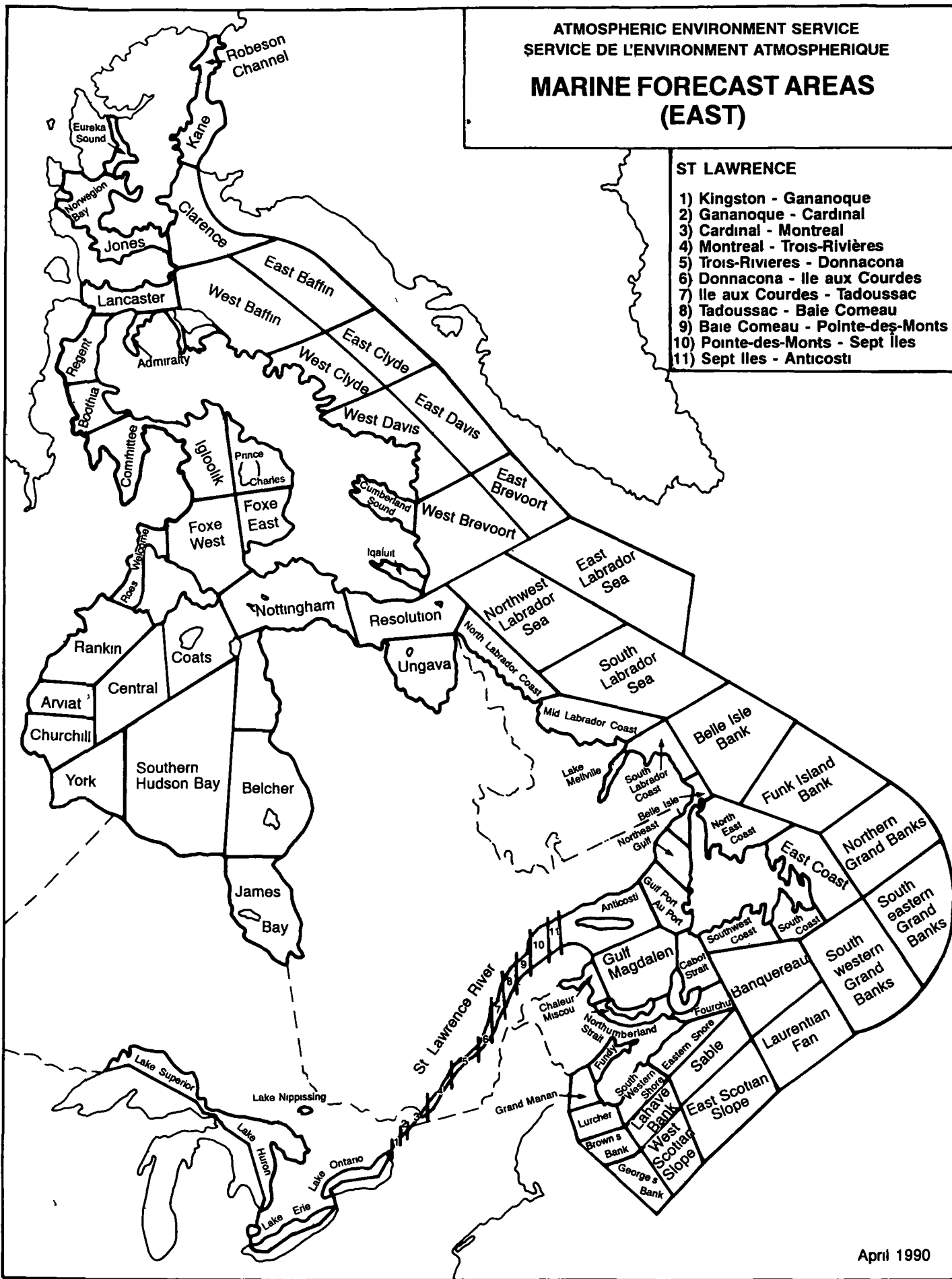
ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE
**MARINE FORECAST AREAS
(WEST)**

ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

**MARINE FORECAST AREAS
(EAST)**

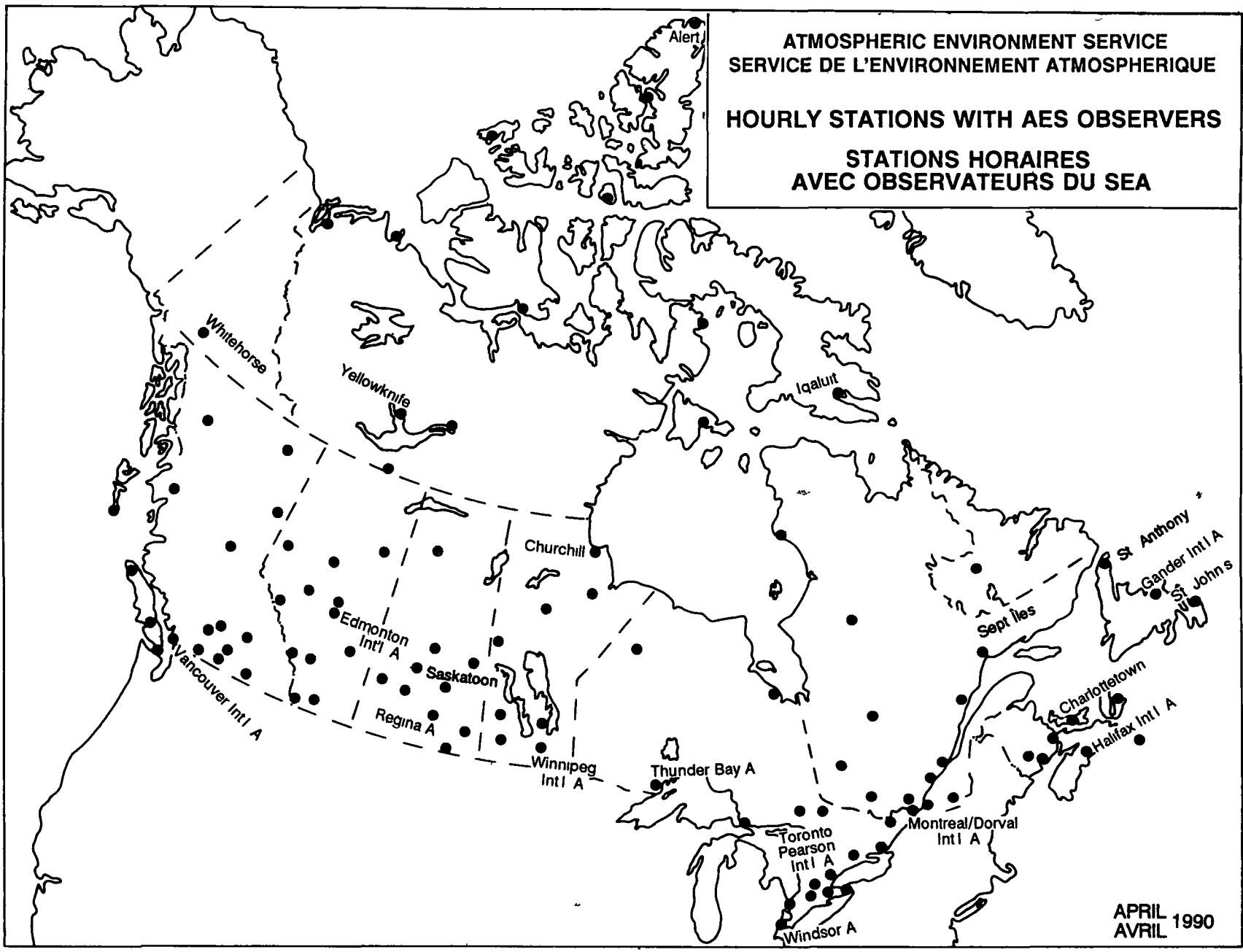
ST LAWRENCE

- 1) Kingston - Gananoque
- 2) Gananoque - Cardinal
- 3) Cardinal - Montreal
- 4) Montreal - Trois-Rivières
- 5) Trois-Rivières - Donnacona
- 6) Donnacona - Ile aux Courdes
- 7) Ile aux Courdes - Tadoussac
- 8) Tadoussac - Baie Comeau
- 9) Baie Comeau - Pointe-des-Monts
- 10) Pointe-des-Monts - Sept Iles
- 11) Sept Iles - Anticosti



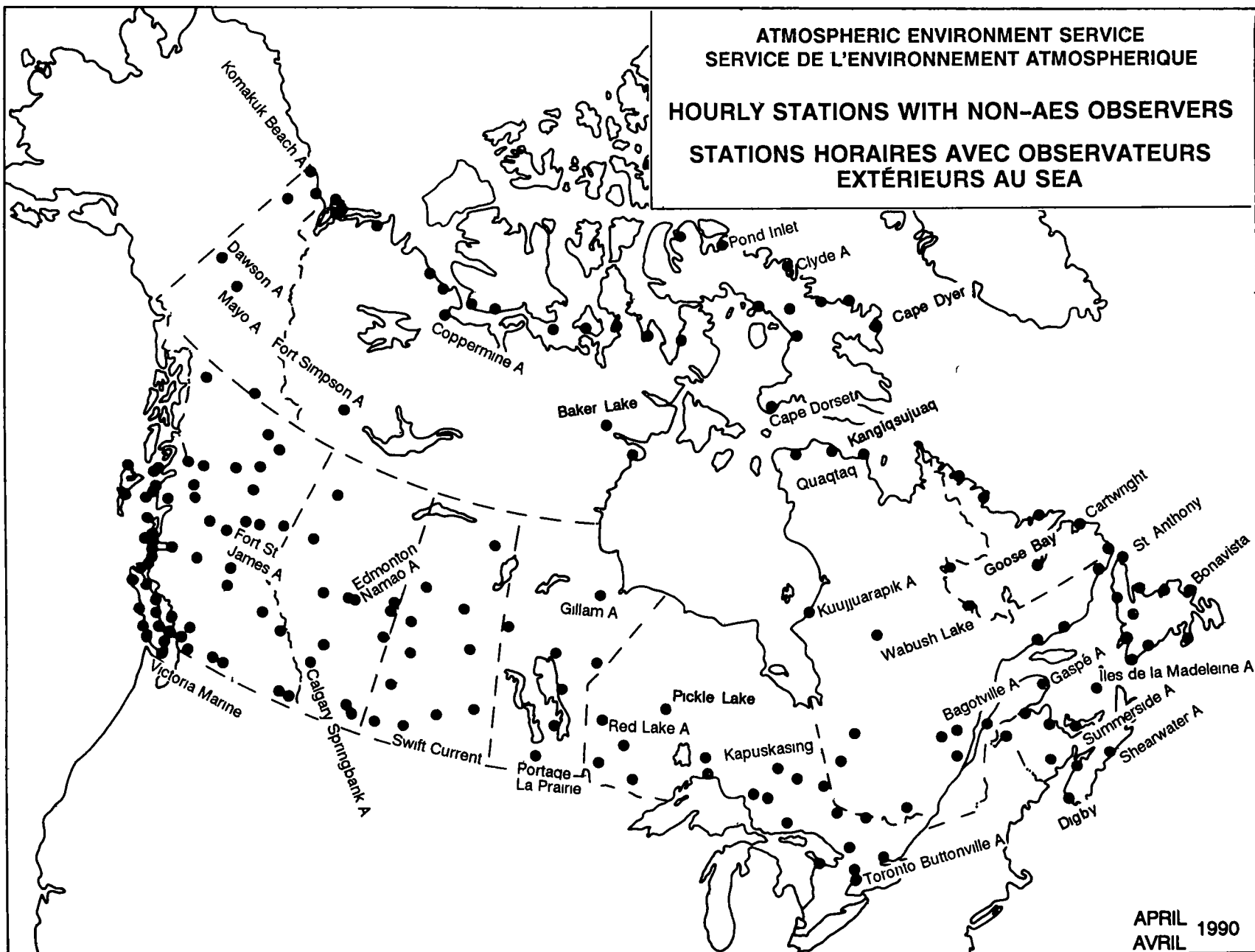
**ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE**

**HOURLY STATIONS WITH AES OBSERVERS
STATIONS HORAIRES
AVEC OBSERVATEURS DU SEA**



ATMOSPHERIC ENVIRONMENT SERVICE
 SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

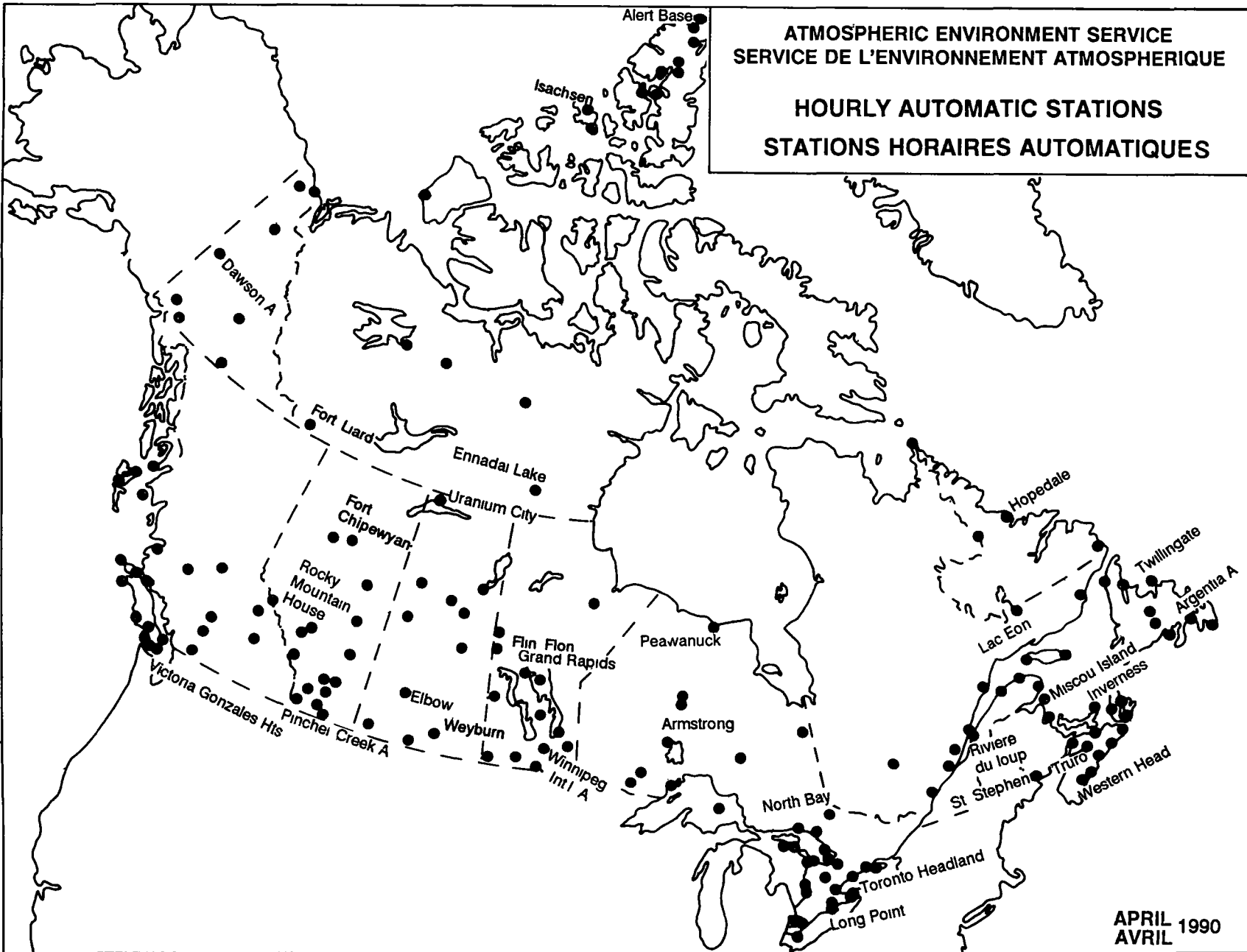
HOURLY STATIONS WITH NON-AES OBSERVERS
 STATIONS HORAIRES AVEC OBSERVATEURS
 EXTÉRIEURS AU SEA



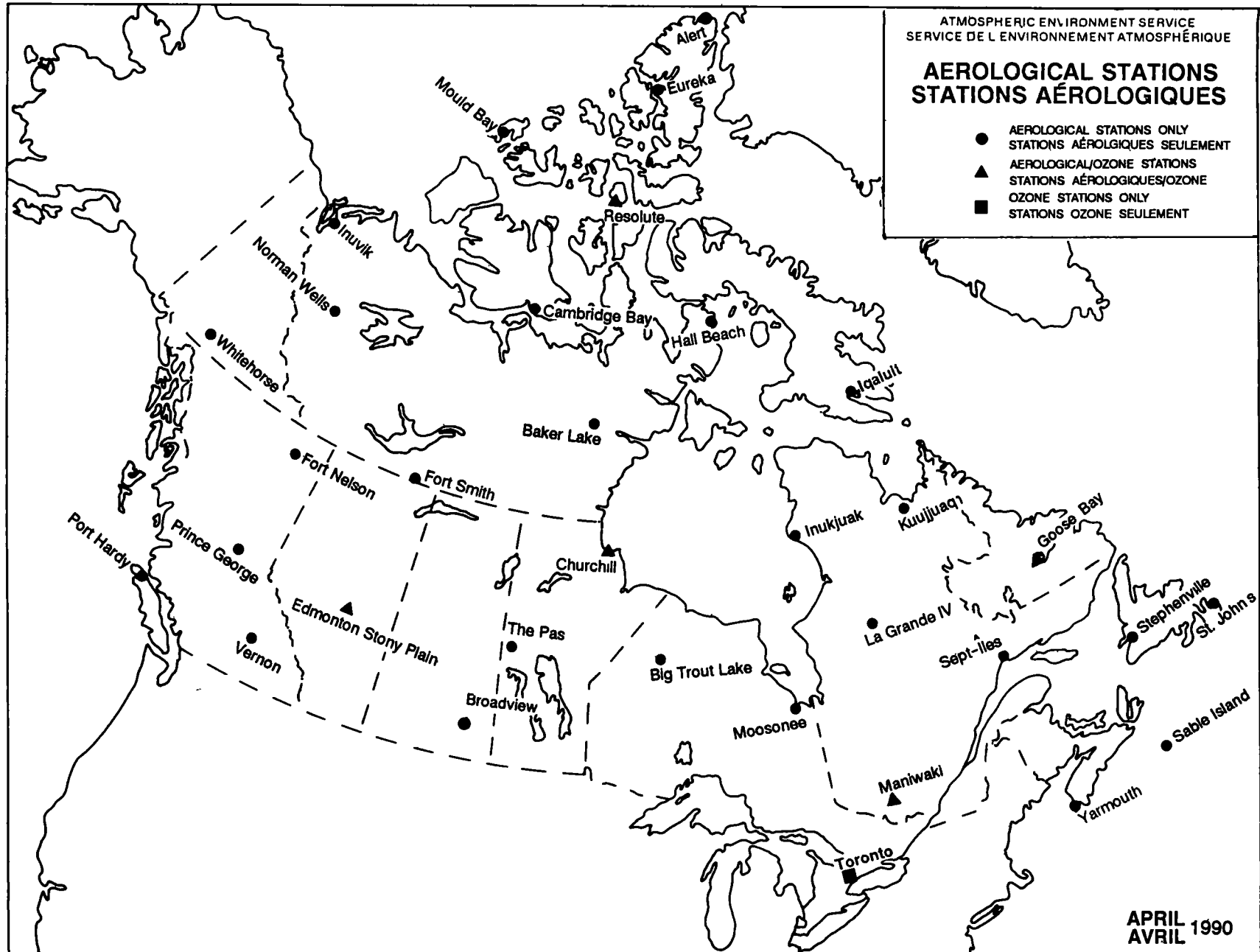
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ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

