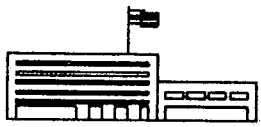
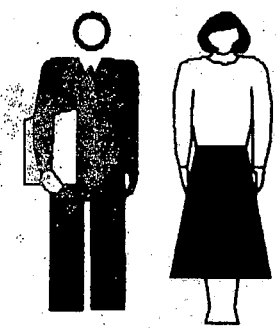
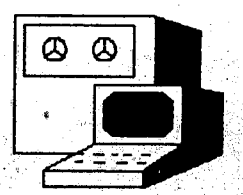
WSO PROTOTYPE

B.C. SOUTHERN INTERIOR
WEATHER FORECAST OFFICE



A FEASIBILITY STUDY





PREPARED BY
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PACIFIC REGION, DECEMBER 1988

FEASIBILITY STUDY FOR THE ESTABLISHMENT OF A WEATHER SERVICE OFFICE IN THE SOUTHERN INTERIOR OF BRITISH COLUMBIA

EXECUTIVE SUMMARY

Under the Deputy Director Program Transition, F. Herfst, project teams were formed in May 1988 to produce a feasibility study for establishing a WSO in the southern interior of British Columbia. Team 1, composed of R. Janes and B. Hammond was assigned the following objectives:

1. To define the current level of service.
2. To define shortcomings in the present system.
3. To define data network requirements.
4. To define WSO program outputs.
5. To define dissemination requirements.
6. To define NCS requirements.
7. To define workload and operational staffing requirements.
8. To define workstation requirements.
9. To define the WSO organization and structure.

The concept of the WSO of 2007 as outlined by G. Wells was kept in mind as the project progressed. The problem of how to place AES on the best path to the WSO of 2007 will not be easily solved. There are a number of options along the way. Decisions will have to be made as each fork in the road is approached. The WSO of 1991 will be one of the first milestones along this road.

Development and implementation of new technology will play an important role in the evolution of the WSO. The WSO should not become dependent on new technology that has not been proven to be adequate and dependable for the task.

Recommendation #1. New technology should be tested and proven in an opertational setting before the WSO becomes dependent on it for operational production.

In this report, the team recommends a phased strategy that will gradually move the WSO through 2 levels. Level 1 will be the initial phase where the main emphasis will be on increasing dissemination capabilities, expanding the data network, and attempting to focus the forecast products on local peculiarities by improving and increasing the Day 1 content. The WSO will gradually progress towards Level 2, the WSO of 2007. In Level 2,

the analysis and forecasting of mesoscale events will be addressed. Air quality and climate services will also be addressed.

Under Level 1, the team explored 2 options....A and B.

Option A. The prototype WSO assumes all responsibility for provision of meteorological services for the southern interior.

Option B. The prototype southern interior WSO prepares and issues forecasts, but depends on forecast guidance from the Pacific Weather Centre. Prognostic guidance support for the other southern interior weather offices will be provided by the Pacific Weather Centre.

The report explores and weighs the pros and cons of Option A and Option B.

Recommendation #2. Adopt a phased strategy for the WSO, beginning with Level 1 and progressing with time to Level 2, the WSO of 2007.

Section 5.1 documents the present level of service. The WSO will have to maintain the level of service presently provided by the Pacific Weather Centre, the Kelowna and Penticton Weather Offices, and the Vernon Aerological Station. This includes forecast production, aerological observations, dissemination and consultation. Section 5.1.6 outlines weather service contact statistics for the southern interior. Major weather service stakeholders and area elected officials are outlined in sections 5.1.7 and 5.1.8.

Recommendation #3. As a minimum, maintain the present level of service.

Shortcomings in the present system are highlighted in Section 5.2. The recommendations presented in this study will attempt to address these inadequacies.

The list of shortcomings were compiled after considerable discussion and thought by AES managers and staff, particularly at the Pacific Region retreat held in November 1987. This list follows:

1) The data base is sparse during daylight hours and extremely sparse at night. (refer to Data Network Requirements)

2) The forecasts are issued from a remote location.

3) Meteorologists are tasked with producing forecasts for large forecast regions covering an extensive geographical area.

4) There is not enough emphasis placed on providing point forecasts for the main population centres.

5) Tailored forecasts such as recreational and agricultural forecasts produced by the weather offices have limited distribution and may at times be different from the "official" forecast distributed to the media by the Pacific Weather Centre.

6) There is little opportunity for the meteorologist who is issuing the forecast to have user contact.

7) Dissemination of forecasts is done primarily through a second party (the media). Thus AES has no direct control over dissemination of weather warnings.

8) The aerological observing network in the southern interior is inadequate to support mesoscale forecasting.

9) Full 24 hour coverage for weather watch, weather warning and consultation is not available in the southern interior.

10) Adequate remote sensing data such as satellite imagery and spherics data is not available in the southern interior weather offices.

11) Mesoscale wind problems have not been adequately addressed.

12) There are discrepancies in the provision of weather services between different southern interior communities.

Data network requirements are addressed in Section 5.3. The surface data network at night consists of 3 manned observations and 2 automatic observations. This data network needs to be greatly improved if it is going to adequately support a realistic forecast and warning service! Increases in the surface data network proposed in section 5.3.1 would bring the number of hourly observational stations up to a total of 27. As a minimum, there should be a real time reporting surface data network of at least 2 observations for each forecast region.

Recommendation #4. A detailed data network study should be done to determine the optimum surface network required.

As the WSO progresses towards Level 2 and becomes more involved in mesoscale forecasting, there will have to be a number of studies carried out on various mesoscale problems. These would include lake winds, air quality, the various agricultural problems, etc. This will in turn require a further expansion of the data network as observational sites are set up to analyze mesoscale events.

Recommendation #5. Provide a series of portable temporary observational stations to examine mesoscale problems.

WSO program outputs are examined in Section 5.4.

A number of changes are proposed for the forecast products under Level 1. The most significant changes are as follows:

1) The Weather Warning criteria will be examined in an attempt to make it more relevant to the peculiarities of the different forecast regions.

2) There will be 2 additional forecast regions.

3) Point temperature forecasts will be provided for communities with a population in excess of 3K.

4) The Public and Mountain forecasts will be combined.

5) More detail will be added to the Day 1 portion of the forecast.

6) The use of the Probability of Precipitation statement will be examined. An attempt will be made to move the POP information into the body of the forecast.

7) Some forecasts will be issued more frequently.

8) Very short range forecasts will be issued as required.

Under Level 2, further development will be done on forecast products. Mesoscale forecasting problems will be defined and addressed. The problem of lake winds on Okanagan and Shuswap lakes will take priority. The present lack of knowledge of mesoscale lake winds impacts directly on the ability of AES to provide an adequate warning service.

Recommendation #6. Program outputs for Level 1 should be determined and defined within the next year. A start should be made on determining the program outputs for Level 2.

The WSO will improve consultative services by extending coverage to 24 hours and by bringing the producer of the forecast and the user into communication. Toll free lines will assure that consultative services are available in communities where the AES presence has been withdrawn. Scientific expertise will be available to handle requests requiring knowledge of specialized meteorological fields such as air pollution, hydrology, etc.

As mesoscale meteorological problems are addressed, more information will be disseminated to the various users. This may in fact increase the requirement for consultative services. However. the overall number of requests for information will likely be reduced due to improved dissemination.

Recommendation #7. Install toll free lines to communities where the AES presence has been withdrawn. Ensure consultative services are readily available in the WSO.

Dissemination requirements are explored in Section 5.5. Efficient and frequent dissemination of the various WSO products is essential to satisfy the users' requirement and minimize the need for users to consult with the WSO staff. The total 1987 user contacts of the 3 present AES facilities in the Okanagan excluding aviation was 169,985. A large number of contacts can be expected if enhanced dissemination is not provided.

As AES depends mainly on the media for dissemination, it is imperative that they be serviced adequately. The team recommends that the radio media, AES's most important disseminator, continue to be served on a one on one basis. It is recommended that the use of dedicated media hotlines be examined and tested.

Recommendation #8. Improve dissemination methods and continue to serve the media on a one on one basis. Examine and test the use of media hotlines.

Weather radio will play an important role in improving dissemination. It is the team's recommendation that in Level 1, AES should initially aim for full coverage of the main media outlets. Coverage of the recreational lakes and agricultural areas would follow.

Recommendation #9. Install weather radio to provide coverage first to the main media outlets, then to the recreational lakes and then to the agricultural areas.

ATAD's should be installed in the 15 communities with a population in excess of 5k. This would provide ATAD coverage to at least 60% of the population. Eventually, under Level 2, ATAD

coverage should be extended to all 24 communities with a population in excess of 3K. ATAD coverage would then be extended to at least 80% of the population. This would go a long way towards providing equal service to all communities and would also reduce the potential call load on the WSO.

The use of electronic bulletin boards should also be explored as a means of dissemination.

Recommendation #10. Install remote loading ATAD's in the 15 communities with a population in excess of 5K and later under Level 2 extend this coverage to all 24 communities with a population in excess of 3K. Extend ATAD coverage further as resources permit.

NCS requirements are outlined under Section 5.6. In order to provide an equal and/or better service than is available under the current organization, there must be at least the same availability of data that exists in the Pacific Weather Centre. The capability to manipulate this data and produce products must also exist to at least the same extent as that of the Pacific Weather Centre. This applies to alphanumeric data, graphics products, and satellite imagery.

Recommendation #11. Ensure NCS capabilities are at least the same as that of the Pacific Weather Centre.

The workload and operational staffing requirements are outlined under Section 5.7.

Forecast workload was explored under Level 1 for both Option A and Option B. The assumption was made that present technology would be used at least in the initial stages of the WSO. The WSO concept will allow meteorologists to focus on a smaller area, however, decentralization of forecast production will not be as efficient as the present system. Under Level 2, the forecast production time should be reduced due to advances in technology. This free time will then become available to be used in lowering the staffing requirement or in advancing mesoscale forecasting.

The weather service workload, consisting of media support, consultation, dissemination, etc. was estimated at the equivalent of 1 forecast desk.

The forecast and weather service duties will be distributed and integrated into the workloads of the various WSO operational desks. An analysis of the workload has determined that under Option B, there will be a requirement for the equivalent of 3 operational forecast desks. Option A would require an additional forecast desk.

Recommendation #12. Carry out a test, preferably in the Pacific Weather Centre, for Option A and B to verify workloads, required resources, etc.

Section 5.8 outlines the workstation requirements.

Under Option B, peak busy periods in the WSO will require that 4 meteorologists be on duty at certain times. Therefore there must be 4 workstations available for operational use. An additional workstation should be available for backup and ODIT purposes, bringing the total to 5.

Under Option A, an additional workstation would be required.

Recommendation #13. Ensure that the recommended number of forecaster workstations are available.

The workstation will be one of the keys to improving the efficiency of the operational workload by improving the ability of the meteorologists to assimilate data and to produce forecasts.

Recommendation #14. Begin development of the workstation as soon as possible. Develop and test the workstation in an operational setting so it will be proven adequate and dependable before implementation in the WSO.

Ergonomic factors must be given a high priority in the design of a suitable workstation and in the overall design of the forecast workplace. The arrangement and placement of a background wall display will be crucial to the office design.

Recommendation #15. Ensure that ergonomic factors are given a high priority in the WSO design.

Sections 5.8.4 through 5.8.7 outline some of the capabilities that must be built into the workstation. The ability to manipulate and utilize satellite data will take second place only to surface observations in the production of mesoscale forecasts and weather warnings. In order to achieve an adequate satellite capability, the WSO must be capable of receiving the same satellite data as the Pacific Weather Centre. Satellite data must be received within 10 minutes of observational time (timeliness is crucial in dealing with mesoscale problems and severe weather). To be operationally practical, the workstation must have quick response times and uninterruptable power backup.

Recommendation #16. Ensure that the workstation meets operational requirements as outlined.

The WSO organization and structure is examined in Section 5.9. The number of staff required will vary depending on whether Option A or Option B is pursued. An operational test of the two options will aid in determining staffing requirements. Three possible options are given for management structure, however, it is recommended that there be a scientific authority, university degree individual who will be responsible for making decisions in the forecast and research programs. The team feels that this is an important area with a number of options for the support structure that need to be examined.

As technology advances, and the WSO progresses towards Level 2, there may be some reduction in staffing requirements.

Recommendation #17. Further work should be done on determining the organizational structure and the staffing requirements.

The Strategic Plan and the WSO Concept papers have both placed a priority on increased marketing and client relations activities. Marketing then has been identified as one of the special programs to be included in the WSO outputs. Under section 5.4.3 short term and long term marketing activities are discussed. It is anticipated that in the first year or two of operation such activity will be extensive and time consuming. In the teams opinion, one dedicated marketing P/Y will be required for short term activities. Longer term requirements will be a minimum of 1/2 dedicated P/Y plus the participation of operational staff. This activity will ultimately be integrated into the activities of the manager and support staff.

Recommendation #18. Plan for a dedicated marketing P/Y for the first 1 to 2 years, decreasing to 1/2 P/Y. This activity will ultimately become part of the manager and support staff activities.

The WSO of 1991 will not be the WSO of 2007, however, implementing the WSO of 1991 will move AES down the road towards the WSO of 2007. The WSO of 2007 will make use of technology that is yet to be developed. The WSO of 1991 will restructure AES operations and set the stage for development and implementation of new technology needed to support the WSO. While the WSO of 1991 will not necessarily be more economical or efficient than the present system, it will bring forecast producers and users closer together and should improve services to the users. In time, as technological advances continue, economies and savings in the WSO operation should be realized.

This feasibility study provides guidelines and recommendations for the initial establishment of the southern interior WSO. It is hoped that these guidelines will help AES negotiate the road to the WSO of 2007.

WSO PROJECT - TEAM 1

FINAL DRAFT

Feasibility Study for the Establishment of a Weather Service Office (WSO) in the Southern Interior of B.C.

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2.0 (July 5, 1988)
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3.4 (Aug 22, 1988)
3.5 (Aug 26, 1988)
4.0 (Sept 1, 1988)
4.1 (Sept 9, 1988)
4.2 (Sept 15, 1988)
4.3 (Sept 26, 1988)
5.0 (Oct 4, 1988)
6.0 (Nov 24, 1988)
7.0 (Dec 1, 1988)

Title Page
Outline
Title

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WSO PROJECT - TEAM 1

Feasibility Study for the Establishment of a Weather Service Office (WSO) in the Southern Interior of B.C.

1 BACKGROUND

Under the Deputy Director Program Transition, F. Herfst, project teams were formed in May 1988 to produce a plan for establishing a WSO in the southern interior of British Columbia. The final draft plan is to be produced by September 30, 1988. This document includes the portion of the plan allotted to Team 1.

2 OBJECTIVES

The objectives of Team 1 are as follows:

1. To define the current level of service.
2. To define shortcomings in the present system.
3. To define data network requirements.
4. To define WSO program outputs.
5. To define dissemination requirements.
6. To define NCS requirements.
7. To define workload and operational staffing requirements.
8. To define workstation requirements.
9. To define the WSO organization and structure.

3 PROJECT DESCRIPTION

In order to meet the nine objectives of the project, each objective was subdivided into various activity elements which were examined initially by either R. Janes or B. Hammond. The final draft report contains input from both participants as well as a number of other resource individuals.

Mr. G. Wells, in his document "The AES Weather Service Office - A Concept" has outlined what the WSO should look like in 2007. The prototype WSO proposed for the BC southern interior will differ from the WSO of 2007 in a number of areas. The main reason for these differences is technology. Technology will not be able to support the WSO in 1991 to the same degree that it will in 2007. As developments in technology increase, the WSO will advance towards the WSO of 2007.

The WSO will be set up using state of the art technology. As new technology becomes available and has been proven adequate and dependable it will be incorporated into the WSO. The WSO should not have to rely on new technology that has not been proven in an operational setting to be dependable and adequate for the task. New technology should be tested in operational settings (PWC, weather offices, or a testbed) as soon as it becomes available. This will allow as much development time as possible before the WSO becomes operational.

The WSO Concept proposes that the WSO concentrate on Day 1 - the first 24 hour period. Unfortunately, the forecast for Day 2 will almost certainly not be adequately automated by 1991. The question then arises as to who will prepare the Day 2 forecast?

The WSO Concept infers the elimination of weather offices. The functions of the WSO of 2007 do not include supporting subordinate weather offices. However, in 1991, weather offices will still be open in the southern interior and will still require support. Who will provide support to the southern interior weather offices?

There are basically 2 options:

Option A. The prototype WSO assumes all responsibility for provision of meteorological services for the southern interior.

Option B. The prototype southern interior WSO prepares and issues forecasts, but depends on guidance from the Pacific Weather Centre. Prognostic guidance support for the other southern interior weather offices will be provided by the Pacific Weather Centre.

Option B would be difficult for the other weather offices as the forecasts would be issued from the WSO but the guidance would come from PWC as well as CMC. This would likely create some confusion as well as coordination problems.

Option B may leave the WSO in a difficult position when the weather centres are phased out and the system changes over. When the weather centres are phased out and the prognostic guidance is no longer available, will the WSO then perform this duty or will it be automated and so no longer be required?

Option B does not seem to encompass the spirit or the goal of the WSO of 2007.

Option B would require less person year resources.

Option A on the other hand, would mean that the WSO was not in any way dependent on or subordinate to the Pacific Weather Centre.

Option A would mean that the WSO produces and issues analyses, guidance and forecasts for the southern interior. The preparation of analysis and guidance materials is a valuable step in the preparation of forecasts. Going through this preparation

process undoubtedly aids the thinking process and would improve the forecast quality. The WSO meteorologists would have the authority and independence to use their own abilities in preparing forecasts.

Option A would require more person year resources, at least in the short term until the technology can support further automation.

Both Option A and Option B require that the forestry forecasts be issued from the WSO. The team felt that this was necessary in order to maintain coordination of forecasts issued for the southern interior and to try to minimize duplication of effort in forecast production. If a meteorologist is producing a public forecast for the southern interior it is more efficient to have him also issue the forestry forecast than to have another meteorologist at the Pacific Weather Centre examine the same basic forecasting problems and then produce a forestry forecast for the southern interior.

Under Option A, the WSO will be responsible for providing meteorological services for the southern interior area of responsibility as defined. The WSO will provide at least the same level of service as that now provided by the Pacific Weather Centre, the Kelowna and Penticton Weather Offices, and the Vernon Aerological Station. This includes assuming responsibility for <u>all</u> forecasts issued for the southern interior. The WSO will be responsible for providing meteorological services in support of environmental emergencies in the southern interior. The WSO will be responsible for addressing air quality issues and providing scientific consultation and expertise.

Under Option B, the WSO will fulfill the same responsiblities as under Option A, only the WSO will depend on forecast guidance from the Pacific Weather Centre.

At present considerable effort is put into finding the best model, evaluating model performance, dealing with the idiosyncrasies of each model, and deciding which model best reflects present and future meteorological conditions. Forecasts can be improved by using the best possible guidance. Eventually, the point may be reached when a single computer model will perform as well as a meteorologist who uses various different computer models as guidance; but this is probably still well in the future especially in the Pacific Region where satellite imagery and other remote sensing types of data are used extensively. For the present, it is still valuable and cost effective to have a meteorologist spend time attempting to improve on computer produced guidance, especially in the Day 1 period. Manually produced prognosis guidance also serves as a valuable coordination tool where there are more than 2 meterologists working together and there are dependent, subordinate offices. Time will still have to be spent producing guidance support and interpretation at least for the next several years. Under Option B, the Pacific Weather Centre would still be tasked with guidance production for the southern interior although the WSO would have responsiblity for warnings and all forecast products. Some time in the WSO would have to be allotted for guidance interpretation and production of "in

house" guidance. This has been included in the workload estimates calculated for the proposed forecast products. Guidance production would eventually be assumed by the WSO as technology advances.

After some discussion of the pros and cons, the team decided that both Option A and Option B should be explored.

The WSO Concept states that the WSO will focus on Day 1 mesoscale forecasts and warnings. At times there has been some confusion as to exactly what "mesoscale meteorology or mesometeorology" means. In the Glossary of Meteorology published by the American Meteorological Society, mesometeorology is defined as "that portion of the science of meteorology concerned with the study of atmospheric phenomena on a scale larger than that of micrometeorology, but smaller than the cyclonic scale. It includes, also, study of the so-called "local effects"; that is, the influence of natural and man-made topographic features upon the weather in their immediate vicinities". This definition has been adopted for the purpose of this document. The complete definition is stated in appendix 3.1.

Setting up a new WSO in the southern interior will require that a meaningful nomenclature be adopted. The team proposes that the WSO be called the "Southern Interior Weather Forecast Centre". Subordinate weather offices should be called "Weather Information Offices", and observing sites be referred to as "Weather Observing Stations".

Throughout the project plan there will be references to 2 levels of service. Level 1 is the level that should be realistically obtainable within the setup time frame of the initial WSO. Level 2 is the goal that the WSO would eventually aim for. A phased strategy should be adopted that will move the WSO through Level 1 to Level 2, the WSO of 2007. The 2 Levels are defined as follows:

Level 1

1. Present level of service is visibly enhanced primarily through the implementation of increased dissemination capabilities such as weather radio.
2. A start made on basic air quality products and some basic climate services.
3. A higher level of scientific expertise and consultation available on a 24 hour basis.
4. Forecast products essentially the same but with considerable streamlining and focussing on specific local issues and requirements.
5. Expansion in the data network to support the WSO programs.

Level 2

1. Same enhanced dissemination as in Level 1 but improved ability to observe, analyze and predict

mesoscale events.
2. Air quality and climate services are addressed.
3. A high level of scientific expertise and consultation continues.
4. Forecast products updated more frequently and expanded as well as focussed on smaller scales.
5. Data networks enhanced to allow improved observation of severe weather events, air quality problems and mesoscale features such as inversions, valley winds, etc.

