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# **Climatological, Meteorological and Air Quality Products Summary**

Prepared by  
Ministry of Environment Lands and Parks  
Air Resources Branch  
for the Atmosphere and Air Quality Ecosystem Task Force  
Resources Information Standards Committee

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The Resources Information Standards Committee evolved from the Resources Inventory Committee which received funding from the Canada-British Columbia Partnership Agreement of Forest Resource Development (FRDA II), the Corporate Resource Inventory Initiative (CRII) and by Forest Renewal BC (FRBC), and addressed concerns of the 1991 Forest Resources Commission.

For further information about the Resources Information Standards Committee, please access the RISC website at:  
<http://ilmbwww.gov.bc.ca/risc/index.htm>.

# Climatological, Meteorological and Air Quality Products Summary

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# 1. Introduction

In response to commission reports and public concerns, the Resource Inventory Committee (RIC) was established in 1991 to determine the natural resource inventory requirements for British Columbia and to develop standards and methodologies necessary to compile and use these inventories.

A Task Force, established in 1992 to review climatological and meteorological networks in BC, subsequently renamed the Atmospheric Resources Task Force (ARTF), undertook to deliver a comprehensive attribute level inventory of long term climatological and meteorological databases and interpretative products in the province. The terms of reference of the ARTF were expanded to include air quality and the task force undertook the same task for air quality. Pacific Meteorology Inc. of Richmond, BC contracted with the BC Ministry of Forests to compile the inventories.

The meteorological and climatological networks inventories include:

1. Narrative descriptions of 31 federal, provincial and regional government and crown agency meteorological observing networks in the province;
2. Databases of climatological and meteorological observing station locations giving details of location, instrumentation, methods of archiving, etc.; and
3. A bibliography of literature related to the meteorology and climatology of British Columbia.

Included in the 31 meteorological networks are the general purpose meteorological networks, e.g. the AES networks, and the special purpose networks including hydrometeorological, fire weather, highways and air quality networks. Since these networks serve different purposes, they all have varying attributes.

Brief descriptions of the 31 networks are found below.

The air quality monitoring networks' inventories, similar to the climatological inventories, include:

1. Narrative descriptions of six federal, provincial and regional government air quality networks in the province;
2. Databases of air quality monitoring station locations giving details of location, instrumentation, methods of archiving, etc.;
3. Narrative descriptions of emissions inventories for the province; and
4. A bibliography of literature related to the air quality of British Columbia.

These products are available from the same source as the meteorological and climatological products.

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## 2. Information Available For Each Class Of Network

### Meteorological And Climatological Networks

The *narrative description* of each network includes: brief descriptions of the operating agency and its programs or mandates; a brief description of the network (history, purposes, etc.); agency contacts; data storage formats and data accessibility and a listing of any routine analyses carried out or published. Information on up to thirteen of the main meteorological elements monitored in the network is provided. This includes instrument types and, where applicable, observation and sampling frequencies, averaging periods and measurement resolution. The sampling software used (if any), the operating period (e.g. continuous, winter, summer, etc.), the quality assurance program and the siting and instrument standards adhered to are discussed briefly.

An example of a network description may be found in Appendix I.

All *station databases* contain details of the station locations (latitude and longitude as well as UTM coordinates) and elevations. The locations for most stations are given to the nearest 1/10TH of a minute of latitude or longitude. The precision of the location is given in a field (NDEC) indicating the number of decimal places (0 or 1) of accuracy (e.g. if the station is only accurate to the nearest minute it will have a 0 in the NDEC field, if it is accurate to 1/10th of a minute, it will have a 1 in the NDEC field). The networks vary considerably in their make-up; some have the same instrumentation throughout, others vary from station to station and one must refer to these databases to determine the station characteristics. Many (but not all) of the databases include details of the instrumentation (e.g. instrument type, recorder type, observation frequency, etc.) and a site description of each station.

### Air Quality Monitoring Networks

The narrative description of each network includes brief descriptions of the operating agency and its programs or mandates; a brief description of the network (history, purposes, etc.); agency contacts; data storage formats and data accessibility and a listing of any routine analyses carried out or published. Information on the air pollutants or air toxins (SO<sub>2</sub>, TRS, NO<sub>2</sub>, NO, CO, O<sub>3</sub>, stratospheric O<sub>3</sub>, THC, COH, PM<sub>10</sub>, DUST, VOC, TSP, precipitation chemistry, PAH, and other toxins) monitored in the network is provided. This includes instrument types and, where applicable, observation and sampling frequencies, averaging periods and measurement resolution. The sampling software used (if any), the operating period (e.g., continuous, winter, summer), the quality assurance program and the siting and instrumentation standards adhered to are discussed briefly.

An example of a network description may be found in Appendix II.

All station databases contain details of the station locations (latitude and longitude as well as UTM coordinates) and elevations. Additionally, the pollutants monitored at each station with details of start and end dates are found in the station databases.

NOTE:- IT IS RECOMMENDED THAT USERS REFER TO THE STATION DATABASES TO DETERMINE THE ATTRIBUTES OF PARTICULAR METEOROLOGICAL OR AIR QUALITY MONITORING SITES. WHILE THE

NETWORK DESCRIPTIONS GIVE SOME DETAILS OF INSTRUMENTATION, THE DETAILS ARE CONTAINED IN THE STATION DATABASES.

### **EMISSIONS INVENTORY**

A database of emissions inventories for the province was compiled; it is maintained in dBASE IV format.

Each entry of the database contains information on the holder of the inventory, the contaminants emitted, types of sources, the date of the inventory, availability of the inventory and documentation.

A sample entry from the database may be found in Appendix III.

### 3. Standards

Traditionally, meteorological measurements made at the earth's surface have been called *surface observations*. Some are instrumental measurements but others, for example, cloud type and amount, are made using the human senses (sight). It is these surface observations which comprise the bulk of the meteorological data obtained from the networks in this database.

Since agencies collect meteorological data to meet their specific needs, the data from individual networks differ. The World Meteorological Organization (WMO) classifies meteorological stations as follows: Synoptic stations; Climatological Stations; Agricultural meteorological stations (includes forestry); Aeronautical meteorological stations; Special stations (such as radar, atmospheric chemistry, etc.). The meteorological stations comprising the networks described in the databases fall into a similar classification.

One of the first uses of meteorological data was in weather prediction. Soon after weather prediction began, it became evident that data from a large area was required to carry out the basic analyses and data compatibility was essential. Standardization of measurements has therefore always been an important consideration and one of the main purposes of the WMO is to promote standardization. To that end, the WMO has adopted technical regulations and guidelines that describe practices, procedures and specifications for member-states to follow to ensure proper siting of instruments, precision and accuracy of measurements, and archive formats. WMO guides are available for synoptic meteorological practices, climatological practices, agricultural (including forestry) practices, hydrometeorological practices and aeronautical practices. These may be found in such publications as the *Technical Regulations* (WMO No. 40), *Guide to Climatological Practices* (WMO No. 100 TP 44), *Guide to Hydrometeorological Practices* (WMO No. 168 TP 82) and the *Guide to Meteorological Instrument and Observing Practices*. As the Canadian national meteorological service, the Atmospheric Environment Service (AES, now called the Environment Canada Atmospheric Program) adopts, and to the extent feasible, follows the WMO standards.

The US Environmental Protection Agency (EPA) has been a leader in air quality research and, as such, has tended to set the standards for air quality monitoring. Modified versions of these standards have been adopted by many Canadian agencies. In Canada, standards have been set for the National Air Pollution Surveillance (NAPS) network; standards for that network are contained in the document, *NAPS Network Site Documentation Manual*. (This manual is under review and is to be re-issued in database format.)

While the main standards have been developed by the WMO and the US EPA, individual agencies have adapted the standards to their own needs or have accepted WMO-based standards such as those of the AES. A number of agencies have published their own guidelines or manuals; these are noted in the network descriptions. The network descriptions and databases (climatological and air quality) do not list the standards *per se*, rather they indicate which standards are followed (for example, WMO), or refer to manuals or documentation in which the standards are given.

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## 4. Summarized Network Descriptions

### Meteorological And Climatological Networks

#### **NETWORK: AES Climate Network**

##### NETWORK DESCRIPTION:

The Atmospheric Environment Service Climate Network has been in operation since the 1800's and currently consists of approximately 500 stations in BC. Most are manned by volunteer observers, however, some Campbell Scientific dataloggers are employed.

The data are used to define the climate of Canada; they are also used by engineers and scientists for design purposes, by lawyers in court cases, and by the general public. Climate normals are calculated for stations with a sufficient term of record.

##### ELEMENTS:

Precipitation; Precipitation rate; Temperature; Wind; Evaporation; Sun; Radiation; Snow depth

##### CONTACT:

Climate Services Specialist 604-664-9156

#### **NETWORK: AES First Order Network**

##### NETWORK DESCRIPTION:

The Atmospheric Environment Service First Order Network dates, mainly, from the period near World War II. It was initiated to provide synoptic data in real-time for weather forecasting and to support commercial airlines, general and military aviation. Nearly all the stations are located at airports or lightstations.