HOURLY AUTOMATIC STATIONS
STATIONS HORAIRES AUTOMATIQUES



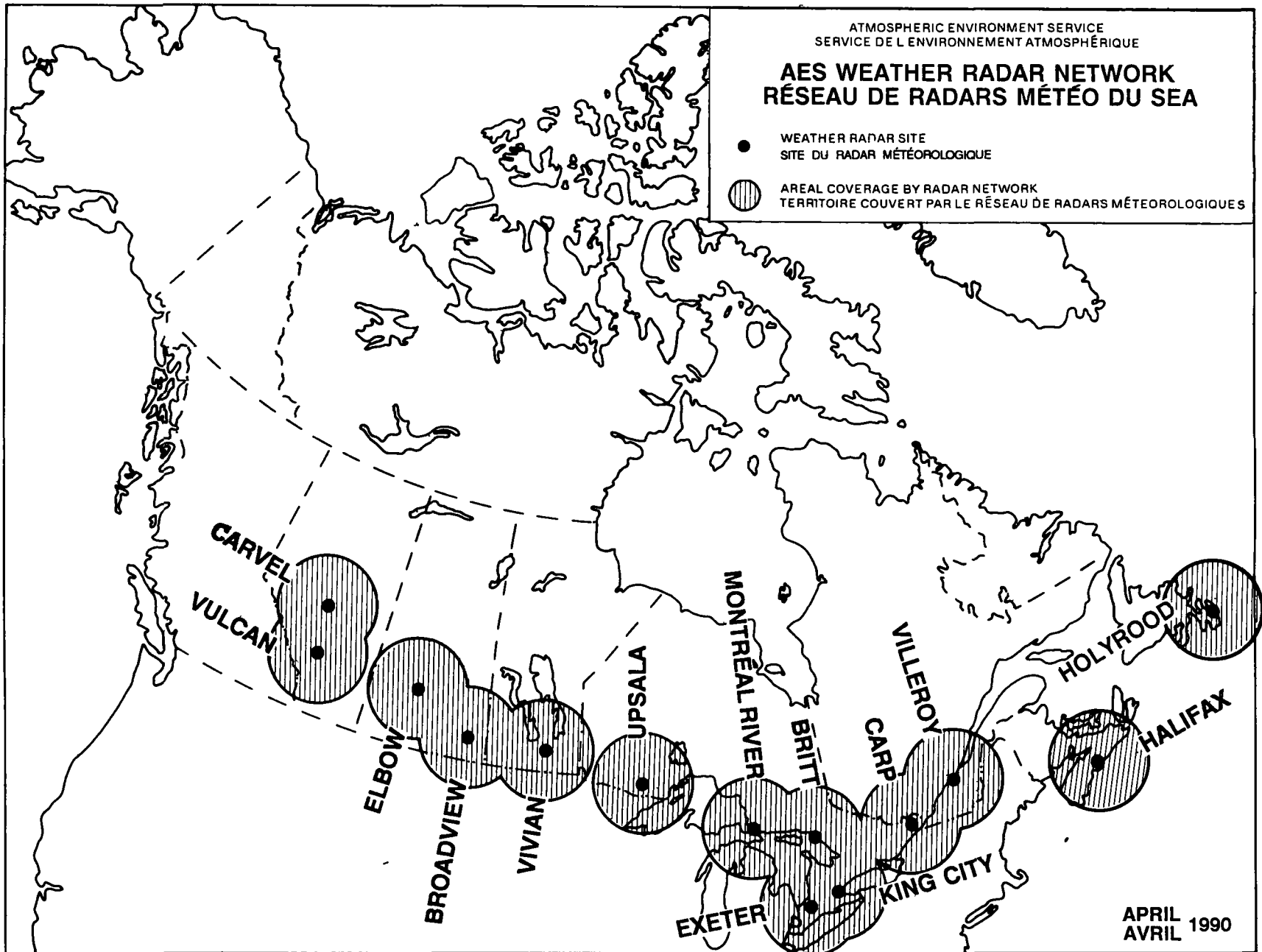
APRIL 1990
AVRIL



ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

AES WEATHER RADAR NETWORK RÉSEAU DE RADARS MÉTÉO DU SEA

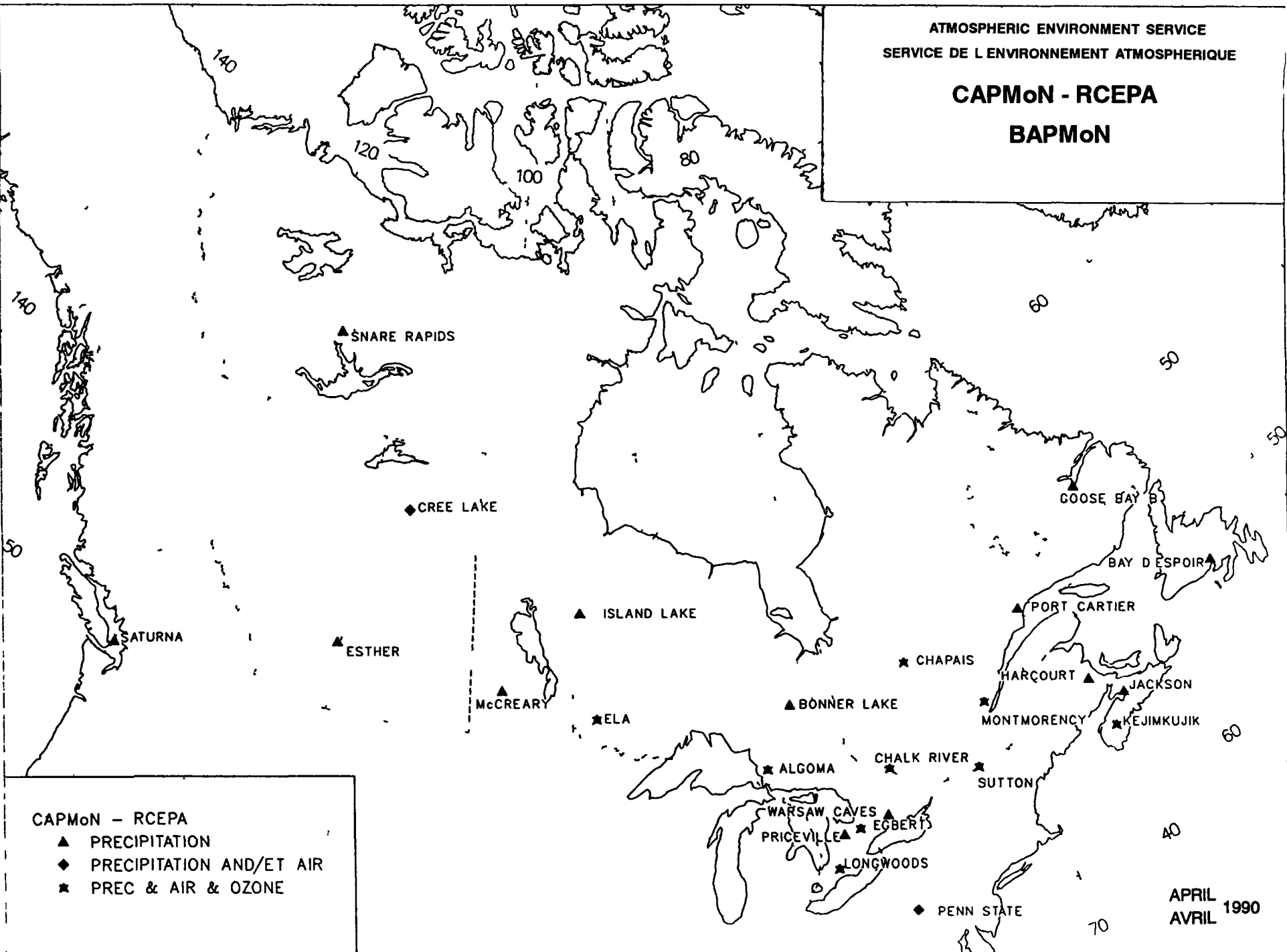
- WEATHER RADAR SITE
SITE DU RADAR MÉTÉOROLOGIQUE
- ◐ AREAL COVERAGE BY RADAR NETWORK
TERRITOIRE COUVERT PAR LE RÉSEAU DE RADARS MÉTÉOROLOGIQUES



APRIL 1990
AVRIL

ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

CAPMoN - RCEPA
BAPMoN



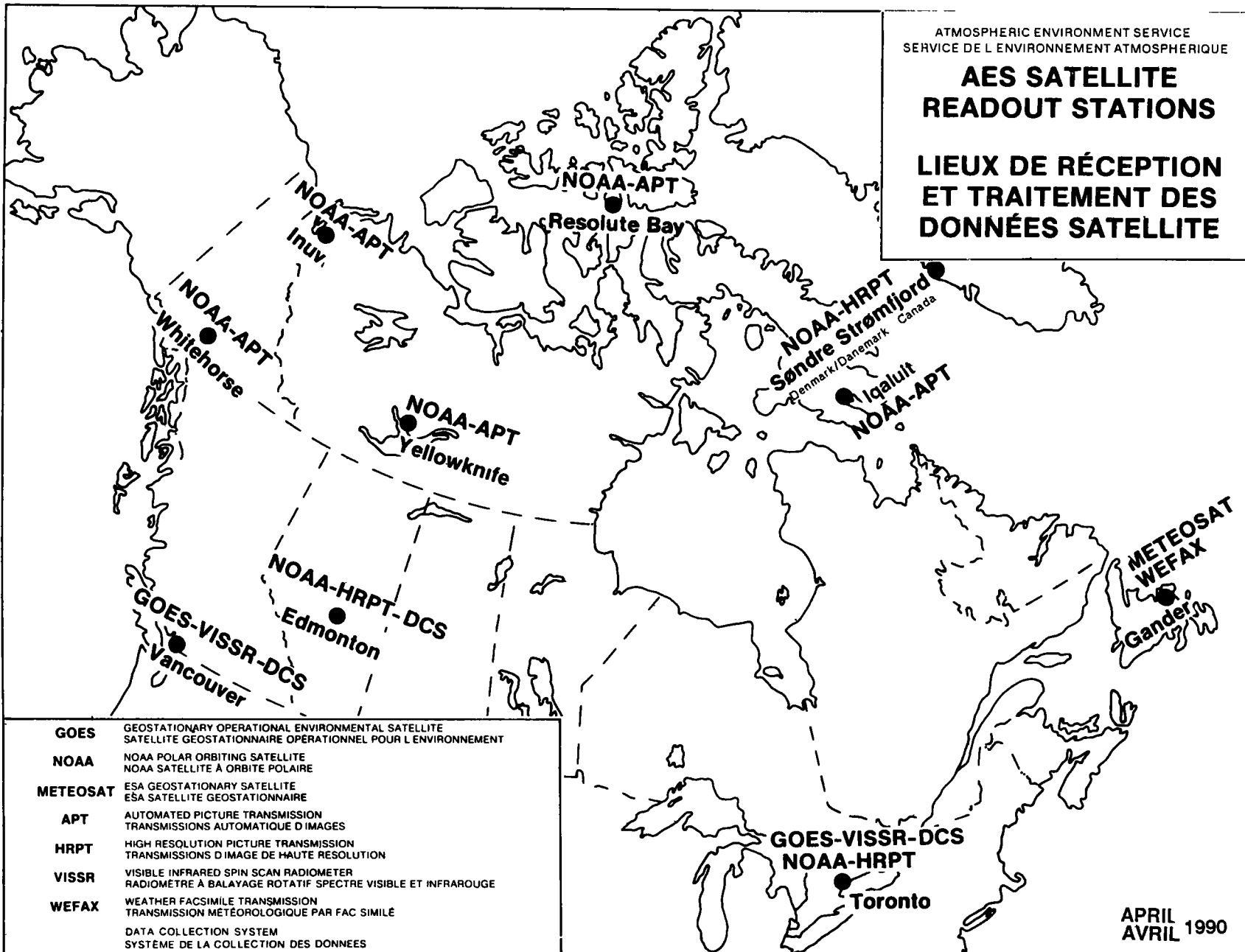
- CAPMoN - RCEPA
- ▲ PRECIPITATION
 - ◆ PRECIPITATION AND/ET AIR
 - ★ PREC & AIR & OZONE

APRIL
AVRIL 1990

ATMOSPHERIC ENVIRONMENT SERVICE
 SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

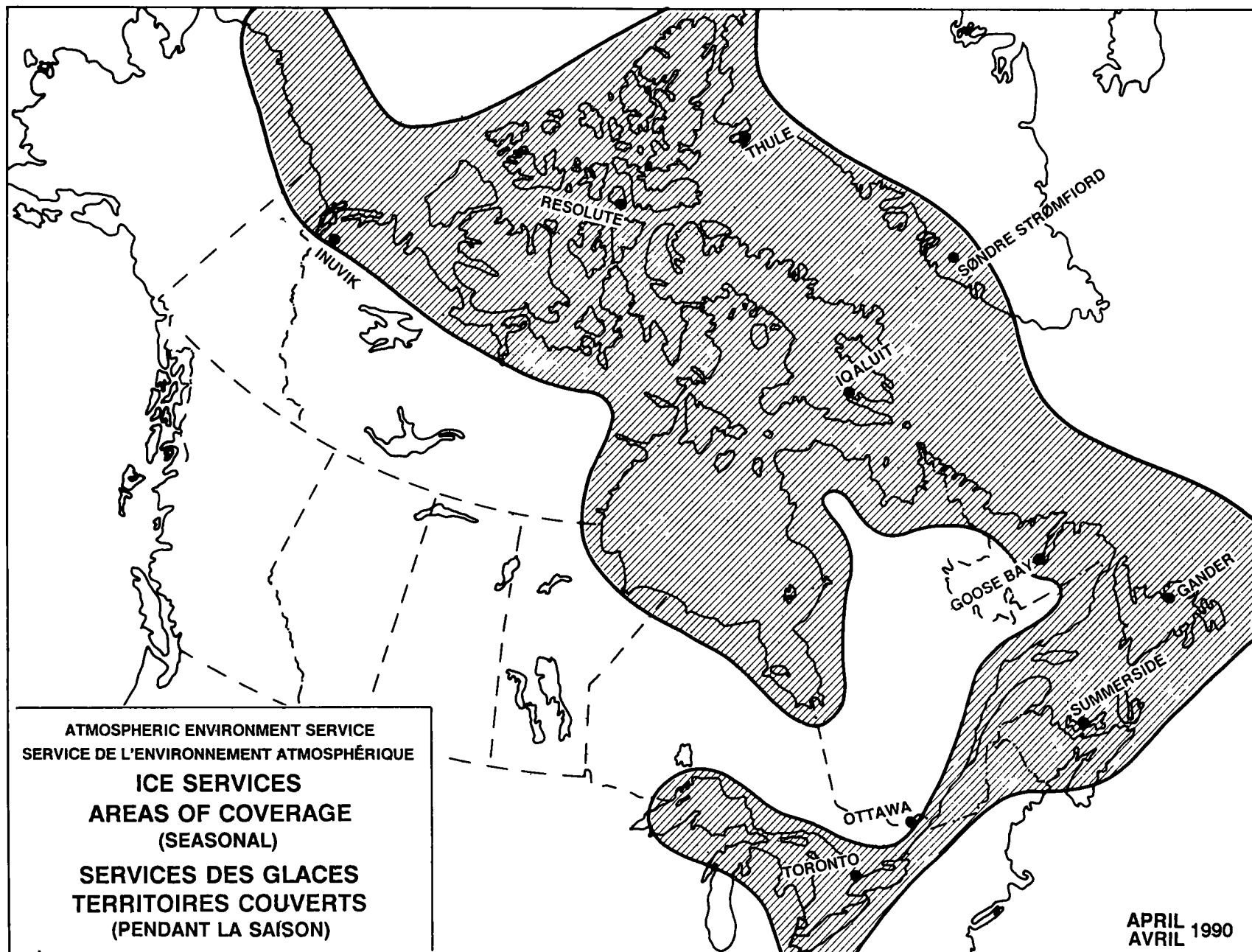
AES SATELLITE READOUT STATIONS

LIEUX DE RÉCEPTION
 ET TRAITEMENT DES
 DONNÉES SATELLITE



GOES	GEOSTATIONARY OPERATIONAL ENVIRONMENTAL SATELLITE SATELLITE GEOSTATIONNAIRE OPERATIONNEL POUR L'ENVIRONNEMENT
NOAA	NOAA POLAR ORBITING SATELLITE NOAA SATELLITE À ORBITE POLAIRE
METEOSAT	ESA GEOSTATIONARY SATELLITE ESA SATELLITE GEOSTATIONNAIRE
APT	AUTOMATED PICTURE TRANSMISSION TRANSMISSIONS AUTOMATIQUE D'IMAGES
HRPT	HIGH RESOLUTION PICTURE TRANSMISSION TRANSMISSIONS D'IMAGE DE HAUTE RESOLUTION
VISSR	VISIBLE INFRARED SPIN SCAN RADIOMETER RADIOMETRE À BALAYAGE ROTATIF SPECTRE VISIBLE ET INFRAROUGE
WEFAX	WEATHER FACSIMILE TRANSMISSION TRANSMISSION MÉTÉOROLOGIQUE PAR FAC SIMILÉ
	DATA COLLECTION SYSTEM SYSTÈME DE LA COLLECTION DES DONNÉES