4 AREA OF RESPONSIBILITY

The WSO proposed area of responsibility was established by the team early in the planning stage. Determining factors considered in this exercise were;

1) the present Weather Offices' areas of responsibility.
2) the present Pacific Region forecast boundaries.
3) the Provincial Ministry of Transportation and Highways major routes requiring weather forecasts.
4) natural major watershed boundaries.
5) logical grouping of mountain ranges.
6) federal and provincial electoral boundaries.
7) newly established provincial economic zones.

It was not possible to align the boundaries with each of the above, so some compromising had to be done, especially on the northern and western boundaries.

The boundary of the southern interior WSO then was defined as the BC/Washington border on the south, the BC/Alberta border on the east, and a line from 53.3N-119.4W to 52N-119.4W to 51.3N-123.8W to 49N.9-121.3W to 49.45N-121.3W to 49.1N-120.6W to 49.0N-120.6W on the north and west sides. This line is drawn to include in the WSO region the communities of Valemount, Blue River, 100 Mile House, Shalalth, and Goldbridge. Most of the Coquihalla Highway and the Duffey Lake road is included in the region to accommodate highways forecast requirements. Manning park, most of the Fraser Canyon and Hope to Princeton Highways are just outside of the WSO region. See attached map, figure 1.

The proposed area of responsibility for the prototype WSO has many interesting aspects. The 1986 census indicated a population of 482,856 for this area of approximately 170,851 square kilometres. A low percentage of the population were identified as French speaking (French was mother tongue) in the last census. The average percentage figure of French speaking population for the area was 1.3 percent, and ranged from 0.9 percent in the West Kootenays to 1.5 percent in the Okanagan/Similkameen electoral district. Terrain is the

prominent feature in the area and is comprised of massive mountain ranges with snowfields and glaciers, rugged deep valleys, rolling plateau areas, long valley lakes, numerous smaller lakes on the plateaus, many rivers, and a few pocket deserts.

The population is concentrated in a few major centres, with the rest along the valley floors near the lakes and rivers. A seasonal influx of winter sports enthusiasts to the ski resorts and winter highway travel generates a requirement for weather service aimed at higher elevations.

Various industries operate in the area requiring weather service support. Forestry, agriculture, tourism and transportation are the main users.

The Canadian Climate manual states that the WSO area is part of the most complex climatic zone in the country. Altitude and latitude determine to a great extent the "climate" of any particular location. Climatic conditions vary from desert to rain forest and the proximity to mountains, valleys, lakes, rivers, all play a role in the weather to be expected. The western section of the region is only 300km downstream from the Pacific Ocean and its accompanying moist maritime air. This then creates many different types of weather zones across the area of responsibility. Precipitation normals range from less than 30 mm annually in the drier southern and western sections, to over 250mm in the Selkirk Mountains just east of Revelstoke. Each mountain range will have a wet and dry side. Valley floors will receive much less precipitation than the surrounding hills and mountains. Summer temperatures will range from continental tropical in some southern valleys to cooler maritime conditions in the mountains. In winter, arctic to subarctic conditions are experienced occasionally as continental arctic air masses surge southward across the province displacing the pacific maritime airmass. Temperatures then can range from 25 to 40 degrees in the summer, and from -10 to -40 degrees in the winter. Frequent temperature inversions in the fall and winter months adversely affects air quality and result in extensive low valley cloud hampering air travel. Wind patterns are complex and vary greatly in areal extent due to the terrain effects. Valley winds are difficult to predict.

WSO FORECAST REGIONS

FIGURE 1

5 ACTIVITIES

5.1 Present Level of Service

This section provides a comprehensive view of weather services currently available to users in the proposed WSO area of responsibility. It also identifies the main users and influential persons.

5.1.1 PWC forecast products for the southern interior

Attachment 5.1.1 contains a listing of products currently issued by the Pacific Weather Centre. Some of these products are produced solely for the southern interior, others are produced for a larger area that includes the southern interior WSO region. The following table summarizes the products produced and transmitted.

PRODUCTS	PERIOD OF ISSUE
ANALYSIS PRODUCTS	
Surface analysis	4 times daily
Satellite analysis	4 times daily
GUIDANCE PRODUCTS	
FXCN1 (Guidance discussion)	4 times daily
FXCN4 (Satellite discussion)	4 times daily
FXCN5 (Hurricane message)	as required
18 and 30 Hour progs	once daily
24 and 36 Hour progs	once daily
AVIATION PRODUCTS	
FACN2 (Area forecast)	4 times daily
FTs for 6 terminals	4 times daily (3 terminals have less than 24 hours coverage)
FUCN1 (Mid-level weather)	4 times daily
WSCN1 (Sigmet)	as required
PUBLIC PRODUCTS	
FPCN12 (One line weather)	2 times daily
FPCN52 (3-5 Day outlook)	2 times daily
FPCN53 (3-5 Day outlook French)	2 times daily
FPCN13 (Public forecast)	4 times daily
WWCN1 (Weather warning)	as required
WPCN1 (Weather advisory)	as required
WPCN3 (Hurricane statement)	as required
FORESTRY PRODUCTS	

FPCN32 (Fire weather forecast)	2 times daily during fire weather season
Lightning strike map	3 times daily
FPCN39 (Smoke control)	as required
FPCN38 (Lightning assessment)	once daily

MOUNTAIN PRODUCTS

FPCN50 CWVR (Mountain forecast)	4 times daily

SPECIAL PRODUCTS

WBCN2 (Press bulletin)	2 times daily
WBCN1 (Point temperature)	once daily
FMCN1 (YKA temp)	once daily
WBCN5 (BC Hydro temps)	once daily
Inland Gas Temperatures	once daily
CXCN1 (Climate message)	as required
CXCN2 (CLimate message)	as required

5.1.2 Local forecast products defined

The four weather offices located in the communities of Castlegar, Kamloops, Kelowna, and Penticton provide a number of detailed, specialized forecasts for users in the area. These forecasts are provided to support Agriculture, Surface Transportation, the Tourist Industry, the Forest Industry, and the AES mandate regarding Weather Warnings. The following table and map provide information on which communities are receiving the various forecasts. Additional detail is available in Appendix 5.1.2.

Weather Office Forecast Products

Community	Pop 1986	Haying Fcsts	Frost Fcsts	Mtn Fcsts	Recre Fcsts	Forest Fcsts
Kamloops	61773			X	X	X
Kelowna	61213	X	X	X		
Penticton	23588	X	X		X	
Vernon	20241	X	X	X		
Cranbrook	15893					
Salmon Arm	11199	X	X		X	
Revelstoke	8279			X		
Nelson	8113			X		X
Trail	7948					
Summerland	7755	X	X		X	
Armstrong/Spallumcheen	7016	X				
Coldstream	6872	X	X			
Kimberley	6732			X		
Castlegar	6385		X	X		
Merritt	6180					
Fernie	5188					
Sparwood	4540					
Creston	4190	X	X			
Golden	3584					
Rossland	3472					
Grandforks	3282					
Elkford	3187					
Peachland	2988	X				
Osoyoos	2956	X	X		X	
Princeton	2910					
Logan Lake	2001					
Invermere	1998					
Oliver	1963	X	X		X	
Chase	1933					
Fruitvale	1932					
Ashcroft	1914					
Warfield	1840					
Lillooet	1758					
Enderby	1714					
Hundred Mile House	1692					
Nakusp	1410					
Montrose	1183					
Lumby	1181	X				
Valemount	1161					
Cache Creek	1147					
Salmo	1014					
Kaslo	858					
Keremeos	839		X			
Greenwood	767					
Clinton	754					
Midway	640					
New Denver	596					
Lytton	368					
Slocan	294					
Silverton	233					
Blue River	230			X		

5.1.3 Local weather service outlet media dissemination

Dissemination of weather service products is done chiefly through the commercial radio networks. In mid 1988, 58 weather broadcasts were provided daily to a number of radio station studios from 5 AES weather service outlets. Some of these broadcasts were then retransmitted over repeaters, and thus served other communities as well. Two communities with TV production studios received a number of daily weather briefings from the resident AES facility. Most community newspapers carry weather information received from the closest weather service outlet. The following table illustrates which form of media is supported by AES in each of the communities. Additional detail is available in appendix 5.1.3.

Local Weather Service Outlet Media Dissemination

Community	Pop 1986	AES Com Rdo Bdcsts	AES CBU Rdo Bdcsts	Newsprnt Support	TV Prod Support	Cable TV
Kamloops	61773	X	X	X	X	X
Kelowna	61213	X	X	X	X	
Penticton	23588	X	X	X	X	X
Vernon	20241	X	X	X	X	
Cranbrook	15893		X	X		
Salmon Arm	11199	X	X		X	
Revelstoke	8279	X	X	X	X	
Nelson	8113	X	X	X		
Trail	7948	X	X	X		
Summerland	7755	X	X	X	X	
Armstrong/Spallumcheen	7016	X	X		X	
Coldstream	6872	X	X		X	
Kimberley	6732		X			
Castlegar	6385	X	X	X		
Merritt	6180	X	X		X	
Fernie	5188		X	X		
Sparwood	4540		X			
Creston	4190	X	X			
Golden	3584	X	X	X		
Rossland	3472	X	X			
Grandforks	3282	X	X			
Elkford	3187		X			
Peachland	2988	X	X		X	
Osoyoos	2956	X	X		X	
Princeton	2910	X	X		X	
Logan Lake	2001	X	X		X	
Invermere	1998	X	X			
Oliver	1963	X	X	X	X	
Chase	1933	X	X		X	
Fruitvale	1932	X	X			
Ashcroft	1914	X	X		X	
Warfield	1840	X	X			
Lillooet	1758	X	X			
Enderby	1714	X	X		X	
Hundred Mile House	1692	X	X		X	
Nakusp	1410	X	X		X	
Montrose	1183	X	X			
Lumby	1181	X	X		X	
Valemount	1161		X		X	
Cache Creek	1147	X	X		X	
Salmo	1014		X			
Kaslo	858	X	X			
Keremeos	839	X	X		X	
Greenwood	767		X		X	
Clinton	754	X	X		X	
Midway	640		X			
New Denver	596	X	X			
Lytton	368	X	X		X	
Slocan	294	X	X			
Silverton	233	X	X			
Blue River	230	X	X		X	

5.1.4 Weather office consultative services

All four weather offices in the southern interior are involved in providing consultative services as well as forecasts and bulletins. These services are provided in person, over the phone, or in writing. Requests for this service originates from all industries and areas of the district, and include; aviation, agriculture, smoke management, media, tourism, economic/safety, marine, severe weather, emergency environmental response, environment, climatological, special events/projects, and the general public. The following table indicates the level of service received by each community. Additional detail is available in appendix 5.1.4.

Toll Free Services Available

Community	Pop 1986	Consultation Wx Off.	ATADS	Basic Data Wx Stn	Basic Data Contr	Real Time Reports
Kamloops	61773	X	X			X
Kelowna	61213	X	X			X
Penticton	23588	X	X			X
Vernon	20241			X		X
Cranbrook	15893					X
Salmon Arm	11199					
Revelstoke	8279			X		X
Nelson	8113					
Trail	7948					
Summerland	7755					
Armstrong/Spallumcheen	7016					
Coldstream	6872					
Kimberley	6732					
Castlegar	6385	X				X
Merritt	6180					
Fernie	5188					
Sparwood	4540				X	X
Creston	4190		X			
Golden	3584				X	X
Rossland	3472					
Grandforks	3282					
Elkford	3187					
Peachland	2988					
Osoyoos	2956					
Princeton	2910				X	X
Logan Lake	2001					
Invermere	1998					
Oliver	1963					
Chase	1933					
Fruitvale	1932					
Ashcroft	1914					
Warfield	1840					
Lillooet	1758					
Enderby	1714					
Hundred Mile House	1692					
Nakusp	1410					
Montrose	1183					
Lumby	1181					
Valemount	1161					
Cache Creek	1147					
Salmo	1014					
Kaslo	858					
Keremeos	839					
Greenwood	767					
Clinton	754					X
Midway	640					
New Denver	596					
Lytton	368			X		X
Slocan	294					
Silverton	233					
Blue River	230				X	X

5.1.5 Other weather services provided

A number of other weather services are provided to users in the proposed area of responsibility. These are provided by 4 weather offices, 3 weather stations, 4 weather contract stations, and 4 Transport Canada FSS's. Most of this is basic information passed directly to the user with limited interpretation. Transport Canada provides 2 person years at the Kelowna Weather Office in support of aviation weather services provided by AES to that community. Additional detail is available in Appendix 5.1.5.

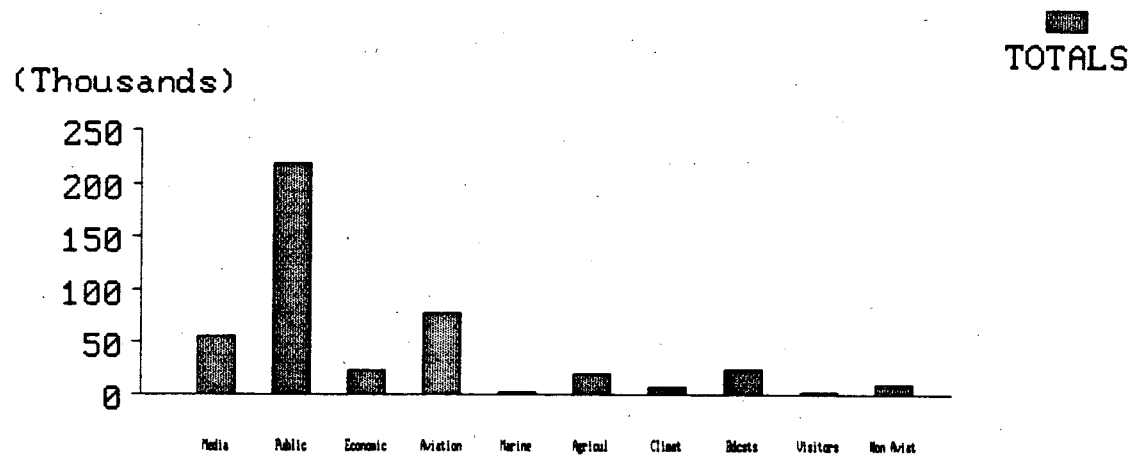
5.1.6 1987 Weather service contact statistics for the area

Contact statistics have been kept at all weather service outlets for a number of years. Weather Offices provide the best breakdown of these weather service contacts while contract weather stations receive only a few calls and have not been required to keep a log until recently. Transport Canada Flight Service stations have a minimal break down of their contacts, into aviation and non aviation. The contacts for 1987 have been presented in the appendix, and include the estimated number of listeners to AES radio broadcasts on commercial radio stations. The following table provides the annual figures for various user groups. Additional detail is available in Appendix 5.1.6.

1987 Weather Service Contact Statistics

Facility	Media	Public	Economic	Aviation	Marine	Agricul	Climat	Bdcsts	Visitors	Non Aviat (FSS)	BBM*	CBU BBM* Daybreak
Castlegar	11637	9218	5035	9984	894	2700	1107	7426	893		738400	
Kamloops	30976	84733	2615	15817	205	1142	747	4237	234		3472508	
Kelowna	9706	77912	12394	18268	601	14322	3061	5431	104		5189600	9812250
Penticton	2651	37195	1067	15003	619	1169	1052	1940	13		1475604	
Lytton	2	750	607	11		57	54		167			
Revelstoke	824	8850	871	1706	35	60	986	5126	1014			
Vernon UA	5	402	1	2		56	71		213			
FSS												
Castlegar				4120						0		
Cranbrook				4332						1055		
Kamloops				5309						5400		
Penticton				3707						3272		
TOTALS	55801	219066	22590	78259	2354	19506	7078	24160	2638	9727	10876112	

* Bureau of Broadcast Measurement



5.1.7 Major weather service stakeholders in the area

The major users of Federal weather services in the area are described in this section. This list was a result of the team interviewing the staff of four weather offices, three weather stations and four contract stations. In addition, provincial economic publications were reviewed. As a result, the following are considered to be the prime users of weather services in the area; media, agricultural industry, forest industry, tourism & recreation, marine operators, community emergency services, general public, aviation interests, surface transportation, and environmentalists. These are the groups that have the most to gain from the local weather "store" and that will support an AES presence in the area. User representation has also been identified for these groups. The following table illustrates in which communities these stakeholders are located. Additional detail is available in Appendix 5.1.7.

Major Weather Service Stakeholders in Community

Community	Pop 1986	Radio Media	TV Media	News-paper Media	Agricul	Forestry	Tourism Recreatn	Marine	EER	Gen Pub	Avtn	Sfc Trans	Envrn-mntlsts
Kamloops	61773	X	X	X	X	X	X	X	X	X	X	X	X
Kelowna	61213	X	X	X	X	X	X	X	X	X	X	X	X
Penticton	23588	X	X	X	X	X	X	X	X	X	X	X	X
Vernon	20241	X			X	X	X	X	X	X		X	X
Cranbrook	15893	X		X		X	X		X	X	X	X	
Salmon Arm	11199	X			X	X	X	X	X	X	X	X	
Revelstoke	8279	X		X		X	X	X	X	X	X	X	
Nelson	8113	X		X	X	X	X	X	X	X	X	X	
Trail	7948	X		X					X	X		X	
Summerland	7755	X			X			X	X	X		X	
Armstrong/Spallumcheen	7016	X			X	X			X	X		X	
Coldstream	6872	X			X				X	X		X	
Kimberley	6732	X					X		X	X		X	
Castlegar	6385	X		X		X		X	X	X	X	X	
Merritt	6180	X			X	X			X	X		X	
Fernie	5188	X		X		X			X	X		X	
Sparwood	4540	X				X			X	X		X	
Creston	4190	X			X	X	X	X	X	X		X	
Golden	3584	X				X	X		X	X		X	
Rossland	3472	X				X	X		X	X		X	
Grandforks	3282	X			X	X			X	X		X	
Elkford	3187	X							X	X		X	
Peachland	2988	X			X			X	X	X		X	X
Osoyoos	2956	X			X		X	X	X	X		X	X
Princeton	2910	X				X			X	X		X	
Logan Lake	2001	X							X	X		X	
Invermere	1998	X			X	X	X	X	X	X		X	
Oliver	1963	X			X			X	X	X		X	X
Chase	1933	X						X	X	X		X	
Fruitvale	1932	X			X				X	X		X	
Ashcroft	1914	X							X	X		X	
Warfield	1840	X							X	X		X	
Lillooet	1758	X			X	X			X	X		X	
Enderby	1714	X			X	X			X	X		X	
Hundred Mile House	1692	X				X			X	X		X	
Nakusp	1410	X				X	X	X	X	X		X	
Montrose	1183	X			X				X	X		X	
Lumby	1181	X			X	X			X	X		X	
Valemount	1161	X				X	X	X	X	X		X	
Cache Creek	1147	X			X				X	X		X	
Salmo	1014	X							X	X		X	
Kaslo	858	X				X	X	X	X	X		X	
Keremeos	839	X			X		X		X	X		X	
Greenwood	767	X			X	X			X	X		X	
Clinton	754	X			X	X			X	X		X	
Midway	640	X			X	X			X	X		X	
New Denver	596	X				X	X	X	X	X		X	X
Lytton	368	X							X	X		X	X
Slocan	294	X						X	X	X		X	X
Silverton	233	X						X	X	X		X	X
Blue River	230	X					X		X	X		X	

5.1.8 Area elected officials

Elected officials at all government levels are important stakeholders to consider when planning changes in service. Generally they are fairly supportive of AES but must be briefed and consulted in any planned future endeavours. It is useful to know what their present interests are, and any issues they are pursuing. A complete list of elected officials is available in Appendix 5.1.8.

5.2 Shortcomings in Present System

The present system was examined to determine shortcomings. This was done in the hope that these could be addressed and corrected in the WSO.

Shortcomings in the present system were brought to light after considerable discussion and thought by AES managers and staff, particularly at the Pacific Region retreat held in November 1987. This list is an internal AES assessment and will be followed by external feedback on shortcomings at a later date.

5.2.1 Shortcomings in forecast production

Under the present arrangement there are a number of shortcomings in the forecast system that could be addressed. Some of the more significant ones are listed below.

1) The data base is sparse during daylight hours and extremely sparse at night. (refer to Data Network Requirements)

2) The forecasts are issued from a remote location. Most meteorologists would agree that when preparing a forecast it is advantageous to be located within or very close to that forecast region.

3) Meteorologists are tasked with producing forecasts for most of British Columbia. If the geographical area is decreased in size, more time should be available for examining detail and becoming familiar with the local peculiarities of the region.

4) The forecast regions are large so a broad brush approach is sometimes used in forecast preparation. (Smaller regions can only be determined as the data network increases.)

5) There is not enough emphasis placed on providing point forecasts for the major population centres. (This can only be done as the data network increases.) Providing point forecasts for more of the towns and cities would almost certainly be perceived as an improvement in service by a significant proportion of the population.

6) Tailored forecasts such as recreational and agricultural forecasts produced by the weather offices have limited distribution. They may at times be different from the "official"

forecast distributed to the media by the Pacific Weather Centre due to differences in issue times and data availability.

7) There is little opportunity for the meteorologist who is issuing the forecast to have user contact.

8) Dissemination of forecasts is done primarily through a second party (the media). AES has no capability to directly disseminate weather warnings. Timeliness of warning dissemination can be critical. At present, timeliness is beyond the control of AES.

5.2.2 Shortcomings in the provision of Weather Services

AES staff at weather offices and weather stations have assisted the team in compiling an internal list of shortcomings in weather service to users. Weather services provided to each of the user groups was analysed for shortcomings. Some of the shortcomings will be the same or similar to those provided in the PWC list above. A summary of the significant shortcomings is listed below, with a complete list in appendix 5.3.2.