Observations for aviation, e.g. sky cover, ceiling height, visibility, obstructions to vision are made, in general, hourly. Synoptic weather conditions are observed, coded and transmitted.

##### ELEMENTS:

Precipitation; Precipitation rate; Temperature; Pressure; Wind; Humidity; Evaporation; Sun; Radiation; Snow depth; Cloud; Visibility

##### CONTACT:

Climate Services Specialist 604-664-9156

#### **NETWORK: AES Automated Systems**

##### NETWORK DESCRIPTION:

The Atmospheric Environment Service has been installing automated weather and climate stations since 1969. Most of them are used as supplementary synoptic and aviation weather stations; some are co-located with manned stations and provide real-time data in the off-hours. Others provide climate data only. All BC stations transmit data to the AES Regional Office. The first order network described above previously includes some of these automatic stations.

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### ELEMENTS:

Precipitation; Precipitation rate; Temperature; Pressure; Wind; Humidity; Radiation; Snow depth; Cloud; Visibility; Soil temperature;

### CONTACT:

Climate Services Specialist 604-664-9156

### **NETWORK: AES Buoy Network**

#### NETWORK DESCRIPTION:

Following the de-commissioning of Ocean Weather Station PAPA in 1981, the Atmospheric Environment Service began to develop and implement systems to obtain marine meteorological data. Observations are taken hourly and relayed by GOES satellite to shore stations, in particular to the Pacific Weather Centre. The data are used mainly in real-time to provide warnings and forecasts for marine interests.

### ELEMENTS:

Temperature; Pressure; Wind; Waves

### CONTACT:

Climate Services Specialist 604-664-9156

### **NETWORK: AES Upper Air Network**

#### NETWORK DESCRIPTION:

Following the Second World War, a network of radiosonde stations was established in North America as well as across the Atlantic and Pacific Oceans. Three stations were established in the 1940's in BC as well as Ocean Station PAPA (at 50N 145W) - a fourth station was established in 1971 at Vernon but was re-located to Kelowna in 1994.

At each site, instrument packages are attached to hydrogen- or helium-filled balloons and released into the atmosphere; a small radio transmitter transmits coded measurements to a ground station. Positions of the balloon are monitored to obtain wind data. Two types of instruments and balloon-tracking equipment are employed: the ADRES-GMD system and Vaisala RS80 system.

### ELEMENTS:

Air temperature; Pressure, Humidity; Wind speed and direction

### CONTACT:

Climate Services Specialist 604-664-9156

### **Network: BC Forest Service Hourly Fire Weather Network**

#### NETWORK DESCRIPTION:

This mostly seasonal network, operated by Protection Branch, provides weather data to support the Canadian Forest Fire Danger Rating System (CFFDRS) which is the primary fire management decision-making tool in Canada. Weather data are used as a basis for decisions in fire prevention, preparedness and suppression operations as well as a number of other fire management activities in BC.

This network consists of about 240 hourly reporting automated weather stations. The stations are set up to transfer data to the VAX computer in Victoria in three primary ways: stand alone

telephone modem, UHF radio telemetry to a common telephone modem and stand alone meteorburst telemetry for the most remote sites. The data is stored as both hourly readings and a daily roll-up consisting of the 1200 PST readings with the precipitation accumulated for the period 1300-1200 hours.

The sites are usually located in midslope positions but a number of valley bottom and ridge top sites are also in operation.

**ELEMENTS:**

Temperature; Relative Humidity; Precipitation; Wind Speed and Direction

**CONTACT:**

Fire Weather Specialist 604-387-8744

Systems Services Supervisor 604-387-8730

**NETWORK: BC Forest Service Daily Fire Weather Stations**

**NETWORK DESCRIPTION:**

The daily fire weather stations are operated by the Forest District offices and in some cases, cooperatively with private ventures. These stations are either read manually with the data phoned in to the Forest District or interactively polled by computer over the local VHF communications network. Polling is usually carried out once per day during fire season, collecting either the daily data roll-up for the 1300 - 1200 hour period alone or along with the hourly values for that same period.

In some cases the daily data roll-up values are fed to the Protection Branch VAX computer and archived there. In any case, the data collected is stored for the season on the controlling PC in the district.

**ELEMENTS:**

Temperature; Relative Humidity; Precipitation; Wind Speed and Direction.

**CONTACTS:**

BC Forest Service District Offices

Fire Weather Specialist 604-387-8744

Systems Services Supervisor 604-387-8730

**NETWORK: BC Forest Service Nelson-West Arm Demonstration Forest**

**NETWORK DESCRIPTION:**

The West Arm Demonstration forest occupies an area of approximately 14,500 ha. along the north shore of the West Arm of Kootenay Lake, between Kokanee Creek in the west and Queens Creek in the east. Data have been collected at 8 sites located in the Kokanee Creek and Redfish Creek areas. Data are recorded on Campbell Scientific dataloggers which, in addition to hourly output, provide daily summaries including maximum and minimum values for air temperature, relative humidity and wind speed.

**ELEMENT AND SENSOR DESCRIPTION:**

Air temperature; Humidity; Soil temperature; Snow temperature; Wind speed and direction, Precipitation; Solar radiation; Snow depth and water equivalent

**CONTACT:**

Hydrologist 604-356-6281

**NETWORK: BC Forest Service Research Branch FRDA Climate Network**

**NETWORK DESCRIPTION:**

As part of a study by the BC Ministry of Forests, Research Branch, under the FRDA (Forest Resource Development Agreement), forest areas having regeneration problems were identified. Climatological stations were established by individual researchers. Campbell Scientific instruments were employed.

**ELEMENTS:**

Precipitation; Precipitation rate; Temperature; Wind; Humidity; Radiation; Soil moisture

**CONTACT:**

Forest climatologist 604-387-3453

**NETWORK: BC Forest Service Silviculture Seed Orchard Climate Network**

**NETWORK DESCRIPTION:**

Each BC Forestry seed orchard operates one climate station at its site. The climate data are archived on each orchard's individual microcomputer.

**ELEMENTS:**

Precipitation; Temperature; Wind; Humidity

**CONTACT:**

Bowser 604-757-2015

Campbell River 604-286-7560

Cobble Hill 604-743-3554

Saanich 604-652-7616

**NETWORK: BC Forest Service Penticton Creek Experimental Watershed**

**NETWORK DESCRIPTION:**

Climate stations are located at 240 Creek, Dennis Creek and below the Greyback Lake dam at elevations of roughly 1600-1700m. Since 1991, the parameters measured include air temperature, relative humidity, solar radiation, wind speed, soil temperature and precipitation. Data loggers record daily average, and daily maximum and minimum values for each of the parameters. Prior to 1991, only precipitation during the snow-free season and air temperature were measured at the three sites. Snow gauges were installed at the 240 and Dennis Creek sites in the fall of 1992. Snow water equivalent has been measured at the 240 and Dennis Creek sites since 1989.



ELEMENTS:

Precipitation; Precipitation rate; Air temperature; Humidity; Wind speed and direction; Solar radiation; Snow depth; Soil temperature

CONTACT:

Research hydrologist 604-828-4169

**NETWORK: BC Hydro Autographic Station Network**

NETWORK DESCRIPTION:

The purpose of the network is to obtain meteorological data that will assist in the determination of runoff from various drainage basins in BC. Most of the active stations are in the Bridge River basin.

ELEMENTS:

Precipitation; Precipitation rate; Temperature

CONTACT:

Hydrotechnical Advisor, Hydrotechnical Dept. 604-528-2747

**NETWORK: BC Hydro DCP Network**

NETWORK DESCRIPTION:

The purpose of the network is to obtain data that will assist in the determination of runoff from various drainage basins in BC. The DCP program was initiated in 1980. Many are high elevation stations.

ELEMENTS:

Precipitation; Temperature; Wind; Humidity; Snow depth; Snow water equivalent; Solar radiation; Hydrometric data

CONTACT:

Hydrotechnical Department 604-528-2749

**NETWORK: BC Hydro Snow Course Network**

NETWORK DESCRIPTION:

In BC Hydro, snow course measurements are taken for System Operations (SO) and for Dam Safety. The majority of these stations consist of snow course measurements only, however about 27 locations are also equipped with snow pillows used to obtain a continuous record of snow water equivalent. HYDRO snow pillow data are described under BC Hydro DCP network. A four point snow course sample is taken around the snow pillows as an independent check of the pillow operation. Systems Operations are responsible for 59 snow courses and Dam Safety for 14. All 59 of the SO snow courses are part of the provincial network administered by the Water Management Division (WMD) of the BC Ministry of Environment (MOE). Ten-point survey measurements are taken at these stations and the data are archived by WMB and published in the WMB Snow Survey. Data from the other 14 HYDRO operated snow courses are not archived by WMB and are available in hard copy format from BC Hydro. Five-point survey measurements are undertaken at these stations. These 14 stations are listed as the BC Hydro Snow Course Network

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### ELEMENTS:

Snow depth

### CONTACT:

Hydrotechnical Advisor, Hydrotechnical Dept. 604-528-2747

### **NETWORK: BC MOE ARB Climate Data Capture (CDC)**

#### NETWORK DESCRIPTION:

The network has been closed since 1990 but the data are available in the archives. In the main, records are short-term.