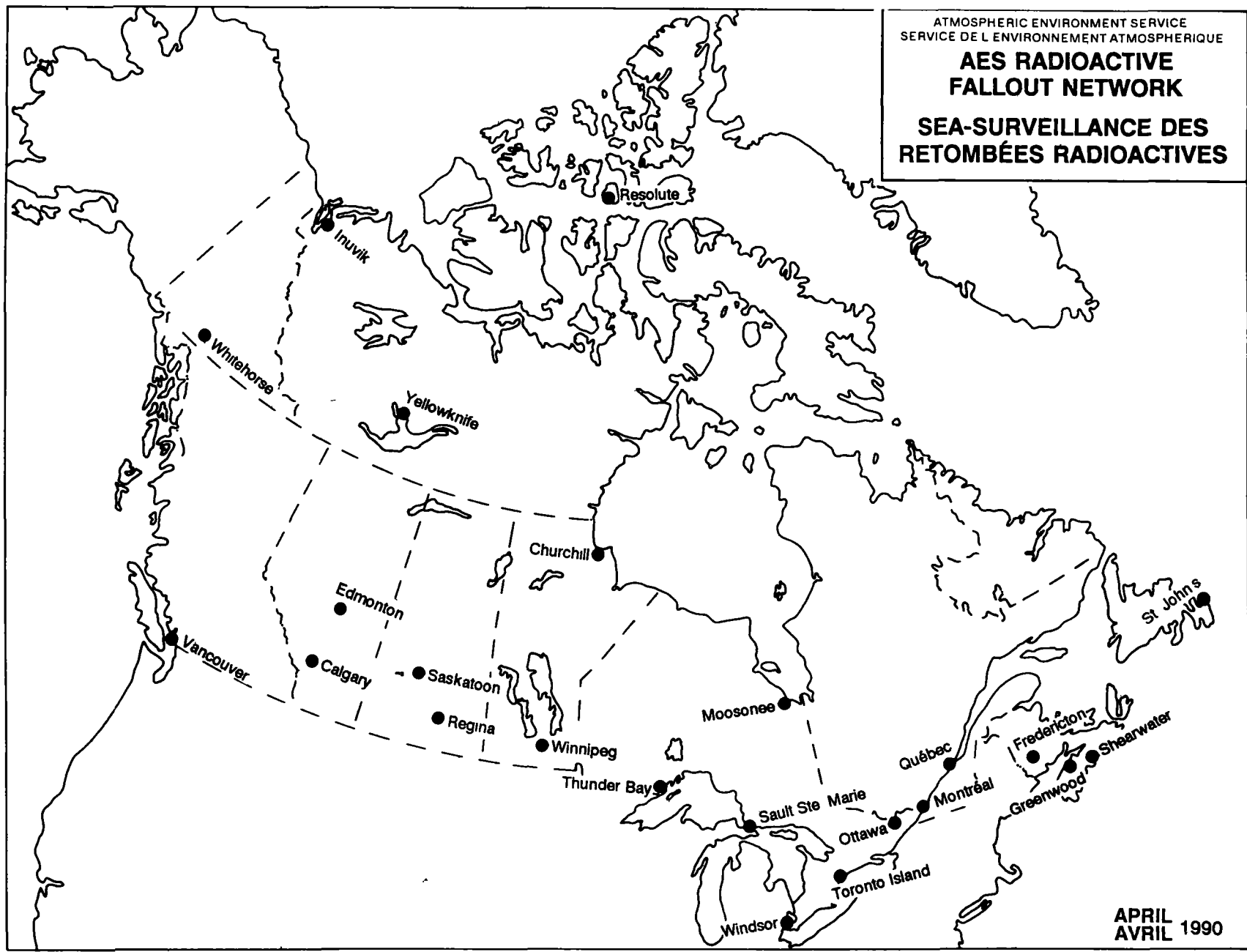
APRIL 1990
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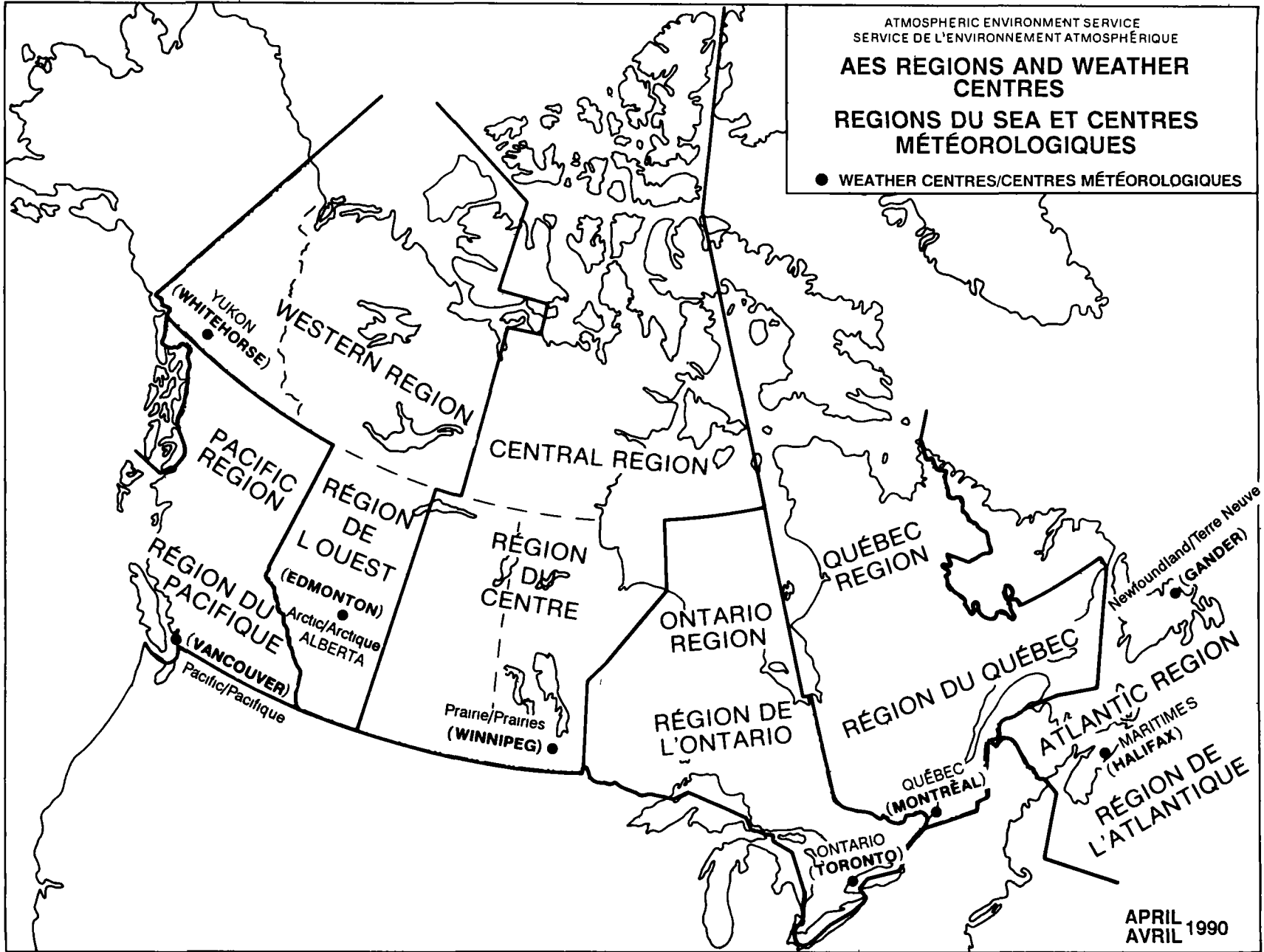
ATMOSPHERIC ENVIRONMENT SERVICE
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

**AES RADIOACTIVE
FALLOUT NETWORK**

**SEA-SURVEILLANCE DES
RETOMBÉES RADIOACTIVES**



APRIL
AVRIL 1990



CHAPTER 5
FUNCTIONS AND BUDGETS BY ORGANIZATION

ATMOSPHERIC ENVIRONMENT SERVICE

5 1

ATMOSPHERIC ENVIRONMENT SERVICE

5 1 1 AES Organizational Structure

The Atmospheric Environment Service is organized functionally into five Directorates and two Branches

Weather Services Directorate	WSD
Atmospheric Research Directorate	ARD
Canadian Climate Centre	CCC
Central Services Directorate	CSD
Policy, Planning and Assessment Directorate	APDG
Finance and Administration Branch	AABD
Human Resources Branch	AHRD

Four of the five Directorates plus the Finance and Administration Branch and the Human Resources Branch have their headquarters in Downsview, Ontario. The Policy, Planning and Assessment Directorate has its office in Ottawa, Ontario but also maintains staff in Downsview. The Assistant Deputy Minister has an office in both Ottawa and Downsview. Downsview, of course, houses more than just H Q management and administration units. Telecommunications, research and training staff, labs, instruments experts, the library, and other national operational units are also located there.

The Atmospheric Environment Service provides weather, ice and sea-state services to the Department of National Defence as provided for in a Memorandum of Understanding between the two parties. For this purpose DND maintains a Canadian Forces Weather Service headed by the Director of Meteorology and Oceanography (DMetOc) in Ottawa. DMetOc formally reports to a higher level DND authority while, functionally the Director reports to either the ADM of the Atmospheric Environment Service or to the Director General of the Weather Services Directorate as appropriate, and is a full member of the AES Management Committee.

The AES part of the DOE Communications Directorate is located in Downsview, but is not formally part of AES. However, it does provide direct support to the ADM and full services to AES managers. This includes development and implementation of AES' public information and media relations programs (in particular press releases).

The International Affairs Co-ordinator reports directly to the ADM, and co-ordinates and assists with the official business with other countries and organizations.

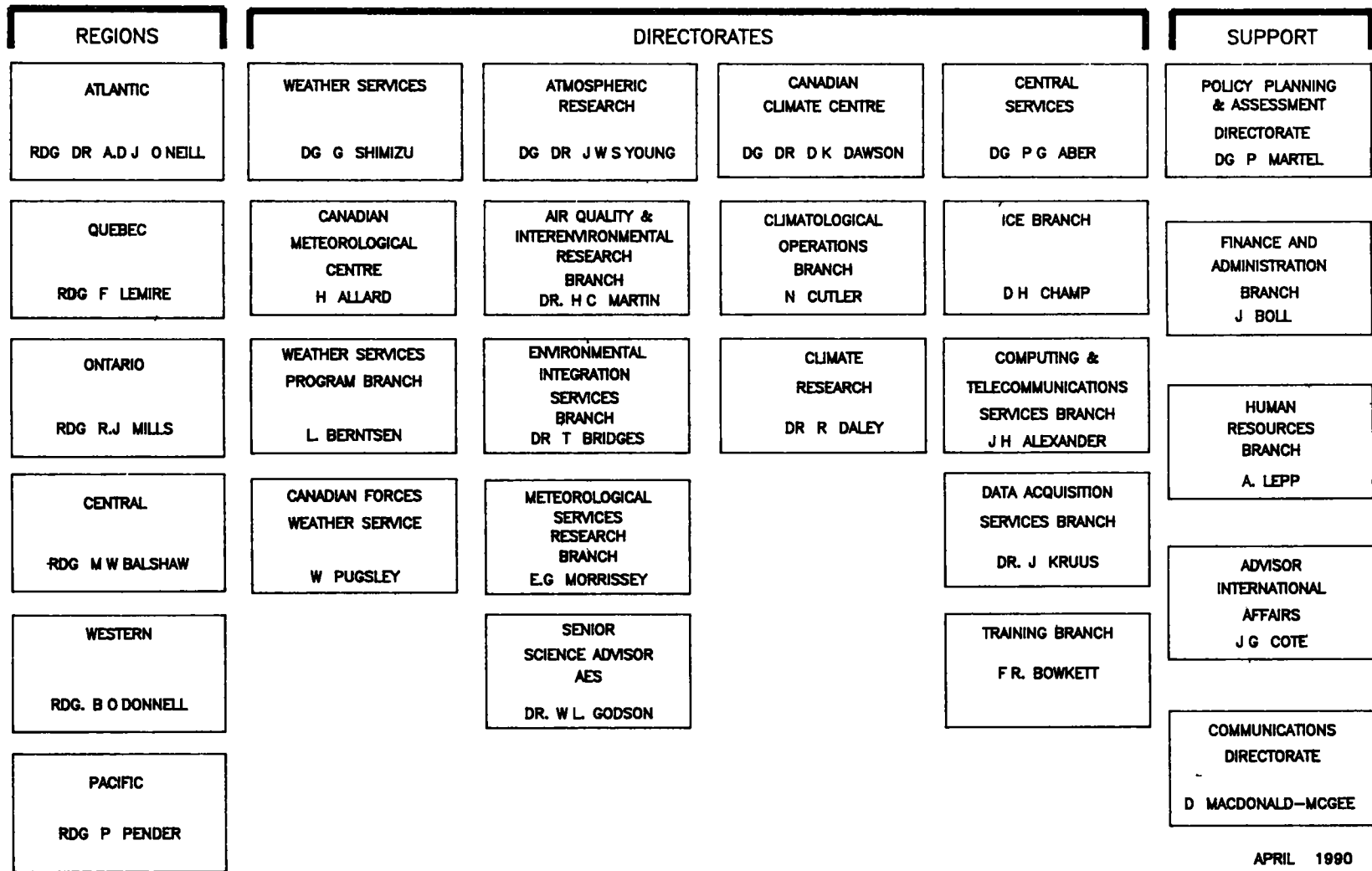
The International Affairs Co-ordinator reports directly to the ADM, and co-ordinates and assists with the official business with other countries and organizations

One other special advisor reports to the ADM. This advisor is responsible for advising the ADM on energy consumption trends and the impacts of domestic and international environmental action plans on energy in Canada

Finally, it should be noted that while there is a relationship between the organizational structure and the five program components (sub-activities) of the AES, they do not correspond exactly. For program support purposes, certain "common service" directorates have been created within AES to achieve such objectives as efficiency, effectiveness and the centralization of expertise. These directorates include Atmospheric Research Directorate, Central Services Directorate, Policy, Planning and Assessment Directorate, Finance and Administration Branch, and Human Resources Branch

ATMOSPHERIC ENVIRONMENT SERVICE ORGANIZATION 1990 - 91

ASSISTANT DEPUTY-MINISTER
E. DOWDESWELL



- 69 -

APRIL 1990

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET (\$000)

5 1 2 TOTAL BUDGET BY PROGRAM ACTIVITY AND ORGANIZATION

SA1	SA2	ADMA	APDG	AABD	AHRD	ARD	CCC	CSD	WSD	TOTAL

0800	MANAGEMENT & COMMON SUPPORT SERVICES									
	0810	478 3	1460 7	331 0						2270 0
	0830	137 9		6642 1	2234 9					9014 9

	TOTAL	616 2	1460 7	6973 1	2234 9					11284 9

1000	WEATHER SERVICES									
	1100							24925 9		24925 9
	1200							1748 1		1748 1
	1300							8012 0		8012 0
	1400							1019 2		1019 2
	1500							6808 8		6808 8
	2000							9675 8	37415 5	47091 3
	3000			4852 1		7138 6		22695 4	41514 0	76200 1

	TOTAL			4852 1		7138 6		32371 2	121443 5	165805 4

4000	CLIMATE SERVICES & RESEARCH									
	4100					9 0	5273 1	163 7	3076 3	8522 1
	4500					1876 3	3908 5			5784 8
	4600			100 0			1370 8	3877 6	619 1	5967 5
	4700						1019 6			1019 6

	TOTAL			100 0		1885 3	11572 0	4041 3	3695 4	21294 0

5	ICE SERVICES									
	5100							17552 6		17552 6
	5200							5505 8		5505 8
	5300							474 8		474 8
	5400			150 0				269 5		419 5
	5500							1181 4		1181 4

	TOTAL			150 0				24984 1		25134 1

6 0	AIR QUALITY SERVICES & RESEARCH									
	6100			210 0		1988 5			640 7	2839 2
	6300					10504 7			88 3	10593 0
	6700					1022 4				1022 4

	TOTAL			210 0		13515 6			729 0	14454 6

GRAND TOTAL		616 2	1460 7	12285 2	2234 9	22539 5	11572 0	61396 6	125967 9	237973 0

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET

5 1 3 PERSON YEARS BY PROGRAM ACTIVITY AND ORGANIZATION

SA1	SA2	ADMA	APDG	A&BD	AHRD	ARD	CCC	CSD	WSD	TOTAL

0800	MANAGEMENT & COMMON SUPPORT SERVICES									
	0810 MANAGEMENT	6 0	18 0	5 0						29 0
	0830 COMMON SUPPORT SERVICES	1 0		63 0	35 0					99 0
	TOTAL	7 0	18 0	68 0	35 0					128 0

1000	WEATHER SERVICES									
	1100 PUBLIC WEATHER SERVICES							452 9		452 9
	1200 MARINE WEATHER SERVICES							28 0		28 0
	1300 AVIATION WEATHER SERVICES							135 5		135 5
	1400 ECONOMIC WEATHER SERVICES							19 7		19 7
	1500 CANADIAN FORCES WEATHER SERVICES							108 0		108 0
	2000 DATA ACQUISITION							73 0	354 0	427 0
	3000 WEATHER SERVICES SUPPORT SYSTEMS			37 0		79 5		145 0	441 6	703 1
	TOTAL			37 0		79 5		218 0	1539 7	1874 2

4000	CLIMATE SERVICES & RESEARCH									
	4100 CLIMATE SERVICES						74 0	3 0	43 9	120 9
	4500 CLIMATE RESEARCH AND DEVELOPMENT					10 2	42 0			52 2
	4600 CLIMATE SERVICES SUPPORT SYSTEMS						12 5	32 5	12 0	57 0
	4700 CANADIAN CLIMATE PROGRAM						1 5			1 5
	TOTAL					10 2	130 0	35 5	55 9	231 6

5000	ICE SERVICES									
	5100 ICE RECONNAISSANCE AND DATA ACQUISITION							25 0		25 0
	5200 ICE ANALYSIS AND FORECASTING							31 5		31 5
	5300 ICE CLIMATE SERVICES							3 5		3 5
	5400 ICE SERVICES SUPPORT SYSTEM							4 0		4 0
	5500 ICE SERV RESEARCH AND DEVELOPMENT							4 5		4 5
	TOTAL							68 5		68 5