1) AES field staff fully support the contention that the present weather data network is barely adequate to support existing forecast programs, and needs to be greatly improved to support mesoscale and weather warning forecasts. It is the team's opinion then that a greatly enhanced surface data network is needed to provide improved services; for severe weather watch, in the event of toxic waste spills, to agriculture for economic benefit, and to tourists for planning information. Aerological observations are of paramount importance in assessing the impact of temperature inversions on air quality, stratus cloud persistence and in providing winds aloft for aviation and general forecasting. It is again the teams opinion that additional temperature, wind and moisture profiles are needed to provide data near other major population centres in the southern interior.

2) Three out of the four weather offices in the southern interior operate only 10 hours per day(0700-1700) and the remaining one (Kelowna) is open 19.5 hours. This means that part of the southern interior 24 hour weather watch and weather warning service must be done from Vancouver for a portion of each day. Media requiring consultation on severe weather events during "off hours" do not have local AES support. Community emergency response to disasters also has only part time local AES support. It is recommended then that 24 hour forecast and consultation service be brought into the southern interior.

3) Satellite imagery and spherics data has greatly improved AES' ability to monitor cloud movement and development. The information has proved to be exceptionally useful during the convective months to track and monitor the development and motion of large convective clouds and forecast their sometimes severe weather impact on communities. Dissemination of this imagery to most weather offices in real usable time and in quality condition

has not yet occurred. Spherics data arrives in good quality but is infrequent. In the case of satellite imagery, different levels of service are provided across the weather office network. The team has identified this as a definite shortcoming but have been assured that the implementation of the proposed WSO forecaster workstation will provide the data required.

4) The topographic nature of the southern interior lends itself to complex wind patterns throughout the year. Up to the present time, AES has not been able to provide a wind forecast with any useful detail. The many lakes scattered through the district in the valleys and up on the plateaus attract a large number of fishermen and marine recreation users. The agricultural industry in the orchard and hay growing areas is heavily dependent on wind information to assist with costly chemical spray application and hay drying. It is the recommendation of the team that the data network be enhanced and that mesoscale wind problems be examined so that more detailed wind forecasts can be provided for agriculture and marine users.

5) Toll free telephone access to a weather office facility is limited to those communities of Castlegar, Kamloops, Kelowna and Penticton. This leaves a large number of communities and potential users that are affected by this unequal provision of toll free service. Several area radio stations such as those located in Cranbrook, Salmon Arm, Osoyoos, Grandforks etc must incur toll charges to utilize any of the specialized weather services provided. These media outlets are the prime disseminators of AES products. The team feels that consideration should be given to providing toll free access from all communities over 5k to the nearest Weather Office or the WSO in the case of the Okanagan. This will provide toll free access to 60 percent of the area population. Calls to the Weather Office after hours could be switched to the WSO.

6) In view of the AES decision to pursue user pay (976) telephone service, the team suggests that a study be completed on the impact of the implementation in British Columbia.

5.3 Data Network Requirements

An inadequate data network is one of the most important problems facing the WSO. The southern interior area of responsibility has a population of almost half a million people. It covers an area of approximately 170,000 square kilometers. The Pacific Weather Centre is responsible for issuing weather warnings and forecasts for this vast area. At night there are only 3 manned observations and 2 automatic observations. Issuing warnings and forecasts with such limited data is an extremely difficult task! In addition to the 5 stations operating 24 hours, there are presently 8 stations reporting during the day and for part of the evening. Until there are major increases in the data network there is little that can be done to improve the

forecasts. As a minimum requirement, each forecast region should have at least 2 AES controlled 24 hour observations. This is recommended because each proposed forecast region has considerable climatological diversity due to topography. It is also necessary to ensure that in the event of sensor failure, there will be at least one observation from each region. Having two points in a region would also make a verification system more representative.

Satellite imagery, workstations, spherics data, mesoscale models, etc. are all valuable tools but they do not really provide meteorologists with the ground truth data necessary to issue and verify warnings and forecasts. Warnings are issued for events like tornadoes, high winds, freezing rain, snowfall, heavy rain, etc. Satellite imagery, spherics data, etc. will give indications that severe weather is approaching or developing but they do not give accurate observations of the actual severity. An adequate surface observational network reporting in real time is a must!

In order to provide better coverage for the majority of the population, more observations are necessary. In order to place more emphasis on providing point observations and forecasts, it is the team's opinion that 24 hours observations should be received from most communities having a population of 3 thousand people or more.

5.3.1 Level 1

For Level 1, the first priority should be to increase the 8 part time stations to 24 hour coverage. In order to provide coverage to most communities with a population in excess of 3 thousand people there will also be a requirement for an additional 9 stations. At least an additional 5 stations should be provided to cover the more remote areas which are strategically located but where population is sparse. This would give a total of 27 stations for the WSO region as detailed below.

Observations as of August 1988

24 HR Stations	Part Time Stations	Additional Stations to Increase Coverage for pop. Greater than 3K	Additional Stations for Remote Areas
Kamloops	Kelowna	Salmon Arm	Osoyoos
Penticton	Vernon	Nelson	Invermere
Cranbrook	Revelstoke	Trail	Nakusp
Clinton	Castlegar	Armstrong/Spal	Valemount
Blue River	Sparwood	Kimberly	Clearwater
	Golden	Merritt	
	Princeton	Fernie	
	Lytton	Creston	
		Grand Forks	

Ideally, each station should be instrumented to provide all observational data including sky cover and visibility. Observational data of this calibre is not likely to be obtained in time for Level 1 but will become necessary as the WSO progresses towards Level 2. For Level 1, each of the sites listed above as part time or additional stations, should produce observational data on a 24 hour basis for all elements except cloud cover and visibility. Instrumentation to provide cloud cover and visibility should be installed at each of these stations as soon as practically possible. The possibility of using a total solar radiation sensor to indicate the amount of sunshine/cloudiness should be investigated. The use of a POSS (Precipitation Occurrence Sensing System) and precipitation intensity and type sensors used in conjunction with Campbell Scientific instrumentation should also be investigated. In the meantime, a manned daytime observational program for these stations should be pursued using volunteer observers.

Additional observations from secondary sources such as forestry, mountain, and BC Hydro sites must be solicited and worked into the WSO data base in a usable format. A network of volunteer observers should be established to provide reports of severe or unusual weather events. These volunteer observers would play a vital role in providing real time information on severe weather events such as; sudden strong winds, damaging hail, freezing rain, severe thunderstorms, heavy snow/rain, and flooding. The RCMP, climate observers, highways crews, ski operators, etc. should be asked to participate in this network. Even with this coverage, there would still be difficulty in producing forecasts for regions smaller than those proposed for level 1. (For details on regional division see Section 5.4.1 and map in Figure 2.)

Station installation is another problem facing the WSO. Communities in the region should be approached for assistance in station installation. Communities should be asked to provide a vandalism free site and some maintenance if an automatic station is to be installed. Communities should be asked to contribute some manned observations during daylight hours as well as a volunteer weather watch.

Observations of the vertical structure of the atmosphere should be enhanced to support forecasts of valley winds, stratus formation and dissipation, air pollution, etc.
A profilometer should be tested for this purpose.

The requirements for satellite data are covered under section 5.8.5 Workstation Requirements - Satellite Data.

5.3.2 Level 2

As mentioned in the previous section, the forecast quality for any region can be improved by increasing the density and frequency of the observations.

Progress towards Level 2 would be made once the WSO is installed. There should also be a set of at least a dozen automatic observing stations that could be set up on a temporary

basis at various locations in order to study air quality and agricultural problems and various mesoscale phenomena such as lake winds, valley winds, local frost conditions, local temperature variations, precipitation patterns, etc. The exact number of automatic stations used will vary depending on the mesoscale problem being studied.

Once a study is done of the local or mesoscale problem, there would at least be some knowledge to determine what instrumentation is necessary in order to produce and verify a forecast for that particular mesoscale problem. Each mesoscale problem should have at least an initial study done on it before AES produces forecasts and warnings for that problem.

5.4 WSO Program Outputs

5.4.1 Forecast Products

Forecast products produced at the WSO in the southern interior will vary depending on the level of service provided. Two possible levels of service were defined under the Project Description section.

In both levels, advances in automation will be phased in as soon as they are tested operationally and proven viable. These advances could enhance the ability of meteorologists to assimilate data quickly. They could also result in a great time saving in producing worded forecasts. As advances in automation increase, more time will become available for mesoscale forecasting.

Forecasts will be issued and updated as frequently as the technology allows. The ultimate goal is for the various forecast products to be continuously updated as weather conditions change.

Forecast structure will have to be examined and changes may have to be made if the WSO forecasts are really going to attempt to address some of the shortcomings noted in section 5.2.1. The guidelines set out in MANPUB may have to be amended or exceptions made for some WSO products. The current public forecast format does not lend itself well to the provision of point forecasts for the main populations centres.

Forecast products are outlined below for each of the 2 levels of service and for both option A and option B available under level 1.

Level 1 (Option A)

Under Option A the WSO will not require support from the weather centre. It will also provide support to some smaller weather offices, flight service offices and weather stations.

Refer to appendix 5.1.1A

This attachment lists the forecast products presently produced by the Pacific Weather Centre. These will be produced by the WSO with the following changes:

1) The Analysis and Prognostic Discussion (FXCN1) and the Satellite Analysis and Development Discussion (FXCN4) will be combined into one message issued every 6 hours. The Hurricane Prognostic Message (FXCN5) will continue to be issued by PWC.

2) The Hurricane Information Statement (WPCN3) will continue to be issued by PWC.

3) The Weather Warning criteria for the various regions in the southern interior will be examined and revised as required. See appendix 5.4.1A for recommended revisions.

4) There will be an increase in the number of forecast regions from 5 to 7. The Thompson region will be split into West Thompson and Shuswap-North Thompson. The northern section of the Columbia region will be split off to form the Yellowhead region. There will be a slight revision to the present public forecast region boundaries. See map in figure 1.

The addition of these 2 regions will only be possible when the data network is expanded as indicated in the Data Requirements section. Further subdivision of regions may be possible as experience is gained in the region, user requirements indicate the need for further subdivision, and the data network expands even farther. As a minimum requirement, each forecast region should have at least 2 AES controlled 24 hour observations.

5) Temperature and wind reports will be received from most communities with a population in excess of 3K. Forecast temperatures for these communities will be added to the point temperature bulletin. Point temperature forecasts will also be added into the text of the public forecast.

This will necessitate an increase in the automatic station network but would be perceived as a definite improvement in service. Only stations reporting on a 24 hour basis would have site specific forecast maximum and minimum temperatures issued.

6) The Public and the Mountain forecasts will be examined with a view to combining them.

Specific information on some of the instrumented highway mountain passes will be included. As mountain observations are increased in density and frequency, the forecast quality will improve. At a future date AES could designate separate mountain forecast regions. However, this should not be done unless there are at least 2 AES controlled stations providing data in those areas on a 24 hour basis.

To combine the Public and Mountain forecasts will necessitate the following changes:

- The synopsis will be technical.

Under the present regime the public synopsis often does not cover the technical details such as frontal positions, depth of low pressure areas, etc. but rather seeks to provide background information on the weather situation in layman's terminology. Unfortunately, it is often ignored by the media and receives very

limited dissemination. (A recent AES radio station survey points out that 76% of the stations do not require the synopsis). A technical synopsis will provide valuable detailed information to all users. The mountain users in British Columbia are one group that have requested such a technical synopsis. A more technical synopsis would probably be well received by other special user groups as well.

- There will be a confidence statement issued with each synopsis.
- The synopsis will comment briefly on the trend over the next 3 to 5 days.

The possibility of combining the Forestry and Agricultural forecasts was also considered. However, the team agreed that these particular forecasts contain too much detail and deal with too many site specific issues to be realistically combined with the Public forecast.

7) Aviation VFR Route Forecasts will be issued as required.

8) Fire Weather forecasts will be issued from the WSO in basically the same format as at present.

9) More detail on individual weather elements such as winds and local temperatures will be provided in the forecast in an attempt to meet recreational, frost, and other local requirements. Some specialized forecasts will still be necessary in order to provide sufficient detail on local mesoscale problems. Earlier startup of the Spring Farm Weather Program will be considered.

10) The use of the Probability of Precipitation statement will be examined. See appendix 5.4.1B for details on proposed guidelines.

In order to provide shorter, more meaningful, and less confusion, the POP statement should be incorporated into the body of the forecast rather than appended at the end. For example the forecast could read "60% chance of showers". This would allow more room for inclusion of descriptive detail applicable to Day 1 and to the mesoscale.

11) Air quality products such as forecasts for smoke control, inversion levels, mixing levels, etc. will be examined and issued as required.

12) Various other products will undoubtedly be required for some specialized users. The WSO should have the capability to issue alphanumeric, graphic and satellite products in support of the forecast program. An example of this is the VFR Route Forecast Program presently being tested in the Pacific Region.

Level 1 (Option B)

Under Option B the WSO will require prognostic guidance support from the weather centre but will issue independent forecasts for the southern interior area of responsibility.

Refer to appendix 5.1.1B.

This attachment lists the forecast products presently done by the Pacific Weather Centre that will now be done by the WSO. These products will be issued with the same changes as noted under Level 1 Option A.

In summary, the prognostic guidance and the satellite products would be provided by the Pacific Weather Centre. Some of the other products that are regional in nature but pertain in part to the southern interior would also be issued from the Pacific Weather Centre. These would include the surface analyses, the 3 to 5 Day Forecasts, the Mid-level Significant Weather Prognosis (FUCN1), the One Liner Weather and Temperatures for BC (FPCN12), and the various press bulletins and snow report bulletins.

Level 2

A thorough evaluation of forecast user requirements should be done in order to arrive at forecast products issued for Level 2. This should not be finalized until after the WSO has been established and the WSO Concept itself has been tested and proven. This would permit some buildup of experience. The study in fact would be ongoing and would examine in depth the climatology of the region, the meteorological needs of the various communities, the type of forecast products needed to support those needs, and the type and location of additional data required to support forecast production.

A vigorous marketing program will be a necessity.

Mesoscale forecast problems will be defined and examined in detail. Mesoscale forecasts for lake winds, local frost conditions, pollution dispersion, etc. will be issued.

As mentioned under the Data Requirements Section (5.3.2), the most important requirement when dealing with a mesoscale forecasting problem is the data base. Each mesoscale forecast problem should be adequately instrumented and a knowledge base built up before forecasts and warnings are issued.

Probably the most urgent mesoscale forecasting problems are the lake winds on Okanagan and Shuswap lakes. These lakes experience high recreational usage, often by inexperienced boaters, primarily during the months when severe weather is most frequent. The present lack of knowledge of mesoscale lake winds impacts directly on the ability of AES to provide an adequate warning service. Present plans call for one automatic observing station to be installed on the Salmon Arm waterfront in 1989/90. Initially, at least an additional 6 temporary automatic stations should be installed on and around Shuswap Lake in order to obtain a basic knowledge of the wind patterns. Once a basic knowledge has been gained, a reasonable decision could be made on whether to add or delete stations or relocate them to other sites around the lake. Observations should also be solicited from marinas, boaters, etc. After some knowledge has been gained of the local mesoscale peculiarities, forecasts and warnings could be issued. This same methodology would hold for the Okanagan Lake mesoscale problem, the Okanagan orchard wind problem (spray

and frost), as well as any other mesoscale problem in the region. If these 2 mesoscale problems are going to be addressed as soon as the WSO is operational, then preliminary work such as determining suitable sites for the temporary automatic stations should begin as soon as possible.

5.4.2 Consultative Services Defined

The WSO will respond to the fact that there will still be a requirement for consultation with users of AES products. Refer to appendicies 5.1.4 and 5.1.6 which identify the present contacts and the number of each in the southern interior. The consultation aspect of the WSO operation fulfills one of the basic philosophies behind the WSO concept; to bring the producer of the forecast and the user into communication. As the WSO must operate on a 24 hour basis to support forecast programs, it was decided early on by the planning team to emphasize that 24 hour consultation service would be available. The team is concerned that the consultation requirement could easily detract from the forecast production through interruptions. Consideration must be given to the provision of call screening during known busy periods and ensure that sufficient ATADs and other mass dissemination techniques are in place to minimize this concern.

The following then is a summary of the teams assessment of the most likely consultative work load in the WSO.

Level 1

1) In reference to the details of level 1 provided in the "Project Description" (page 4), increased dissemination capabilities such as weather radio and the focus on specific local issues and requirements should reduce the consultation requirements. At the same time, consultation will be expanded to 24 hours per day and become toll free for all users in Vernon and Penticton when the AES physical presence is withdrawn from those 2 sites.

2) Aviation consultation will be limited to AES briefers at other WO's and when these are closed, from Flight Service Stations in the area. Occasional contacts with the Canadian Aviation Safety Board involved in aircraft accident investigation will require action. Any other requests for aviation information will be referred to the nearest AES briefing office or FSS.

3) Marine consultation may increase as more of the populace engages in water related recreational activities. Wind reports and wind forecasts for the local lakes will likely be the main concerns.

4) Consultation with the radio/TV media, industries such

as agriculture/forestry, and environmentalists will continue but may be less frequenct as a result of the planned enhancement of product dissemination.

5) Requests for basic on line climatological information will continue. Experience has shown that most of these will be by phone, some in person, and a few by mail. Requests for other than basic on line climatological information will be referred to Vancouver or Downsview.

6) Scientific expertise will be available to handle requests requiring knowledge of specialized meteorological fields such as air pollution, hydrology, etc.

Level 2

1) Requests for consultative service at this level should decrease as the planned level of WSO operation described on page 4 (Project Description)is achieved.

2) The implementation of "inland marine forecasts" for some of the larger lakes may prompt an increase in calls for lakes not covered by this product.

3) Climatological requests will decrease if information is made available through interactive access to the AES data bank.

4) Some users such as those in agriculture, forestry, air quality, smoke management, media, tourism and local special events will still have a need to call for additional information.

5) Scientific expertise will be available to handle special meteorological requests.

5.4.3 Marketing Activities

The Strategic Plan and the WSO Concept papers have placed a priority on increasing the marketing and client relations activities. From the WSO Concept: "WSO staff will consult with clients to review operations and products/services, and will establish cooperative programs including reciprocal training activities."

The WSO Concept paper identifies the following activities in the cycle of marketing and client relations:

- client consultation on their operations and requirements;
- identification of needs;
- training and familiarization;
- development and testing;
- implementation;
- verification and assessment;

- feedback from clients.

It is anticipated that these activities will be performed under the leadership of the manager of the office supported by development staff and focal point operational staff within the WSO as well as by expertise within the Region.

In the short term following the establishment of the WSO, it is probable that most of the marketing efforts will centre on meeting the inevitable demands placed on the new office for consultation on problems which may result from the change.

In the long term, two types of activities will probably be required: ongoing liaison with local user agencies and committees and focussed exploration activities involving one or two user groups for a period of time. These focussed special efforts will either be done as a local initiative, part of a regional priority, or as part of a national marketing effort.

Because of the need to communicate policy and program concerns to the Regional management, a significant part of the short and long term marketing activities will require frequent consultation with Regional office.

The level of effort required is difficult to estimate but it should not be underestimated. In the Team's opinion, one dedicated P/Y of effort will be required. In the longer term, it is possible that the marketing activities per se will require a minimum of half a P/Y plus the participation of operational staff. Management should therefore consider identifying an up-front dedicated marketing resource for the first year of the WSO operation. Once the program is running smoothly, this dedicated resource could be removed and the effort integrated into the activities of the manager and support staff.

5.4.4 Other WSO Outputs

Other miscellaneous outputs or services presently being done by the Pacific Weather Centre and the 3 AES facilities in the Okanagan Valley will also need to be handled by the WSO staff.

Level 1

1) At least twice daily aerological observations using a navaid system or a profilometer.
2) Computer generated meteorological summaries for Kelowna and Penticton.
3) Verification programs for forecast products. These will be automated as much as possible.

Level 2

1) Further automation of atmospheric temperature and wind profile observations as technological advances permit.

2) Expand, develop and evaluate other outputs and services as the WSO advances.

5.5 Dissemination Requirements

Efficient and frequent dissemination of the various WSO products is essential to satisfy the users' requirement and minimize the need for users to consult with the WSO staff. The total 1987 user contacts of the 3 present AES facilities in the Okanagan excluding aviation was 169,985. A large number of contacts can be expected if enhanced dissemination is not provided. Hardcopy dissemination will be provided in both official languages as required.

5.5.1 Weather Warning Dissemination

Dissemination of weather warnings in a timely and efficient manner will be a prime function of the WSO. The large number of agencies and individuals to be contacted across the area of responsibility during warnings will create a formidable task in the WSO. It is imperative that state of the art technology be used to automate dissemination and thus provide the service AES is mandated for. See appendix 5.5.1

5.5.2 Media Services

Level 1

At present, the Kelowna and Penticton Weather Offices provide local radio stations with 22 radio broadcasts daily. An additional 12 broadcasts are provided daily during April and May in support of agricultural requirements, and 6 daily from June through August in support of agriculture and recreation. There is then a period in the spring when 36 daily radio broadcasts are disseminated by AES staff. Some of the broadcasts are prerecorded while others provide a live interchange. While this number may change slightly in the next 2 or 3 years, there will still be a large number of radio broadcasts to be handled by the WSO staff.

An AES Radio Station Survey conducted in the spring of '88 indicated that 80 percent of the Pacific Region radio stations sampled felt it was "very important" to "critical" to have direct service from the closest AES facility staff.

The team recommends that the radio media, AES's most important disseminator continue to be served on a one on one basis.

The new weather channel will likely have a dramatic effect on the requirements of local TV production studios for weather briefings. It is the view of the team that the present support provided to the Kelowna television production studio for several daily off air briefings may not need to continue under the WSO but will if required. Satellite imagery including "loops" could be made available to the production studio if requested.

Forecast and climatological support will be provided daily to the newspapers in the Okanagan Valley currently serviced and any others that may request data.