### ELEMENTS:

Precipitation; Temperature; Wind; Radiation; Snow depth

### CONTACT:

Quality Assurance Scientist 604-387-9940

### **NETWORK: BC MOE ARB Meteorological Information System**

#### NETWORK DESCRIPTION:

The network commenced in 1983 and since the main purpose of the network is to collect meteorological data for air quality assessment, the focus is on wind measurement. The network does not include stations in the GVRD.

### ELEMENTS:

Temperature; Wind

### CONTACT:

Quality Assurance Scientist 604-387-9940

### **NETWORK: BC MOE Water Management Snow Course Network**

#### NETWORK DESCRIPTION:

The purpose of the snow course network is to determine the water content of accumulated winter snow prior to snowmelt in order to estimate the subsequent streamflow. WMD co-operates with many agencies in the collection of snow course data including Government of Canada, other provincial agencies, local governments, BC Hydro, mining companies etc. Snow survey stations, the majority of which consist of a snow course only, are established at selected locations and elevations on major and minor tributary basins. Snow pillow stations are described under the BC MOE Water Management Snow Pillow Network.

### ELEMENTS:

Precipitation; Temperature; Snow depth

### CONTACT:

Head, Operations Unit 604-387-9480

**NETWORK: BC MOE Water Management Snow Pillow Network**

NETWORK DESCRIPTION:

The purpose of the network is to determine the water content of accumulated winter snow during the winter season and particularly prior to snowmelt in order to estimate the subsequent streamflow. This is of great benefit to those concerned with hydro-electric power, flood control, irrigation and domestic and municipal water supply. The snow pillow data are archived and published by BC MOE, Water Management Division (WMD). The WMD snow pillow network and data archive consists of 35 stations operated by other agencies and 9 stations operated by WMD. This comprises the official record. However the snow pillow data from 30 BC Hydro stations are also archived in the BC Hydro DCP Network. All snow pillow stations also record temperature and precipitation and transmit data via DCP.

ELEMENTS:

Precipitation; Precipitation rate; Temperature; Snow depth

CONTACT:

Head, Operations Unit 604-387-9480

**NETWORK: Carnation Creek Experimental Watershed**

NETWORK DESCRIPTION:

The purpose of the climate network is to provide meteorological data in support of a wide variety of studies carried out under the aegis of the Carnation Creek Project. The network is located in a small watershed approximately 6 km long and 2 km wide covering a range in elevation from near sea level to 685 m. Data have been collected at 11 sites. Data loggers were installed in 1988/89. Prior to that time, autographic chart data were collected. The main station was manned till 1990 and data from that station was collected in co-operation with AES and archived in the AES Canadian Climate Centre archive. The data from the other stations were abstracted from charts and are available at the Pacific Forestry Centre, as are all the data logger information. Data logger information is downloaded every two months.

ELEMENTS:

Precipitation; Precipitation rate; Temperature; Wind direction and speed; Humidity; Evaporation; Solar radiation; Cloud cover and weather conditions (until 1990)

CONTACT:

Watershed Hydrologist, Pacific Forestry Centre 604-363-0600

**NETWORK: Environmental Surveys Hydrometeorological Network**

NETWORK DESCRIPTION:

Environmental Surveys Branch (ESB) services and operates, under contract, approximately 53 DCP stations for BC Hydro (includes 5 ALCAN stations). At another 5 DCP locations, ESB operates AES automatic stations. Meteorological sensors at these stations have been supplied by BC Hydro and AES respectively. Measurements of temperature, precipitation, and water level are taken at each location. The water level data is archived by ESB. The 53 BC Hydro stations are listed under the BC HYDRO DCP Network and the meteorological data is archived by BC Hydro. The 5 co-operative AES stations are listed under the AES Auto-station network and the data is archived with the AES Canadian Climate Centre.

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CONTACT:

For data, contact AES (604-664-9156) or Water Management Branch (604-387-9940)

ELEMENTS:

Precipitation; Temperature

**NETWORK: GVRD Ambient Air Gaseous Monitoring Network**

NETWORK DESCRIPTION:

The GVRD operates an extensive ambient air quality monitoring network located across 14 communities. It is designed to provide information about the nature and extent of air pollution in the Regional District to facilitate the planning of control and abatement programs and to measure their effectiveness. A number of the air quality monitoring stations are equipped with meteorological sensors; data from these assist in interpretation of the air quality data.

ELEMENTS:

Precipitation; Precipitation rate; Temperature; Wind; Radiation

CONTACT:

Supervisor, Air Monitoring and Comp. Services 604-436-6746

**NETWORK: GVRD Sewerage and Drainage Rainfall Network**

NETWORK DESCRIPTION:

The Sewerage and Drainage Department of GVRD operates a rainfall measurement network to support its activities in urban hydrology. The network consists of 6 stations with TBRG (Tipping Bucket Rain Gauge) instrumentation equipped with chart recorders.

ELEMENTS:

Precipitation; Precipitation rate

CONTACT:

Rainfall Technician 604-432-6466

**NETWORK: GVRD Watershed Management Climate Network**

NETWORK DESCRIPTION:

GVRD operates six climate stations most of which are co-located with river gauging measurements. Three stations transmit the data hourly using DCP transmission and the others use radio telemetry. The stations are active year around. In addition, two stations at Cleveland Dam and Seymour Falls are operated co-operatively with AES and the data are archived by AES.

ELEMENTS:

Precipitation; Precipitation rate; Temperature; Wind; Humidity

CONTACT:

Hydrological Technician 604-432-6411

**NETWORK: GVRD Watershed Management Fire Weather Network**

NETWORK DESCRIPTION:

The GVRD Watershed Management Fire Weather Network consists of three stations which provide data for fire weather index calculations. The fire weather program operates from March to November. However at one site (Seymour Weather and Fire Station) observations are taken all year.

ELEMENTS:

Precipitation; Precipitation rate; Temperature; Wind; Humidity

CONTACT:

Hydrological Technician 604-432-6411

**NETWORK: GVRD Watershed Management Manual Station Network**

NETWORK DESCRIPTION:

The manual network consists of 15 stations measuring precipitation only. Recording and storage type gauges are used. Thirteen stations are maintained by the University of British Columbia (UBC) with assistance from GVRD Watershed Management. The primary function of these stations is to provide data for the numerous UBC studies carried out in the watershed areas. In addition, the GVRD Watershed Management and Water Engineering groups use the data for inflow and flood forecasting, sediment production studies, gauge calibration, etc.

ELEMENTS:

Precipitation; Precipitation rate

CONTACT:

Hydrological Technician 604-432-6411

**NETWORK: GVRD Watershed Management Snowpack Network**

NETWORK DESCRIPTION:

GVRD Watershed Management is responsible for snow course measurements at three locations. One of the sites is also equipped with a snow pillow. Snow course measurements follow BC Ministry of Environment guidelines. Hourly readings are stored and also available by radio telemetry (FTS RM 4000). All data are archived by BC Water Management Branch as well as GVRD. The snow pack program runs from January to June. For station information see BC WMB Snow Course Network.

ELEMENTS:

Precipitation; Precipitation rate; Temperature; Wind speed and direction; Humidity

CONTACT:

Hydrological Technician 604-432-6411

**NETWORK: Kootenay National Park Weather Network**

NETWORK DESCRIPTION:

The main weather program at Kootenay National Park is the Fire Weather Network; fire weather data are recorded at three stations and only the 1200 LST readings are archived. Measurements usually begin in May (depending on snow cover) and end in October.

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In addition, an avalanche weather program (similar to BC Department of Highways program) is carried out at Vermilion Crossing from November to April by manned observers. Two other stations (one with tipping bucket rain gauge) are operated co-operatively with AES and are described in the AES Climate Network.

### ELEMENTS:

Precipitation; Temperature; Wind direction and speed; Snow depth; Snow water equivalent

### CONTACT:

Warden's Office 604-347-9361

## **NETWORK: Ministry of Highways Manual Weather Stations**

### NETWORK DESCRIPTION:

There are 128 (in 1992) manual weather stations in the network scattered throughout the Province. Two classes of stations are operated: (1) avalanche weather stations and; (2) road maintenance weather stations. Observations at both types of stations are collected by road maintenance contractors. The avalanche weather stations (52 in 1992) are located at highway elevations within avalanche areas. Road Maintenance stations (76 in 1992) are located throughout the Province, often at Highway Maintenance Depots. They are used primarily for monitoring weather conditions affecting roads.