6000	AIR QUALITY SERVICES & RESEARCH									
	6100 AIR QUALITY SERVICES & RESEARCH					8 0			11 4	19 4
	6300 AIR QUALITY RESEARCH					81 3			2 0	83 3
	6700 AIR QUALITY & RESEARCH SUPPORT SERVICES					10 0				10 0
	TOTAL					99 3			13 4	112 7

GRAND TOTAL		7 0	18 0	105 0	35 0	189 0	130 0	322 0	1609 0	2415 0

ATMOSPHERIC ENVIRONMENT SERVICE

1990-91 BUDGET (\$000)

5 1 4 SALARY BY PROGRAM ACTIVITY AND ORGANIZATION

SA1	SA2	ADMA	APDG	AABD	AHRD	ARD	CCC	CSD	WSD	TOTAL

0800	MANAGEMENT & COMMON SUPPORT SERVICES									
	0810 MANAGEMENT	310 3	985 0	256 0						1551 3
	0830 COMMON SUPPORT SERVICES	33 4		2306 9	1884 2					4224 5
	TOTAL	343 7	985 0	2562 9	1884 2					5775 8

1000	WEATHER SERVICES									
	1100 PUBLIC WEATHER SERVICES							22812 5		22812 5
	1200 MARINE WEATHER SERVICES							1470 3		1470 3
	1300 AVIATION WEATHER SERVICES							6899 5		6899 5
	1400 ECONOMIC WEATHER SERVICES							900 6		900 6
	1500 CANADIAN FORCES WEATHER SERVICES							6263 8		6263 8
	2000 DATA ACQUISITION						3448 7	16841 5		20290 2
	3000 WEATHER SERVICES SUPPORT SYSTEMS			1525 9		4306 3		7306 7	22163 5	35302 4
	TOTAL			1525 9		4306 3		10755 4	77351 7	93939 3

4000	CLIMATE SERVICES & RESEARCH									
	4100 CLIMATE SERVICES						3337 9	148 7	1915 8	5402 4
	4500 CLIMATE RESEARCH AND DEVELOPMENT					534 8	2394 9			2929 7
	4600 CLIMATE SERVICES SUPPORT SYSTEMS						678 5	1722 2	527 5	2928 2
	4700 CANADIAN CLIMATE PROGRAM						78 8			78 8
	TOTAL					534 8	6490 1	1870 9	2443 3	11339 1

5000	ICE SERVICES									
	5100 ICE RECONNAISSANCE AND DATA ACQUISITION							1533 3		1533 3
	5200 ICE ANALYSIS AND FORECASTING							1695 8		1695 8
	5300 ICE CLIMATE SERVICES							245 8		245 8
	5400 ICE SERVICES SUPPORT SYSTEM							170 0		170 0
	5500 ICE SERV RESEARCH AND DEVELOPMENT							285 4		285 4
	TOTAL							3930 3		3930 3

6000	AIR QUALITY SERVICES & RESEARCH									
	6100 AIR QUALITY SERVICES & RESEARCH					426 1		592 1		1018 2
	6300 AIR QUALITY RESEARCH					4535 4		88 3		4623 7
	6700 AIR QUALITY & RESEARCH SUPPORT SERVICES					498 4				498 4
	TOTAL					5459 9		680 4		6140 3

GRAND TOTAL		343 7	985 0	4088 8	1884 2	10301 0	6490 1	16556 6	80475 4	121124 8

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET (\$000)

5 1 5 O&M BY PROGRAM ACTIVITY AND ORGANIZATION

SA1	SA2	ADMA	APDG	AABD	AHRD	ARD	CCC	CSD	WSD	TOTAL
0800	MANAGEMENT & COMMON SUPPORT SERVICES									
	0810 MANAGEMENT	161 2	434 5	65 0						660 7
	0830 COMMON SUPPORT SERVICES	104 5		2825 2	317 7					3247 4
	TOTAL	265 7	434 5	2890 2	317 7					3908 1
1000	WEATHER SERVICES									
	1100 PUBLIC WEATHER SERVICES							1816 3		1816 3
	1200 MARINE WEATHER SERVICES							277 8		277 8
	1300 AVIATION WEATHER SERVICES							1112 5		1112 5
	1400 ECONOMIC WEATHER SERVICES							118 6		118 6
	1500 CANADIAN FORCES WEATHER SERVICES							545 0		545 0
	2000 DATA ACQUISITION							625 9	17171 3	17797 2
	3000 WEATHER SERVICES SUPPORT SYSTEMS			2131 2		1759 9		15041 5	10915 8	29848 7
	TOTAL			2131 2		1759 9		15667 7	31957 3	51516 1
4000	CLIMATE SERVICES & RESEARCH									
	4100 CLIMATE SERVICES						920 3	15 0	1141 5	2076 8
	4500 CLIMATE RESEARCH AND DEVELOPMENT					315 0	778 6			1093 6
	4600 CLIMATE SERVICES SUPPORT SYSTEMS			100 0			291 3	2128 4	87 6	2607 3
	4700 CANADIAN CLIMATE PROGRAM						940 8			940 8
	TOTAL			100 0		315 0	2931 0	2143 4	1229 1	6718 5
5000	ICE SERVICES									
	5100 ICE RECONNAISSANCE AND DATA ACQUISITION							12442 4		12442 4
	5200 ICE ANALYSIS AND FORECASTING							3616 0		3616 0
	5300 ICE CLIMATE SERVICES							184 0		184 0
	5400 ICE SERVICES SUPPORT SYSTEM			150 0				94 5		244 5
	5500 ICE SERV RESEARCH AND DEVELOPMENT							389 0		389 0
	TOTAL			150 0				16725 9		16875 9
6000	AIR QUALITY SERVICES & RESEARCH									
	6100 AIR QUALITY SERVICES & RESEARCH			210 0		709 9			32 3	952 2
	6300 AIR QUALITY RESEARCH					4057 4				4057 4
	6700 AIR QUALITY & RESEARCH SUPPORT SERVICES					439 0				439 0
	TOTAL			210 0		5206 3			32 3	5448 6
GRAND TOTAL		265 7	434 5	5481 4	317 7	7281 2	2931 0	34537 0	33218 7	84467 2

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET (\$000)

5 1 6 CAPITAL BY PROGRAM ACTIVITY AND ORGANIZATION

SA1	SA2	ADMA	APDG	AABD	AHRD	ARD	CCC	CSD	WSD	TOTAL

0800	MANAGEMENT & COMMON SUPPORT SERVICES									
	0810 MANAGEMENT	6 8	41 2	10 0						58 0
	0830 COMMON SUPPORT SERVICES			1510 0	33 0					1543 0
	TOTAL	6 8	41 2	1520 0	33 0					1601 0

1000	WEATHER SERVICES									
	1100 PUBLIC WEATHER SERVICES							297 1		297 1
	1200 MARINE WEATHER SERVICES									
	1300 AVIATION WEATHER SERVICES									
	1400 ECONOMIC WEATHER SERVICES									
	1500 CANADIAN FORCES WEATHER SERVICES									
	2000 DATA ACQUISITION						5601 2	3402 7		9003 9
	3000 WEATHER SERVICES SUPPORT SYSTEMS					745 4	246 9	8434 7		9427 0
	TOTAL					745 4	5848 1	12134 5		18728 0

4000	CLIMATE SERVICES & RESEARCH									
	4100 CLIMATE SERVICES						1014 9	19 0		1033 9
	4500 CLIMATE RESEARCH AND DEVELOPMENT					710 0	735 0			1445 0
	4600 CLIMATE SERVICES SUPPORT SYSTEMS						401 0	27 0	4 0	432 0
	4700 CANADIAN CLIMATE PROGRAM									
	TOTAL					710 0	2150 9	27 0	23 0	2910 9

5000	ICE SERVICES									
	5100 ICE RECONNAISSANCE AND DATA ACQUISITION						3576 9			3576 9
	5200 ICE ANALYSIS AND FORECASTING						194 0			194 0
	5300 ICE CLIMATE SERVICES						45 0			45 0
	5400 ICE SERVICES SUPPORT SYSTEM						5 0			5 0
	5500 ICE SERV RESEARCH AND DEVELOPMENT						507 0			507 0
	TOTAL						4327 9			4327 9

6000	AIR QUALITY SERVICES & RESEARCH									
	6100 AIR QUALITY SERVICES & RESEARCH					852 5		16 3		868 8
	6300 AIR QUALITY RESEARCH					1780 4				1780 4
	6700 AIR QUALITY & RESEARCH SUPPORT SERVICES					85 0				85 0
	TOTAL					2717 9		16 3		2734 2

GRAND TOTAL		6 8	41 2	1520 0	33 0	4173 3	2150 9	10203 0	12173 8	30302 0

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET (\$000)

5 1 7 GRANTS AND CONTRIBUTIONS BY PROGRAM ACTIVITY AND ORGANIZATION

SA1	SA2	ADMA	APDG	AABD	AHRD	ARD	CCC	CSD	WSD	TOTAL

0800	MANAGEMENT & COMMON SUPPORT SERVICES									
	0810	MANAGEMENT								
	0830	COMMON SUPPORT SERVICES								

		TOTAL								
1000	WEATHER SERVICES									
	1100	PUBLIC WEATHER SERVICES								
	1200	MARINE WEATHER SERVICES								
	1300	AVIATION WEATHER SERVICES								
	1400	ECONOMIC WEATHER SERVICES								
	1500	CANADIAN FORCES WEATHER SERVICES								
	2000	DATA ACQUISITION								
	3000	WEATHER SERVICES SUPPORT SYSTEMS								
				1195 0		327 0		100 0		1622 0

		TOTAL								
				1195 0		327 0		100 0		1622 0
4000	CLIMATE SERVICES & RESEARCH									
	4100	CLIMATE SERVICES								
	4500	CLIMATE RESEARCH AND DEVELOPMENT								
	4600	CLIMATE SERVICES SUPPORT SYSTEMS								
	4700	CANADIAN CLIMATE PROGRAM								

		TOTAL								
						325 5				325 5
5000	ICE SERVICES									
	5100	ICE RECONNAISSANCE AND DATA ACQUISITION								
	5200	ICE ANALYSIS AND FORECASTING								
	5300	ICE CLIMATE SERVICES								
	5400	ICE SERVICES SUPPORT SYSTEM								
	5500	ICE SERV RESEARCH AND DEVELOPMENT								

		TOTAL								
6000	AIR QUALITY SERVICES & RESEARCH									
	6100	AIR QUALITY SERVICES & RESEARCH								
	6300	AIR QUALITY RESEARCH								
	6700	AIR QUALITY & RESEARCH SUPPORT SERVICES								

		TOTAL								
						131 5				131 5

		TOTAL								
						131 5				131 5

GRAND TOTAL				1195 0		784 0		100 0		2079 0

1990 - 91 Budget

ATMOSPHERIC ENVIRONMENT SERVICE

5 1 8 BY ORGANIZATIONAL UNIT

	PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
OFFICE OF THE ASSISTANT DEPUTY MINISTER	7 0	343 7	265 7	6 8		616 2
POLICY, PLANNING AND ASSESSMENT	18 0	985 0	434 5	41 2		1460 7
CANADIAN CLIMATE CENTRE	130 0	6490 1	2931 0	2150 9		11572 0
ATMOSPHERIC RESEARCH DIRECTORATE	189 0	10301 0	7281 2	4173 3	784 0	22539 5
WEATHER SERVICES DIRECTORATE	1501 0	74211 6	32673 7	12173 8		119059 1
CANADIAN FORCES WEATHER SERVICE	108 0	6263 8	545 0			6808 8
CENTRAL SERVICES DIRECTORATE	322 0	16556 6	34537 0	10203 0	100 0	61396 6
FINANCE AND ADMINISTRATION BRANCH	105 0	4088 8	5481 4	1520 0	1195 0	12285 2
HUMAN RESOURCES BRANCH	35 0	1884 2	317 7	33 0		2234 9
AES TOTAL	2415 0	121124 8	84467 2	30302 0	2079 0	237973 0

1990-91 Budget
(\$000)

5 1 9

ATMOSPHERIC ENVIRONMENT SERVICE
RECONCILIATION TO MAIN ESTIMATES
AND NET REFERENCE LEVEL

1) <u>Allocated Within AES</u> (Total in Program Digest)	\$237,973 0
2) <u>Plus</u> Employee Fringe Benefits	18,164 0
3) <u>Main Estimates (Blue Book)</u>	256,137 0
4) <u>Less</u> Vote Netted Revenue	33,880 0
5) <u>Less</u> Non-tax Revenue	1,800 0
6) <u>1990/91 Net Reference Level</u>	\$220,457 0

5 1 10 AES MAIN ESTIMATES BY ORGANIZATION AND INPUT FACTOR (1990/91)

	<u>ADMA</u>	<u>APDG</u>	<u>AABD</u>	<u>ACDG</u>	<u>CCDG</u>	<u>ARDG</u>	<u>AWDG</u>	<u>CFWS</u>	<u>AHRD</u>	<u>TOTAL</u>
P-Ys	7 0	18 0	105 0	322 0	130 0	189 0	1501 0	108 0	35 0	2415 0
SALARY	336 2	972 9	3481 7	14815 5	6222 9	9646 2	62354.3	5656 2	1356 2	104842 1
OVERTIME	3 5	4 9	49 4	1223 0	50 3	400 5	7583 2	210 0	7 0	9531 8
OPC	4 0	7 2	557 7	518 1	216 9	254.3	4274 1	397 6	521 0	6750 9
CEBP	52 6	135 4	789 7	2421 9	977 8	1421 5	11289 5	812 3	263 3	18164 0
O&M	265 7	434 5	5481 4	34537 0	2931.0	7281 2	32673 7	545 0	317 7	87767 2
CAPITAL	6 8	41 2	1520 0	10203 0	2150 9	4173 3	12173 8	0 0	33 0	30302 0
G & C	0 0	0 0	1195 0	100 0	0 0	784 0	0 0	0 0	0 0	2079 0
1										
<u>TOTALS</u>	668 8	1596 1	13074 9	63818 5	12549 8	23961 0	130348 6	7621 1	2498 2	256137 0

NOTES

(1) VNR included - see next page for details

OPC - Other Personnel Costs
 CEBP - Employee Fringe Benefits
 G&C - Grants and Contributions

5 1 11 VOTE NETTED REVENUE ALLOCATIONS (1990/91)

SALARY
(000's \$)

	ACDG	CCDG	AABD	AWDG	CFWS	TOTAL	P-Ys
DOT-MARINE	1666 0					1666 0	31 0
DOT-AIR				7629 2		7629 2	146 0
EM&R				89 7		89 7	
DND					6263 8	6263 8	108 0
MISCELLANEOUS			279 0			279 0	
TOTAL SAL	1666 0	0 0	279 0	7718 9	6263 8	15927 7	285 0

NON-SALARY
(000's \$)

	ACDG	CCDG	AABD	AWDG	CFWS	TOTAL	P-Ys
DOT-MARINE	12680 0					12680 0	
DOT-AIR	306 9			3963 1		4270 0	
EM&R				32 3		32 3	
DND					545 0	545 0	
MISC	150 0	25 0	150 0	100 0		425 0	
TOTAL O&M	13136 9	25 0	150 0	4095 4	545 0	17952 3	
TOTAL VNR (000's \$)	14802 9	25 0	429 0	11814 3	6808 8	33880 0	285 0

5 1 12

ATMOSPHERIC ENVIRONMENT SERVICE
PERSON-YEARS BY ORGANIZATION AND BY LOCATION
 (TOTAL 2415 0)

	<u>Location</u>	<u>Region/ Branch</u>	<u>Directorate</u>
OFFICE OF THE ASSISTANT DEPUTY MINISTER		7 0	7 0
Downsview, Ont	5 0		
Ottawa, Ont	2 0		
POLICY, PLANNING AND ASSESSMENT		18 0	18 0
Downsview, Ont	6 0		
Ottawa, Ont	12 0		
FINANCE AND ADMINISTRATION		105 0	105 0
Downsview, Ont	105 0		
HUMAN RESOURCES BRANCH		35 0	35 0
Downsview, Ont	35 0		
ATMOSPHERIC RESEARCH DIRECTORATE			189 0
Director General's Office		6 0	
Downsview, Ont	6 0		
Air Quality and Inter-Environmental Research Branch		98 5	
Downsview, Ont	97 5		
Victoria, B C	1 0		
Meteorological Services Research Branch		79 5	
Dorval, Que	20 0		
Downsview, Ont	59 5		
Environmental Integration Services Branch		5 0	
Downsview, Ont	5 0		
CANADIAN CLIMATE CENTRE			130 0
Director General's Office		11 0	
Downsview, Ont	11 0		
Research Component		23 0	
Downsview, Ont	23 0		
Climatological Operations Branch		96 0	
Downsview, Ont	88 0		
Saskatoon, Sask	8 0		
CENTRAL SERVICES DIRECTORATE			322 0
Director General's Office		4 0	
Downsview, Ont	4 0		
Computing and Telecommunications Services Branch		104 5	
Dorval, Que	34 0		
Downsview, Ont	70 5		
Data Acquisition Services Branch		77 0	
Downsview, Ont	77 0		
Ice Branch		67 5	
Downsview, Ont	34 5		
Ottawa, Ont	33 0		

	<u>Station Type *</u>	<u>Location</u>	<u>Region or Branch</u>	<u>Directorate</u>
Training Branch			69 0	
Cornwall, Ont		32 0		
Downsview, Ont		29 0		
Montreal, Que		8 0		
WEATHER SERVICES DIRECTORATE				1501 0
Toronto (Downsview), Ontario		60 4		
- Directors General's Office			16 0	
- Program Branch			44 4	
Montreal (Dorval), Quebec		93 5		
- Canadian Meteorological Centre			93 5	
Atlantic Region			228 7	
Charlottetown, P E I	W04	4 0		
Churchill Falls, Labrador	WS3	4 0		
Fredericton, N B	W04	5 0		
Gander, NFLD				
- Newfoundland Weather Centre	W01/W04	40 5		
Halifax, N S (Bedford)				
- Regional Headquarters		86 7		
- Maritmes Weather Centre	W01/W04	43 5		
Moncton, N B	W04	10 0		
Sable Island, N S	WS1	6 0		
Saint John, N B	W04	5 0		
St John's, Nfld	W04	10 0		
Stephenville, Nfld	WS2	3 0		
Sydney, N S	W04	6 0		
Yarmouth, N S	W04	5 0		
Quebec Region			208 8	
Baie Comeau, Que	WS3	5 0		
Chibougamau, Que.	WS3	5 0		
Iqaluit, N W T	W04/WS2	6 0		
Inukjuak, N W T	WS1	4 0		
Kuujuaq, Que	WS2	3 0		
La Grande IV, Que	WS1	4 0		
Maniwaki, Que	WS1	5 0		
Mirabel, Que	W04/WS3	8 0		
Montreal, Que				
- Regional Headquarters (Ville St Laurent)		65 3		
- Quebec Weather Centre				
(Ville St Laurent)	W01	61 5		
- International Airport Weather				
Office (Dorval)	W04	13 0		