Level 2

The technological advances at this level should permit more efficient means of disseminating weather to the radio media. The team feels however that there is a good possibility that the media will prefer to continue with known voices and personalities as indicated in the recent radio media survey. If this is not the case, then the team suggests that quality voice synthesizers be considered as a means of directly disseminating the WSO products to this media.

Support to the television media at this level will be dependent on the success of the present Weather Channel. The WSO could provide a very sophisticated type of support if resources permit.

Newspaper support if required, could be in the form of prepackaged information with a pictorial map of the area depicting the forecast for the next 24 hours.

5.5.3 Weather Radio Services

Weather radio will play an important role in improving the dissemination capability of the WSO. Weather radio will be installed under Level 1 and expanded under Level 2. Forecast products broadcast on weather radio will be similar regardless of which level of service is achieved. These would include:

1) Severe weather warnings
2) Public/Mountain forecasts
3) Specialized forecasts dealing with seasonal and mesoscale events such as frost, local winds, lake winds etc.
4) Bulletins, including climatological and air quality data.

It is the team's recommendation that weather radio coverage be established on a priority basis. The first priority would be to maximize coverage to all media outlets to address the AES mandate on safety and security. The second priority would be coverage of the main recreational lakes and the third priority is coverage to the extensive agriculture industry.

5.5.4 Telephone and ATAD Services

Level 1

In order to minimize the impact of the loss of AES physical presence in any community, an equal or better toll free consultation service must be made available to the users of the community losing the facility. It is recommended then that toll free lines be installed to the WSO from Vernon and Penticton. Direct contact with the media during severe weather events is essential. Media hotlines could be used to contact the Wire Services Vancouver studios with severe weather warnings during those times each day the broadcasts are not done at the local station. Media hotlines would be in addition to a dedicated line for normal media service. It is recommended that a hot line should be established from the WSO to a Kelowna radio station on a test basis. Beyond that, normal business and administration lines should be installed, including several additional ones for connection to ATADs.

Okanagan Weather service contact statistics for 1987 provide an insight to the number of telephone calls handled by ATAD's. Without adequate ATAD service the WSO staff will be overworked answering basic calls. It is recommended by the team that ATAD's be installed in communities where AES physical presence has been withdrawn. ATAD service should also be expanded to other communities with populations of 5k and greater in order to provide equal service and to reduce the potential call load. A total of 15 ATADs would be necessary to cover all communities with populations in excess of 5k. This would serve 60 percent of the area residents.

Level 2

It is recommended to extend the equal service policy using ATADs to all communities with a population of 3k or greater. These additional communities then would be able to access a recorded weather message for their area through a local ATAD which has been computer downloaded from the weather radio facility. This will increase the percentage of area residents served to at least 80 percent. It is further suggested that consideration be given to approaching B.C. Tel regarding locating the ATAD in their facility and negotiating a maintenance contract with them.

5.5.5 Cable Television Systems

The following will be considered if the "weather channel" does not provide the local users' weather requirements:

Level 1

A computer generated state of the art telidon type service from the WSO could be offered to Cable companies in Kamloops, Penticton, Kelowna, and Vernon.

Level 2

An extension of the level 1 service could be offered to Cable Companies in Revelstoke, Nelson, and Castlegar.

5.5.6 In Person

The amount of "walk in" business will depend on the location of the WSO facility. Most of the requests will initially be for climatological data or just to tour and view the complex.

Level 1

A suitable area for walk in users should be planned for, and include a PC and printer to provide climatological data as required. At this level, it is recommended that the WSO be set up to handle;

1) personal requests for climatological data.
2) requests for other information such as how to set barometers, snowloads for construction, rate of rainfall for planning, etc.
3) brief tours of the WSO operation if time and operations permit.
4) requests for a suitable video of the WSO operation to be used by schools and other groups or viewed on a monitor at the site.
5) in depth consultation relating to all meteorological information.

6) a media briefing area for newsworthy weather events

Level 2

The team feels that personal contact requirements will continue in this level.

5.5.7 Electronic Mail Service

As the use of PC's becomes more the norm than just a fad or toy, AES is receiving requests from various users for access to forecasts and other data through electronic bulletin boards. It is recommended then that consideration be given to directing some of the WSO products to electronic bulletin boards in a few major communities if there is a significant requirement.

Level 1

Forecasts and climatological bulletins could be made available to selected users accessing bulletin boards using PC's.

Level 2

Level 1 service could be expanded to cover more communities in the area of responsibility.

5.6 NCS Requirements

5.6.1 Level 1 - Input

Alphanumeric Data

Alphanumeric data received at the WSO will have to be the same as that received by the Pacific Weather Centre. This would include all observations, warnings, forecasts, bulletins and messages.

Observations from other data networks such as forestry, highways, and BC Hydro must also be readily available.

Graphics - Analysis and Prognoses

Meteorological fields received by the WSO will have to be the same as those received by the Pacific Weather Centre. This includes forecast and analysis products issued by other centres. Also some products such as surface analyses and prognoses issued by the Pacific Weather Centre will be required to aid in coordination.

Satellite Imagery

Satellite data would have to be available for manipulation just as it is in the Pacific Weather Centre.

The resolution of the data must be at least as high as that of the Pacific Weather Centre and be available in the same timely fashion. If satellite data is truly going to be utilized to the fullest extent to support weather warning, very short range forecast and mesoscale forecast production, it is crucial that it be available almost immediately and in the highest possible resolution.

5.6.2 Level 2 - Input

Alphanumeric Data

Alphanumeric data received at the WSO will have to be the same as that received by the Pacific Weather Centre. This would include all observations, warnings, forecasts, bulletins and messages.

Observations from other data networks such as forestry and BC Hydro and our own mesoscale and climatological data networks must be readily available in both an alphanumeric and pictorial format.

Graphics - Analysis and Prognoses

Same as Level 1.

Satellite Imagery

Same as Level 1.

5.6.3 Level 1 - Output

Alphanumeric data

Observations, warnings, forecasts, bulletins and messages must be able to be easily and conveniently sent for distribution on the various circuits to other centres and various users such as the media and the news services.

The same capability as the Pacific Weather Centre possesses must be maintained as a minimum. The output and distribution must be automated as much as possible.

Graphics - Analysis and Prognoses

The ability to send graphics products must be at least the same as that of the Pacific Weather Centre.

Graphics products will be sent by a simple action like pressing a button.

Satellite Imagery

The WSO should have the capability to send clear high resolution satellite imagery to various users. Satellite imagery and other satellite products could very likely become a very desirable and necessary component of forecast products produced by the WSO for some of the specialized users. An example of this type of product is the VFR Route Forecasts provided for Transport Canada by the Pacific Weather Centree.

5.6.4 Level 2 - Output

Alphanumeric data

Same as Level 1.

Graphics - Analysis and Prognoses

Same as Level 1.

Satellite Imagery

Same as Level 1.

5.7 Workload and Operational Staffing Requirements

A workload analysis was done in order to obtain an estimate of the human resources required in the prototype WSO. This is divided into 2 sections: **Analysis/Forecast Workload** and **Weather Service Workload.**

5.7.1 Analysis/Forecast Workload and Staffing Requirements

Level 1 (Option A)

The southern interior WSO meteorologist will remove approximately the following workload from each of the positions at the Pacific Weather Centre. The numbers represent the portion of the workload of particular desks.

Forecast desk	Portion of workload
Aviation Interior duties.....	.50
Public duties..... (includes division of the Mountain duties)	.25
Forestry duties.....	.25
Satellite duties.....	.05
Guidance preparation and supervisory duties.....	.10
Total.....	1.15

All positions are 24 hour except the forestry position which is staffed for 10 hours per day for about 6 months.
The workload at the Pacific Weather Centre would be decreased by approximately 1 forecast desk.

When these duties are assumed by the southern interior WSO, they can not be done within the PY resources removed from the Pacific Weather Centre. For example, the PWC supervisor, in preparing guidance for the eastern Pacific and British Columbia, includes the BC southern interior as a small part of his area of responsibility. The WSO meteorologist, in preparing guidance for the southern interior must also go through most of the same procedures and thinking processes as the PWC supervisor. Although the WSO meteorologist will be forecasting for only a subset of the area, he must still consider the larger geographical picture, interpretation of numerical models, etc. and spend considerable time in guidance preparation. This argument would also hold for the other forecast desks such as the Public. In preparing the Public forecast the PWC public forecaster examines a large geographical area and prepares one synopsis for BC. The WSO meteorologist must consider a geographical area almost as large and then prepare a synopsis for his somewhat smaller region.

In summary then, the WSO concept will allow meteorologists to concentrate or focus on a smaller area. However, at least in the prototype, this system will not be as efficient as the present system and will result in some duplication of effort.

Estimated WSO resources required to assume the workload removed from the Pacific Weather Centre are detailed below.

Forecast desk	Portion of workload
Aviation duties.....	.90 (21.50 hrs)
Public duties..... (includes Mountain and Forestry duties)	1.10 (26.95 hrs)
Guidance preparation and supervisory duties.... (includes Satellite duties)	1.00 (23.35 hrs)
Total.....	3.00

This would result in a requirement for approximately 3 forecast desks staffed on a 24 hour basis. As the workload will vary depending on the time of day; there may be a requirement for 4 desks during certain daylight hours and only 1 desk for part of the nighttime hours.

Workload estimates assume that the products are prepared and issued using essentially the same technology presently available in the Pacific Weather Centre. Advances in technology will undoubtedly reduced the time required for preparation of forecast products and monitoring and interpreting data of various sorts.

The actual time required to perform the forecast duties will vary somewhat depending on the weather. In the event of severe weather, top priority products like warnings would be issued promptly while other items like internal products would be delayed. In the event of good weather, it is estimated that about 12 hours (or the workload of one half of one of the positions) could be made available for other duties such as research projects or marketing activities.

The aviation duties do not include preparation of route forecasts. The use of route forecasts is presently being tested in British Columbia. The Pacific Weather Centre is now engaged in a program to prepare forecasts for 2 routes. If the route forecast program is successful there will be a requirement for route forecasts for the southern interior.

It is the team's recommendation that a testbed WSO be set up in the Pacific Weather Centre before the actual WSO is set up in the southern interior. This would allow new technology such as the workstation to be developed and tested well before implementation. It would also allow verification of the estimated times required to perform the various duties and verification of the time saved by PWC through the loss of those duties.

A more detailed analysis of the WSO workload is outlined in appendix 5.7.1A.

Level 1 (Option B)

Under Option B, the WSO will require support from the Pacific Weather Centre. The prognostic guidance and some of the other forecast and analysis products will be issued from the Pacific Weather Centre.

Under Option B, the southern interior WSO meteorologist will remove approximately the following workload from each of the positions at the Pacific Weather Centre. The numbers represent the portion of the workload of particular desks.

Forecast desk	Portion of workload
Aviation Interior duties.....	.50
Public duties..... (includes division of the Mountain duties)	.25
Forestry duties.....	.25
Total.....	1.00

All positions except the forestry desk are staffed on a 24 hour basis. The workload at the Pacific Weather Centre would be decreased by slightly less than 1 forecast desk.

Estimated WSO resources required to assume the workload removed from the Pacific Weather Centre are detailed below.

Forecast desk	Portion of workload
Supervisory/Aviation duties.....	1.00 (24.50 hrs)
Public duties..... (includes Mountain and Forestry duties)	1.20 (29.35 hrs)
Total.....	2.20

This would result in a requirement for just over 2 forecast desks staffed on a 24 hour basis. As the workload will vary depending on the time of day; there may be a requirement for 3 desks during certain daylight hours and only 1 desk for part of the nighttime hours.

A detailed analysis of the WSO workload for Option B is outlined in appendix 5.7.1B.

Level 2

Regardless of which option is selected for Level 1, level 2 will be as follows.

As advances in automation continue, duties like the preparation of Day 2 forecasts and guidance will likely be either eliminated or the amount of manual input greatly reduced. Advances in automation should also permit a significant reduction in preparation time for Day 1 forecasts and the various analyses. The WSO meteorologists will then have more time to devote to the preparation of mesoscale forecasts.

5.7.2 Weather Service Workload and Staffing Requirements

Level 1

The establishment of a WSO in the Okanagan is planned to incorporate into one, the 3 present AES facilities at Vernon, Kelowna and Penticton. This means that most or all of the weather services provided by these facilities as outlined in Appendicies 5.1.2 to 5.1.5 and including; local forecast products, media dissemination, consultation, aerological observations, shared weather watch and miscellaneous outputs will need to be provided by the WSO in level 1. Streamlining and consolidation of duties in the WSO will result in some reduction, while the 24 hour operational status will in turn increase the time required to fulfil the service requirements. A summary of the tentative "service" workload in the WSO using estimates from the present WOs is provided below with a detailed breakdown in appendix 5.7.2.

Service	Hours daily
Media Support	2.60
Consultation	6.75
Aerological Observations	4.00
Weather Watch	2.00
Other miscellaneous services	7.90

is available intermittently for low priority duties nearby for approx 2 hrs.

The addition of Weather Radio will add 2.00 hours to the final total, but will be offset by the reduction of ATAD service time done automatically by the Weather Radio.

The present local forecast program will be rolled in with the routine forecast duties. The weather watch duties will become 2 hours with the 24 hour operation of the WSO. This then

should leave approximately 23.25 hours (or one desk) daily of weather service requirements to be covered by the WSO forecast staff.

The demands for service will vary and are driven by the state of the weather. During a period of good, stable weather the need will decrease to an estimated 17.5 hrs per day. Local projects or assignments can be worked on during these periods. On the other hand, during events of poor and/or variable weather the need will increase to an estimated 27.4 hours per day. Some of the "other weather services" would be delayed.

A seasonal requirement by the BCFS for an AES weather service specialist at Williams Lake is presently provided by the Kelowna Weather Office. Under the WSO several options in meeting this resource requirement are available and mentioned in appendix 5.7.2. The team recommends that consideration be given to the option of contracting out this service.

Level 2

The service will have improved by this level. Automated dissemination will reduce the human resources required to do this. Technology will also have expanded to the point that other areas of service will be done automatically and further reduce the need for "service" PYs.

5.7.3 Integrated Workload

It is intended to integrate the workload on each shift so that forecast production, dissemination and consultation will be done to some degree at every desk.

5.8 Workstation Requirements

5.8.1 PWC Staff Survey

On June 16, 1988 a Workstation Questionnaire was sent to all meteorologists in the Pacific Weather Centre and all weather specialists in the Lower Mainland Weather Office. The results of this questionnaire have been incorporated into the workstation requirements.

5.8.2 Number of Stations

The workbreakdown analysis performed in section 5.7 determined that there will have to be 5 meteorologists on duty in the southern interior WSO during peak busy periods.

Therefore there must be 5 workstations available for operational use. The number of workstations required will vary from 5 during peak load hours to 1 during minimum load hours.

There will also be 1 workstation available for backup in the event of technical problems with any of the operational workstations. This station will also be used for ODIT purposes.

A start should be made on the WSO workstation as soon as possible. It should be developed and tested in an operational setting such as the Pacific Weather Centre or a Southern Interior WSO Testbed. This would allow maximum development and testing to take place before implementation.

Under option B the number of workstations will be reduced by one.

The number of workstations required could be verified when a test is done of the actual workload.

5.8.3 Ergonomic Requirements

Ergonomic factors in workstation design are very important. As well as just the workstation, the total environment where the workstations will be located must be considered.

The space occupied by the workstations must meet the following requirements:

1) Air conditioning must be adequate to handle the load produced by numerous computers and electrical equipment.
2) Ambient light from outside must be controlled to prevent reflection and glare on video screens.
3) The space must have a raised floor and a false ceiling.
4) The ceiling height must be a minimum 3 metres.
5) The space must be acoustically designed to keep noise levels to a minimum.
6) Wall display (video and hard copy) must be easily viewed and accessible from the workstations.
7) Telephones must have low noise level ringers.
8) There must be ready access to west facing windows.

The workstations must meet the following ergonomic requirements:

1) Video screens in the workstation must be easily viewed for extended periods of time.
2) Positions of screens must be easily adjustable for individual comfort.
3) Displayed information must be clear and have no current ripple.
4) There must be no reflection or glare on the screens.

5) The use of mice, trackballs, and tablets will be kept to a minimum. Except for a keyboard, most interactive actions should take place directly on the video screen.

5.8.4 Analysis Requirements

The workstation will have:

1) The ability to display alphanumeric data in plotted chart format.
2) The ability to contour data either automatically or manually or a combination of both. Manual contouring would be done directly on the video screen.
3) The ability to automatically shade, colour, or enhance areas as specified by the meteorologist.
4) 6 animation loops of 24 frames each which will show changes in contours or enhanced areas over time. These animation loops will have the option of being able to be preprogrammed and automatically updated.
5) The ability to display vertical soundings with an option for displaying up to 2 historical soundings.
6) The ability to display hodographs.
7) The ability to display spherics data and to provide a time loop display.
8) The ability to display radar data and to provide a time loop display.
9) The ability to retrieve climatological data such as record temperatures, rainfalls, etc.
10) Digital terrain data bases capable of displaying actual terrain to a 2KM scale and also the model terrain of the numerical weather prediction models.
11) The ability to display climatological information in graphics format and in a geographic format.
12) The ability to provide information on station history as well as the current operating status of stations with flags on possible sensor problems. This information becomes increasingly more important as automatic station networks are expanded. The information would be valuable to both inspection and forecast staff.

5.8.5 Satellite Data Requirements

Satellite data is crucial to forecasting and will be especially applicable to dealing with mesoscale problems.
The workstation must have:
1) The ability to receive and manipulate the highest possible resolution satellite data.
2) The ability to change and devise enhancment curves for various applications.
3) The ability to have all imagery available in both GOES or polar stereographic projections.
4) The ability to provide at least 6 animation loops of 24 frames each.
5) The ability to vary the animation speed.
6) The ability to quickly (< 5 seconds) recall any single frame from an animation loop in the highest possible resolution.
7) The ability to provide an animation sequence using false colour images. (visual and infrared overlaid)
8) The ability to overlay fields on the imagery.
9) The ability to display data on images.

10) The ability to easily determine speeds of systems, cloud elements, etc.
11) The ability to display images in any map projection.
12) The ability to zoom and roam.

The required satellite data would have to be transmitted to the WSO from an AES ground receiving facility. The amount of data required will be great. High resolution will be required. The data must also be available within 10 minutes of observational time (timeliness is crucial in working with mesoscale problems and severe weather). The next generation of GOES satellites will be designed to focus on severe weather and mesoscale problems, providing high resolution imagery as frequent as every 5 minutes. In order to derive maximum benefit from the new satellite capabilities the WSO should have the ability to receive and manipulate the satellite data. Providing the WSO with this capability will have a direct impact on the provision of weather warnings, very short range forecasts and mesoscale forecasts.

5.8.6 Prognosis Preparation Requirements

Prognoses preparation will be one of the most important functions of the workstation. The workstation must have:
1) The ability to assimilate and have readily available in memory 200 fields. Another 100 fields should be available for callup within 10 seconds.
2) The ability to overlay up to 4 fields.
3) The ability to overlay up to 3 fields on a satellite image.
4) The ability to display data on analysis fields.
5) The ability to modify fields and store them.
6) The ability to zoom and roam.
7) The ability to subtract fields.
8) The ability to quickly and easily make a hard copy of any screen display.
9) A good quality background map with optional location identifiers.
10) A total of 4 video terminals, each capable of displaying either graphics or alphanumeric data or satellite imagery.
11) As a minimum, all fields available in the Pacific Weather Centre, including the American models.

5.8.7 Forecast Preparation Requirements

A considerable amount of time is spent by meteorologists composing forecasts. In order to make any significant strides forward in saving time, forecast composition must be automated as much as possible. The workstation must have:
1) An efficient, fast, user friendly word processor.

2) A total of 4 video terminals, each capable of displaying either graphics or alphanumeric data or satellite imagery.
3) The ability to generate worded forecasts from a pictorial representation such as a significant weather chart.
4) The ability to display alphanumeric data (observational and forecast) in chart format.

5.8.8 Wall Display Requirements

As well as the workstation display, there will be a need for a wall display, at least initially. This should consist primarily of a video display but also leave space for some hard copy. The wall display must:
1) Be conveniently located so that it can be readily viewed from a least 2 of the workstations.
2) Consist of monitors or projectors that will produce images large enough to be viewed with clarity from the 2 workstations.
3) Have about 10 screens.
4) Have one screen dedicated to a battleboard where warnings and alerts would be displayed as well as the need for warnings and amendments.
5) Have a 1.5 metre by 2 metre display board for hard copy.

5.8.9 Response Time Requirements

Response times have been noted in some of the preceding sections. Quick response time will be one of the keys in receiving forecaster acceptance of the workstation. In general, a wait of more than a few seconds for any product to be displayed will be unacceptable.

5.8.10 Power Backup Requirements

Uninterruptable power will be a must. The power system must be capable of being maintained and tested without interrupting the operation of the workstation.

5.9 WSO Organization and Structure

5.9.1 Level 1

Level 1 (Option A)

The southern interior WSO must have adequate staff to cover the equivalent of 3 forecast positions operating on a 24 hour basis. The WSO must have adequate staff to cover the equivalent of 1 consultation position operating on a 24 hour basis. Each position (24 hour equivalent) requires 6 meteorologists. This covers leave, training, development, project time, etc.

The total operational requirement therefore would be for 4 positions at 6 meteorologists per position....equals 24 meteorologists.

The overall total including other positions would be:

1) 24 meteorologists for the operational desks.
2) 1 Administrative Manager
3) 1 or 2 Receptionist/Secretary/Clerical/Administrative support positions
4) 1 Operational Program Manager
5) 1 Scientific Development and Consultation meteorologist
6) 1 or 2 Computer programmer/electronic support positions

Level 1 (Option B)

The southern interior WSO must have adequate staff to cover the equivalent of 2 forecast positions operating on a 24 hour basis. The WSO must have adequate staff to cover the equivalent of 1 consultation position operating on a 24 hour basis. Each position (24 hour equivalent) requires 6 meteorologists. This covers leave, training, development, project time, etc.