### ELEMENTS:

Precipitation; Temperature; Pressure; Wind speed and direction; Humidity; Snow depth; Snowpack surface condition; Weight of new snow; Ram penetration; Foot penetration; Avalanche activity; Cloud cover; Precipitation type and rate

### CONTACT:

Senior Avalanche Officer 604-387-6931

## **NETWORK: Ministry of Highways Remote Weather Stations**

### NETWORK DESCRIPTION:

The Ministry of Transportation and Highways operates Remote Automatic Weather Stations (RAWS) in various locations throughout the province. Most of them are operated during the period November 1 to April 30. Campbell Scientific CR-10 or 21X dataloggers are used at all remote sites.

### ELEMENTS:

Precipitation; Temperature; Wind; Humidity; Snow depth; Snowpack

### CONTACT:

Senior Avalanche Officer 604-387-6931

## **NETWORK: Mt. Revelstoke & Glacier National Park Weather Network**

### NETWORK DESCRIPTION:

Mt. Revelstoke and Glacier National Parks have weather networks to support avalanche suppression activities and to calculate the fire danger rating. The former is specifically for the purpose of evaluating avalanche risk to the Trans Canada Highway and the Canadian Pacific Railway through Rogers Pass and to a lesser extent through Mt. Revelstoke National Park. The Fire Weather Network consists of four stations with automatic weather instruments that

provide the meteorological information required to calculate fire danger levels within Mt. Revelstoke and Glacier National Parks.

Two major study plots, Mt. Fidelity and Rogers Pass, are operated on a year-round basis. The climate measurements which are part of the observational program are operated in conjunction with AES and these data are archived in the AES Climate Network. Two others minor plots, Mt. Abbott and Glacier, are operated on a year round basis but only visited weekly. Mt. Revelstoke is a minor plot operated in the winter only.

**ELEMENTS:**

Precipitation; Precipitation rate; Temperature; Wind direction and speed; Humidity; Snow depth

**CONTACT:**

Superintendent 604-837-6274

**NETWORK: Yoho National Park Weather Network**

**NETWORK DESCRIPTION:**

The weather network at Yoho National Park consists of three stations; two stations are used for avalanche control purposes, the third station is used in calculating the fire danger ratings in the Park. The two avalanche stations have telemetry transmission capability; hourly data are received from these stations. The third station is the base station and includes Campbell Scientific software for data retrieval and display. At Boulder Creek manual observations are taken twice daily; an additional reading is taken at 1300 LST during the fire weather season (April-October).

**ELEMENTS:**

Precipitation; Precipitation rate; Temperature; Wind direction and speed; Humidity; Snow depth; Snow temperature

**CONTACT:**

Warden's Office 604-343-6324

**Air Quality Monitoring Networks**

**NETWORK: ARB Ambient Monitoring Network**

**NETWORK DESCRIPTION:**

BC Environment operates monitoring stations in most large urban centres of BC. Data are transferred once per day to the Victoria headquarters and transferred to the automated air quality system for final verification and validation. Data from about 18 of the GVRD stations are included in the archive (indicated in the station database). Selected stations of the network are included in the NAPS (National Air Pollution Surveillance) network.

**ELEMENTS:**

SO<sub>2</sub>; TRS; NO<sub>2</sub>; NO; CO; Ozone; PM<sub>10</sub>; DUST; TSP/PM<sub>10</sub>; Precipitation Chemistry; PAH; (Fluorides).

**CONTACT:**

Quality Assurance Scientist 604-387-9940

**NETWORK: CANSAP**

NETWORK DESCRIPTION:

The Canadian Network for Sampling Precipitation (CANSAP) was established in 1977. Precipitation sampling commenced at a number of meteorological stations across Canada including Vancouver International Airport. Sampling continued until 1985 in B.C. The network was superseded by the CAPMoN network established to monitor "background" concentrations of various elements.

ELEMENTS:

Precipitation Chemistry (Main ions)

CONTACT:

Atmospheric Chemist 604-664-9125

**NETWORK: CAPMoN**

NETWORK DESCRIPTION:

The Canadian Air and Precipitation Monitoring Network (CAPMoN) began operations in mid-1983 replacing the Canadian Network for Sampling Precipitation (CANSAP) and the Canadian Air and Precipitation Network (APN). The main objective of the network is to provide regional-scale spatial and temporal variations, and long-term trends in the chemical composition of air and precipitation, wet and dry deposition. Data are used for model verification and for phenomenological and process studies. One CAPMoN station is operated in British Columbia, on Saturna Island. Most of the stations are in eastern Canada, the region where the impact of acidic deposition has been the greatest.

ELEMENTS:

Ozone; Precipitation Chemistry; S02; CA; CL; MG; NH4NO3; HNO3; SO4; NO3; NH4

CONTACT:

Atmospheric Chemist 604-664-9125

**NETWORK: GVRD Ambient Air Monitoring (Dustfall and Particulate)**

NETWORK DESCRIPTION:

The GVRD operates a network of particulate and dustfall monitoring stations throughout Greater Vancouver. The network is designed to facilitate the planning of control and abatement programs. Some of the stations in this network are listed in the Air Resources Branch network; selected stations are included in the NAPS (National Air Pollution Surveillance) network.

ELEMENTS:

Dustfall; TSP\PM10

CONTACT:

Supervisor, Air Monitoring and Comp. Services 604-436-6746



**NETWORK: GVRD Ambient Air Monitoring (Gaseous)**

NETWORK DESCRIPTION:

The GVRD operates an extensive ambient air quality monitoring network located across 14 communities. Data from many of them are transmitted continuously by telemetry to the Air Quality Monitoring System (AQMS) computer in the Air Quality and Source Control Office. In addition, data from several BC Ministry of Environment Fraser Valley stations are logged on the AQMS computer. The network is designed to provide information about the nature and extent of air pollution in the Regional District to facilitate the planning of control and abatement programs and to measure their effectiveness. Many of the stations in this network are listed in the Air Resources Branch network; data for those stations may be obtained from either source. Selected stations of the network (indicated in the station database) are included in the NAPS (National Air Pollution Surveillance) network.

ELEMENTS:

SO<sub>2</sub>; TRS; NO<sub>2</sub>; NO; CO; Ozone; THC; COH; PM<sub>10</sub>; VOC

CONTACT:

Supervisor, Air Monitoring and Comp. Services 604-436-6746

**NETWORK: Organics in Precipitation**

NETWORK DESCRIPTION:

To aid in determining the pathways of toxic pollutants entering freshwater lakes and streams, the Environmental Surveys Branch on behalf of the National Water Resource Institute (NWRI) operates a precipitation sampling station at Kanaka Creek. Chlorinated organics only are monitored at the stations.

ELEMENTS:

Chlorinated Organics - Lindane; DDT; Alpha BHC; Toxophene

CONTACT:

Head, Environmental Networks 604-666-8009

## Climatological, Meteorological and Air Quality Products Summary

## 5. Retrieval And Display Of Information

All network, emissions inventory, and bibliographic information is maintained in a suite of dBASE IV files. These files include the network descriptions (METNETWK.DBF and AQNETWK.DBF) plus the station database files. All of the latter include station locations (latitude, longitude and UTM coordinates) plus elevation (metres) above mean sea level. If a network has uniform characteristics (i.e., instrumentation and the observing program are the same at each station), no further information is included in the station database. For networks with non-uniform characteristics, the details of instrumentation and the observing program at each station are included in the station database. (Two auxiliary files, AESCATLG.DBF and BCFSHIST.DBF, contain historical information for the AES and BC Forest Service climatological networks, respectively.)

Principal access to the information is through the use of database or spreadsheet programs such as DBASE IV, FoxPro, Access, or Excel, or any other program that can import a DBASE file. Technical documentation giving the contents of the databases, field definitions and characteristics is available in hard copy or on diskette.

A limited amount of software has been written for accessing the databases if the user is running DBASE IV as their database program. The main software includes programs to print the network (climatological and air quality) in hard copy or to computer files. For example, the DBASE IV program, PRNETWK.PRГ may be used to print the meteorological network descriptions.

The emissions inventory description and the bibliographies are also contained as DBASE IV files. As with the network and station databases, access to the information in them is through the use of database or spreadsheet programs. (The technical documentation includes information on the structures for these databases.) A DBASE IV program has been written to print a hard copy of the emissions inventory description.