* See page 84 for definitions of station types

	<u>Station Type *</u>	<u>Location</u>	<u>Region or Branch</u>	<u>Directorate</u>
- International Airport Weather				
Station (Dorval)	WS3	5 0		
Quebec City, Que	W04	7 0		
Sept-Iles, Que	W04	3 0		
Sherbrooke, Que	W04	2 0		
St Hubert, Que	W04	5 0		
Trois Rivieres, Que	W04	1 0		
Val d'Or, Que	W04	6 0		
Ontario Region			199 6	
Hamilton, Ont	W04	4 0		
Kingston, Ont	W04	3 0		
London, Ont	W04	5 0		
Moosonee, Ont	WS1	4 0		
Niagara District, Ont	W04	2 0		
North Bay, Ont	W04	2 0		
Ottawa, Ont	W04	9 5		
Peterborough, Ont	W04	2 0		
Sarnia, Ont	W04	2 0		
Sault Ste Marie, Ont	W04	6 0		
Sudbury, Ont	W04	6 0		
Thunder Bay, Ont	W04	7 0		
Toronto, Ont				
- Regional Headquarters		69 1		
- Ontario Weather Centre	W01	37 0		
- International Airport Weather Office	W04	26 0		
Big Trout Lake, Ont	WS1	6 0		
Waterloo-Wellington, Ont	W04	2 0		
Windsor, Ont	W04	7 0		
Central Region			246 1	
Alert, N W T	WS1	4 0		
Baker Lake, N W T	WS2	2 0		
Brandon, Man	W04	1 0		
Broadview, Sask	WS3	5 0		
Churchill, Man	WS1	7 0		
Cree Lake, Sask	WS3	4 0		
Dauphin, Man	W04	1 0		
Estevan, Sask	WS3	4 0		
Elbow, Sask	WS3	2 0		
Eureka, N W T	WS1	8 0		
Gillam, Man	WS3	1 0		

* see page 84 for definitions of station types

	Station Type *	Location	Region or Branch	Directorate
Gimli, Man	WS3	1 0		
Hall Beach, N W T	WS1	5 0		
Hudson Bay, Sask	WS3	1 0		
Kindersley, Sask	WS3	1 0		
Mould Bay, N W T	WS1	7 0		
Prince Albert, Sask	W04	3 0		
Regina, Sask	W03	11 0		
Resolute, N W T	W04/WS2	6 0		
Saskatoon, Sask	W04	8 0		
The Pas, Man	WS1	6 0		
Thompson, Man	W04	1 0		
Winnipeg, Man				
- Regional Headquarters		78 1		
- Prairie Weather Centre	W01	59 0		
- International Airport Weather Office	W04	19 0		
Wynyard, Sask	WS3	1 0		
Western Region			266 3	
Banff, Alta	W04	3.0		
Calgary, Alta	W04	16 0		
Cambridge Bay, N W T	WS1	6 0		
Cape Parry, N W T	WS3	3 0		
Coronation, Alta	WS3	2 0		
Edmonton, Alta				
- Regional Headquarters		88 3		
- Alberta Weather Centre	W01/W04	32 0		
- Arctic Weather Centre	W01/W04	31 0		
- International Airport Weather Office	W04	6 0		
- Municipal Airport Weather Office	W04	5 0		
Edson, Alta	WS3	4 0		
Fort McMurray, Alta	WS3	3 0		
Fort Reliance, N W T	WS3	3 0		
Fort Smith, N W T	WS2	3 0		
Grande Prairie, Alta	W04	4 0		
Inuvik, N W T	W04/WS2	8 0		
Jasper, Alta	WS3	3 0		
Lethbridge, Alta	W04	5 0		
Norman Wells, N W T	WS2	3 0		
Pincher Creek, Alta	WS3	1 0		
Rocky Mountain House, Alta	WS2	3 0		
Slave Lake, Alta	WS3	4 0		
Stony Plain, Alta	WS2	3 0		
Whitehorse, Yukon				
- Yukon Weather Centre	W01/W04	18 0		

* see page 84 for definitions of station types

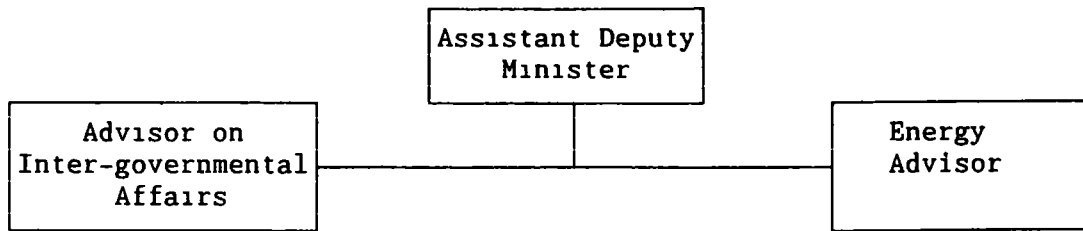
	<u>Station Type *</u>	<u>Location</u>	<u>Region or Branch</u>	<u>Directorate</u>
- Weather Station	WS2	3 0		
Yellowknife, N W T	W03	6 0		
Pacific Region			197 6	
Cape St James, B C	WS3	3 0		
Castlegar, B C	W04	3 0		
Dease Lake, B C	WS3	2 0		
Fort St John, B C	W04	3 0		
Fort Nelson, B C	W04/WS2	4 0		
Hope, B C	WS3	3 0		
Kamloops, B C	W04	4 0		
Kelowna, B C	W04	7 0		
Lytton, B C	WS3	2 0		
Penticton, B C	W04	2 0		
Port Alberni, B C	WS3	2 0		
Port Hardy, B C	WS2/W04	5 0		
Prince George, B C	WS2/W04	8 0		
Revelstoke, B C	WS3	3 0		
Terrace, B C	W04	3 0		
Vancouver, B C				
- Regional Headquarters		79 3		
- Pacific Weather Centre	W01	34 0		
- Lower Mainland Weather Office	W04	12 3		
- International Airport Weather Station	WS3	6 0		
Vernon, B C	WS2	2 0		
Victoria, B C				
- Weather Office	W03	10 0		
CANADIAN FORCES WEATHER SERVICE			108 0	108 0
AES TOTAL				2415 0

Station types

- W01 - a primary forecast office which provides forecasts, consultation and in some cases, presentation services
- W03 - provides consultation and presentation services to a wide variety of users, in addition to taking surface weather observations
- W04 - provides presentation services to a wide variety of users, in addition to taking surface weather observations
- WS1 - takes both surface and upper air (radiosonde and rawinsonde) observations and provides weather information service
- WS2 - takes upper air observations
- WS3 - maintains a full or partial surface observing program, with observations taken by AES technicians and provides weather information service

5 2

OFFICE OF THE ASSISTANT DEPUTY MINISTER



5 2 1 FUNCTIONS OF THE OFFICE OF THE ADM (7 0 PY, \$616 2 K)

The Assistant Deputy Minister (ADM)

- provides executive direction to, and management of, the Atmospheric Environment Service,
- participates in the corporate executive management of Environment Canada, and
- represents Canada on the executive governing body of the World Meteorological Organization of the United Nations

There are two additional functions provided by the office of the ADM

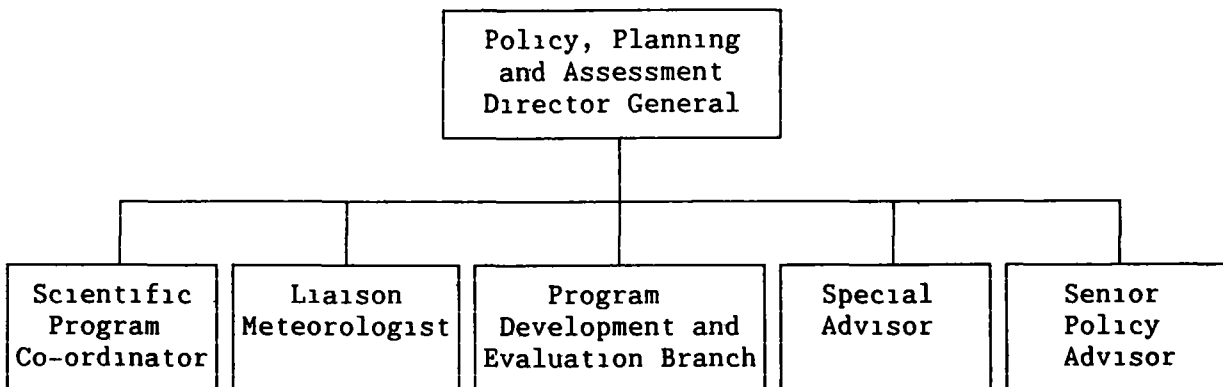
- coordination of international affairs concerning the atmospheric sciences, and
- providing advice on energy consumption trends and the impacts of domestic and international environmental action plans on energy in Canada

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
OFFICE OF THE ASSISTANT DEPUTY MINISTER - ADMA

SA1	SA2		PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800		MANAGEMENT & COMMON SUPPORT SERVICES						
	0810	MANAGEMENT	6 0	310 3	161 2	6 8		478 3
	0830	COMMON SUPPORT SERVICES	1 0	33 4	104 5			137 9
		TOTAL	7 0	343 7	265 7	6 8		616 2
1000		WEATHER SERVICES						
4000		CLIMATE SERVICES & RESEARCH						
5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						
GRAND TOTAL			7 0	343 7	265 7	6 8		616 2

5 3

POLICY, PLANNING AND ASSESSMENT DIRECTORATE



5 3 1 FUNCTIONS OF THE POLICY, PLANNING AND ASSESSMENT DIRECTORATE
(18 0 PY, \$1,460 7 K)

Reporting to the ADM, AES, the Director General of the Policy, Planning, and Assessment Directorate

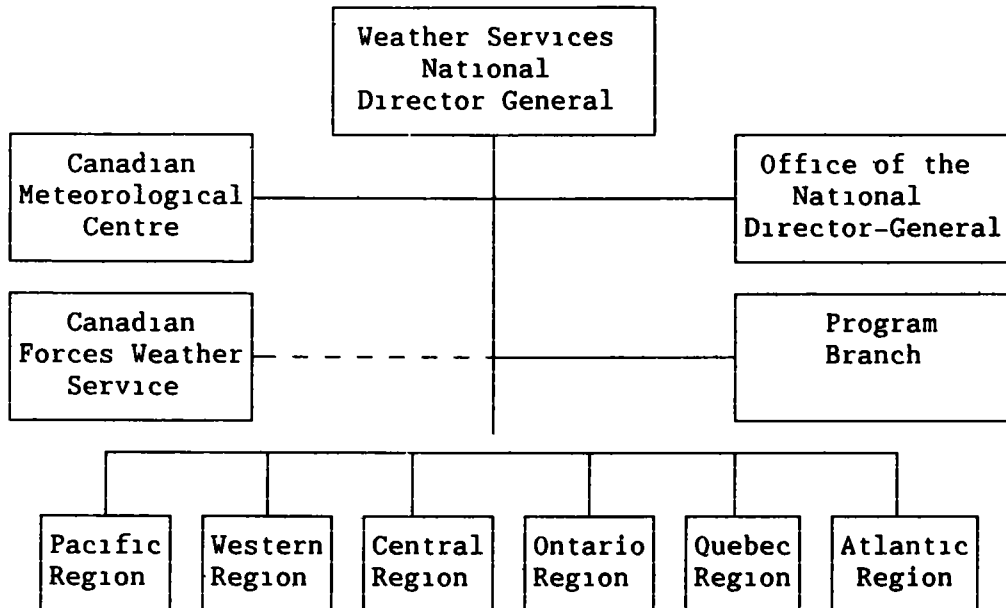
- provides policy and strategic advice to AES senior management on priority Service and Departmental issues,
- manages policy projects and issues of interest to AES and co-ordinates these among the stakeholders, inside and outside government,
- co-ordinates and integrates Service strategic, operational and program evaluation and audit activities,
- provides program management advice, information and intelligence services and support to the Assistant Deputy Minister and to the AES management committee (AMC),
- is responsible for Service wide contributions to department, governmental and non-governmental science programs and initiatives,
- liaises with the Minister's and Deputy Minister's offices on Service issues, and
- informs and advises AES senior management on private sector meteorological activities and liaises with the meteorological industry on behalf of AES

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
POLICY, PLANNING & ASSESSMENT DIRECTORATE - APDG

SA1	SA2		PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800		MANAGEMENT & COMMON SUPPORT SERVICES						
	0810	MANAGEMENT	18 0	985 0	434 5	41 2		1460 7
		TOTAL	18 0	985 0	434 5	41 2		1460 7
1000		WEATHER SERVICES						
4000		CLIMATE SERVICES & RESEARCH						
5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						
GRAND TOTAL			18 0	985 0	434 5	41 2		1460 7

5 4

WEATHER SERVICES DIRECTORATE



5 4 1 FUNCTIONS WEATHER SERVICES DIRECTORATE (1501 0 PY, \$119,059 1 K)

This Directorate is the largest in AES. It employs 62% of the total staff. It is responsible for all Regional activities, including data acquisition, the forecast production program and the dissemination of weather information to the general public. The National Director General is supported in Downsview by the Office of the Director General and the Program Branch. Others reporting to the Director General are the Regional Directors-General of the six Regions of the AES: Pacific, Western, Central, Ontario, Quebec and Atlantic Regions, and the Director of the Canadian Meteorological Centre (CMC) in Montreal.

Office of the National Director General (16 0 PY, \$3,007 7 K)

This office is responsible for the day-to-day support of the affairs of the National Director-General and for coordination and liaison with Regional management on national aspects of the weather services program. In this role the office

- provides the National Director-General with corporate advice and national level issue management support,
- provides advice on the effectiveness and on client satisfaction with the weather services program,
- provides an up-to-date management information service in support of advice and decision-making,
- provides responses to politically sensitive program issues, and
- serves as the first point of contact for selected national activities

Program Branch (44 4 PY, \$8,025 7 K)

The Program Branch supports the National Director General in the development, control and management of change to Directorate national operations, and the monitoring and assessment of trends in Directorate operations and outputs. The Branch has the following composition:

Policy and Plans Division

- develops national plans and policies for the Weather Services Program, including data acquisition, weather forecasting and dissemination activities, and
- develops and maintains DOE/AES agreements and relationships with components of other departments such as Transport, National Defence, and Fisheries and Oceans

Procedures and Requirements Division

- develops the procedures and requirements to be used in the WSD activities of data acquisition, weather forecasting and dissemination, and
- maintains the national meteorological applications programs used in the weather centres

Financial and Administrative Services Unit

- provides financial analysis and advice on WSD proposals for the Weather Services program,
- provides guidance and advice on financial procedures, and
- prepares resource allocations for the Directorate and monitors expenditures

Canadian Meteorological Centre (93 5 PY, \$5,140 6 K)

The Canadian Meteorological Centre, as described on page 33, is made up of two divisions - the Operations Division and Development Division

The Operations Division

- assimilates data into operational runs,
- prepares subjective forecast products,
- implements and maintains the computerized production system, and
- monitors and evaluates automated and manual output

The Development Division

- improves the quality and range of forecast products, and
- provides efficient production systems

Pacific, Western, Central, Ontario, Quebec and Atlantic Regions
(1347 1 PY, 102,885 1 K)

The six regions within AES provide weather services to all Canadians. Although each region is similar in structure and responsibilities, they differ in their geographical coverage and regional needs. Each of the regions has four operational divisions.