The total operational requirement therefore would be for 3 positions at 6 meteorologists per position....equals 18 meteorologists.

The overall total including other positions would be:

1) 18 meteorologists for the operational desks.
2) 1 Administrative Manager
3) 1 or 2 Receptionist/Secretary/Clerical/Administrative support positions
4) 1 Operational Program Manager
5) 1 Scientific Development and Consultation Meteorologist
6) 1 or 2 Computer programmer/electronic support positions

<u>Management structure</u>

There are a number of options as to how the management duties of the WSO would be handled. Management duties could be divided as follows:

1) Operational Manager

Administrative Manager — Development and Consultation Meteorologist

In this case the Operational Manager would be ultimately responsible for all decisions.

2) Administrative Manager (Facilities, Administration, Public Relations, Marketing) — Operational Manager (Forecasting, Development, Scientific Consultation CS and EL Support)

In this case there would be a dual structure, with each manager responsible for decisions in their separate areas.

3) Administrative Manager

Operational Manager

Development and Consultation Meteorologist

In this case the Administrative Manager is ultimately responsible for all decisions, however, the Operational Manager would in fact make and be responsible for all scientific and forecasting decisions.

In any case it is recommended that there be a scientific authority, university degree individual who will be responsible for making decisions in the forecast and research programs.

5.9.2 Level 2

For Level 2, staffing requirements for meteorologists may be reduced. (This would be particularly true if Option A is followed.) As advances in automation continue, some of the meteorologist's duties may be eliminated or at least reduced in manual input requirements. This might eventually result in a reduction of 1 forecast position (6 meteorologists).

Other positions in the WSO will likely not change.

Appendix

3.1 Definitions

5.1.1A. PWC Forecast Products

5.1.1B. PWC Forecast Products

5.1.2 Local Weather Office Forecast Products

5.1.3 Local Weather Service Outlet Dissemination

5.1.4 Weather Office Consultative Services

5.1.5 Other Weather Services Provided

5.1.7 Major Weather Service Stakeholders in the Area

5.1.8 Area Elected Officials

5.2.2 Community Weather Warning Service

5.2.2.1 Present Weather Services to These Areas

5.4.1.1 Proposal for Weather Warning Guidelines

5.4.1.2 Proposal for POPS Guidelines

5.4.2 WSO Consultative Services Defined

5.5.1 Weather Warning Dissemination

5.7.1A. Analysis/forecast workload

5.7.1B. Analysis/forecast workload

5.7.2 Weather Services workload

3.1 DEFINITIONS

Mesometeorology - That portion of the science of meteorology concerned with the study of atmospheric phenomena on a scale larger than that of micrometeorology, but smaller than the cyclonic scale.

Thus, this field is concerned with the detection and analysis of the state of the atmosphere as it exists between meteorological stations, or at least well beyond the range of normal observation from a single point. The types of major weather phenomena that are small enough to remain undetected within a normal observation network are sometimes called "mesometeorological"; they include tornadoes, thunderstorms, and immature tropical cyclones. However, the detailed observation of larger-scale occurrences (fronts, precipitation areas, etc.) also is an important part of mesometeorology. Radar has proven to be an efficient means of conducting this type of observation, and currently is the most widely used method. Aircraft observation, spherics, and dense surface observing networks are also used to this end.

It includes, also, study of the so-called "local effects"; that is, the influence of natural and man-made topographic features upon the weather in their immediate vicinities.

5.1.1A PWC FORECAST PRODUCTS FOR THE SOUTHERN INTERIOR

SI ANALYSIS PRODUCTS
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1. FOR FAX	0740	0040	SATELLITE ANALYSIS 06Z
2. FOR FAX	0909	0209	SURFACE ANALYSIS 06Z
3. AVIATION(INT)	1200	0500	SURFACE ANALYSIS 09Z
4. FOR FAX	1326	0626	SATELLITE ANALYSIS 12Z
5. FOR FAX	1525	0825	SURFACE ANALYSIS 12Z
6. AVIATION(INT)	1800	1100	SURFACE ANALYSIS 15Z
7. FOR FAX	1940	1240	SATELLITE ANALYSIS 18Z
8. FOR FAX	2110	1410	SURFACE ANALYSIS 18Z
9. AVIATION(INT)	0000	1700	SURFACE ANALYSIS 21Z
10. FOR FAX	0132	1832	SATELLITE ANALYSIS 00Z
11. FOR FAX	0326	2026	SURFACE ANALYSIS 00Z
12. AVIATION(INT)	0600	2300	SURFACE ANALYSIS 03Z

Appendix 5.1.1A

SI ANALYSIS PRODUCTS
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. FOR FAX	0909	0109	SURFACE ANALYSIS 06Z
2. AVIATION(INT)	1200	0400	SURFACE ANALYSIS 09Z
3. FOR FAX	1326	0526	SATELLITE ANALYSIS 12Z
4. FOR FAX	1525	0725	SURFACE ANALYSIS 12Z
5. AVIATION(INT)	1800	1000	SURFACE ANALYSIS 15Z
6. FOR FAX	1940	1140	SATELLITE ANALYSIS 18Z
7. FOR FAX	2110	1310	SURFACE ANALYSIS 18Z
8. AVIATION(INT)	0000	1600	SURFACE ANALYSIS 21Z
9. FOR FAX	0132	1732	SATELLITE ANALYSIS 00Z
10. FOR FAX	0326	1926	SURFACE ANALYSIS 00Z
11. AVIATION(INT)	0600	2200	SURFACE ANALYSIS 03Z
12. FOR FAX	0740	2340	SATELLITE ANALYSIS 06Z

Appendix 5.1.1A

AVIATION FORECASTS
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

	HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1.	FT	1030	0330	AERODROME FORECASTS FOR YKA, YYF, YXC
2.	FACN2 CWVR	1130	0430	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
3.	FUCN1 CWVR	1140	0440	MID-LEVEL SIGNIFICANT WEATHER PROGNOSIS
4.	FT	1340	0640	AERODROME FORECASTS FOR YRV
5.	FT	1340	0640	AERODROME FORECAST FOR YLW
6.	FT	1445	0645	AERODROME FORECASTS FOR YCG
7.	FT	1630	0930	AERODROME FORECASTS FOR YKA, YYF, YLW, YCG, YXC, YRV
8.	FACN2 CWVR	1730	1030	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
9.	FUCN1 CWVR	1740	1040	MID-LEVEL SIGNIFICANT WEATHER PROGNOSIS
10.	FT	2230	1530	AERODROME FORECASTS FOR YKA, YYF, YLW, YCG, YXC
11.	FACN2 CWVR	2330	1630	AREA FORECAST FOR B.C. INTERIOR SOUTHERN MOUNTAINS
12.	FUCN1 CWVR	2340	1640	MID-LEVEL SIGNIFICANT WEATHER PROGNOSIS
13.	FT	0430	2130	AERODROME FORECASTS FOR YKA, YYF, YLW, YXC
14.	FACN2 CWVR	0530	2230	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
15.	FUCN1 CWVR	0540	2240	MID-LEVEL SIGNIFICANT WEATHER PROGNOSIS
16.	WSCN1 CWVR	AS REQUIRED		SIGMET

Appendix 5.1.1A

SI AVIATION FORECASTS
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. FT	1030	0230	AERODROME FORECASTS FOR YKA YYF, YXC
2. FACN2 CWVR	1130	0330	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
3. FUCN1 CWVR	1140	0340	MID-LEVEL SIGNIFICANT WEATHER PROGNOSIS
4. FT	1340	0540	AERODROME FORECASTS FOR YRV
5. FT	1440	0640	AERODROME FORECAST FOR YLW
6. FT	1545	0745	AERODROME FORECASTS FOR YCG
7. FT	1630	0830	AERODROME FORECASTS FOR YKA YYF, YLW, YCG, YXC, YRV
8. FACN2 CWVR	1730	0930	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
9. FUCN1 CWVR	1740	0940	MID-LEVEL SIGNIFICANT WEATHER PROGNOSIS
10. FT	2230	1430	AERODROME FORECASTS FOR YKA YYF, YLW, YCG, YXC
11. FACN2 CWVR	2330	1530	AREA FORECAST FOR B.C. INTERIOR SOUTHERN MOUNTAINS
12. FUCN1 CWVR	2340	1540	MID-LEVEL SIGNIFICANT WEATHER PROGNOSIS
13. FT	0430	2030	AERODROME FORECASTS FOR YKA, YYF, YLW, YXC
14. FACN2 CWVR	0530	2130	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
15. FUCN1 CWVR	0540	2140	MID-LEVEL SIGNIFICANT WEATHER PROGNOSIS
16. WSCN1 CWVR	AS REQUIRED		SIGMET

Appendix 5.1.1A

SI FORESTRY FORECASTS
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1. FPCN32 CWVR	1330	0630	FIRE WEATHER FORECASTS FOR THE SOUTHERN INTERIOR FOR TODAY INCLUDING SOUTHEAST B.C. WEATHER ZONES 22,23,24,25,26,27 7 INDIVIDUAL LOCATIONS SOUTHWEST INTERIOR WEATHER ZONES 20,21 4 INDIVIDUAL LOCATIONS CHANCE OF LIGHTNING CHANCE OF INTENSE LIGHTNING 1PM FORECAST OF TEMPERATURE; RELATIVE HUMIDITY; WIND; PERCENTAGE CHANCE OF RAIN; PERCENTAGE CHANCE OF RAIN GREATER THAN 2 MM (TRACE)
2. TO FAX 1801	1941	1241	MAP SHOWING LOCATION OF LIGHTNING STRIKES OVER A SPECIFIC AREA
3. FPCN32 CWVR	2030	1330	FIRE WEATHER FORECASTS FOR THE SOUTHERN INTERIOR FOR THE NEXT DAY CONTENT AS ABOVE
4. TO FAX 1801	2117	1417	MAP SHOWING LOCATION OF LIGHTNING STRIKES OVER A SPECIFIC AREA
5. FPCN39 CWVR	AS NEEDED		FORECAST FOR SMOKE CONTROL FOR VARIOUS REGIONS INCLUDES MIXING HEIGHT; VENTILATION INDEX; 900M WIND; 1800M WIND; 3000M WIND OUTLOOK AND REMARKS
6. FPCN38 CWVR	2230	1530	LIGHTNING ASSESSMENT FOR TODAY AND THIS EVENING BASED ON LIGHTNING STRIKE DATA AND SATELLITE IMAGERY
7. TO FAX 1801	0030	1730	MAP SHOWING LOCATION OF LIGHTNING STRIKES OVER A SPECIFIC AREA

Appendix 5.1.1A

SI FORECAST GUIDANCE
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

	HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1.	FXCN1 CWVR	1100	0400	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
2.	FXCN4 CWVR	1320	0620	SATELLITE ANALYSIS AND DEVELOPMENT DISCUSSION FOR PACIFIC REGION
3.	FXCN1 CWVR	1900	1200	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
4.	FXCN4 CWVR	1920	1220	SATELLITE ANALYSIS AND DEVELOPMENT DISCUSSION FOR PACIFIC REGION
5.	FXCN1 CWVR	2300	1600	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
6.	FXCN4 CWVR	0120	1720	SATELLITE ANALYSIS AND DEVELOPMENT DISCUSSION FOR PACIFIC REGION
7.	FXCN1 CWVR	0600	2300	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
8.	FXCN4 CWVR	0720	0020	SATELLITE ANALYSIS AND DEVELOPMENT DISCUSSION FOR PACIFIC REGION
9.	FXCN5 CWVR	AS REQUIRED		CANADIAN HURRICANE PROGNOSTIC MESSAGE NOT FOR MEDIA BUT FOR RECIPIENTS WITH METEOROLOGICAL EXPERTISE (CMC, DND, WEATHER CENTRES)

Appendix 5.1.1A

SI FORECAST GUIDANCE
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. FXCN1 CWVR	1100	0300	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
2. FXCN4 CWVR	1320	0520	SATELLITE ANALYSIS AND DEVELOPMENT DISCUSSION FOR PACIFIC REGION
3. FXCN1 CWVR	1900	1100	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
4. FXCN4 CWVR	1920	1120	SATELLITE ANALYSIS AND DEVELOPMENT DISCUSSION FOR PACIFIC REGION
5. FXCN1 CWVR	2300	1500	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
6. FXCN4 CWVR	0120	1620	SATELLITE ANALYSIS AND DEVELOPMENT DISCUSSION FOR PACIFIC REGION
7. FXCN1 CWVR	0600	2200	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
8. FXCN4 CWVR	0720	2320	SATELLITE ANALYSIS AND DEVELOPMENT DISCUSSION FOR PACIFIC REGION
9. FXCN5 CWVR	AS REQUIRED		CANADIAN HURRICANE PROGNOSTIC MESSAGE NOT FOR MEDIA BUT FOR RECIPIENTS WITH METEOROLOGICAL EXPERTISE (CMC, DND, WEATHER CENTRES)

Appendix 5.1.1A

SI MOUNTAIN FORECAST GUIDANCE
WINTER SCHEDULE (NOVEMBER 1-APRIL 30)
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. FPCN50 CWVR	1200	0400	MOUNTAIN FORECAST GUIDANCE FOR B.C. ISSUED FOR: THOMPSON OKANAGAN MOUNTAINS SOUTH COLUMBIA MOUNTAINS NORTH COLUMBIA MOUNTAINS YOHO PARK INCLUDING SYNOPSIS, FREEZING LEVELS, PRECIPITATION AMOUNTS, MOUNTAIN TOP WINDS AND CONFIDENCE STATEMENT.
2. FPCN50 CWVR	1800	1000	MOUNTAIN FORECAST GUIDANCE FOR B.C. (AREAS AND CONTENT AS ABOVE)
3. FPCN50 CWVR	2300	1500	MOUNTAIN FORECAST GUIDANCE FOR B.C. (AREAS AND CONTENT AS ABOVE)
4. FPCN50 CWVR	0300	1900	MOUNTAIN FORECAST GUIDANCE FOR B.C. (AREAS AND CONTENT AS ABOVE)

Appendix 5.1.1A

SI PROGNOSTIC PRODUCTS
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1. FOR FAX	1107	0407	18 HOUR SURFACE PROGNOSIS VALID 00Z
2. FOR FAX	1114	0414	30 HOUR SURFACE PROGNOSIS VALID 12Z
3. FOR INTERNAL	1100	0400	42 HOUR TOTAL WEATHER PROGNOSIS VALID 00Z
4. FOR FAX	1830	1130	24 HOUR SURFACE PROGNOSIS VALID 12Z
5. FOR FAX	1836	1136	36 HOUR SURFACE PROGNOSIS VALID 00Z
6. FOR FAX	2225	1525	18 HOUR SURFACE PROGNOSIS VALID 12Z (OPTIONAL)
7. FOR FAX	2231	1531	30 HOUR SURFACE PROGNOSIS VALID 00Z (OPTIONAL)

Appendix 5.1.1A

PROGNOSTIC PRODUCTS
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. FOR FAX	1107	0307	18 HOUR SURFACE PROGNOSIS VALID 00Z
2. FOR FAX	1114	0314	30 HOUR SURFACE PROGNOSIS VALID 12Z
3. FOR INTERNAL	1100	0300	42 HOUR TOTAL WEATHER PROGNOSIS VALID 00Z
4. FOR FAX	1830	1030	24 HOUR SURFACE PROGNOSIS VALID 12Z
5. FOR FAX	1836	1036	36 HOUR SURFACE PROGNOSIS VALID 00Z
6. FOR FAX	2225	1425	18 HOUR SURFACE PROGNOSIS VALID 12Z (OPTIONAL)
7. FOR FAX	2231	1431	30 HOUR SURFACE PROGNOSIS VALID 00Z (OPTIONAL)

Appendix 5.1.1A

SI PUBLIC FORECASTS
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

	HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1.	FPCN12 CWVR	0845	0145	WEATHER,TEMPERATURES FOR B.C. ONE LINER
2.	FPCN52 CWVR	1200	0500	3-5 DAY OUTLOOK FOR SOUTHERN INTERIOR PRODUCED BY CMC; FOCN12 CWAO MONITORED BY PWC
3.	FPCN53 CWVR	1200	0500	3-5 DAY OUTLOOK FOR SOUTHERN INTERIOR PRODUCED BY CMC; FOCN13 CWAO MONITORED BY PWC FRENCH VERSION
4.	FPCN13 CWVR	1200	0500	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
5.	FPCN13 CWVR	1700	1000	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
6.	FPCN12 CWVR	1845	1145	WEATHER, TEMPERATURES FOR B.C. ONE LINER
7.	FPCN13 CWVR	2200	1500	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
8.	FPCN52 CWVR	2200	1500	4-5 DAY FORECASTS REISSUED MAY BE CHANGED FROM MORNING
9.	FPCN53 CWVR	2200	1500	4-5 DAY FORECASTS REISSUED MAY BE CHANGED FROM MORNING FRENCH VERSION
10.	FPCN13 CWVR	0200	1900	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
11.	WWCN1 CWVR	AS REQUIRED		WEATHER WARNING
12.	WPCN1 CWVR	AS REQUIRED		WEATHER ADVISORY
13.	WPCN3 CWVR	AS REQUIRED		CANADIAN HURRICANE INFORMATION STATEMENT FOR DISTRIBUTION TO THE MEDIA

Appendix 5.1.1A

SI PUBLIC FORECASTS
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

	HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1.	FPCN12 CWVR	0845	0045	WEATHER,TEMPERATURES FOR B.C. ONE LINER
2.	FPCN52 CWVR	1300	0500	3-5 DAY OUTLOOK FOR SOUTHERN INTERIOR PRODUCED BY CMC; FOCN12 CWAO MONITORED BY PWC
3.	FPCN53 CWVR	1300	0500	3-5 DAY OUTLOOK FOR SOUTHERN INTERIOR PRODUCED BY CMC; FOCN13 CWAO MONITORED BY PWC FRENCH VERSION
4.	FPCN13 CWVR	1300	0500	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
5.	FPCN13 CWVR	1800	1000	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
6.	FPCN12 CWVR	1845	1045	WEATHER, TEMPERATURES FOR B.C. ONE LINER
7.	FPCN13 CWVR	2300	1500	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
8.	FPCN52 CWVR	2300	1500	4-5 DAY FORECASTS REISSUED MAY BE CHANGED FROM MORNING
9.	FPCN53 CWVR	2300	1500	4-5 DAY FORECASTS REISSUED MAY BE CHANGED FROM MORNING FRENCH VERSION
10.	FPCN13 CWVR	0300	1900	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
11.	WWCN1 CWVR	AS REQUIRED		WEATHER WARNING
12.	WPCN1 CWVR	AS REQUIRED		WEATHER ADVISORY
13.	WPCN3 CWVR	AS REQUIRED		CANADIAN HURRICANE INFORMATION STATEMENT FOR DISTRIBUTION TO THE MEDIA

Appendix 5.1.1A

SI SPECIAL FORECASTS AND INFORMATION
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1. WBCN2 CWVR	1200	0400	PRESS BULLETIN
2. WBCN1 CWVR	1300	0600	POINT TEMPERATURE BULLETIN HIGH-TODAY LOW-TONIGHT HIGH-NEXT DAY FOR KAMLOOPS LYTTON PENTICTON KELOWNA BLUE RIVER REVELSTOKE CRANBROOK CASTLEGAR
3. FMCN1 CWVR	1500	0800	MAX & MIN FOR YKA
4. WBCN5 CWVR	1800	1100	B.C. HYDRO-5 DAY TEMPERATURE AND PRECIPITATION FORECASTS FOR LYTTON ROGERS PASS REVELSTOKE BLUE RIVER GOLDEN VALEMOUNT
5. BY TELEX	2100	1400	FORECASTS FOR INLAND NATURAL GAS LOW TONIGHT HIGH NEXT DAY LOW NEXT NIGHT FOR CRANBROOK CASTLEGAR KELOWNA PENTICTON LYTTON KAMLOOPS
6. FXCN1 CWVR	2300	1600	FROST FORECAST GUIDANCE FOR OKANAGAN MENTIONED IN FXCN1 DURING FROST SEASON AND INCLUDED IN 3PM AND 7PM PUBLIC FORECASTS (FPCN13)

7.	WBCN2	CWVR	0000 1700	PRESS BULLETIN
8.	CXCN1	CWVR	AS NEEDED	CLIMATE MESSAGES
9.	CXCN2	CWVR	AS NEEDED	CLIMATE MESSAGES

Appendix 5.1.1A

SI SPECIAL FORECASTS AND INFORMATION
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. WBCN2 CWVR	1200	0400	PRESS BULLETIN
2. WBCN1 CWVR	1400	0600	POINT TEMPERATURE BULLETIN HIGH-TODAY LOW-TONIGHT HIGH-NEXT DAY FOR KAMLOOPS LYTTON PENTICTON KELOWNA BLUE RIVER REVELSTOKE CRANBROOK CASTLEGAR
3. FMCN1 CWVR	1500	0800	MAX & MIN FOR YKA
4. WBCN5 CWVR	1800	1000	B.C. HYDRO-5 DAY TEMPERATURE AND PRECIPITATION FORECASTS FOR LYTTON ROGERS PASS REVELSTOKE BLUE RIVER GOLDEN VALEMOUNT
5. WBCN3 CWVR	1900	1100	SNOW REPORTS FROM VARIOUS LOCATIONS IN B.C. MOSTLY FROM MINISTRY OF HIGHWAYS
6. WBCN4 CWVR	1900	1100	SNOW REPORTS MOSTLY FROM SKI AREAS
7. BY TELEX	2100	1300	FORECASTS FOR INLAND NATURAL GAS LOW TONIGHT HIGH NEXT DAY LOW NEXT NIGHT FOR CRANBROOK CASTLEGAR KELOWNA PENTICTON LYTTON KAMLOOPS