The network databases have also been converted from DBASE IV format to geo-positioned GIS (Geographic Information System) files. These are presently stored as ArcInfo coverages. By using a package such as ArcView, or any other GIS which can import ArcInfo E00 files, the user can examine the networks spatially. This allows users to view the networks in relationship with political boundaries, biogeoclimatic zones, or any other digital mapping available. Multiple networks may be examined simultaneously so as to ascertain where there may be geographic areas of interest that may not be wholly covered by one network. Most GIS's will also allow the user to examine the DBASE IV station files or formulate queries of those datasets. The networks are presently in a NAD27 Polyconic projection using the following parameters:

Longitude of Central Meridian -130 00 00

Latitude of projection's origin 49 00 00

False easting (meters) 1000000

False northing (meters) 200000



## Bibliographies

Two bibliographies - one related to the climate and meteorology of British Columbia, the other to the air quality of British Columbia - were compiled by searches of the American Meteorological Society *Meteorological and Geostrophysical Abstracts*, searches of University (UBC, SFU and UVic) catalogues and the AES library catalogue. These were supplemented with any available information on related publications.

The bibliographies, in DBASE IV format, contain titles, authors, date of publication, report number, agency or publisher, subject key words and locations for some 478 articles on climate and meteorology, and for 248 articles on air quality. Abstracts or summaries are available for approximately half of the entries.



# Appendix I

## SAMPLE METEOROLOGICAL NETWORK DESCRIPTION

### NETWORK: AES First Order Network

**AGENCY:** Atmospheric Environment Service

**ADDRESS:** Atmospheric Environment Service  
Suite 700  
1200 W. 73rd Avenue  
Vancouver, B.C.  
V6P 6H9

### METEOROLOGICAL & CLIMATOLOGICAL PROGRAMS:

The Atmospheric Environment Service (AES) carries out Environment Canada's legislated role in regard to meteorology in Canada. AES's main task is to issue routine public, aviation, marine and other specialized weather forecasts. However, it also provides many climatological services, is involved in atmospheric research and in air quality monitoring and research.

### NETWORK DESCRIPTION:

The network dates, mainly, from the period near World War II. It was initiated to provide synoptic data in real-time for weather forecasting and to support commercial airlines, general and military aviation. However, many others, for example, mariners, make use of the information. Many of the stations are located at airports. The network in BC comprises approximately 150 stations, a mix of manned and automatic stations.

### CONTACTS:

- DATA: Climate Services Specialist
- TECH.: Supervisor, Inspection and Standards

### PHONES:

- DATA: 604-664-9156 FACSIMILE: 604-664-9195
- TECH.: 604-664-9173

### DATA:

- STORAGE: Downsview, Ont. mainframe
- FORMAT: Archived data are stored in standard AES format files.
- ACCESS: Through agency contact

Connected to internet.

- CHARGE FOR DATA? Yes

- STATISTICS:

### ROUTINE REPORTS/REPORT MEDIA AND FORMAT:

B.C. Climate Summaries (P,T and Sunshine) are prepared monthly. Data (quality-controlled) are available on disk.

## Climatological, Meteorological and Air Quality Products Summary

A variety of statistical routines may be applied.

### ELEMENT AND SENSOR DESCRIPTION:

**PRECIP.:** Standard AES rain gauge is used.

OBSERVATION FREQ. One/6 hr SAMPLING FREQ.

AVERAGING PERIOD RESOLUTION 0.2 mm

### PRECIP. RATE:

Tipping bucket rain gauges are used.

OBSERVATION FREQ. Variable SAMPLING FREQ. Variable

AVERAGING PERIOD Variable RESOLUTION 0.2 mm

### TEMPERATURE:

Manned stations use ordinary mercury thermometers for hourly readings, and AES maximum and minimum thermometers for daily temperatures. The thermometers and dewcells are kept in an aspirated Stevenson screen. Automatic stations have one of (a) Vaisala temperature and humidity probe, (b) Campbell Scientific probe, or (c) Thermolshear probe and AES dewcell.

OBSERVATION FREQ. Hly, daily SAMPLING FREQ.

AVERAGING PERIOD RESOLUTION 0.1 deg C

**PRESSURE:** AES mercury barometers, bellows barograph.

OBSERVATION FREQ. One/hour SAMPLING FREQ.

AVERAGING PERIOD RESOLUTION 0.01 kPa

**WIND:** Stations have one of AES U2A, AES 78D, AES 45B or RM Young anemometers.

OBSERVATION FREQ. One/hour SAMPLING FREQ. One hour

AVERAGING PERIOD- DIR: Instant.

- SPD: 1 min-1 hr

RESOLUTION- DIR: 10 deg

- SPD: One mph

**HUMIDITY:** Aspirated dewcells.

OBSERVATION FREQ. One/hour SAMPLING FREQ.

AVERAGING PERIOD RESOLUTION 1 C dew pt

### EVAPORATION:

Some stations have class A evaporation pans.

OBSERVATION FREQ. One/day SAMPLING FREQ.

AVERAGING PERIOD RESOLUTION 0.2 mm

**SUNSHINE:** Casella.

OBSERVATION FREQ. One/day SAMPLING FREQ.



AVERAGING PERIODRESOLUTION 0.1 hour

**SOLAR RAD\_N.:**

Solar radiation fields (RF1, RF2, RF3, RF4, RF7, RF9) are measured at some stations with a pyranometer.

OBSERVATION FREQ. One/hourSAMPLING FREQ.

AVERAGING PERIODRESOLUTION

**SNOW DEPTH:**

At manned sites, snow depth is a one/day average of five measurements made with a snow ruler with a resolution of 0.2 cm. Some automated stations use Ultrasonic Depth Gauges (UDG) which sample hourly; the resolution is 0.5 mm.

OBSERVATION FREQ. One/daySAMPLING FREQ.

AVERAGING PERIODRESOLUTION 0.5-2 mm

**OTHER SENSORS:**

Observations for aviation, e.g. sky cover, ceiling height, visibility, obstructions to vision are made. Synoptic weather conditions are observed, coded and transmitted.

**SAMPLING SOFTWARE:**

**OPERATING PERIODS:**

Continuous

**QUALITY ASSURANCE PROGRAM:**

At manned stations, the observers check the instruments daily. Inspectors from the Regional Office inspect the stations regularly. Automated stations are inspected and serviced routinely by Regional Office inspectors. The data are monitored hourly by observers, briefers and forecasters; gross inaccuracies are reported to inspection staff. Hourly data are quality-controlled by an automated process at AES headquarters in Downsview. Daily and monthly data are quality-controlled by station observers and by the Atmospheric Issues and Services Branch of the Regional Office.

**STANDARDS:**

World Meteorological Organization standards are followed. In the main, these are found in the publication, "Technical Regulations", WMO No. 49 which describes standard practices and procedures for service to agriculture, aviation, etc.

**Latest update:** 03/07/93



## Appendix II

### SAMPLE AIR QUALITY MONITORING NETWORK DESCRIPTION

#### NETWORK : GVRD Ambient Air Monitoring (Gaseous)

**AGENCY:** Greater Vancouver Regional District

**ADDRESS:** Air Quality and Source Control  
Greater Vancouver Regional District  
4330 Kingsway  
Burnaby, B.C. V5H 4G8

#### AIR QUALITY PROGRAMS:

Air Quality management in the Greater Vancouver Area began in 1949 when the City of Vancouver initiated an air pollution control program. By 1959, the City of Vancouver program had been expanded to provide contract services to Richmond and the North Shore municipalities.

Provincial government concerns about air pollution led to the 1970 amendment of the *Pollution Control Act* (now the *Waste Management Act*) which established a provincial regulatory program for air emissions. Shortly afterwards, in 1972, the issue of Letters Patent and a further amendment of the *Pollution Control Act* established the Greater Vancouver Regional District as a single agency under which all provincial and municipal air pollution control activities in the Greater Vancouver urban area would be recognised. This GVRD mandate is continued under the current provincial *Waste Management Act*.

#### NETWORK DESCRIPTION:

The GVRD operates an extensive ambient air quality monitoring network located across 14 communities. Data from many of them are transmitted continuously by telemetry to the Air Quality Monitoring System (AQMS) computer in the Air Quality and Source Control Office. In addition, data from several BC Ministry of Environment Fraser Valley stations are logged on the AQMS computer.

The network is designed to provide information about the nature and extent of air pollution in the Regional District to facilitate the planning of control and abatement programs and to measure their effectiveness.

Many of the stations in this network are listed in the Air Resources Branch network; data for those stations may be obtained from either source. Selected stations of the network (indicated in the station database) are included in the NAPS (National Air Pollution Surveillance) network. Data for NAPS sites may be obtained from Supervisor, NAPS Data Publications, Conservation and Protection, Environment Canada, 3439 River Road, RRETC, Ottawa, Ont. K1A 0H3 as well as from GVRD. NAPS data are available on-line; accounts may be arranged through the AES Downsview Computing Centre (416-739-4476).