1) Data Acquisition

- provides weather data (see page 31) as inputs to the AES forecast operation systems and the Canadian Climate programs,
- provides other environmental data on air quality, atmospheric ozone, soil temperatures etc ,
- administers contract weather observation stations,
- ensures that meteorological instruments are properly maintained and calibrated, and
- trains volunteer and contract station observers

2) Weather Forecasting

- produces regional weather forecasts and weather warnings based on all incoming weather data. The forecasts are prepared for use by the public and for use by aviation, marine and various other interests, and

3) Weather Services

- provides weather information to Canadians using Weatheradio Canada, the media, telephones and personal contacts, and
- ensures that the regional needs for weather services are met

4) Scientific Services

- studies regional meteorological problems related to agriculture, forestry, air quality, energy applications and hydrometeorology, and studies the regional impact of climate change on these activities,
- acts as the focal point for AES regional participation in environmental assessment,
- controls the quality of climatological data in the region, and
- provides climatological data to users

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 WEATHER SERVICES DIRECTORATE - WSD

SA1	SA2	PY	SALARY	O&M	(¹⁰⁰⁰) CAPITAL	G&C	TOTAL

0800	MANAGEMENT & COMMON SUPPORT SERVICES						
1000	WEATHER SERVICES						
	1100 PUBLIC WEATHER SERVICES	452 9	22812 5	1816 3	297 1		24925 9
	1200 MARINE WEATHER SERVICES	28 0	1470 3	277 8			1748 1
	1300 AVIATION WEATHER SERVICES	135 5	6899 5	1112 5			8012 0
	1400 ECONOMIC WEATHER SERVICES	19 7	900 6	118 6			1019 2
	2000 DATA ACQUISITION	354 0	16841 5	17171 3	3402 7		37415 5
	3000 WEATHER SERVICES SUPPORT SYSTEMS	441 6	22163 5	10915 8	8434 7		41514 0
	TOTAL	1431 7	71087 9	31412 3	12134 5		114634 7

4000	CLIMATE SERVICES & RESEARCH						
	4100 CLIMATE SERVICES	43 9	1915 8	1141 5	19 0		3076 3
	4600 CLIMATE SERVICES SUPPORT SYSTEMS	12 0	527 5	87 6	4 0		619 1
	TOTAL	55 9	2443 3	1229 1	23 0		3695 4

5000	ICE SERVICES						
6000	AIR QUALITY SERVICES & RESEARCH						
	6100 AIR QUALITY SERVICES & RESEARCH	11 4	592 1	32 3	16 3		640 7
	6300 AIR QUALITY RESEARCH	2 0	88 3				88 3
	TOTAL	13 4	680 4	32 3	16 3		729 0

GRAND TOTAL		1501 0	74211 6	32673 7	12173 8		119059 1

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
OFFICE OF THE DIRECTOR GENERAL - WSD

SA1	SA2		PY	SALARY	O&M	(^{\$} 000) CAPITAL	G&C	TOTAL
0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
1000	2000	DATA ACQUISITION	1 0	51 2	227 0	50 0		328 2
	3000	WEATHER SERVICES SUPPORT SYSTEMS	15 0	831 2	1508 3	340 0		2679 5
		TOTAL	16 0	882 4	1735 3	390 0		3007 7
4000		CLIMATE SERVICES & RESEARCH						
5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						
GRAND TOTAL			16 0	882 4	1735 3	390 0		3007 7

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
WEATHER SERVICES PROGRAM BRANCH - WSD

SA1	SA2		PY	SALARY	O&M	(CAPITAL	G&C	TOTAL

0800	MANAGEMENT & COMMON SUPPORT SERVICES							
1000	WEATHER SERVICES							
	2000	DATA ACQUISITION	4 0	195 0	76 0			271 0
	3000	WEATHER SERVICES SUPPORT SYSTEMS	40 4	1870 6	329 4	5554 7		7754 7

		TOTAL	44 4	2065 6	405 4	5554 7		8025 7
4000	CLIMATE SERVICES & RESEARCH							
5000	ICE SERVICES							
6000	AIR QUALITY SERVICES & RESEARCH							

GRAND TOTAL			44 4	2065 6	405 4	5554 7		8025 7

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 CANADIAN METEOROLOGICAL CENTRE - WSD

SA1	SA2		PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
	1100	PUBLIC WEATHER SERVICES	7 0	394 1	60 0			454 1
	3000	WEATHER SERVICES SUPPORT SYSTEMS	86 5	3982 3	573 1	131 1		4686 5
		TOTAL	93 5	4376 4	633 1	131 1		5140 6
4000		CLIMATE SERVICES & RESEARCH						
5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						
GRAND TOTAL			93 5	4376 4	633 1	131 1		5140 6

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
PACIFIC REGION - WSD

SA1	SA2		PY	SALARY	O&M	CAPITAL	G&C	TOTAL
						(\$000)		

0800	MANAGEMENT & COMMON SUPPORT SERVICES							
1000	WEATHER SERVICES							
	1100	PUBLIC WEATHER SERVICES	66 1	3215 3	196 2			3411 5
	1200	MARINE WEATHER SERVICES	6 0	338 3	83 3			421 6
	1300	AVIATION WEATHER SERVICES	23 0	1103 3	25 3			1128 6
	1400	ECONOMIC WEATHER SERVICES	1 0	58 8	60 3			119 1
	2000	DATA ACQUISITION	50 0	2275 6	3029 0	1170 9		6475 5
	3000	WEATHER SERVICES SUPPORT SYSTEMS	42 5	2080 0	1783 5	678 5		4542 0
TOTAL			188 6	9071 3	5177 6	1849 4		16098 3

4000	CLIMATE SERVICES & RESEARCH							
	4100	CLIMATE SERVICES	6 0	203 5	238 8	14 0		456 3
	4600	CLIMATE SERVICES SUPPORT SYSTEMS	1 0	53 9	11 5			65 4
TOTAL			7 0	257 4	250 3	14 0		521 7

5000	ICE SERVICES							
6000	AIR QUALITY SERVICES & RESEARCH							
	6100	AIR QUALITY SERVICES & RESEARCH	2 0	103 0	8 1	1 8		112 9
TOTAL			2 0	103 0	8 1	1 8		112 9

GRAND TOTAL			197 6	9431 7	5436 0	1865 2		16732 9

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
WESTERN REGION - WSD

SA1	SA2	PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800	MANAGEMENT & COMMON SUPPORT SERVICES						
1000	WEATHER SERVICES						
	1100 PUBLIC WEATHER SERVICES	80 0	4188 8	366 3			4555 1
	1200 MARINE WEATHER SERVICES	1 0	61 2				61 2
	1300 AVIATION WEATHER SERVICES	39 0	2033 8	171 1			2204 9
	2000 DATA ACQUISITION	76 0	3595 9	1702 3			5298 2
	3000 WEATHER SERVICES SUPPORT SYSTEMS	59 8	2901 7	1831 1	932 0		5664 8
	TOTAL	255 8	12781 4	4070 8	932 0		17784 2
4000	CLIMATE SERVICES & RESEARCH						
	4100 CLIMATE SERVICES	6 5	283 3	82 2			365 5
	4600 CLIMATE SERVICES SUPPORT SYSTEMS	2 0	96 8	24 5			121 3
	TOTAL	8 5	380 1	106 7			486 8
5000	ICE SERVICES						
6000	AIR QUALITY SERVICES & RESEARCH						
	6100 AIR QUALITY SERVICES & RESEARCH	2 0	109 4	8 2			117 6
	TOTAL	2 0	109 4	8 2			117 6
GRAND TOTAL		266 3	13270 9	4185 7	932 0		18388 6

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
CENTRAL REGION - WSD

SA1	SA2	PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800	MANAGEMENT & COMMON SUPPORT SERVICES						
1000	WEATHER SERVICES						
	1100 PUBLIC WEATHER SERVICES	68 1	3487 3	349 9	50 6		3887 8
	1300 AVIATION WEATHER SERVICES	11 0	548 4				548 4
	1400 ECONOMIC WEATHER SERVICES	3 0	144 8				144 8
	2000 DATA ACQUISITION	96 0	4762 7	4413 2	705 8		9881 7
	3000 WEATHER SERVICES SUPPORT SYSTEMS	55 0	2825 1	1482 6	155 6		4463 3
	TOTAL	233 1	11768 3	6245 7	912 0		18926 0
4000	CLIMATE SERVICES & RESEARCH						
	4100 CLIMATE SERVICES	9 0	384 8	109 0			493 8
	4600 CLIMATE SERVICES SUPPORT SYSTEMS	2 0	88 8	12 4			101 2
	TOTAL	11 0	473 6	121 4			595 0
5000	ICE SERVICES						
6000	AIR QUALITY SERVICES & RESEARCH						
	6100 AIR QUALITY SERVICES & RESEARCH	2 0	103 0	5 0			108 0
	TOTAL	2 0	103 0	5 0			108 0
GRAND TOTAL		246 1	12344 9	6372 1	912 0		19629 0

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 WESTERN REGION - WSD

SA1	SA2	PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800	MANAGEMENT & COMMON SUPPORT SERVICES						
1000	WEATHER SERVICES						
	1100 PUBLIC WEATHER SERVICES	80 0	4188 8	366 3			4555 1
	1200 MARINE WEATHER SERVICES	1 0	61 2				61 2
	1300 AVIATION WEATHER SERVICES	39 0	2033 8	171 1			2204 9
	2000 DATA ACQUISITION	76 0	3595 9	1702 3			5298 2
	3000 WEATHER SERVICES SUPPORT SYSTEMS	59 8	2901 7	1831 1	932 0		5664 8
	TOTAL	255 8	12781 4	4070 8	932 0		17784 2
4000	CLIMATE SERVICES & RESEARCH						
	4100 CLIMATE SERVICES	6 5	283 3	82 2			365 5
	4600 CLIMATE SERVICES SUPPORT SYSTEMS	2 0	96 8	24 5			121 3
	TOTAL	8 5	380 1	106 7			486 8
5000	ICE SERVICES						
6000	AIR QUALITY SERVICES & RESEARCH						
	6100 AIR QUALITY SERVICES & RESEARCH	2 0	109 4	8 2			117 6
	TOTAL	2 0	109 4	8 2			117 6
GRAND TOTAL		266 3	13270 9	4185 7	932 0		18388 6

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 CENTRAL REGION - WSD

SA1	SA2		PY	SALARY	O&M	CAPITAL	G&C	TOTAL
(\$000)								

0800	MANAGEMENT & COMMON SUPPORT SERVICES							
1000	WEATHER SERVICES							
	1100	PUBLIC WEATHER SERVICES	68 1	3487 3	349 9	50 6		3887 8
	1300	AVIATION WEATHER SERVICES	11 0	548 4				548 4
	1400	ECONOMIC WEATHER SERVICES	3 0	144 8				144 8
	2000	DATA ACQUISITION	96 0	4762 7	4413 2	705 8		9881 7
	3000	WEATHER SERVICES SUPPORT SYSTEMS	55 0	2825 1	1482 6	155 6		4463 3
		TOTAL	233 1	11768 3	6245 7	912 0		18926 0

4000	CLIMATE SERVICES & RESEARCH							
	4100	CLIMATE SERVICES	9 0	384 8	109 0			493 8
	4600	CLIMATE SERVICES SUPPORT SYSTEMS	2 0	88 8	12 4			101 2
		TOTAL	11 0	473 6	121 4			595 0

5000	ICE SERVICES							
6000	AIR QUALITY SERVICES & RESEARCH							
	6100	AIR QUALITY SERVICES & RESEARCH	2 0	103 0	5 0			108 0
		TOTAL	2 0	103 0	5 0			108 0

GRAND TOTAL			246 1	12344 9	6372 1	912 0		19629 0

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
ONTARIO REGION - WSD

SA1	SA2	PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800	MANAGEMENT & COMMON SUPPORT SERVICES						
1000	WEATHER SERVICES						
	1100 PUBLIC WEATHER SERVICES	74 0	3345 6	234 8	61 0		3641 4
	1200 MARINE WEATHER SERVICES	10 0	500 1	44 0			544 1
	1300 AVIATION WEATHER SERVICES	15 0	855 1	38 7			893 8
	1400 ECONOMIC WEATHER SERVICES	10 0	436 8	58 3			495 1
	2000 DATA ACQUISITION	32 0	1501 1	2505 8	285 7		4292 6
	3000 WEATHER SERVICES SUPPORT SYSTEMS	42 6	2375 7	813 7	155 8		3345 2
	TOTAL	183 6	9014 4	3695 3	502 5		13212 2
4000	CLIMATE SERVICES & RESEARCH						
	4100 CLIMATE SERVICES	10 0	445 2	95 3	5 0		545 5
	4600 CLIMATE SERVICES SUPPORT SYSTEMS	3 0	118 4	33 0	4 0		155 4
	TOTAL	13 0	563 6	128 3	9 0		700 9
5000	ICE SERVICES						
6000	AIR QUALITY SERVICES & RESEARCH						
	6100 AIR QUALITY SERVICES & RESEARCH	2 0	98 3	11 0	14 5		123 8
	6300 AIR QUALITY RESEARCH	1 0	40 0				40 0
	TOTAL	3 0	138 3	11 0	14 5		163 8
GRAND TOTAL		199 6	9716 3	3834 6	526 0		14076 9

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 QUEBEC REGION - WSD

SA1	SA2		PY	SALARY	O&M	CAPITAL	G&C	TOTAL
(\$000)								
0800	MANAGEMENT & COMMON SUPPORT SERVICES							
1000	WEATHER SERVICES							
	1100	PUBLIC WEATHER SERVICES	53 0	3014 6	270 1	105 5		3390 2
	1200	MARINE WEATHER SERVICES	1 0	58 1				58 1
	1300	AVIATION WEATHER SERVICES	30 5	1467 5	847 4			2314 9
	1400	ECONOMIC WEATHER SERVICES	4 7	219 6				219 6
	2000	DATA ACQUISITION	63 0	2926 1	2699 4	466 0		6091 5
	3000	WEATHER SERVICES SUPPORT SYSTEMS	49 8	2731 1	1478 0	314 1		4523 2
		TOTAL	202 0	10417 0	5294 9	885 6		16597 5
4000	CLIMATE SERVICES & RESEARCH							
	4100	CLIMATE SERVICES	4 4	218 2	489 3			707 5
		TOTAL	4 4	218 2	489 3			707 5
5000	ICE SERVICES							
6000	AIR QUALITY SERVICES & RESEARCH							
	6100	AIR QUALITY SERVICES & RESEARCH	1 4	78 4				78 4
	6300	AIR QUALITY RESEARCH	1 0	48 3				48 3
		TOTAL	2 4	126 7				126 7
GRAND TOTAL			208 8	10761 9	5784 2	885 6		17431 7

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 ATLANTIC REGION - WSD

SA1	SA2	PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800	MANAGEMENT & COMMON SUPPORT SERVICES						
1000	WEATHER SERVICES						
	1100 PUBLIC WEATHER SERVICES	104 7	5166 8	339 0	80 0		5585 8
	1200 MARINE WEATHER SERVICES	10 0	512 6	150 5			663 1
	1300 AVIATION WEATHER SERVICES	17 0	891 4	30 0			921 4
	1400 ECONOMIC WEATHER SERVICES	1 0	40 6				40 6
	2000 DATA ACQUISITION	32 0	1533 9	2518 6	724 3		4776 8
	3000 WEATHER SERVICES SUPPORT SYSTEMS	50 0	2565 8	1116 1	172 9		3854 8
	TOTAL	214 7	10711 1	4154 2	977 2		15842 5
4000	CLIMATE SERVICES & RESEARCH						
	4100 CLIMATE SERVICES	8 0	380 8	126 9			507 7
	4600 CLIMATE SERVICES SUPPORT SYSTEMS	4 0	169 6	6 2			175 8
	TOTAL	12 0	550 4	133 1			683 5
5000	ICE SERVICES						
6000	AIR QUALITY SERVICES & RESEARCH						
	6100 AIR QUALITY SERVICES & RESEARCH	2 0	100 0				100 0
	TOTAL	2 0	100 0				100 0
GRAND TOTAL		228 7	11361 5	4287 3	977 2		16626 0

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 CANADIAN FORCES WEATHER SERVICE

SA1	SA2		PI	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL

0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
	1500	CANADIAN FORCES WEATHER SERVICES	108 0	6263 8	545 0			6809,8

		TOTAL	108 0	6263 8	545 0			6808 8
4000		CLIMATE SERVICES & RESEARCH						
5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						

GRAND TOTAL			108 0	6263 8	545 0			6808 8

1990 - 91 Budget

WEATHER SERVICES DIRECTORATE

5 4 2

BY ORGANIZATIONAL UNIT

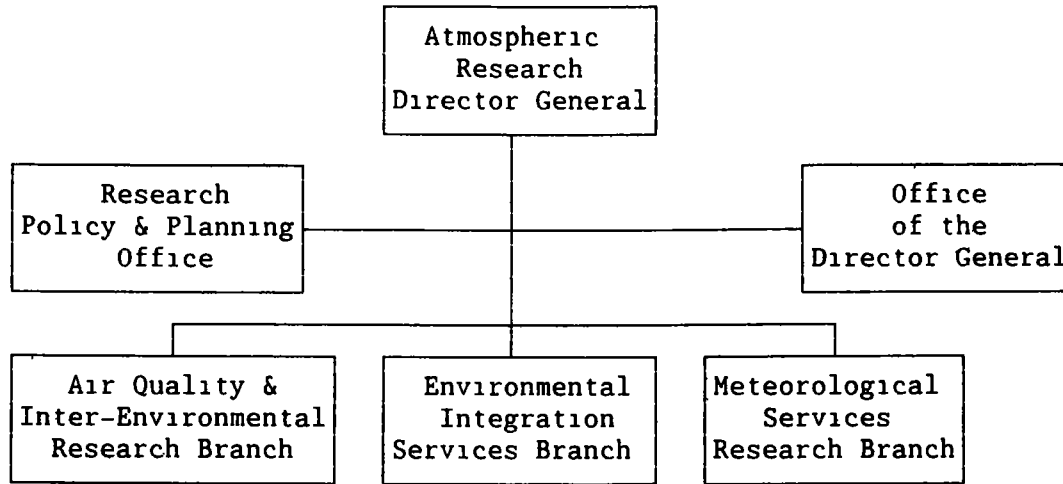
	PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
OFFICE OF THE DIRECTOR GENERAL-WSD	16 0	882 4	1735 3	390 0		3007 7
WEATHER SERVICES PROGRAM BRANCH	44 4	2065 6	405 4	5554 7		8025 7
CANADIAN METEOROLOGICAL CENTRE	93 5	4376 4	633 1	131 1		5140 6
ATLANTIC REGION	228 7	11361 5	4287 3	977 2		16626 0
QUEBEC REGION	208 8	10761 9	5784 2	885 6		17431 7
ONTARIO REGION	199 6	9716 3	3834 6	526 0		14076 9
CENTRAL REGION	246 1	12344 9	6372 1	912 0		19629 0
WESTERN REGION	266 3	13270 9	4185 7	932 0		18388 6
PACIFIC REGION	197 6	9431 7	5436 0	1865 2		16732 9

WSD TOTAL	1501 0	74211 6	32673 7	12173 8		119059 1
CANADIAN FORCES WEATHER SERVICE	108 0	6263 8	545 0			6808 8

CANADIAN FORCES WEATHER SERVICE	108 0	6263 8	545 0			6808 8

5 5

ATMOSPHERIC RESEARCH DIRECTORATE



5 5 1 FUNCTIONS ATMOSPHERIC RESEARCH DIRECTORATE (189 0 PY, \$22,539 5 K)

Offices of the Director General and Research Policy and Planning (6 0 PY, \$1,009 8 K)

These offices provide the following services

- executive and management direction for ARD,
- long-term direction to Service programs,
- ensures scientific representation of AES nationally and internationally,
- manages Post-Graduate Scholarships and Science Subventions for AES, and
- coordinates the management of the AES Scientific Research Group

Air Quality and Inter-Environmental Research Branch (98 5 PY, \$14,036 1 K)

This Branch analyzes and comprehends the atmospheric chemical and physical environment as it relates to environmental (air) quality. This is done by measuring (to ascertain the extent and quality), by studying processes (to understand the method of operation), through integration (combining parts into a whole) and through the provision of services. A major part of the above efforts is in support of the Long-Range Transport of Air Pollutants (LRTAP) program, and to monitor and study the stratospheric ozone layer. In the future, the Branch will shift its attention toward assessing the significance of the transport and deposition of toxic chemicals, and exploring the linkage between atmospheric composition and climate change.

Environmental Integration Services Branch (5 0 PY, \$421 0 K)

This Branch is responsible for the coordination of federal and provincial research projects on acid rain, ground-level ozone and associated LRTAP issues, and provides advice to policy-makers. It will be expanding its coordinating activity to other air quality problems and the socio-economic consequences of air pollution.

Meteorological Services Research Branch (79 5 PY, \$7,072 6 K)

This Branch carries out research and development in support of the prediction services of the AES for weather, sea-state, ice and other environmental elements.