8.	WBCN2 CWVR	0000	1600	PRESS BULLETIN
9.	WBCN3 CWVR	0200	1800	SNOW REPORTS FROM VARIOUS LOCATIONS AS ABOVE
10.	WBCN4 CWVR	0200	1800	SNOW REPORTS MOSTLY FROM SKI AREAS AS ABOVE
11.	CXCN1 CWVR	AS NEEDED		CLIMATE MESSAGES
12.	CXCN2 CWVR	AS NEEDED		CLIMATE MESSAGES

5.1.1B PWC FORECAST PRODUCTS FOR THE SOUTHERN INTERIOR

SI ANALYSIS PRODUCTS
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1. FOR INT	0909	0209	SURFACE ANALYSIS 06Z
2. AVIATION(INT)	1200	0500	SURFACE ANALYSIS 09Z
3. FOR INT	1525	0825	SURFACE ANALYSIS 12Z
4. AVIATION(INT)	1800	1100	SURFACE ANALYSIS 15Z
5. FOR INT	2110	1410	SURFACE ANALYSIS 18Z
6. AVIATION(INT)	0000	1700	SURFACE ANALYSIS 21Z
7. FOR INT	0326	2026	SURFACE ANALYSIS 00Z
8. AVIATION(INT)	0600	2300	SURFACE ANALYSIS 03Z

Appendix 5.1.1B

SI ANALYSIS PRODUCTS
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. FOR INT	0909	0109	SURFACE ANALYSIS 06Z
2. AVIATION(INT)	1200	0400	SURFACE ANALYSIS 09Z
3. FOR INT	1525	0725	SURFACE ANALYSIS 12Z
4. AVIATION(INT)	1800	1000	SURFACE ANALYSIS 15Z
5. FOR INT	2110	1310	SURFACE ANALYSIS 18Z
6. AVIATION(INT)	0000	1600	SURFACE ANALYSIS 21Z
7. FOR INT	0326	1926	SURFACE ANALYSIS 00Z
8. AVIATION(INT)	0600	2200	SURFACE ANALYSIS 03Z

Appendix 5.1.1B

AVIATION FORECASTS
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1. FT	1030	0330	AERODROME FORECASTS FOR YKA, YYF, YXC
2. FACN2 CWVR	1130	0430	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
3. FT	1340	0640	AERODROME FORECASTS FOR YRV
4. FT	1340	0640	AERODROME FORECAST FOR YLW
5. FT	1445	0645	AERODROME FORECASTS FOR YCG
6. FT	1630	0930	AERODROME FORECASTS FOR YKA, YYF, YLW, YCG, YXC, YRV
7. FACN2 CWVR	1730	1030	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
8. FT	2230	1530	AERODROME FORECASTS FOR YKA, YYF, YLW, YCG, YXC
9 . FACN2 CWVR	2330	1630	AREA FORECAST FOR B.C. INTERIOR SOUTHERN MOUNTAINS
10. FT	0430	2130	AERODROME FORECASTS FOR YKA, YYF, YLW, YXC
11. FACN2 CWVR	0530	2230	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
12. WSCN1 CWVR	AS REQUIRED		SIGMET

Appendix 5.1.1B

SI AVIATION FORECASTS
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. FT	1030	0230	AERODROME FORECASTS FOR YKA YYF, YXC
2. FACN2 CWVR	1130	0330	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
3. FT	1340	0540	AERODROME FORECASTS FOR YRV
4. FT	1440	0640	AERODROME FORECAST FOR YLW
5. FT	1545	0745	AERODROME FORECASTS FOR YCG
6. FT	1630	0830	AERODROME FORECASTS FOR YKA YYF, YLW, YCG, YXC, YRV
7. FACN2 CWVR	1730	0930	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
8. FT	2230	1430	AERODROME FORECASTS FOR YKA YYF, YLW, YCG, YXC
9. FACN2 CWVR	2330	1530	AREA FORECAST FOR B.C. INTERIOR SOUTHERN MOUNTAINS
10. FT	0430	2030	AERODROME FORECASTS FOR YKA, YYF, YLW, YXC
11. FACN2 CWVR	0530	2130	AREA FORECASTS FOR B.C. INTERIOR SOUTHERN MOUNTAINS
12. WSCN1 CWVR	AS REQUIRED		SIGMET

Appendix 5.1.1B

SI FORESTRY FORECASTS
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1. FPCN32 CWVR	1330	0630	FIRE WEATHER FORECASTS FOR THE SOUTHERN INTERIOR FOR TODAY INCLUDING SOUTHEAST B.C. WEATHER ZONES 22,23,24,25,26,27 7 INDIVIDUAL LOCATIONS SOUTHWEST INTERIOR WEATHER ZONES 20,21 4 INDIVIDUAL LOCATIONS CHANCE OF LIGHTNING CHANCE OF INTENSE LIGHTNING 1PM FORECAST OF TEMPERATURE; RELATIVE HUMIDITY; WIND; PERCENTAGE CHANCE OF RAIN; PERCENTAGE CHANCE OF RAIN GREATER THAN 2 MM (TRACE)
2. FPCN32 CWVR	2030	1330	FIRE WEATHER FORECASTS FOR THE SOUTHERN INTERIOR FOR THE NEXT DAY CONTENT AS ABOVE
3. FPCN39 CWVR	AS NEEDED		FORECAST FOR SMOKE CONTROL FOR VARIOUS REGIONS INCLUDES MIXING HEIGHT; VENTILATION INDEX; 900M WIND; 1800M WIND; 3000M WIND OUTLOOK AND REMARKS
4. FPCN38 CWVR	2230	1530	LIGHTNING ASSESSMENT FOR TODAY AND THIS EVENING BASED ON LIGHTNING STRIKE DATA AND SATELLITE IMAGERY

Appendix 5.1.1B

SI FORECAST GUIDANCE
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1. FXCN1 CWVR	1100	0400	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
2. FXCN1 CWVR	1900	1200	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
3. FXCN1 CWVR	2300	1600	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
4. FXCN1 CWVR	0600	2300	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
5. FXCN5 CWVR	AS REQUIRED		CANADIAN HURRICANE PROGNOSTIC MESSAGE NOT FOR MEDIA BUT FOR RECIPIENTS WITH METEOROLOGICAL EXPERTISE (CMC, DND, WEATHER CENTRES)

Appendix 5.1.1B

SI FORECAST GUIDANCE
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. FXCN1 CWVR	1100	0300	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
2. FXCN1 CWVR	1900	1100	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
3. FXCN1 CWVR	2300	1500	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
4. FXCN1 CWVR	0600	2200	ANALYSIS AND PROGNOSTIC DISCUSSION FOR PACIFIC REGION
5. FXCN5 CWVR	AS REQUIRED		CANADIAN HURRICANE PROGNOSTIC MESSAGE NOT FOR MEDIA BUT FOR RECIPIENTS WITH METEOROLOGICAL EXPERTISE (CMC, DND, WEATHER CENTRES)

Appendix 5.1.1B

SI MOUNTAIN FORECAST GUIDANCE
WINTER SCHEDULE (NOVEMBER 1-APRIL 30)
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. FPCN50 CWVR	1200	0400	MOUNTAIN FORECAST GUIDANCE FOR B.C. ISSUED FOR: THOMPSON OKANAGAN MOUNTAINS SOUTH COLUMBIA MOUNTAINS NORTH COLUMBIA MOUNTAINS YOHO PARK INCLUDING SYNOPSIS, FREEZING LEVELS, PRECIPITATION AMOUNTS, MOUNTAIN TOP WINDS AND CONFIDENCE STATEMENT.
2. FPCN50 CWVR	1800	1000	MOUNTAIN FORECAST GUIDANCE FOR B.C. (AREAS AND CONTENT AS ABOVE)
3. FPCN50 CWVR	2300	1500	MOUNTAIN FORECAST GUIDANCE FOR B.C. (AREAS AND CONTENT AS ABOVE)
4. FPCN50 CWVR	0300	1900	MOUNTAIN FORECAST GUIDANCE FOR B.C. (AREAS AND CONTENT AS ABOVE)

Appendix 5.1.1B

SI PROGNOSTIC PRODUCTS
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PDT	DESCRIPTION

Guidance issued from the Pacific Weather Centre.

Appendix 5.1.1B

PROGNOSTIC PRODUCTS
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
Guidance issued from the Pacific Weather Centre.			

Appendix 5.1.1B

SI PUBLIC FORECASTS
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

	HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1.	FPCN13 CWVR	1200	0500	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
2.	FPCN13 CWVR	1700	1000	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
3.	FPCN13 CWVR	2200	1500	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
4.	FPCN13 CWVR	0200	1900	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
5.	WWCN1 CWVR	AS REQUIRED		WEATHER WARNING
6.	WPCN1 CWVR	AS REQUIRED		WEATHER ADVISORY
7.	WPCN3 CWVR	AS REQUIRED		CANADIAN HURRICANE INFORMATION STATEMENT FOR DISTRIBUTION TO THE MEDIA

Appendix 5.1.1B

SI PUBLIC FORECASTS
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. FPCN13 CWVR	1300	0500	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
2. FPCN13 CWVR	1800	1000	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
3. FPCN13 CWVR	2300	1500	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
4. FPCN13 CWVR	0300	1900	PUBLIC FORECAST FOR THOMPSON OKANAGAN AND COLUMBIA KOOTENAY INCLUDING SYNOPSIS
5. WWCN1 CWVR	AS REQUIRED		WEATHER WARNING
6. WPCN1 CWVR	AS REQUIRED		WEATHER ADVISORY
7. WPCN3 CWVR	AS REQUIRED		CANADIAN HURRICANE INFORMATION STATEMENT FOR DISTRIBUTION TO THE MEDIA

Appendix 5.1.1B

SI SPECIAL FORECASTS AND INFORMATION
SUMMER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PDT	DESCRIPTION
1. WBCN1 CWVR	1300	0600	POINT TEMPERATURE BULLETIN HIGH-TODAY LOW-TONIGHT HIGH-NEXT DAY FOR KAMLOOPS LYTTON PENTICTON KELOWNA BLUE RIVER REVELSTOKE CRANBROOK CASTLEGAR
2. FMCN1 CWVR	1500	0800	MAX & MIN FOR YKA
3. WBCN5 CWVR	1800	1100	B.C. HYDRO-5 DAY TEMPERATURE AND PRECIPITATION FORECASTS FOR LYTTON ROGERS PASS REVELSTOKE BLUE RIVER GOLDEN VALEMOUNT
4. BY TELEX	2100	1400	FORECASTS FOR INLAND NATURAL GAS LOW TONIGHT HIGH NEXT DAY LOW NEXT NIGHT FOR CRANBROOK CASTLEGAR KELOWNA PENTICTON LYTTON KAMLOOPS
5. FXCN1 CWVR	2300	1600	FROST FORECAST GUIDANCE FOR OKANAGAN MENTIONED IN FXCN1 DURING FROST SEASON AND INCLUDED IN 3PM AND 7PM PUBLIC FORECASTS (FPCN13)
6. CXCN1 CWVR	AS NEEDED		CLIMATE MESSAGES

Appendix 5.1.1B

7. CXCN2 CWVR AS NEEDED CLIMATE MESSAGES

Appendix 5.1.1B

SI SPECIAL FORECASTS AND INFORMATION
WINTER SCHEDULE
LAST VERIFIED---MARCH, 1988

HEADER	ISSUE TIME GMT	PST	DESCRIPTION
1. WBCN1 CWVR	1400	0600	POINT TEMPERATURE BULLETIN HIGH-TODAY LOW-TONIGHT HIGH-NEXT DAY FOR KAMLOOPS LYTTON PENTICTON KELOWNA BLUE RIVER REVELSTOKE CRANBROOK CASTLEGAR
2. FMCN1 CWVR	1500	0800	MAX & MIN FOR YKA
3. WBCN5 CWVR	1800	1000	B.C. HYDRO-5 DAY TEMPERATURE AND PRECIPITATION FORECASTS FOR LYTTON ROGERS PASS REVELSTOKE BLUE RIVER GOLDEN VALEMOUNT
4. BY TELEX	2100	1300	FORECASTS FOR INLAND NATURAL GAS LOW TONIGHT HIGH NEXT DAY LOW NEXT NIGHT FOR CRANBROOK CASTLEGAR KELOWNA PENTICTON LYTTON KAMLOOPS
5. CXCN1 CWVR	AS NEEDED		CLIMATE MESSAGES
6. CXCN2 CWVR	AS NEEDED		CLIMATE MESSAGES

5.1.2 LOCAL WEATHER OFFICE FORECAST PRODUCTS

AGRICULTURAL

Haying forecasts

-produced and disseminated twice daily from June through August by the Kelowna Weather Office for the Okanagan Valley from Peachland to Salmon Arm, including the Coldstream Valley east from Vernon.
-issued twice daily in season by the Castlegar Weather Office for the Creston Valley area.
-issued by the Penticton Weather Office twice daily from June through September for the southern Okanagan area.

Frost and Spray Weather forecasts

-produced and disseminated daily at 1830 by the Kelowna Weather Office in comprehensive detail, for the complex climatic area of the Okanagan and Similkameen Valleys during the period of April and May.
-produced and disseminated by the Kelowna Weather Office twice daily as preliminary minimum temperature outlooks and detailed spray weather forecasts for the central and north Okanagan valley area during April and May.
-produced and disseminated by the Kelowna Weather Office twice daily with emphasis on temperature for grape and vegetable growers during September and October.
-produced and disseminated by the Penticton Weather Office twice daily during the period April and May for use by area orchardists.
-produced and disseminated by the Penticton Weather Office twice daily during September and October for use by area grape and vegetable growers.
-produced and disseminated by the Castlegar Weather Office twice daily April through October for use by growers of orchard and cereal crops.

MOUNTAIN

Highways/Ski Resorts/Avalanche Technicians

-produced and disseminated by the Castlegar Weather Office twice daily from November to March for use by the Ministry of Highways, three Ski Resorts, and Salmo Creston Avalanche Technicians.
-produced and disseminated by the Kamloops Weather Office twice daily from November through April for use by Ministry of Highways, Travelling Public, Avalanche Technicians and 2 local Ski Hills.
-produced and disseminated by the Kelowna Weather Office 3 times daily for the period November through March for use of local travelling public, skiers and two area Ski Resorts.
-prepared by the Revelstoke Weather Station once daily from December through April and issued as phone briefings to four Heli Ski Companies in the area.

RECREATION

-produced and disseminated by the Kamloops Weather Office once daily from June , to early September for the use of tourists and recreational mariners holidaying in the Thompson Valley and Shuswap Lake area, including the higher elevation lakes.
-produced and disseminated by the Penticton Weather Office once daily from June to early September for use of tourists and recreational mariners holidaying in the southern Okanagan.

WEATHER WARNINGS

-rapidly developing severe weather events are supported with immediate Weather Warnings produced and disseminated from Castlegar, Kamloops, Kelowna and Penticton Weather Offices as required year round. Emphasis is on safety and protection of property.

FORESTRY

Fire Weather

-produced and disseminated twice daily by AES Weather Service Specialists attached to the B.C. Forest Service District Offices in Kamloops and Nelson during the period April through October. Provides weather details needed to efficiently and safely manage the two large Forest Districts during the period of fire risk.
-additional forecasts and charts are produced and disseminated as required during wild fires and slash burning periods.

5.1.3 LOCAL WEATHER SERVICE OUTLET DISSEMINATION

Castlegar Weather Office

-Radio Broadcasts, 23 daily (some taped and rebroadcast at a later time, only 12 actual broadcasts) to the following stations and repeaters;

CKQR Castlegar
CJAT Trail with repeaters at Nelson and Creston
CKGF Grandforks

It is estimated that over 25% of the radio audience listen to the Spokane Radio Stations through Cable hookups.

-Newspapers, daily and weekly;

Nelson Daily News, forecast and climatological statistics.
Trail Times, daily forecast and climatological statistics.
Castlegar News, twice weekly forecast and extended outlook.
Cranbrook Townsman, weekly/monthly climatological statistics.

In addition to weather interest articles as required.

Kamloops Weather Office

-Radio Broadcasts, to the general public and agriculture, 18 daily to the following stations;

CHNL Kamloops with repeaters in Clearwater and Sorrento
CKXR Salmon Arm with repeaters in Revelstoke, Golden and Invermere
CFIM Kamloops
CFJC Kamloops

-Newspaper

Kamloops Daily News, forecast and climatological statistics.

-Local TV,

CFJC Kamloops, provide briefing and forecast.

-Cable TV,

Comprehensive Telidon Service to the community cable channel.

Kelowna Weather Office

-Radio Broadcasts to the general public and agriculture, 16 daily to the following stations;

CKIQ Kelowna	CJIB Vernon
CKOV Kelowna	CKAL Vernon
CILK FM Kelowna	CBC Vancouver

-Radio Broadcasts, solely in support of agriculture, 12 daily in April and May, 4 daily June through early September to the following stations;

CKIQ Kelowna	CJMG Penticton
CKOV Kelowna	CKSP Summerland via CKOK
CILK Kelowna	CKOO Osoyoos via CKOK
CKXR Salmon Arm	CJIB Vernon

CIGV Penticton
CKOK Penticton
CKAL Vernon

-Local TV,
CHBC TV Kelowna, provide briefing, forecast and cross Canada reports 3 times daily.

-Newspapers,
Kelowna Daily Courier; forecast, extended outlook and comprehensive climatological statistics, in addition to articles of weather interest as required.

Penticton Weather Office

-Radio Broadcasts, 6 daily to the following stations;
CKOK Penticton with repeaters in Summerland, Osoyoos, and Princeton
CIGV Penticton
CKOO Osoyoos

-Radio Broadcasts, 2 daily in summer solely in support of Recreation broadcast to the following stations;
CKOK Penticton
CIGV Penticton

-Newspaper,
Penticton Herald, forecast and climatological statistics daily. In addition to weather interest articles as required.
Oliver Chronicle, Summerland Review and Bulletin, occasionally request articles of interest.

Revelstoke Weather Station

-Radio Broadcasts, 6 daily to the following stations;
CKCR Revelstoke
CKGR Golden

-Newspaper
Revelstoke Review, 5 day forecast and previous weeks climatological statistics.

-Cable TV, community channel provides Weather Station telephone number at bottom of the viewing screen.

MEDIA SERVING THE AREA

Television Production Studios

-CHBC TV Kelowna
-CFJC TV Kamloops

Cable TV Operators (Canadian Cable TV Assn. (BC))

Appendix 5.1.3

Company	Area Served	Subscribers
-Shaw Cable (Castlegar)	-Castlegar/Trail/Rossland/Montrose/ Fruitvale/Robson/Blueberry Crk/Brilliant	10008
-Cranbrook Television Ltd	-Cranbrook	5858
-Creston Cable-Video Ltd	-Creston/Erickson/Canyon	2400
-Kootenay Cable Ltd,Fernie	-Elkford/Fernie/Sparwood	5900
-Genelle TV Coop Society	-Genelle	214
-Golden Television Ltd	-Golden/Nicholson/N&E Benches	1467
-Greenwood Video Ltd	-Greenwood/Midway/Grandforks/Anaconda	700
-Hedley Cable TV Ltd	-Hedley & surrounding homes	129
-Panorama Cable Systems Ltd	-Invermere/Windermere/Athelmere/Canal Flats/Edgewater/Radium	2000
-Kamloops Cablenet Ltd	-Kamloops/Del Oro/Keekwai	20138
-Kaslo Television Ltd	-Kaslo Village	300
-Shaw Cable (Kelowna)	-Kelowna/Lakeview Heights/Westbank	26282
-Kootenay Cable Ltd	-Kimberley/Marysville & District/Chapman Camp/Meadow Brook	2760
-Merritt Cablevision Ltd	-Merritt/Lower Nicola/Collettville	2603
-Shaw Cable (Nelson)	-Nelson/Sitkuma Creek/Kokanee Creek	4097
-Oliver Tele-Vue	-Oliver/Osoyoos	3300
-Central Int. Cablevision Ltd	-100 & 103 Mile House	1150
-Shaw Cable (Penticton)	-Penticton/Summerland/Naramata/Kaleden/ Okanagan Falls	15148
-Princeton Television Ltd	-Princeton	1200
-Revelstoke Cable Ltd	-Revelstoke & surrounding area.	2590
-Riondel Cable/Video Society	-Riondel	134
-Salmo Cable Programs Ltd	-Salmo	449
-Sun Country Cablevision Ltd	-Salmon Arm/Armstrong/Enderby	2400
-South Slocan TV Coop Assn	-South Slocan	78
-Vercom Cable TV	-Vernon/Coldstream/Okanagan Landing	13000

Not listed in Cable Directory

-Blue River Community Cable	-Blue River
-Mascon Communications Corp	-Chase/Keremeos/Lumby
-Ian Mckay	-Peachland
-Wood Lake Video Ltd	-Winfield/Okanagan Centre/Oyama
-Sicamous Video Ltd	-Sicamous

-Ashcroft/Cache Creek/Clinton
-Savona
-Lytton
-Valemount
-Barrier
-Lillooet
-Spences Bridge
-Nakusp

Radio

-CBU Vancouver, serving most communities in the interior over low power transmitters
-CFJC Kamloops/Merritt/Clearwater/ Ashcroft/Clinton/Lytton/Barrier/100 Mile House
-CKOV Kelowna

Appendix 5.1.3

-CIFM Kamloops/Chase/Merritt/Clinton/ Ashcroft/Lytton/Barrier/Chase/Cache Ck/Savona/Pritchard
-CHNL Kamloops/Ashcroft/Cache Creek/Sorrento/Wrn Shuswap/Clearwater
-CJNL Merritt (from Kamloops)
-CJIB Vernon
-CKAL Vernon/Nakusp/New Denver/Kaslo
-CKXR Salmon Arm
-CKCR Revelstoke
-CKGR Golden
-CKIR Invermere/Radium/Sorrento
-CKQR Castlegar
-CKEK Cranbrook/Kimberley
-CKIQ Kelowna
-CHIM Kelowna
-CILK Kelowna
-CKOK Penticton/Summerland/Osoyoos/ Princeton
-CIGV Penticton
-CJAT Trail
-CKGF Grandforks
-CKKC/CFKC Nelson/Creston
-CFEK Fernie/Sparwood