#### CONTACTS:

- DATA: Supervisor, Air Monitoring & Computer Services
- TECH.: Supervisor, Air Monitoring & Computer Services

**PHONES:**

- DATA: 604-436-6746 FACSIMILE: 604-436-6707
- TECH.: 604-436-6746

**DATA:**

- STORAGE: Digital PDP 11/84 micro-computer hard disk
- FORMAT: Data are stored in a non-standard database on hard drive.
- ACCESS: Dialup, floppy disk (IBM or MAC) or hard copy, by request.
- CHARGE FOR DATA? None
- STATISTICS:  
Exceedances of air quality pollutant conc. objectives.

**ROUTINE REPORTS/REPORT MEDIA AND FORMAT:**

Quarterly and Annual Summary Reports. Environment Canada (C & P) publishes an annual summary for NAPS sites.

**ELEMENT AND SENSOR DESCRIPTION:**

SO2:	Pulsed fluorescence		
	OBSERVATION FREQ.	Hourly	AVERAGING PERIOD One hour
	SAMPLING FREQ.	One/sec	RESOLUTION 1 ppb
TRS:	Pulsed fluorescence		
	OBSERVATION FREQ.	Hourly	AVERAGING PERIOD One hour
	SAMPLING FREQ.	One/sec	RESOLUTION 1 ppb
NO2:	Chemiluminescence		
	OBSERVATION FREQ.	Hourly	AVERAGING PERIOD One hour
	SAMPLING FREQ.	One/sec	RESOLUTION 1 ppb
NO:	Chemiluminescence		
	OBSERVATION FREQ.	Hourly	AVERAGING PERIOD One hour
	SAMPLING FREQ.	One/sec	RESOLUTION 1 ppb
CO:	Infrared absorption		
	OBSERVATION FREQ.	Hourly	AVERAGING PERIOD One hour
	SAMPLING FREQ.	One/sec	RESOLUTION 10 ppb

## Climatological, Meteorological and Air Quality Products Summary

OZONE (low-level):

Ultraviolet absorption

OBSERVATION FREQ.	Hourly	AVERAGING PERIOD
		One hour

SAMPLING FREQ.	One/sec	RESOLUTION 1 ppb
----------------	---------	------------------

THC:

FID

OBSERVATION FREQ.	Hourly	AVERAGING PERIOD
		One hour

SAMPLING FREQ.	One/sec	RESOLUTION 0.1 ppm
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COH:

Light transmittance

OBSERVATION FREQ.	Hourly	AVERAGING PERIOD
		One hour

SAMPLING FREQ.	One/sec	RESOLUTION 0.1 coh
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PM10:

Special PM10 studies are done; real-time data not available.

OBSERVATION FREQ.	AVERAGING PERIOD
-------------------	------------------

SAMPLING FREQ.	RESOLUTION
----------------	------------

VOC:

Special VOC studies are done; real-time data not available.

OBSERVATION FREQ.	AVERAGING PERIOD
-------------------	------------------

SAMPLING FREQ.	RESOLUTION
----------------	------------

SAMPLING SOFTWARE:

Customised in-house.

OPERATING PERIOD:

Continuous.

QUALITY ASSURANCE PROGRAM:

Quality assurance procedures include:

- hourly and daily data review;
- zero and span checks carried out every four days(at least);
- multi-point calibration done four times per year;
- Federal government audit

All calibration and zero/span gases are NIST traceable.

STANDARDS:

## Climatological, Meteorological and Air Quality Products Summary

US EPA standards for air quality monitoring are followed. Standards for the NAPS sites may be found in "NAPS Network Site Documentation" which is under review and will be re-issued in database format.

Latest update 05/18/93

## **Appendix III**

### **SAMPLE EMISSIONS DATABASE ENTRY**

#### **EMISSIONS INVENTORY DESCRIPTION**

**AGENCY:** Greater Vancouver Regional District

Air Quality and Source Control

**ADDRESS:**

4330 Kingsway

Burnaby, B.C.

V5H 4G8

**CONTACT:**

Assistant Engineer, Program Planning and Development

PHONE: 604-436-6825 FAX:

**CONTAMINANTS IN THE INVENTORY:**

Contaminants (tonnes per year) in the inventory include:

- Particulates;
- Sulphur oxides (SO<sub>x</sub>);
- Nitrogen oxides (NO<sub>x</sub>);
- Carbon Monoxide (CO);
- Volatile organic compounds (VOC).

**DATE OF INVENTORY:**

Base years 1985 and 1990

**SOURCES INCLUDED:**

Point, area and mobile.

**FORMAT OF INVENTORY:**

Database

**AVAILABILITY:**

The inventory is available on request without charge in hard copy

**DOCUMENTATION AND REPORTS:**

Summary, methodology and detailed listing reports are available.

**REMARKS**

**LATEST UPDATE:** 05/19/93





## Appendix IV

### SAMPLE NETWORK STATION DATABASE ENTRY

STNID	11002
NAME	PEMBERTON
LATD	50
LATM	19.0
LONGD	122
LONGM	48.0
UTMZONE	10
UTME	514.239
UTMN	5573.609
ELEV	185
ACTIVE	Y
DISTRICT'	HOWE SOUND
MAP_SHEET	92J/7
START	OCT 15
END	APR 30
STN_TYPE	H115
LOCATION	MTC. EST., HWY 99, PEMBERTON
HTG_TG	THERMOGRAPH
PRECIP	BELFORT GAUGE
BAROM_TYPE	
BOARDS	
SCALE	
DENS_TUBE	
WIND	
DATE_BGN	01/11/88
DATE_END	
ü	N
STNID	11003
NAME	WHISTLER
LATD	50
LATM	7.0
LONGD	122
LONGM	57.0

Climatological, Meteorological and Air Quality Products Summary

UTMZONE 10  
 UTME 503.575  
 UTMN 5551.356  
 ELEV 640  
 ACTIVE Y  
 DISTRICT' HOWE SOUND  
 MAP\_SHEET 92J/2  
 START OCT 15  
 END APR 30  
 STN\_TYPE H115  
 LOCATION MTC. EST., HWY 99, WHISTLER  
 HTG\_TG THERMOGRAPH  
 PRECIP PLASTIC RAIN GAUGE  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND  
 DATE\_BGN 01/11/88  
 DATE\_END  
 ü M  
 STNID 11101  
 NAME LION'S BAY-BRUNSWICK  
 LATD 49  
 LATM 27.0  
 LONGD 123  
 LONGM 14.0  
 UTMZONE 10  
 UTME 483.088  
 UTMN 5477.270  
 ELEV 50  
 ACTIVE Y  
 DISTRICT' HOWE SOUND  
 MAP\_SHEET 92G/6  
 START OCT 1  
 END MAR 31  
 STN\_TYPE H161

Climatological, Meteorological and Air Quality Products Summary

LOCATION LION'S BAY MUNICIPALITY YARD  
 HTG\_TG HYGROTHERMOGRAPH  
 PRECIP BELFORT GAUGE  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND ANEMOMETER  
 DATE\_BGN 30/01/80  
 DATE\_END  
 ü N  
 STNID 12001  
 NAME GIBSONS  
 LATD 49  
 LATM 24.0  
 LONGD 123  
 LONGM 31.0  
 UTMZONE 10  
 UTME 462.513  
 UTMN 5471.814  
 ELEV 60  
 ACTIVE Y  
 DISTRICT' SUNSHINE COAST  
 MAP\_SHEET 92G/5  
 START NOV 1  
 END MAR 31  
 STN\_TYPE H115  
 LOCATION MTC. EST., SUNSHINE COAST HWY, GIBSONS  
 HTG\_TG THERMOGRAPH  
 PRECIP PLASTIC RAIN GAUGE  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND  
 DATE\_BGN  
 DATE\_END

Climatological, Meteorological and Air Quality Products Summary

ü M  
STNID 14001  
NAME PORT MANN  
LATD 49  
LATM 12.0  
LONGD 122  
LONGM 48.0  
UTMZONE 10  
UTME 514.570  
UTMN 5449.473  
ELEV 75  
ACTIVE Y  
DISTRICT' LOWER MAINLAND  
MAP\_SHEET 92G/2  
START NOV 1  
END MAR 31  
STN\_TYPE H115  
LOCATION SOUTH END OF PORT MANN BRIDGE IN MAINTENANCE  
HTG\_TG THERMOGRAPH  
PRECIP PLASTIC RAIN GAUGE  
BAROM\_TYPE  
BOARDS  
SCALE  
DENS\_TUBE  
WIND  
DATE\_BGN 05/12/88  
DATE\_END  
ü M  
STNID 15001  
NAME ABBOTSFORD  
LATD 49  
LATM 3.0  
LONGD 122  
LONGM 50.0  
UTMZONE 0  
UTME 0.000  
UTMN 0.000