The Aerospace Meteorology Division develops systems to receive and exploit data from satellites.

La Division de la Recherche en Prevision Numerique located in Dorval, Quebec develops numerical weather forecasting models in support of the forecasting operations at the Canadian Meteorological Centre.

Forecast Research Division develops statistical/dynamical models and procedures for forecasting various weather elements and environmental parameters such as sea-state, ice and ice-related variables. Also, the Division participates in the development and evaluation of automated systems to support the weather services function of the AES.

The Cloud Physics Division remains current in all aspects of cloud and precipitation physics, and weather radar (including precipitation enhancement or suppression, modification of hailstorms, etc). It is also involved in chemical analysis of fog samples and in analysis data from the Canadian Atlantic Storm Program (CASP) carried out in 1986, and will be involved in the 1989 Experiment on Rapid Intensification of Cyclones in the Atlantic (ERICA).

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 ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 ATMOSPHERIC RESEARCH DIRECTORATE - ARD

SA1	SA2		PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL

0800	MANAGEMENT & COMMON SUPPORT SERVICES							
1000	WEATHER SERVICES							
	3000	WEATHER SERVICES SUPPORT SYSTEMS	79 5	4306 3	1759 9	745 4	327 0	7138 6
TOTAL			79 5	4306 3	1759 9	745 4	327 0	7138 6

4000	CLIMATE SERVICES & RESEARCH							
	4100	CLIMATE SERVICES					9 0	9 0
	4500	CLIMATE RESEARCH AND DEVELOPMENT	10 2	534 8	315 0	710 0	316 5	1876 3
TOTAL			10 2	534 8	315 0	710 0	325 5	1885 3

5000	ICE SERVICES							
6000	AIR QUALITY SERVICES & RESEARCH							
	6100	AIR QUALITY SERVICE RESEARCH	8 0	426 1	709 9	852 5		1988 5
	6300	AIR QUALITY RESEARCH	81 3	4535 4	4057 4	1780 4	131 5	10504 7
	6700	AIR QUALITY & RESEARCH SUPPORT SERVICES	10 0	498 4	439 0	85 0		1022 4
TOTAL			99 3	5459 9	5206 3	2717 9	131 5	13515 6

GRAND TOTAL			189 0	10301 0	7281 2	4173 3	784 0	22539 5

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 OFFICE OF THE DIRECTOR GENERAL - ARD

SA1	SA2	PY	SALARY	O&M	CAPITAL (\$000)	G&C	TOTAL				

0800	MANAGEMENT & COMMON SUPPORT SERVICES										
1000	WEATHER SERVICES										
	3000	WEATHER SERVICES SUPPORT SYSTEMS					66 0	66 0			
	TOTAL						66 0	66 0			

4000	CLIMATE SERVICES & RESEARCH										
	4100	CLIMATE SERVICES					9 0	9 0			
	4500	CLIMATE RESEARCH AND DEVELOPMENT					214 5	214 5			
	TOTAL						223 5	223 5			

5000	ICE SERVICES										
6000	AIR QUALITY SERVICES & RESEARCH										
	6700	6 0	278 5	391 8	50 0		720 3				
	TOTAL						6 0	278 5	391 8	50 0	720 3

GRAND TOTAL		6 0	278 5	391 8	50 0	289 5	1009 8				

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
ENVIRONMENTAL INTEGRATION SERVICES BRANCH - ARD

SA1	SA2		PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL

0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
4000		CLIMATE SERVICES & RESEARCH						
5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						
	6300	AIR QUALITY RESEARCH	5 0	302 8	118 2			421 0

		TOTAL	5 0	302 8	118 2			421 0

GRAND TOTAL			5 0	302 8	118 2			421 0

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 AIR QUALITY & INTER-ENVIRONMENTAL RESEARCH BRANCH - ARD

SA1	SA2		PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
4000		CLIMATE SERVICES & RESEARCH						
	4500	CLIMATE RESEARCH AND DEVELOPMENT	10 2	534 8	315 0	710 0	102 0	1661 8
		TOTAL	10 2	534 8	315 0	710 0	102 0	1661 8
5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						
	6100	AIR QUALITY SERVICES & RESEARCH	8 0	426 1	709 9	852 5		1988 5
	6300	AIR QUALITY RESEARCH	76 3	4232 6	3939 2	1780 4	131 5	10083 7
	6700	AIR QUALITY & RESEARCH SUPPORT SERVICES	4 0	219 9	47 2	35 0		302 1
		TOTAL	88 3	4878 6	4696 3	2667 9	131 5	12374 3
GRAND TOTAL			98 5	5413 4	5011 3	3377 9	233 5	14036 1

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
METEOROLOGICAL SERVICES RESEARCH BRANCH - ARD

SA1	SA2		PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
	3000	WEATHER SERVICES SUPPORT SYSTEMS	79 5	4306 3	1759 9	745 4	261 0	7072 6
		TOTAL	79 5	4306 3	1759 9	745 4	261 0	7072 6
4000		CLIMATE SERVICES & RESEARCH						
5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						
GRAND TOTAL			79 5	4306 3	1759 9	745 4	261 0	7072 6

1990 - 91 Budget

ATMOSPHERIC RESEARCH DIRECTORATE

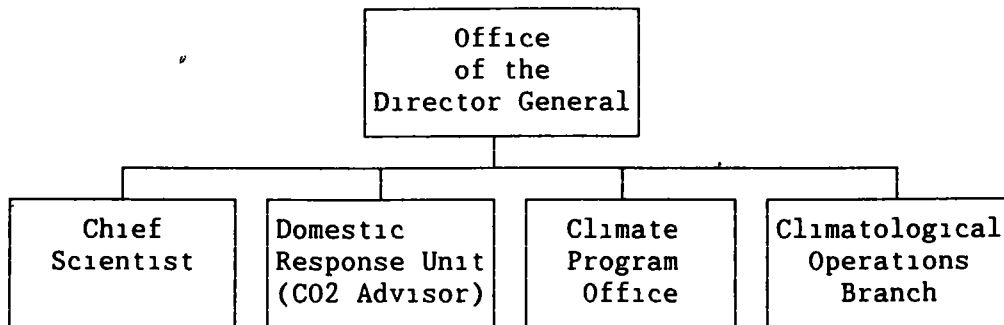
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BY ORGANIZATIONAL UNIT

	PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
OFFICE OF THE DIRECTOR GENERAL-ARD	6 0	278 5	391 8	50 0	289 5	1009 8
ENVIRONMENTAL INTEGRATION SERV BRANCH	5 0	302 8	118 2			421 0
AIR QUALITY & INTER-ENVIRONMENTAL RESEARCH	98 5	5413 4	5011 3	3377 9	233 5	14036 1
METEOROLOGICAL SERVICES RESEARCH BRANCH	79 5	4306 3	1759 9	745 4	261 0	7072 6
ARD TOTAL	189 0	10301 0	7281 2	4173 3	784 0	22539 5

5 6

CANADIAN CLIMATE CENTRE



5 6 1 FUNCTIONS THE CANADIAN CLIMATE CENTRE (130 0 PY, \$11,572 0 K)

The Canadian Climate Centre was organized in 1978 to provide a focus for climate activity in Canada. The Centre consists of a Climatological Applications Branch with five Divisions, a Research Component with a Chief Scientist and two Divisions, the Canadian Climate Program Office, and the CO₂ Advisor.

Office of the Director General, Climate Program Office and Domestic Response Unit (11 0 PY, \$1,682 8 K)

- provides the executive scientific direction and management of the Canadian Climate Centre

The Climate Program Office acts as a focal point to

- provide secretariat support for the Climate Planning Board of Canada and other committees associated with the Canadian Climate Program,
- promote the achievement of Climate Program objectives
- manages the impacts program and publishes the Climate Change Digest

The Domestic Response Unit

- provides up-to-date information and advice concerning CO₂ issues to EMR, DOE and the Climate Planning Board
- assists development of domestic and international strategies to respond to climate change

Climatological Operations Branch (119 0 PY, \$9,889 2 K)

This Branch consists of a Director's Office and seven Divisions

1) The Data Management Division

- collects and quality controls all surface, upper air and supplemental data entering the national archives,
- manages archives to serve the needs for climate data in applications and research, and
- assists the Climatological Services Division in the provision of services

- 2) The Climatological Services Division
 - assists regional offices in handling inquiries,
 - processes inquiries that are national in scope,
 - prepares climate data and information (such as maps, atlases, guides, manuals, bibliographies, data summaries and climate studies) describing the availability of climate data,
 - provides information in digital form, on microfilm and in printed copy,
 - assembles the information in national, current, historical and statistical series publications for the CCC, and
 - conducts data homogeneity tests and does parameter trend analyses
- 3) The Hydrometeorological and Marine Division
 - acts as a national centre of expertise on hydrometeorology and marine climatology, providing information and advice for policy development, engineering design, environmental protection and other activities where meteorological information related to water resources and the offshore environment is needed, and
 - conducts a program of applied research in support of this role
- 4) The Hydrometeorological Research Division (Saskatoon)
 - undertakes research to produce a better understanding of physical processes within the hydrological cycle,
 - carries out research into the use of remote sensing inputs in hydrological modelling,
 - conducts investigations into climatic variability and change and their relationships to, and impacts on water resources with emphasis on Prairie drought, and
 - carries out studies on quantitative precipitation monitoring and forecasting utilizing radar data
- 5) The Analysis and Impact Division
 - has extensive applications expertise dealing with agriculture and forestry meteorology, arctic meteorology, energy, industrial applications, and the overall implications of climate variability and change upon Canada

Research Component

The research component of the Branch consists of two divisions working under the functional direction of the Chief Scientist

- 1) The Numerical Modelling Division
 - undertakes research to gain improved knowledge of climate as a physical system and to simulate climate through numerical modelling
- 2) The Monitoring and Prediction Division
 - develops improved systems for monitoring the current climate situation across Canada for weekly publication, and
 - analyses and assesses statistical and other methods of climate prediction

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 CANADIAN CLIMATE CENTRE - CCC

SA1	SA2		PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL

0500		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
4000		CLIMATE SERVICES & RESEARCH						
	4100	CLIMATE SERVICES	74 0	3337 9	920 3	1014 9		5273 1
	4500	CLIMATE RESEARCH AND DEVELOPMENT	42 0	2394 9	778 6	735 0		3908 5
	4600	CLIMATE SERVICES SUPPORT SYSTEMS	12 5	678 5	291 3	401 0		1370 8
	4700	CANADIAN CLIMATE PROGRAM	1 5	78 8	940 8			1019 6
		TOTAL	130 0	6490 1	2931 0	2150 9		11572 0

5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						

GRAND TOTAL			130 0	6490 1	2931 0	2150 9		11572 0

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
OFFICE OF THE DIRECTOR GENERAL - CCC

SA1	SA2		PI	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800	MANAGEMENT & COMMON SUPPORT SERVICES							
1000	WEATHER SERVICES							
4000	CLIMATE SERVICES & RESEARCH							
	4100 CLIMATE SERVICES		7 0	431 5	51 6	25 9		509 0
	4500 CLIMATE RESEARCH AND DEVELOPMENT		16 0	947 1	105 2	286 0		1338 3
	4600 CLIMATE SERVICES SUPPORT SYSTEMS		9 5	493 6	159 6	10 0		663 2
	4700 CANADIAN CLIMATE PROGRAM		1 5	78 8	940 8			1019 6
		TOTAL	34 0	1951 0	1257 2	321 9		3530 1
5000	ICE SERVICES							
6000	AIR QUALITY SERVICES & RESEARCH							
GRAND TOTAL			34 0	1951 0	1257 2	321 9		3530 1

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 CLIMATOLOGICAL APPLICATIONS BRANCH - CCC

SA1	SA2		PY	SALARY	O&M	CAPITAL	G&C	TOTAL
(\$000)								

0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
4000		CLIMATE SERVICES & RESEARCH						
	4100	CLIMATE SERVICES	67 0	2906 4	868 7	989 0		4764 1
	4500	CLIMATE RESEARCH AND DEVELOPMENT	26 0	1447 8	673 4	449 0		2570 2
	4600	CLIMATE SERVICES SUPPORT SYSTEMS	3 0	184 9	131 7	391 0		707 6
TOTAL			96 0	4539 1	1673 8	1829 0		8041 9

5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						

GRAND TOTAL			96 0	4539 1	1673 8	1829 0		8041 9

1990 - 91 Budget

CANADIAN CLIMATE CENTRE

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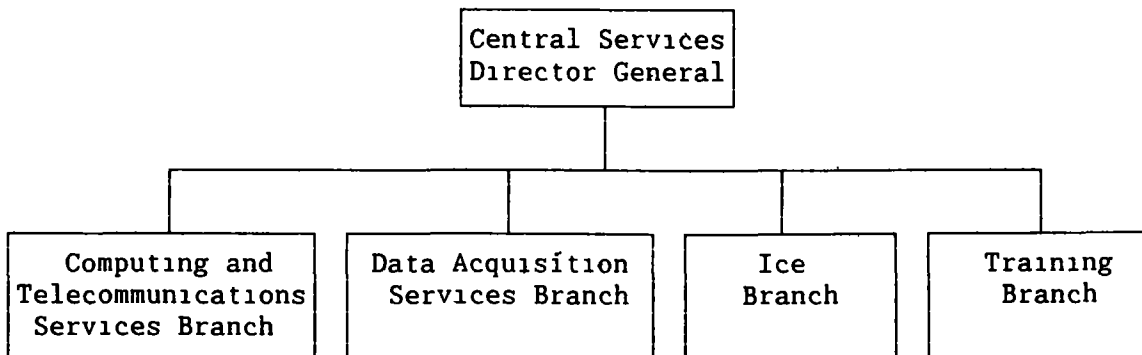
BY ORGANIZATIONAL UNIT

	PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
	-----	-----	-----	-----	-----	-----
OFFICE OF THE DIRECTOR GENERAL-CCC	34 0	1951 0	1257 2	321 9		3530 1
CLIMATOLOGICAL OPERATIONS BRANCH	96 0	4539 1	1673 8	1829 0		8041 9

CCC TOTAL	130 0	6490 1	2931 0	2150 9		11572 0

5 7

CENTRAL SERVICES DIRECTORATE



5 7 1 FUNCTIONS CENTRAL SERVICES DIRECTORATE (322 0 PY, \$61,396 6 K)

This Directorate is responsible for information and advisory services on sea ice distribution, computing and telecommunications services, technical and professional training, and the centralized design, implementation and sustenance of data acquisition systems. The Directorate has four Branches, each of which is responsible for one of the services listed above. The Director General is the Chairman of the AES Program Advisory Committee on Computers and Communications.

Computing and Telecommunications Services Branch
(104 5 PY, \$21,798 0 K)

- plans, designs and operates AES' national EDP and the telecommunications facilities, and
- ensures that AES has the EDP, information-processing, telecommunication services and facilities to meet current and future requirements

Within this Branch, there are three Divisions

1) The Centre d'Informatique de Dorval

- co-located with the Canadian Meteorological Centre in Dorval operates the national computation facilities for all AES programs,
- operates CRAY X-MP 4/16 computer system, along with extensive support computers and peripherals, and
- provides centralized computing services to AES and other government departments and selected academic users

- 2) Operational Systems Division
 - manages, operates and maintains AES national telecommunications systems,
 - operates a Hitachi Data System XL-60 computer system to provide computing and user services primarily to support the Canadian Climate Centre and other users at AES Downsview, and
 - operates the central satellite receiving station
- 3) Planning & Development Division
 - develops plans, manages development projects and co-ordinates activities to ensure that AES' needs for EDP and telecommunications services are satisfied

Data Acquisition Services Branch (77 0 PY, 9,887.7 K)

- responsible for the planning, design, specification and standards, procurement, implementation and operational support of measurement systems for meteorological and related environmental conditions in support of all AES services

There are four Divisions and one Section reporting to the Director, all located in Downsview

- 1) Technology Division
 - develops and evaluates prototype meteorological sensors and systems for AES operational networks and research programs,
 - develops specifications and standards to meet observing systems requirements,
 - investigates new technologies applicable to the AES data acquisition systems, and
 - tests and evaluates new meteorological instrumentation systems
- 2) Implementation Division
 - plans and manages projects for implementation of new and replacement data acquisition systems, and
 - supports new and/or replacement procurements (including for Stores inventory)
- 3) Operational Data Acquisition Systems Division
 - develops and promulgates national standards and documentation for installation and maintenance for the Service's Data Acquisition Services equipment,
 - arranges for the national maintenance program for data acquisition systems,
 - coordinates "life cycle" management activities for data acquisition systems,
 - provides specialized support such as emergency maintenance services, and
 - provides technical training for field personnel of AES and co-operating agencies

- 4) Quality Assurance Division
 - provides quality assurance services for procurement of instruments, systems and related services
- 5) Data Acquisition Systems Planning Section
 - Coordinates the design, development, preparation, and revision of the AES Meteorological Data Acquisition Plan,
 - plans and organizes the preparation of strategic alternatives for meeting objectives in the meteorological data acquisition plan, and
 - prepares and provides consultation on policy documents related to meteorological data acquisition systems

Ice Branch (67 5 PY, \$24,935 9 K)

- responsible for the provision of sea ice information for all Canadian territorial and adjacent ocean areas,
- provides a daily and seasonal ice forecasts to shipping interests in ice waters,
- prepares ice climatology reports,
- supplies climatological ice information to users upon request,
- maintains an ice data archive, and
- conducts research into new and improved techniques for ice data collection and analysis

There are six Divisions in the Branch. Three of the Divisions (Ice Forecasting, Ice Program Planning and Development and Ice Climatology & Applications) are located in Ottawa and are commonly referred to as Ice Centre Environment Canada (ICEC). The Director's Office and the Ice Reconnaissance Division are located in Downsview.