Newspapers

-Salmon Arm Observer
-Enderby Commoner
-Armstrong Advertiser
-Vernon Daily News
-Vernon Advertiser
-Winfield Calendar
-Daily Courier, Kelowna
-Capital News, Kelowna
-Rutland Advertiser
-Westside News, Westbank
-Westside Sun, Westbank
-Summerland Review and Bulletin
-Penticton Herald
-Oliver Chronicle
-Osoyoos Times
-South Okanagan Review, Okanagan Falls, Keremeos
-Princeton Spotlight
-Chase/Shuswap Weekly
-100 Mile house Free Press
-Clearwater Times
-Lillooet/Bridge River News
-Kamloops Daily News
-Revelstoke Review
-Fernie Free Press
-Cranbrook Townsman
-Kimberley Discoverer
-Golden Star
-Castlegar News
-Trail Times
-Nelson Daily News
-Grandforks, Boundary Com. News.
-Greenwood, Boundary Ck Printing
-Nakusp
-Kaslo
-Creston Valley Advance
-The Morning Star, Vernon
-Logan Lake Weekly
-Merritt Herald
-North Thompson Journal (Barrier)
-Shuswap Sun (Sorrento)
-Sicamous/Eagle Valley News
-Valemount/Canoe Mountain Echo

Wire Services Distributing PWC Products

-Broadcast News
-Satellite Radio Network
-Western Information Network

5.1.4 WEATHER OFFICE CONSULTATIVE SERVICES

AVIATION - Weather briefings as required to the following;
- General Aviation Pilots
- Commercial Airline Pilots
- Agricultural Spray/Seed Pilots
- Forestry Fire Patrol Pilots
- Corporate Pilots
- Courier Pilots
- General Public Flying by Commercial Airlines
- Transport Canada Tower Controllers
- Transport Canada Flight Service Specialists
- Department of National Defence Pilots and Crew
- Helicopter Pilots
- Aviation Pilot Training School Students
- Transport Canada and other Government Pilots

AGRICULTURE - Weather briefings as required to the following;
- Orchardists
- Grape Growers
- Vegetable Growers
- Hay Farmers
- Cereal Crop Growers
- Ministry of Agriculture
- Livestock Producers

SMOKE MANAGEMENT - current weather information and forecasts are provided as required to the following;
- Agricultural Industry
- Tourist Industry
- Environmentalists
- Forest Industry
- Ministry of Forests
- Ministry of Environment

MEDIA - information provided as required to the following;
- Radio Stations
- Television Stations
- Newspapers

TOURISM - information provided as required to the following;
- Tourists
- Summer Resort Owners
- Local Businessmen

ECONOMIC/SAFETY - information provided as required to the following;
- Ski Resort Owners
- Construction Companies
- Insurance Companies
- Heli Ski Operators
- Weather Sensitive Businesses (restaurants, recreational etc)

MARINE - mainly wind information provided as required to the following;
- Sports Fishermen

Recreational Boaters
Sailors
Wind Surfers
Float Plane Operators
House Boat Rental Companies

SEVERE WEATHER - warnings provided as required to the following;
Provincial and Community Emergency Response Organizers
RCMP
Airports
Transport Canada Control Tower Operators
Yacht Clubs, Marinas
Media
Pacific Weather Centre

EMERGENCY ENVIRONMENTAL RESPONSE - information provided as required to the following;
Provincial and Community Emergency Response Organizers
Local Fire Departments
Pacific Weather Centre

ENVIRONMENT - information provided as required to the following;
Toxic Spray Applicators
Environmentalists
Concerned citizens

CLIMATOLOGICAL - information provided as required to the following;
General Public
School Students for assigned projects
Radio/TV stations
Newspapers
Agricultural Industry
Insurance Adjustors
Construction Planners
Crown Prosecutors
RCMP
Legal Firms

SPECIAL EVENTS/PROJECTS - information provided as required to those involved in the following;
Festivals
Regattas
Sporting Events
Rallies/Races
Construction

GENERAL PUBLIC - information provided as required for the following;
Tailored forecasts
Dynamics of weather processes
Comparative climatological data
Current local and distant weather reports

5.1.5 OTHER WEATHER SERVICES PROVIDED

WEATHER OFFICES - Castlegar, Kamloops, Kelowna, Penticton.

-production of Monthly and Annual Meteorological Summaries
-aviation and synoptic weather observations (Kelowna and Penticton only)
-ATAD loading and updating
-assist local climatological stations as required
-conduct numerous tours of office annually
-provide media with timely forecast updates
-participate in Community Emergency Planning meetings
-provide barometer settings
-provide comparative testing of public barometers and thermometers
-deal directly with Ministry of Agriculture Horticulturists for the local area.
-deal directly with local Forestry and Highways managers
-local forecast verification provided by the Kelowna Office (4 Annually) and by the Lytton Station for Kamloops (2 annually).
-aviation accident investigation support to CASB

WEATHER STATIONS

Lytton

-prepare tailored, public forecast including freezing level, peak wind gust, and the 3-5 day outlook for the Fraser Canyon area; print it and deliver with a briefing to: Post Office for display, River Rafting Company, and Tourist Bureau.
-provide in season the PWC fire weather forecast and probability of lightning, to local Forest Company planning slashburning.
-relay Weather Warnings to Ministry of Highways, RCMP, Tourist Bureau, Swimming Pool, and Ginseng Farm 6 miles north of Town.
-provide Ginseng Botanist with 3-5 day forecast 4 times weekly.
-provide Hayers with forecasts 4 times weekly in season.
-provide weather observations from 1200z to 0600z
-relay Pemberton weather observations 1500 to 1900z and provide them with a briefing as required.
-estimate a total of 100 to 110 telephone calls per month.

Revelstoke

-provide once daily prior to 0800, tailored forecast to Glacier National Park(West Gate) and Tourist Bureau at Rogers Pass.
-tailored weekend forecasts for CPR Tunnel Project in Rogers Pass
-morning wind forecast for recreation on area lakes
-climate data to BC Hydro
-snow warning call out to; local radio station, MOTH, City Works, and National Parks

Vernon

-in season, provide public forecast to hayers, averaging 5 per week in season
-provide recent climatological data to local industry and media
-average 1 call daily from public for current temperature or forecast
-provide school tours of facility averaging 200 visitors annually.

FLIGHT SERVICE STATIONS

Castlegar

-aviation weather briefings

Cranbrook

-aviation weather briefings
-recent climatological data to industry monthly, and newspaper daily
-5 day forecasts to hayers as required, with some referrals to the Castlelegar Weather Office
-monthly precipitation totals to Ministry of Agriculture for irrigation planning.
-PWC mountain forecast to local ski hills in the winter
-occasional requests for the PWC Fire Weather Forecast from local Forest Industry.
-requests from the area residents and an occasional traveller for the public forecast.
-weather warnings are put out as an aviation advisory.

Kamloops

-aviation weather briefings
-updating AES ATAD 15 times daily when WO4 not operating.

CONTRACT WEATHER STATIONS

Blue River

-in support of local Heli Skiing Operator daily from November to April, provide hard copies of; current local weather data, applicable Pacific Weather Centre public/mountain forecasts, FX discussions, Aviation area forecasts from the Pacific/Alberta Weather Centres, upper level wind forecasts, and any severe weather warnings or aviation SIGMETs.
-public forecast for tourists proceeding to Myrtle Lake in Wells Gray Park.
-in very cold weather, personally supply the Husky Truck stop on the Highway with the current temperature.
-provide local Ministry of Transportation and Highways with actual weather conditions as required.

-make available aviation reports and forecasts to itinerant general aviation flights.
-provide 12 local and area businesses with a copy of the completed monthly climatological form.
-answer 2 to 3 public requests weekly for forecast.
-no relay of Weather Warnings provided.

Golden

-provide local radio station with temperature, wind and RH 4 times daily.
-provide local weekly newspaper with past weeks climatological statistics.
-very few aviation requests as only recently on teletype circuit.
-provide local lumber/plywood mill temperatures as occasionally required for their nursery.
-provide same mill in summer and fall with daily smoke ventilation index and associated information for planning slash burns.
-provide local CP Rail construction division with temperatures as required when concrete work being done nearby.
-provide climatological data as required to Law Firms phoning from Calgary.
-provide public forecast occasionally as required to visitors from out of the area.
-provide climatological data to school students as required.

Princeton

-make available aviation reports and forecasts to itinerant general aviation flights, averaging 3 to 6 weekly.
-infrequent request for climatological data.
-very few calls

Sparwood

-provide public forecast to hayers as required.
-provide public forecast to mountain hikers phoning from Calgary and planning on staying in the Invermere/Windermere district while hiking in the Bugaboo Mountains.
-enquiries for weather and road conditions in the winter.
-20 to 30 pilots per month drop in for aviation weather in late spring and summer.
-provide public forecast during special community events in Fernie and Sparwood.
-provide weekly climatological data and the 3 to 5 day forecast to the Fernie Free Press and the Kootenay Advertiser (in Cranbrook).
-occasional phone call from the Lethbridge Herald if weather unusual.
-local Mining Companies phone for climatological data.
-local School Students phone when involved in weather programs.
-contractors phone for the forecast.

5.1.6 1987 WEATHER SERVICE CONTACT STATISTICS FOR THE AREA

WEATHER OFFICES

	Castlegar	Kamloops	Kelowna	Penticton
-media	11637	30976	9706	2651
-public	9218	84733	77912	37195
-economic	5035	2615	12394	1067
-aviation	9984	15817	18268	15003
-marine	894	205	601	619
-agriculture	2700	1142	14322	1169
-climatology	1107	747	3061	1052
-broadcasts	7426	4237	5431	1940
-visitors	893	234	104	13
Total	48894	140706	141799	60709

WEATHER STATIONS

	Lytton	Revelstoke	Vernon U/A
-media	2	824	5
-public	750	8850	402
-economic	607	871	1
-aviation	11	1706	2
-marine	0	35	0
-agriculture	57	60	56
-climatology	54	986	71
-broadcasts	0	5126	0
-visitors	167	1014	213
Total	1648	19472	750

FLIGHT SERVICE STATIONS (TRANSPORT CANADA)

	Castlegar	Cranbrook	Kamloops	Penticton
-aviation	4120	4332	5309	3707
-non aviation	0	1055	5400	3272
Total	4120	5387	10709	6979

CONTRACT WEATHER STATIONS

Blue River, Golden, Princeton, Sparwood; No Annual Statistics Available.

Total annual weather service contacts for area..... 441,173

AES RADIO BROADCASTS REACH STATISTICS FOR THE AREA

The 1986 fall Bureau of Broadcast Measurement Survey of radio audience listening to AES weather broadcasts provides the following;

	Weekly	Annually
Castlegar Weather Office	14200	738400
Kamloops Weather Office	66779	3472508
Kelowna Weather Office	99800	5189600
Penticton Weather Office	28377	1475604
Revelstoke Weather Station	17284	898768
Total Annual Reach		**11,774,880**

In addition, the Kelowna Weather Office broadcasts on the CBU Daybreak Program once each morning on weekdays for 42 weeks per year. The spring of 1988 BBM audience reach data for the entire Daybreak program area at that time is 62,300. It is estimated that the proposed WSO area population listeners would be approximately 75% of that figure or 46,725 per day. This becomes 233,625 per week, or 9,812,250 in a 42 week year.

If included with the total annual reach, a **Grand Total of 21,587,130 contacts** would result.

5.1.7 MAJOR WEATHER SERVICE STAKEHOLDERS IN THE AREA

MEDIA

The media are perhaps one of the more visible stakeholders. They are well represented, with numerous radio stations, cable TV operations, two local TV production studios and newspapers. Most radio stations in the area utilize the local AES facilities for weather information. Each community has their own newspaper, whether it be weekly or daily, and most carry a weather package.

User Representation:

-Radio & Television News Directors Assn
-British Columbia Assn Of Broadcasters
-Canadian Cable TV Assn, BC - President, Wayne McLean, Vancouver.
-News Directors
-Program Directors
-Newspaper Publishers and Editors
-See section 5.1.3.1 Media Serving the Area, for additional details.

AGRICULTURAL INDUSTRY

Much of the industry is weather sensitive, and growers/ producers are dependent on specialized weather forecasts to minimize the effects of detrimental conditions, and maximize the effects of beneficial weather patterns. At present, specialized forecasts are provided to the Okanagan and Similkameen Valleys for frost protection and spray(chemical) weather conditions each spring. A general forecast is issued for the Creston Area. Tailored haying forecasts for the local area are provided by each of the four weather offices and three weather stations in the area. Frost forecasts for grape growers are issued in the Okanagan each fall.

A 1977 study on the economic benefit of weather forecast services to the orchard industry in the Yakima Valley indicates a cost saving of $808 per acre for red delicious apples, $492 per acre for bartlett pears, and $270 per acre for elberta peaches. Using Stats Canada Consumer Price Index change from 1977 to 1986 of 2.46, the economic benefit increases to $1988 per acre, $1210 per acre, and $664 per acre respectively. This study compared the expected expense using daily forecast minimum temperatures.

The anticipated impact of increasing competition as a result of the impending Free Trade Agreement will focus attention on the economic importance of utilizing available weather services.

User Representation

-British Columbia Fruit Growers Assn, Kelowna
-British Columbia Grape Growers Assn, Kelowna
-Interior Vegetable Marketing Agency, Vernon

-Livestock/Cattlemens' Assn, Kelowna
-B.C. Ministry of Agriculture Horticulturists, Agrologists; Vernon, Kelowna, Penticton, Oliver, Kamloops, Creston.
-B.C. Ministry of Environment, Kelowna
-B.C. Federation of Agriculture.

FOREST INDUSTRY

The forest industry maintains a varied profile across the area with most of the logging done at higher elevations and in the wetter climatic zones on the eastern and northern areas of the district. Logging trucks, sawmills, plywood/veneer plants, and pulpmills are indications that the industry is strong. Weather service requests are varied depending on the extent of operation in any one section of the district. These requests include, slash burning forecasts, wild fire fighting forecasts, smoke management forecasts, and freeze up, break up forecasts for road conditons.

User Representation

-B.C. Forest Service
-Forest Industry; Logging, Slash disposal, Silviculture/planting
-Pulp Mills

TOURISM and RECREATION

The combination of a favourable climate, large lakes available for water recreation, and a location between densely populated urban areas has resulted in the southern interior of British Columbia becoming one of the most popular tourist destinations in Western Canada. If ranked as an industry, Tourism would be in the top three behind Forestry and Agriculture. Periods of unsettled weather or extremes of weather result in an overload of requests from tourists and resort owners for detailed weather forecasts. Summer activities dependent on weather include; all water sports, golf, hiking, camping, trail riding, water slides, and amusement parks, while winter sports include skiing, heli skiing, snowmobiling, and organized winter festivals.

User Representation

-local Chambers of Commerce
-Tourism Association of Southwestern British Columbia - Vancouver
-Kootenay Country Tourist Association - Castlegar
-High Country Tourist Association - Kamloops
-Cariboo Tourist Association - Williams Lake
-hotel/motel/tent & trailer association
-Okanangan/Similkameen Tourist Assn - Kelowna
-amusement park owners
-B.C. Golf Assn
-Rocky Mountain Visitors Assn - Kimberley

MARINE USERS

The numerous lakes in the southern interior are extensively used for fishing, boating, sailing, water skiing, wind surfing, and house boating. Late spring, summer and early fall see the peak use, however fishing in the larger lakes continues year round. Channeled valley winds are of the greatest concern to users on the lower lakes, while higher altitude winds affect those users of the lakes up on the plateau. Marine recreation users are particularly threatened with the sudden onset of strong gusty winds, which occurs a significant number of times each year, varying considerably from one valley to the next in direction and intensity.

User Representation

-water recreation rental operators
-sport fishermens association
-forest industry (log booms and towing), various companies
-sailing associations
-power squadrons, yacht clubs, marinas and house boat rental companies in Okanagan, Kootenays, and Shuswap/South Thompson areas.
-aquatic events and fishing derbys connected with community festivals

COMMUNITY EMERGENCY SERVICES

These organizations are active in all communities and require weather service support. Environmental emergencies such as toxic spills on land or water can be controlled when the wind conditions are monitored and forecasts provided. Air pollution is becoming an increasing concern and under severe conditions, additional weather services support may be required to plan relocation of medically disabled. Prolonged heavy rain, snow or strong winds are also events that require support of the local weather service to the organization responding.

User Representation

-Community Emergency Planning
-Provincial Emergency Planning Officals
-School Boards
-RCMP

AREA RESIDENTS

The general public in the area obviously have a major stake in the weather services provided. The varying requirements by this large group will be handled mainly by the tailored public forecast provided several times daily.

User Representation

-Media

AVIATION INDUSTRY

Increasing use has been made of the available local weather service by the aviation industry. This has been through not only the routine observational service, but also the pilot briefing service and the consultation service with major airlines and their users when poor weather results in routine flight delays or cancellations.

User Representation

-Transport Canada
-Commercial Airlines; CAI, Air BC, Time Air, and feeder airlines.
-Air Charter Operators including Medivac
-COPA
-RCMP
-Department of National Defense
-Airport based Aviation Companies
-Airport Operations
-B.C. Aviation Council
-Airport Advisory Committees

SURFACE TRANSPORTATION

Hazardous driving conditions in snow, fog, wind and freezing rain result in an increase in demand for weather service. Local residents, Freight/Express Co.'s, Bus Lines, transporters of hazardous materials and visitors to the area all utilize the local road and highway system to travel through the mountains. Winter storms provide a hazard and tailored local forecasts are required to minimize the effect of these adverse driving conditons. Abnormal temperatures changes result in requests from logging companies and local Highways Officials on freeze up or break up forecasts. Transporters of mobile homes are concerned with strong cross winds and require detailed local forecasts for known risk areas. Railways are concerned with any weather event that will result in the disruption of service; ie slides, flooding etc.

User Representation

-Ministry of Transportation and Highways
-Motoring Public
-BCAA
-Bus Lines
-Taxi Companies
-Railways
-Trucking Assn's
-RCMP

-Media

ENVIRONMENTALISTS

Among the population of the area communities, are a number of persons with medical disabilities. Air quality has become a burning issue in recent years as indicated by the effect of forest slash burning on persons with respiratory problems. These people are supported by a small, vocal number of dedicated environmentalists, most of the medical profession, and a swelling number of the general public. Prolonged temperature inversions during the late fall and winter combined with industrial or private burning of any kind result in an increase in valley smoke pollution. The local AES offices are being drawn into this issue to comment on the effect on local weather. Certainly air quality measurement and forecasting will continue to need to be addressed.

User Representation

-Tourism Industry, Chamber of Commerce
-Medical Profession
-Sierra Club
-Canadian Earthcare Society
-Committee for a Clean Kettle Valley
-Okanagan Respiratory Puffers Club
-Orchardists and Grape Growers in the Okanagan
-Cominco Smelter in Trail
-Pulp Mills in the area

5.1.8 AREA ELECTED OFFICIALS

Federal Members of Parliament
(see figure 2, a map of electoral areas)

CARIBOO-CHILCOTIN - Dave Worthy PC

KAMLOOPS - Nelson Ris NDP - NDP House Leader

KOOTENAY-EAST - Sid Parker NDP

KOOTENAY-WEST-REVELSTOKE - Lyle Kristiansen NDP

OKANAGAN-CENTRE - Al Horning PC - former Kelowna alderman

OKANAGAN-SHUSWAP - Lyle MacWilliams NDP - 1 term as MLA, former teacher

OKANAGAN-SIMILKAMEEN-MERRITT - Jack Whittaker NDP

PRINCE GEORGE-BULKLEY VALLEY - Brian Gardiner NDP

British Columbia Members of the Legislative Assembly
(see figure 3, a map of electoral areas)

BOUNDARY-SIMILKAMEEN (Dual Riding) - Ivan Messmer SC - Parliamentary Secretary for two Ministers; Jack Davis, Energy/Mines/Resources, and Claude Richmond, Minister of Social Services and Housing. In addition, he is Parliamentary Secretary for the new Economic Region of OKANAGAN, and a former Mayor of Penticton.

- Bill Barlee NDP - Newly elected in a former SC stronghold.

CARIBOO - Neil Vant SC - Minister of Transportation & Highways

COLUMBIA RIVER - Dwayne Crandall SC

KAMLOOPS (Dual Riding) - Claude Richmond SC - Minister of Social Services & Housing. Former broadcaster and radio station manager.

- Bud Smith SC - Attorney General

KOOTENAY - Ann Edwards NDP

NELSON-CRESTON - Howard Dirks SC - Minister of Crown Lands and Minister of State for the Thompson/Okanagan/Kootenay Economic Area.

OKANAGAN NORTH - Lyle Hanson SC - Minister of Labour and Consumer Services

OKANAGAN SOUTH - (Dual Riding) - Cliff Serwa SC - Sits on two Select Standing Committees; one on Tourism and the Environment, and the other on Agriculture and Fisheries.

- Larry Chalmers SC - Parliamentary Secretary for the Nechako Economic Zone, sits on Select Standing Committees; one on Labour and one on Justice.

PRINCE GEORGE SOUTH - W. Bruce Strachan SC - Minister of Environment, Minister of State for the Cariboo, and Minister of Inter Government Relations.

ROSSLAND-TRAIL - Chris D'Arcy NDP - Regularly contacts Castlegar Weather Office for aviation weather.

SHUSWAP-REVELSTOKE - Cliff Michael - SC - Minister of Government Management Services. Former Minister of Highways.

YALE-LILLOOET - James Rabbitt - SC - Pro Logging. Chairman of Solid Waste Disposal Task Force.