Climatological, Meteorological and Air Quality Products Summary

ELEV 18  
 ACTIVE Y  
 DISTRICT' FRASER VALLEY  
 MAP\_SHEET 92G/1  
 START NOV 1  
 END MAR 31  
 STN\_TYPE H115  
 LOCATION COLE ROAD REST AREA EAST OF ABOTTSFORD  
 HTG\_TG THERMOGRAPH  
 PRECIP PLASTIC RAIN GAUGE  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND  
 DATE\_BGN  
 DATE\_END  
 ü M  
 STNID 15004  
 NAME HOPE  
 LATD 49  
 LATM 22.0  
 LONGD 121  
 LONGM 24.0  
 UTMZONE 10  
 UTME 616.166  
 UTMN 5469.208  
 ELEV 60  
 ACTIVE N  
 DISTRICT' FRASER VALLEY  
 MAP\_SHEET 92H/6  
 START  
 END  
 STN\_TYPE DISC  
 LOCATION  
 HTG\_TG HYGROTHERMOGRAPH  
 PRECIP

Climatological, Meteorological and Air Quality Products Summary

BAROM\_TYPE BAROGRAPH

BOARDS

SCALE

DENS\_TUBE

WIND

DATE\_BGN 01/11/77

DATE\_END 05/04/83

ü N

STNID 15102

NAME BOSTON BAR

LATD 49

LATM 52.0

LONGD 121

LONGM 26.0

UTMZONE 10

UTME 612.588

UTMN 5524.737

ELEV 205

ACTIVE Y

DISTRICT' FRASER VALLEY

MAP\_SHEET 92H/14

START NOV 1

END MAR 31

STN\_TYPE H161

LOCATION MTC. EST., HWY 1, BOSTON BAR

HTG\_TG HYGROTHERMOGRAPH

PRECIP BELFORT GAUGE

BAROM\_TYPE BAROGRAPH

BOARDS STORM/INTERVAL

SCALE

DENS\_TUBE DENSITY TUBE

WIND ANEMOMETER

DATE\_BGN 04/01/77

DATE\_END

ü N

STNID 15105

NAME HELLS GATE (LOWER)

Climatological, Meteorological and Air Quality Products Summary

LATD	49
LATM	46.0
LONGD	121
LONGM	26.0
UTMZONE	10
UTME	612.820
UTMN	5513.620
ELEV	300
ACTIVE	N
DISTRICT'	FRASER VALLEY
MAP_SHEET	92H/14
START	
END	
STN_TYPE	DISC
LOCATION	
HTG_TG	
PRECIP	
BAROM_TYPE	
BOARDS	
SCALE	
DENS_TUBE	
WIND	
DATE_BGN	01/11/83
DATE_END	30/04/88
ü	N
STNID	15301
NAME	ALLISON PASS
LATD	49
LATM	7.0
LONGD	120
LONGM	52.0
UTMZONE	10
UTME	655.672
UTMN	5442.377
ELEV	1340
ACTIVE	Y
DISTRICT'	FRASER VALLEY

Climatological, Meteorological and Air Quality Products Summary

MAP\_SHEET 92H/2  
START OCT 15  
END APR 30  
STN\_TYPE H161  
LOCATION MTC. EST., HWY 3, 58 KM EAST OF HOPE  
HTG\_TG HYGROTHERMOGRAPH  
PRECIP BELFORT GAUGE  
BAROM\_TYPE BAROGRAGH  
BOARDS STORM/INTERVAL  
SCALE  
DENS\_TUBE DENSITY TUBE  
WIND ANEMOMETER  
DATE\_BGN 22/10/63  
DATE\_END  
ü M  
STNID 15312  
NAME HOPE SLIDE  
LATD 49  
LATM 17.0  
LONGD 121  
LONGM 16.0  
UTMZONE 10  
UTME 626.059  
UTMN 5460.159  
ELEV 715  
ACTIVE Y  
DISTRICT' FRASER VALLEY  
MAP\_SHEET 92H/6  
START NOV 1  
END MAR 31  
STN\_TYPE H115  
LOCATION HOPE SLIDE SAND PIT, HWY 3, APPROX 16 KM E OF HOPE  
HTG\_TG  
PRECIP  
BAROM\_TYPE  
BOARDS  
SCALE



## Climatological, Meteorological and Air Quality Products Summary

DENS\_TUBE  
 WIND ANEMOMETER  
 DATE\_BGN 14/11/83  
 DATE\_END  
 ü M  
 STNID 21001  
 NAME KAMLOOPS  
 LATD 50  
 LATM 41.0  
 LONGD 120  
 LONGM 23.0  
 UTMZONE 10  
 UTME 684.854  
 UTMN 5617.614  
 ELEV 550  
 ACTIVE Y  
 DISTRICT' THOMPSON  
 MAP\_SHEET 82I/9  
 START NOV 1  
 END APR 15  
 STN\_TYPE H115  
 LOCATION MTC. EST., 1303 MCGILL, KAMLOOPS  
 HTG\_TG THERMOGRAPH  
 PRECIP  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND  
 DATE\_BGN 13/11/88  
 DATE\_END  
 ü Y  
 STNID 21102  
 NAME BARRIERE  
 LATD 51  
 LATM 10.0  
 LONGD 120

Climatological, Meteorological and Air Quality Products Summary

LONGM 8.0  
UTMZONE 10  
UTME 700.427  
UTMN 5671.993  
ELEV 390  
ACTIVE Y  
DISTRICT' THOMPSON  
MAP\_SHEET 92P/1  
START NOV 1  
END APR 15  
STN\_TYPE H161  
LOCATION MTC. EST., BARRIERE  
HTG\_TG HYGROTHERMOGRAPH  
PRECIP BELFORT GAUGE  
BAROM\_TYPE  
BOARDS  
SCALE  
DENS\_TUBE  
WIND  
DATE\_BGN 21/11/88  
DATE\_END  
ü N  
STNID 22001  
NAME SALMON ARM  
LATD 50  
LATM 42.0  
LONGD 119  
LONGM 20.0  
UTMZONE 11  
UTME 335.220  
UTMN 5618.799  
ELEV 365  
ACTIVE Y  
DISTRICT' OKANAGAN-SHUSWAP  
MAP\_SHEET 82L/11  
START OCT 15  
END APR 15

Climatological, Meteorological and Air Quality Products Summary

STN\_TYPE H115  
 LOCATION MTC. EST., GLENEDEN RD., SALMON ARM  
 HTG\_TG THERMOGRAPH  
 PRECIP  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND  
 DATE\_BGN 12/10/88  
 DATE\_END  
 ü M  
 STNID 22003  
 NAME FALKLAND  
 LATD 50  
 LATM 30.0  
 LONGD 119  
 LONGM 33.0  
 UTMZONE 11  
 UTME 319.154  
 UTMN 5597.071  
 ELEV 610  
 ACTIVE Y  
 DISTRICT' OKANAGAN-SHUSWAP  
 MAP\_SHEET 82L/5  
 START OCT 15  
 END APR 15  
 STN\_TYPE H115  
 LOCATION MTC. EST., GYP RD., FALKLAND  
 HTG\_TG THERMOGRAPH  
 PRECIP  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND  
 DATE\_BGN 14/11/88

Climatological, Meteorological and Air Quality Products Summary

DATE\_END

ü M  
STNID 22004  
NAME SICAMOUS  
LATD 50  
LATM 50.0  
LONGD 118  
LONGM 59.0  
UTMZONE 11  
UTME 360.335  
UTMN 5632.903  
ELEV 350  
ACTIVE Y  
DISTRICT' OKANAGAN-SHUSWAP  
MAP\_SHEET 82L/15  
START OCT 15  
END APR 15  
STN\_TYPE H115  
LOCATION MTC. EST., FINLAYSON RD., SICAMOUS  
HTG\_TG THERMOGRAPH

PRECIP

BAROM\_TYPE

BOARDS

SCALE

DENS\_TUBE

WIND

DATE\_BGN 10/11/88

DATE\_END

ü M  
STNID 22006  
NAME MALAKWA  
LATD 50  
LATM 56.0  
LONGD 118  
LONGM 46.0  
UTMZONE 0  
UTME 0.000

Climatological, Meteorological and Air Quality Products Summary

UTMN 0.000  
 ELEV 370  
 ACTIVE Y  
 DISTRICT' OKANAGAN-SHUSWAP  
 MAP\_SHEET  
 START OCT 15  
 END APR 30  
 STN\_TYPE H115  
 LOCATION FIELD BEHIND MALAKWA CAFE ON TRANS-CANADA HIGHWAY  
 HTG\_TG THERMOGRAPH  
 PRECIP  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND  
 DATE\_BGN 01/12/90  
 DATE\_END  
 ü M  
 STNID 22102  
 NAME CHASE  
 LATD 50  
 LATM 49.0  
 LONGD 119  
 LONGM 41.0  
 UTMZONE 11  
 UTME 310.974  
 UTMN 5632.603  
 ELEV 365  
 ACTIVE Y  
 DISTRICT' OKANAGAN-SHUSWAP  
 MAP\_SHEET 82L/13  
 START OCT 15  
 END APR 15  
 STN\_TYPE H161  
 LOCATION MTC. EST., SOUTH SIDE HWY 1, E OF CHASE  
 HTG\_TG HYGROTHERMOGRAPH