- 1) Ice Forecast Division
 - provides analyses and forecasts of ice distribution, type, movement and development, and
 - provides daily and seasonal ice forecasts to various users, including the Canadian Coast Guard icebreaker fleet, the Canadian Oil and Gas Lands Administration (COGLA), marine transportation interests, fishermen, offshore resource development interests
- 2) Ice Climatology & Applications Division
 - develops and maintains the ice data archive,
 - supplies climatological ice information and prepares reports, and
 - provides advice on ice climatology application to varied users such as marine engineers and designers, naval architects, scientists in varied fields as geophysics, environment, fisheries

3) Ice Program Planning and Development Division

- manages sub-projects to implement the Expanded Ice Information Services Project (EIISP), and
- provides engineering expertise for the design, specification, acquisition and implementation of ice data acquisition systems

4) Ice Reconnaissance Division

- provides observations of the distribution and type of sea ice from aerial ice reconnaissance, ship reports, shore reports and satellites

5) Ice Research & Development Division

This Division functions within the Institute for Space and Terrestrial Science at York University in Downsview

- develops models, methods and procedures for making optimum use of remote sensing in the ice programs, and
- participates in international projects for improving research & development activities respecting sea ice with the main emphasis on remote sensing

Training Branch (69 0 PY, \$4,240.2 K)

- recruits and trains professional meteorologists and meteorological technicians to meet AES human resource needs, and
- establishes and maintains contact with Canadian universities and other educational institutions to encourage the training of atmospheric scientists and the development of studies in the atmospheric sciences

There are three Divisions in the Branch

1) Professional Training and Development Division

- conducts professional training courses at Downsview (English) and in Montreal (French) for newly recruited meteorologists to qualify them for positions in operational weather offices,
- develops and conducts advanced and specialized training courses, including correspondence courses, in applied and operational meteorology, and
- sponsors workshops and seminars relating to environmental issues such as environmental emergencies, air quality, acid rain, etc

2) Technical Training and Development Division

- conducts technical training courses for technical personnel in both official languages at the Transport Canada Training Institute, Cornwall Courses presented include the following Basic, Advanced, Presentation and Aerological Technician courses, and Radar, Ice, Weatheradio and Maintenance courses, and
- provides meteorological courses for Transport Canada and selected DND technical personnel

3) Training Co-ordination, Evaluation and Services

- recruits new meteorologists,
- liaises with universities and colleges concerning meteorological training,
- counsels student applicants,
- processes educational enquiries and evaluates educational and training requirements,
- provides French and English Technical Editing/Publishing services,
- prepares graphic art, and
- provides audio visual and computer services to Training Branch and AES clients

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 CENTRAL SERVICES DIRECTORATE - CSD

SA1	SA2		PY	SALARY	O&M	CAPITAL	G&C	TOTAL	
						(\$000)			
0800	MANAGEMENT & COMMON SUPPORT SERVICES								
1000	WEATHER SERVICES								
	2000	DATA ACQUISITION	73 0	3448 7	625 9	5601 2		9675 8	
	3000	WEATHER SERVICES SUPPORT SYSTEMS	145 0	7306 7	15041 8	246 9	100 0	22695 4	
TOTAL			218 0	10755 4	15667 7	5848 1	100 0	32371 2	
4000	CLIMATE SERVICES & RESEARCH								
	4100	CLIMATE SERVICES	3 0	148 7	15 0			163 7	
	4600	CLIMATE SERVICES SUPPORT SYSTEMS	32 5	1722 2	2128 4	27 0		3877 6	
TOTAL			35 5	1870 9	2143 4	27 0		4041 3	
5000	ICE SERVICES								
	5100	ICE RECONNAISSANCE AND DATA ACQUISITION	25 0	1533 3	12442 4	3576 9		17552 6	
	5200	ICE ANALYSIS AND FORECASTING	31 5	1695 8	3616 0	194 0		5505 8	
	5300	ICE CLIMATE SERVICES	3 5	245 8	184 0	45 0		474 8	
	5400	ICE SERVICES SUPPORT SYSTEM	4 0	170 0	94 5	5 0		269 5	
	5500	ICE SERV RESEARCH AND DEVELOPMENT	4 5	285 4	389 0	507 0		1181 4	
TOTAL			68 5	3930 3	16725 9	4327 9		24984 1	
6000	AIR QUALITY SERVICES & RESEARCH								
GRAND TOTAL			322 0	16556 6	34537 0	10203 0	100 0	61396 6	

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
OFFICE OF THE DIRECTOR GENERAL - CSD

SA1	SA2		PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
	3000	WEATHER SERVICES SUPPORT SYSTEMS	4 0	198 3	324 6	11 9		534 8
		TOTAL	4 0	198 3	324 6	11 9		534 8
4000		CLIMATE SERVICES & RESEARCH						
5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						
GRAND TOTAL			4 0	198 3	324 6	11 9		534 8

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 COMPUTING AND TELECOMMUNICATIONS SYSTEMS BRANCH - CSD

SA1	SA2		PI	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
	3000	WEATHER SERVICES SUPPORT SYSTEMS	72 0	3563 8	14264 5	92 1		17920 4
		TOTAL	72 0	3563 8	14264 5	92 1		17920 4
4000		CLIMATE SERVICES & RESEARCH						
	4600	CLIMATE SERVICES SUPPORT SYSTEMS	32 5	1722 2	2128 4	27 0		3877 6
		TOTAL	32 5	1722 2	2128 4	27 0		3877 6
5000		ICE SERVICES						
6000		AIR QUALITY SERVICES & RESEARCH						
		GRAND TOTAL	104 5	5286 0	16392 9	119 1		21798 0

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 DATA ACQUISITION SERVICES BRANCH - CSD

SA1	SA2		PI	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
	2000	DATA ACQUISITION	73 0	3448 7	625 9	5601 2		9675 8
		TOTAL	73 0	3448 7	625 9	5601 2		9675 8
4000		CLIMATE SERVICES & RESEARCH						
	4100	CLIMATE SERVICES	3 0	148 7	15 0			163 7
		TOTAL	3 0	148 7	15 0			163 7
5000		ICE SERVICES						
	5100	ICE RECONNAISSANCE AND DATA ACQUISITION	1 0	48 2				48 2
		TOTAL	1 0	48 2				48 2
6000		AIR QUALITY SERVICES & RESEARCH						
GRAND TOTAL			77 0	3645 6	640 9	5601 2		9887 7

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
ICE SERVICES BRANCH - CSD

SA1	SA2		PY	SALARY	O&M	(CAPITAL	G&C	TOTAL
0800		MANAGEMENT & COMMON SUPPORT SERVICES						
1000		WEATHER SERVICES						
4000		CLIMATE SERVICES & RESEARCH						
5000		ICE SERVICES						
	5100	ICE RECONNAISSANCE AND DATA ACQUISITION	24 0	1485 1	12442 4	3576 9		17504 4
	5200	ICE ANALYSIS AND FORECASTING	31 5	1695 8	3616 0	194 0		5505 8
	5300	ICE CLIMATE SERVICES	3 5	245 8	184 0	45 0		474 8
	5400	ICE SERVICES SUPPORT SYSTEM	4 0	170 0	94 5	5 0		269 5
	5500	ICE SERV RESEARCH AND DEVELOPMENT	4 5	285 4	389 0	507 0		1181 4
		TOTAL	67 5	3882 1	16725 9	4327 9		24935 9
6000		AIR QUALITY SERVICES & RESEARCH						
GRAND TOTAL			67 5	3882 1	16725 9	4327 9		24935 9

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
TRAINING BRANCH - CSD

SA1	SA2		PI	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL

0800	MANAGEMENT & COMMON SUPPORT SERVICES							
1000	WEATHER SERVICES							
	3000	WEATHER SERVICES SUPPORT SYSTEMS	69 0	3544 6	452 7	142 9	100 0	4240 2

TOTAL			69 0	3544 6	452 7	142 9	100 0	4240 2
4000	CLIMATE SERVICES & RESEARCH							
5000	ICE SERVICES							
6000	AIR QUALITY SERVICES & RESEARCH							

GRAND TOTAL			69 0	3544 6	452 7	142 9	100 0	4240 2

1990 - 91 Budget

CENTRAL SERVICES DIRECTORATE

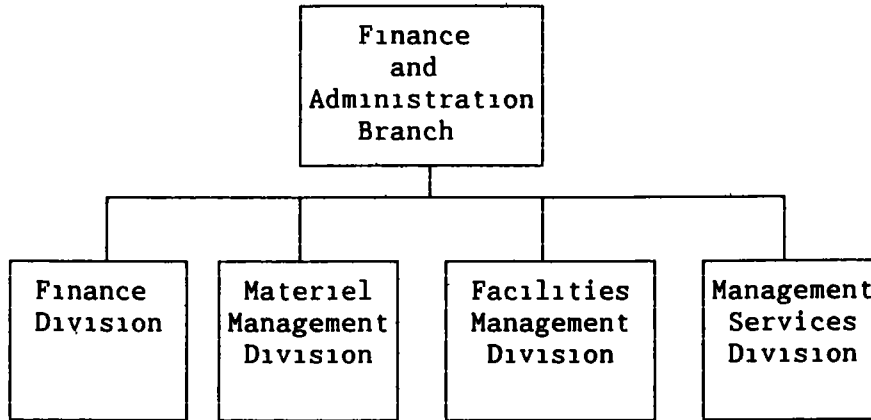
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BY ORGANIZATIONAL UNIT

	Py	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
OFFICE OF DIRECTOR GENERAL-CSD	4 0	198 3	324 6	11 9		534 8
TRAINING BRANCH	69 0	3544 6	452 7	142 9	100 0	4240 2
COMPUTING & TELECOMMUNICATIONS SYSTEMS	104 5	5286 0	16392 9	119 1		21798 0
ICE SERVICES BRANCH	67 5	3882 1	16725 9	4327 9		24935 9
DATA ACQUISITION SERVICES BRANCH	77 0	3645 6	640 9	5601 2		9887 7
CSD TOTAL	322 0	16556 6	34537 0	10203 0	100 0	61396 6

5 8

FINANCE AND ADMINISTRATION BRANCH



5 8 1 FUNCTIONS FINANCE AND ADMINISTRATION BRANCH (105 0 PY, \$12,285 2 K)

This Branch provides functional direction, advice and services to AES headquarters elements, Regions, and those organizations whose central elements interface with AES headquarters. The Branch provides the focal point for the implementation of concepts inherent in Comptrollership. There are four Divisions.

1) Finance Division.

- develops AES financial policies, procedures and systems,
- develops and modifies AES Work Planning policy, procedures and processes,
- ensures, with the Policy, Planning and Assessment Directorate, that both Financial and Planning systems incorporate adequate linkage between resource plans and program objectives, goals and outputs,
- provides guidance and advice on financial matters to senior management,
- co-ordinates and reports on the preparation of Treasury Board submissions,
- processes and pays all invoices and provides accounting services to AES/headquarters,
- prepares and submits Treasury Board Multi-Year Operational Plan and Main Estimates financial data and provides a functional lead for MYOP-Update and Estimates,
- prepares work plan allocations and budget data and recommends changes to ADM,
- analyses and outlines the financial status of AES and recommends, to ADMA and AMC, corrective actions required, and
- ensures accounting and financial information systems function effectively.

2) Materiel Management Division

- develops related Service policies, procedures and systems,
- provides procedural recommendations and advice on supply matters,
- provides a functional lead for the Materiel-In-Use system, Stores Inventory Management system, Fleet Management, Disposal, Procurement and Contracting,
- requisitions, stores and distributes special meteorological instruments, equipment and supplies, and
- co-ordinates the annual Eastern Arctic Resupply for Environment Canada

3) Facilities Management Division

- develops AES policies and procedures and provides support services in accommodations, real property, security, parking, accessibility and telecommunication matters,
- provides functional guidance to regional offices on all facilities-related matters,
- serves as Program Area Co-ordinator for Facilities, Non-Meteorological Furniture and Equipment, and Vehicles,
- co-ordinates Major Construction projects at the service level, and
- provides lead role for security for the service in the area of information, personnel, EDP and physical security

4) Management Services Division

- Provides policy, procedural and system recommendations and advice on general administration matters,
- Develops policies, and provides procedural recommendations and advice, on information retrieval systems and library matters,
- Acquires and makes available for reference and loan a collection of books, journals and other resource material,
- provides support services to AES in records management, mail, publications, cartography, health and safety, distribution,
- Co-ordinates the planning, implementation (as appropriate) and monitoring activities for the Incentive Awards Program, and
- Administers the Access to Information and Privacy Program

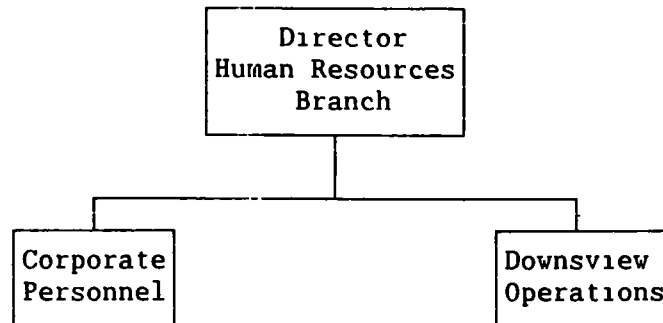
In addition, the Branch (through the AES Management Information Co-ordinating Committee) co-ordinates the identification of management information requirements and the development of Management Information Systems, and the linkages between them

ATMOSPHERIC ENVIRONMENT SERVICE
 1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
 FINANCE AND ADMINISTRATION BRANCH - AABD

SA1	SA2	PY	SALARY	O&M	CAPITAL	G&C	TOTAL
(\$000)							
0800	MANAGEMENT & COMMON SUPPORT SERVICES						
	0810 MANAGEMENT	5 0	256 0	65 0	10 0		331 0
	0830 COMMON SUPPORT SERVICES	63 0	2306 9	2825 2	1510 0		6642 1
	TOTAL	68 0	2562 9	2890 2	1520 0		6973 1
1000	WEATHER SERVICES						
	3000 WEATHER SERVICES SUPPORT SYSTEMS	37 0	1525 9	2131 2		1195 0	4852 1
	TOTAL	37 0	1525 9	2131 2		1195 0	4852 1
4000	CLIMATE SERVICES & RESEARCH						
	4600 CLIMATE SERVICES SUPPORT SYSTEMS			100 0			100 0
	TOTAL			100 0			100 0
5000	ICE SERVICES						
	5400 ICE SERVICES SUPPORT SYSTEM			150 0			150 0
	TOTAL			150 0			150 0
6000	AIR QUALITY SERVICES & RESEARCH						
	6100 AIR QUALITY SERVICES & RESEARCH			210 0			210 0
	TOTAL			210 0			210 0
GRAND TOTAL		105 0	4088 8	5481 4	1520 0	1195 0	12285 2

5 9

HUMAN RESOURCES BRANCH



5 9 1 Human Resources Branch (35 0 PY, \$2,234 9 K)

This Branch provides Human Resources services to the AES Headquarters components, Regions and the Canadian Forces Weather Service (CFWS), and participates in the Personnel Management planning activity of AES. It consists of two components, Corporate Personnel and Downsview Operations. Corporate Personnel consists of five components which are responsible for providing support to management on the implementation of the AES strategic plan, co-ordinating national programs and activities, and providing specialist advice to the operational components. Downsview Operations provides service to AES Headquarters units. The Regional Personnel Offices report directly to the Regional Director General, functional direction is provided by the Branch.

Corporate Personnel

1) Human Resources Division

- provides advice and guidance in application of policies concerning staffing, recruitment, human resources planning, employment equity, and training and development,
- co-ordinates and administers all senior management/executive staffing, redeployment and development,
- develops the Service human resource planning framework, specifically of initiatives to support implementation of the Strategic Plan and the Green plan,
- provides advice and guidance on workforce adjustment and attendant issues and priorities,
- co-ordinates the management of the meteorologist population, including recruitment of meteorologists on a national basis,
- establishes Service recruitment policies and formal career progression plans for meteorological technicians and meteorologists,
- plans, implements and evaluates Service management training and development and education leave programs,
- develops action plans to attain the objectives of the Employment Equity Plan,

- monitors and reports on the progress of the Service towards meeting the objectives of the Employment Equity Plan, and
- manages the Employee Assistance Program and the Personal Harassment Policy for the Service

2) Staff Relations and Compensation Division

- manages the Service compensation program,
- co-ordinates Service input to collective bargaining and serves as a member of the MT and EG negotiating teams,
- investigates and co-ordinates replies to final level grievances and referrals to adjudication,
- provides advice and guidance and ensures conformity in interpretations of collective agreements,
- acts as the AES focal point on conflict of interest questions,
- participates in and provides functional advice at Service-level UMCCs, Safety and Health Committee meetings and co-ordinates personnel-related issues,
- provides guidance in the application of policies and on the administration of discipline,
- administers the designation and exclusion process,
- when appropriate, co-ordinates the service strike contingency planning activities, provides advice to RPMs and senior managers, and acts as two-way communication link between TB, DOE and Service, and
- develops performance standards and indicators and monitors their effectiveness

3) Classification Division

- co-ordinates activities related to AES classification policy, guidelines and systems development,
- co-ordinates activities related to classification of positions including advice and guidance, monitoring of the quality of decisions, control of standards application and relativity,
- reviews the validity of classification standards, with particular emphasis on the prime user standards, such as MT and EG, and manages the implementation of conversions,
- co-ordinates the audit program, grievance administration and classification training,
- recommends the Service framework for delegation of classification authorities, and
- ensures the consistent application of the delegation of classification authority

4) Official Languages Division

- administers the Official Languages Program by providing advice and guidance to line managers,
- develops action plans to attain the objectives of the Official Languages Program,
- monitors and reports on the progress of the Service towards meeting the objectives of the Official Languages Plan,
- investigates complaints,

- supervises revision and editing services,
 - co-ordinates translation services,
 - co-ordinates and administers language tests and schedules language training, and
 - administers the monitor program
- 5) Human Resource Management Information System
- identifies AES' requirements for human resource information and develops plans to meet them,
 - develops and implements human resource reports,
 - designs and implements custom-tailored modules and programs for AES,
 - co-ordinates the implementation of on-line pay, office automation and HRMIS modules in all offices, and
 - provides technical support and training

Downsview Operations

- provides day-to-day personnel services, including classification, staffing, staff relations and pay and benefits, to employees at AES Headquarters

ATMOSPHERIC ENVIRONMENT SERVICE
1990-91 BUDGET BY SUB-ACTIVITY (SA-1) AND SUB-SUB-ACTIVITY (SA-2)
HUMAN RESOURCES BRANCH - AHRD

SA1	SA2		PY	SALARY	O&M	(\$000) CAPITAL	G&C	TOTAL
0800	MANAGEMENT & COMMON SUPPORT SERVICES							
	0830 COMMON SUPPORT SERVICES		35 0	1884 2	317 7	33 0		2234 9
		TOTAL	35 0	1884 2	317 7	33 0		2234 9
1000	WEATHER SERVICES							
4000	CLIMATE SERVICES & RESEARCH							
5000	ICE SERVICES							
6000	AIR QUALITY SERVICES & RESEARCH							
GRAND TOTAL			35 0	1884 2	317 7	33 0		2234 9