Climatological, Meteorological and Air Quality Products Summary

PRECIP BELFORT GAUGE  
BAROM\_TYPE  
BOARDS  
SCALE  
DENS\_TUBE  
WIND  
DATE\_BGN 14/11/88  
DATE\_END  
ü M  
STNID 23105  
NAME CHERRYVILLE  
LATD 50  
LATM 13.0  
LONGD 118  
LONGM 35.0  
UTMZONE 11  
UTME 387.039  
UTMN 5563.669  
ELEV 670  
ACTIVE Y  
DISTRICT' OKANAGAN-SHUSWAP  
MAP\_SHEET 82L/2  
START OCT 15  
END APR 15  
STN\_TYPE H161  
LOCATION MTC. EST., HWY 6, EAST OF CHERRYVILLE  
HTG\_TG THERMOGRAPH  
PRECIP BELFORT GAUGE  
BAROM\_TYPE  
BOARDS  
SCALE  
DENS\_TUBE  
WIND  
DATE\_BGN 14/11/88  
DATE\_END  
ü Y  
STNID 24001

Climatological, Meteorological and Air Quality Products Summary

NAME	PENTICTON
LATD	49
LATM	29.0
LONGD	119
LONGM	35.0
UTMZONE	11
UTME	312.885
UTMN	5484.148
ELEV	0
ACTIVE	Y
DISTRICT'	SOUTH OKANAGAN
MAP_SHEET	82E/5
START	NOV 1
END	APR 15
STN_TYPE	H115
LOCATION	MTC. EST., 270 WATERLOO AVE., PENTICTON
HTG_TG	THERMOGRAPH
PRECIP	
BAROM_TYPE	
BOARDS	
SCALE	
DENS_TUBE	
WIND	
DATE_BGN	03/11/88
DATE_END	
ü	Y
STNID	24002
NAME	KEREMEOS
LATD	49
LATM	13.0
LONGD	119
LONGM	49.0
UTMZONE	11
UTME	294.878
UTMN	5455.115
ELEV	425
ACTIVE	Y

Climatological, Meteorological and Air Quality Products Summary

DISTRICT' SOUTH OKANAGAN  
MAP\_SHEET 82E/4  
START NOV 1  
END APR 15  
STN\_TYPE H115  
LOCATION MTC. EST., HWY 3, KEREMEOS  
HTG\_TG THERMOGRAPH  
PRECIP  
BAROM\_TYPE  
BOARDS  
SCALE  
DENS\_TUBE  
WIND  
DATE\_BGN 03/11/88  
DATE\_END  
ü Y  
STNID 24003  
NAME PRINCETON  
LATD 49  
LATM 28.0  
LONGD 120  
LONGM 31.0  
UTMZONE 10  
UTME 679.933  
UTMN 5482.053  
ELEV 670  
ACTIVE Y  
DISTRICT' SOUTH OKANAGAN  
MAP\_SHEET 92H/7  
START OCT 15  
END APR 30  
STN\_TYPE H115  
LOCATION MTC. EST., 296 ROCKLIN AVE., PRINCETON  
HTG\_TG THERMOGRAPH  
PRECIP  
BAROM\_TYPE  
BOARDS



Climatological, Meteorological and Air Quality Products Summary

SCALE  
DENS\_TUBE  
WIND  
DATE\_BGN 16/11/88  
DATE\_END  
ü N  
STNID 24106  
NAME APEX ALPINE  
LATD 49  
LATM 23.0  
LONGD 119  
LONGM 54.0  
UTMZONE 0  
UTME 0.000  
UTMN 0.000  
ELEV 1875  
ACTIVE Y  
DISTRICT' SOUTH OKANAGAN  
MAP\_SHEET  
START OCT 15  
END APR 30  
STN\_TYPE H161  
LOCATION LOCATION TO BE DETERMINED  
HTG\_TG HYGROTHERMOGRAPH  
PRECIP BELFORT GAUGE  
BAROM\_TYPE  
BOARDS  
SCALE  
DENS\_TUBE  
WIND  
DATE\_BGN 15/10/91  
DATE\_END  
ü N  
STNID 24204  
NAME COALMONT  
LATD 49  
LATM 31.0

Climatological, Meteorological and Air Quality Products Summary

LONGD 120  
 LONGM 41.0  
 UTMZONE 10  
 UTME 667.686  
 UTMN 5487.227  
 ELEV 730  
 ACTIVE Y  
 DISTRICT' SOUTH OKANAGAN  
 MAP\_SHEET 92H/10  
 START OCT 15  
 END APR 30  
 STN\_TYPE H161  
 LOCATION MTC. EST., MAIN STREET, COALMONT  
 HTG\_TG HYGROTHERMOGRAPH  
 PRECIP BELFORT GAUGE  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND  
 DATE\_BGN 02/11/88  
 DATE\_END  
 ü N  
 STNID 25001  
 NAME MERRITT  
 LATD 50  
 LATM 6.0  
 LONGD 120  
 LONGM 47.0  
 UTMZONE 10  
 UTME 658.530  
 UTMN 5551.849  
 ELEV 600  
 ACTIVE Y  
 DISTRICT' NICOLA  
 MAP\_SHEET 92J/2  
 START NOV 1

Climatological, Meteorological and Air Quality Products Summary

END APR 15  
 STN\_TYPE H115  
 LOCATION MTC. EST., 2925 POOLEY AVE., MERRITT  
 HTG\_TG HYGROTHERMOGRAPH  
 PRECIP  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND  
 DATE\_BGN 18/12/85  
 DATE\_END  
 ü M  
 STNID 25002  
 NAME HELMER LAKE  
 LATD 50  
 LATM 20.0  
 LONGD 120  
 LONGM 37.0  
 UTMZONE 10  
 UTME 669.620  
 UTMN 5578.152  
 ELEV 1385  
 ACTIVE Y  
 DISTRICT' NICOLA  
 MAP\_SHEET 92J/7  
 START OCT 15  
 END APR 30  
 STN\_TYPE H161  
 LOCATION 30 KM NORTH OF MERRITT, HWY 5  
 HTG\_TG HYGROTHERMOGRAPH  
 PRECIP BELFORT GAUGE  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND

Climatological, Meteorological and Air Quality Products Summary

DATE\_BGN 05/11/86  
 DATE\_END  
 ü N  
 STNID 25003  
 NAME ELKHART LAKE (THE WART)  
 LATD 49  
 LATM 53.0  
 LONGD 120  
 LONGM 21.0  
 UTMZONE 10  
 UTME 690.375  
 UTMN 5528.774  
 ELEV 1615  
 ACTIVE Y  
 DISTRICT' NICOLA  
 MAP\_SHEET 92H/16  
 START OCT 15  
 END APR 30  
 STN\_TYPE H161  
 LOCATION MTC. EST., ELKHART LAKE, HWY 97C (OKANAGAN CONNECTOR)  
 HTG\_TG HYGROTHERMOGRAPH  
 PRECIP BELFORT GAUGE  
 BAROM\_TYPE  
 BOARDS  
 SCALE  
 DENS\_TUBE  
 WIND  
 DATE\_BGN 04/11/86  
 DATE\_END  
 ü N  
 STNID 25207  
 NAME BOX CANYON  
 LATD 49  
 LATM 35.0  
 LONGD 121  
 LONGM 13.0  
 UTMZONE 10

Climatological, Meteorological and Air Quality Products Summary

UTME	628.907
UTMN	5493.589
ELEV	1340
ACTIVE	N
DISTRICT'	NICOLA
MAP_SHEET	92H/11
START	
END	
STN_TYPE	DISC
LOCATION	
HTG_TG	
PRECIP	
BAROM_TYPE	
BOARDS	
SCALE	
DENS_TUBE	
WIND	
DATE_BGN	24/10/79
DATE_END	30/12/85
ü	N
STNID	25208
NAME	COQUIHALLA SUMMIT
LATD	49
LATM	35.0
LONGD	121
LONGM	6.0
UTMZONE	10
UTME	637.340
UTMN	5493.795
ELEV	1230
ACTIVE	Y
DISTRICT'	NICOLA
MAP_SHEET	92H/11
START	NOV 1
END	APR 30
STN_TYPE	TECH
LOCATION	COQUIHALLA SUMMIT TOLL BOOTH

## Climatological, Meteorological and Air Quality Products Summary

HTG_TG	HYGROTHERMOGRAPH
PRECIP	BELFORT GAUGE
BAROM_TYPE	BAROGRAPH
BOARDS	STORM/INTERVAL
SCALE	
DENS_TUBE	DENSITY TUBE
WIND	
DATE_BGN	24/10/79
DATE_END	
ü	M