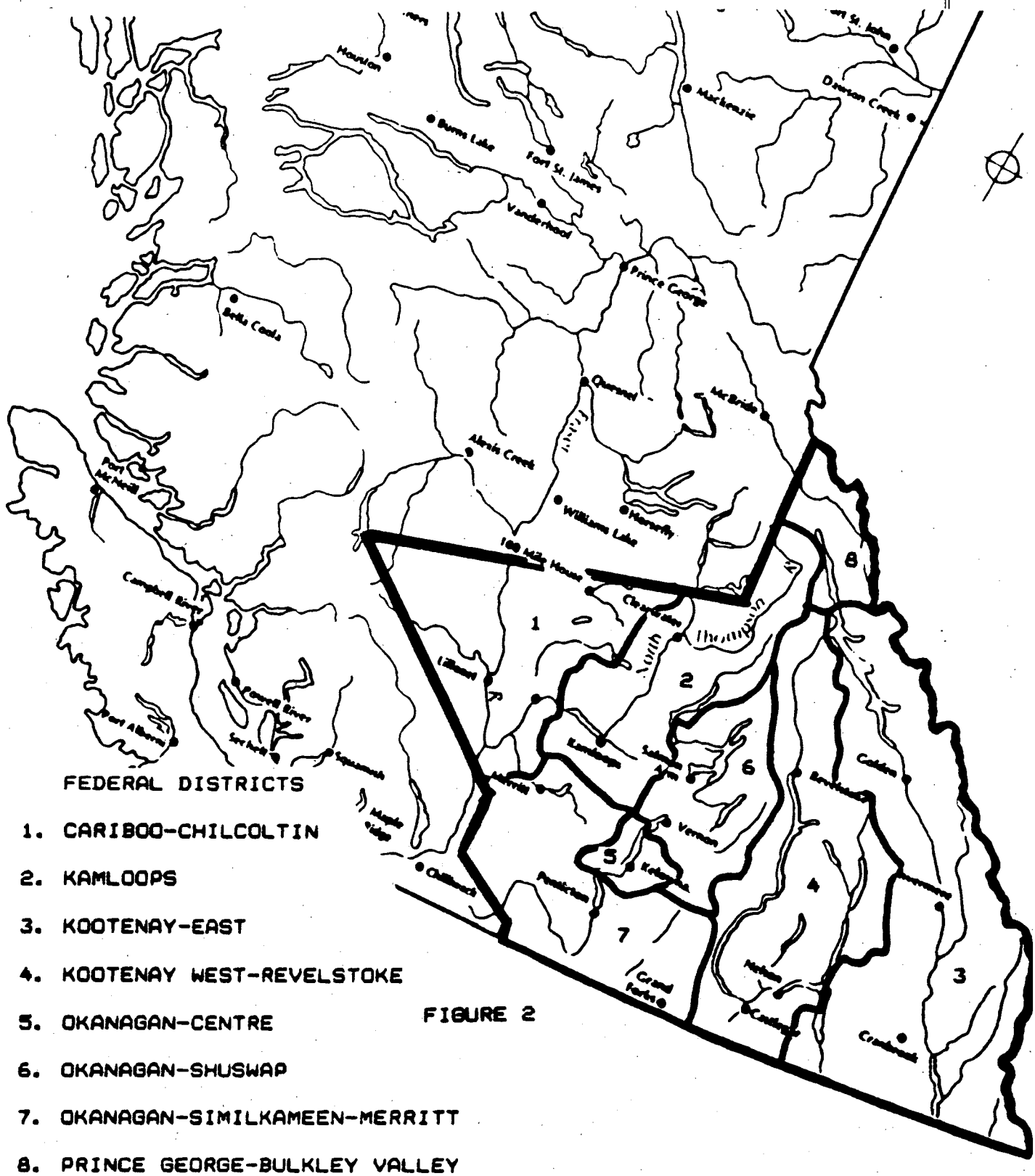
Community Mayors

Community	Population	Mayor	Comments
ARMSTRONG	2706	Eric Hornby	
ASCHROFT	1914		
CASTLEGAR	6385	Audrey Moore - Local econcomic priorities.	
CHASE	1933		
CRANBROOK	15915	Richard Jensen	
CRESTON	4190	Lola Irvine-Agriculture/Watershed concerns	
COLDSTREAM	6450	Ernie Palfry	
ELKFORD	3187	Jack White	
ENDERBY	1816	Terry Fergus	
FERNIE	5440	Tiny Shatoskey	
FRUITVALE	1932	Edward Lawton-Logging, Heavy Ind. Trail	
GOLDEN	3476	James Doyle	
GRANDFORKS	3486	Yasushi Sugimoto-Agricul/forestry/tourism	
INVERMERE	1998	Ron Halvorson-tourism	
KAMLOOPS	61773	Phillip Gaglardi	
KASLO	854		
KELOWNA	61213	Jim Stuart-Environment/Agriculture/Tourism	
KEREMEOS	839	Robert White	
KIMBERLY	7375	Jim Ogilve	
LILLOOET	1758		
LOGAN LAKE	2001	Ove Christensen	
LUMBY	1181	David Simpson	
LYTTON	368	Joseph Chute - Pro logging (Stein area).	

Appendix 5.1.8

MERRITT	6180	Robert Baird
NAKUSP	1410	Rosemarie Johson
NELSON	8113	Gerald Rottering-Tourism/Industry/Envrmt
OLIVER	1963	Hart Buckendahl
OSOYOOS	2813	Mike Radi - Community Weather Image
PEACHLAND	2988	George Waldo
PENTICTON	23588	Dorothy Whittaker
PRINCETON	2910	Gloria Stout
REVELSTOKE	8279	Geoffry Battersby-Environment. No nonsense
ROSSLAND	3472	Donald Camozzi-winter tourism(skiing)
SALMO	1014	Marie Hanson-logging,mining
SALMON ARM	11199	Richard Smith
SPALLUMCHEEN	4310	Harold Norris
SPARWOOD	4540	Collin Curtis
SUMMERLAND	7755	Terry Sabourin
TRAIL	7948	Marc Marcolin - industry
VALEMOUNT	1161	
VERNON	20241	Ann Clarke - Waste management issues
WARFIELD	1840	William Trobella - industrial
WESTBANK/LAKEVIEW HGTS	18529	Regional District Directors

FEDERAL
ELECTORAL DISTRICTS

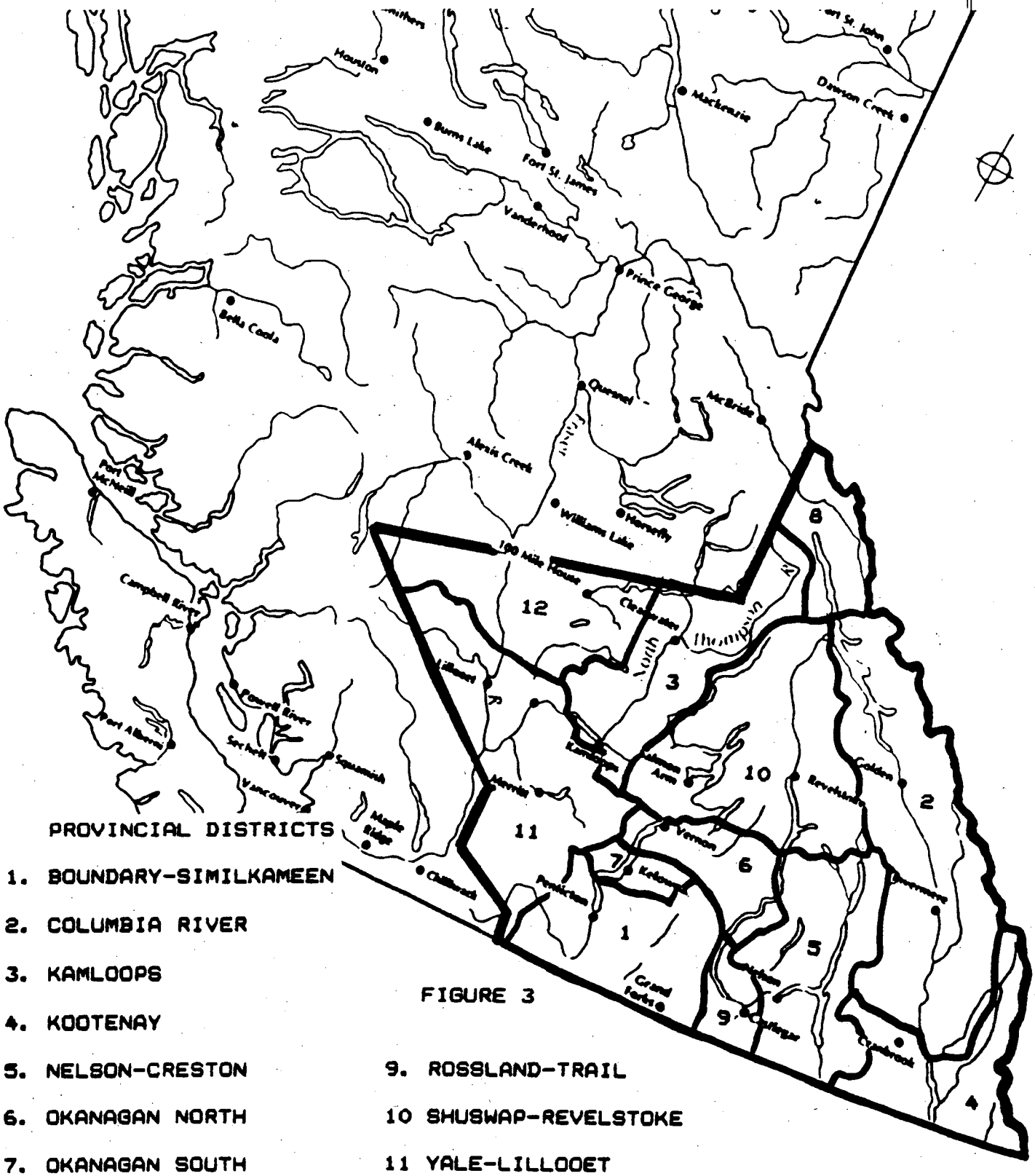


FEDERAL DISTRICTS

1. CARIBOO-CHILCOLTIN
2. KAMLOOPS
3. KOOTENAY-EAST
4. KOOTENAY WEST-REVELSTOKE
5. OKANAGAN-CENTRE
6. OKANAGAN-SHUSWAP
7. OKANAGAN-SIMILKAMEEN-MERRITT
8. PRINCE GEORGE-BULKLEY VALLEY

FIGURE 2

PROVINCIAL
ELECTORAL DISTRICTS



PROVINCIAL DISTRICTS

1. BOUNDARY-SIMILKAMEEN
2. COLUMBIA RIVER
3. KAMLOOPS
4. KOOTENAY
5. NELSON-CRESTON
6. OKANAGAN NORTH
7. OKANAGAN SOUTH
8. PRINCE GEORGE SOUTH
9. ROSSLAND-TRAIL
10 SHUSWAP-REVELSTOKE
11 YALE-LILLOOET
12 CARIBOO

FIGURE 3

5.2.2 COMMUNITY WEATHER WARNING SERVICE

Community	Pop 1986	PWC Produced Wx Warnings To Radio	WO Produced Wx Warnings To Radio	Community WO Call Out List
Kamloops	61773	X	X	X
Kelowna	61213	X	X	X
Penticton	23588	X	X	X
Vernon	20241	X	X	
Cranbrook	15893	X	X	
Salmon Arm	11199	X	X	
Revelstoke	8279	X	X	
Nelson	8113	X	X	X
Trail	7948	X	X	
Summerland	7755	X	X	
Armstrong/Spallumcheen	7016	X	X	
Coldstream	6872	X	X	
Kimberley	6732	X	X	
Castlegar	6385	X	X	X
Merritt	6180	X	X	
Fernie	5188	X		
Sparwood	4540	X		
Creston	4190	X	X	
Golden	3584	X	X	
Rossland	3472	X	X	
Grandforks	3282	X	X	
Elkford	3187	X		
Peachland	2988	X	X	
Osoyoos	2956	X	X	
Princeton	2910	X	X	
Logan Lake	2001	X	X	
Invermere	1998	X	X	
Oliver	1963	X	X	
Chase	1933	X	X	
Fruitvale	1932	X	X	
Ashcroft	1914	X	X	
Warfield	1840	X	X	
Lillooet	1758	X		
Enderby	1714	X	X	
Hundred Mile House	1692	X	X	
Nakusp	1410	X	X	
Montrose	1183	X	X	
Lumby	1181	X	X	
Valemount	1161	X		
Cache Creek	1147	X	X	
Salmo	1014	X		
Kaslo	858	X	X	
Keremeos	839	X	X	
Greenwood	767	X		
Clinton	754	X	X	
Midway	640	X		
New Denver	596	X	X	
Lytton	368	X	X	
Slocan	294	X	X	
Silverton	233	X	X	
Blue River	230	X		

5.2.2.1 PRESENT WEATHER SERVICE TO THESE AREAS

	Mtn Forecast	Spot Mtn Fcst	Recreation Forecast	Marine Forecast
LARGE RECREATIONAL LAKES				
Okanagan			X	
Shuswap			X	
Kootenay				
Arrow				
Kamloops			X	
Kinbasket				
Revelstoke				
Adams				
Mabel				
Slocan				
Christina				
MAJOR HIGHWAY MOUNTAIN PASSES				
Allison	X	X		
Coquihalla	X	X		
Rogers	X	X		
Kootenay	X	X		
YellowHead	X			
Kicking Horse	X			
Crows Nest	X			
SKI RESORTS				
Tod	X	X		
Apex	X	X		
Big White	X	X		
Silver Star	X	X		
Red Mtn	X	X		
White Water	X	X		
Panorama	X			
Fairmont	X			
Kimberley	X			
Fernie Snow Vly	X	X		
Mt McKenzie	X			
HELI SKIING				
Cariboo Mts	X			
Selkirk Mts	X			
Purcell Mts	X			
Monashee Mts	X			

5.3.2 SHORTCOMINGS IN THE PROVISION OF WEATHER SERVICES

WEATHER WARNINGS

-lack of 24 hour service in the area
-incomplete AES data network to provide an adequate weather watch
-the severe weather watcher network needs to include RCMP and Highway Crews
-need to establish realtime access to non AES data networks such as forestry
-lack of frequent, quality satellite imagery to track severe weather cloud formations
-limited access to spherics information
-difficulties during short fuse weather warning dissemination as a result of increased "networking" by radio stations and their inability to locally direct warning to area threatened.
-similarly, CBU Radio with their extensive network of low power transmitters are at times broadcasting nationally and also unable to respond to shortfuse weather warnings for a specific area.
-work overload during the production and dissemination of short fuse weather warnings decreasing efficiency during these events.
-see table on "weather warnings" in appendix 5.3.2

MEDIA

-requests for additional broadcasts are unable to be granted at some AES offices due to staffing, workload and time constraints.
-unequal telephone (toll free) access to a Weather Office by radio stations ie, Cranbrook
-no daily access to local cable television except at Kamloops
-lack of usable satellite imagery to support local TV Production studios in Kelowna and Kamloops

AGRICULTURE

-need for an earlier start up of the spring frost warning program in the southern Okanagan and Keremeos area as formally requested by the BCFGA. A Provincial Irrigation Project also requires an earlier start up of the specialized forecast. Present human resource limitations at that particular time of year make this impossible.
-need to have farm weather forecasts made available to electronic bulletin boards for real time use by the agricultural industry.
-perceived industry need for a separate farm weather forecast for the Oliver/Osoyoos area.
-need to improve wind reporting network and subsequently improve wind forecast in the orchard and vineyard areas to maximize the use of frost retarding methods and chemical spray weather forecasts.
-lack of quality and frequent satellite imagery for short term forecasting impacting on minimum temperatures and winds.

-inadequate dissemination of specialized forecasts to users;
-need for additional ATADs accessed through toll free lines to the rural communities, to provide equal access to those area farmers.
-lack of mesoscale data network to support detailed farm weather forecasts

FORESTRY

-lack of seasonal air quality forecasts and burning guidelines for smoke sensitive areas.
-lack of adequate atmospheric soundings to provide smoke management data to the industry.

TOURISM and RECREATION

-lack of regular reports from all popular tourist destinations; ie Osoyoos, Salmon Arm/Shuswap Area, Kootenay Lake etc
-lack of adequate wind reporting network to provide detailed wind forecasts
-lack of additional atmospheric soundings to improve mountain forecasts provided to ski resorts and heli ski operations.
-see table on "other weather service requirements" in appendix 5.2.2.1

MARINE

-lack of an adequate network of wind data sites to provide marine forecast support.
-lack of detailed wind forecasts for the larger lakes
-AES inability to accurately forecast convectively produced winds
-see table on "other weather service requirements" in appendix 5.2.2.1

COMMUNITY EMERGENCY SERVICES

-lack of urban wind reporting networks to provide adequate drift information to the organization responding to a toxic spill.
-lack of 24 hour service to provide continuous support in case of Environmental Emergencies.

AREA RESIDENTS

-lack of 24 hour data network to provide continuous weather warning service.
-lack of 24 hour AES operation in area to provide detailed weather watch in support of Weather Warning Responsibility.
-lack of air quality data network and forecasts
-lack of temperature data network to all significant communities based on needs.
-need refined forecast districts to consider smaller climatological differences and residents needs.

AVIATION

-need reporting network to improve forecasts to the industry
-need 24 hour briefing service to the industry in support of early morning departures and in some cases overnight international charter activity from some airports.
-need expanded and more frequent atmospheric soundings to improve knowledge of shear zones and temperature inversions, both common to this mountainous area served extensively by commercial aviation.

SURFACE TRANSPORTATION

-need spot forecasts for several high elevation roads not already covered. Regular reports from these sites would be a prerequisite to provision of increased service.
-need reports as required from RCMP and Highway crews of adverse weather/driving conditions.

ENVIRONMENTALISTS/MEDICALLY IMPAIRED

-lack of air quality reports
-lack of air quality forecasts/warnings

5.4.1.1 PROPOSAL FOR GUIDELINES FOR WEATHER WARNINGS

PROPOSAL FOR

GUIDELINES FOR WSO WEATHER WARNINGS

Sep 8/88

The purpose of the Weather Warning Program is to provide an effective warning and advisory service of hazardous weather conditions which may endanger lives, property and the welfare of the general public.

In Section 5.4.1 (Forecast Products), item 4 under Level 1 states that the Weather Warning criteria for the southern interior regions should be examined and revised as required.

Mr. R. Drouillard has done a preliminary study on the Weather Warning criteria and has drawn a few conclusions regarding possible revisions. A copy of his report is attached.

Also, each of the Weather Offices have now defined criteria to be used in "short fuse" Weather Warning situations.

The WSO weather warning system will have to encompass both of these situations as the WSO will also be responsible for "short fuse" warnings.

Initially therefore, it is recommended that the following weather warning criteria be used in the southern interior WSO:

SNOW

HEAVY SNOW WARNING

15 cm or more	20 cm or more
WEST THOMPSON	YELLOWHEAD
SHUSWAP-NORTH THOMPSON	COLUMBIA
OKANAGAN-SIMILKAMEEN	
KOOTENAY WEST	
KOOTENAY EAST	

SNOW ADVISORY

5-15 cm	5-20 cm
WEST THOMPSON	YELLOWHEAD
SHUSWAP-NORTH THOMPSON	COLUMBIA
OKANAGAN-SIMILKAMEEN	
KOOTENAY WEST	
KOOTENAY EAST	

Snow Warnings will only be issued for Day 1.
Snow Advisories will be issued for either Day 1 or Day 2.

There are of course climatic differences within each region which will still have to be handled in the body of the forecast. One of most noteable is the difference in precipitation between Revelstoke and Golden.

RAIN

HEAVY RAIN WARNING

25 mm (All Regions)

Most reporting stations in the regions have a low return period for 25 mm (less than once a year). There are a few, particularly in the Columbia and Yellowhead regions that have higher return periods but this is still less than twice each year. Higher amounts would of course be recorded at mountain stations.

A Heavy Rain Warning would rarely be issued for the drier regions such as the Okanagan-Similkameen.

FREEZING RAIN

FREEZING RAIN WARNING

Freezing rain expected for 2 hours or more. (All Regions)

WIND

WIND WARNING (All Regions)

Mean wind of 50 kmh or greater
and/or gust to 80 kmh

Climatology shows that for most of the reporting stations in the southern interior there are several months in the year when there has never been a maximum hourly wind over 50 kmh. Only 3 of the 18 stations examined have never reported an hourly wind over 50 kmh.

WIND ADVISORY

Mean wind of 37 kmh or greater
and/or gust to 50 kmh

A wind advisory could be used to cover instances where winds less than the warning criteria are expected but it is known that winds of this magnitude can be dangerous and may cause damage. Instances of this would be sudden winds on the lakes when small boats are present and winds occurring during the fruit picking season. Comments can be made in the forecast to distinguish which local areas the Wind Advisory is applicable to.

Once the mesoscale analysis and forecasting problems have been investigated and addressed there may in fact be a dedicated forecast issued for some of the lakes and some of the orchard areas.

BLIZZARD WARNING

BLIZZARD WARNING (All Regions)

Visibility less than 1 kilometre in snow and blowing snow.
Wind greater than 40 kmh.
Temperature less than minus 10C.
Above conditions expected to last for at least a few hours.

SEVERE THUNDERSTORM WARNING

SEVERE THUNDERSTORM WARNING (All Regions)

Large hail (15mm diameter or greater).
Heavy rain (25mm in 1 hour or greater).
Wind gusts to 80 kmh or greater.

FROST WARNING

FROST WARNING

Okanagan Similkameen Region
Salmon Arm area of the Shushwap-North Thompson Region

Minimum temperature expected to be zero or less during the crucial growing season. Marginal cases can be handled using comments in the body of the forecast.

WIND CHILL WARNING

Forecast wind chill 2100 watts/sq metre or higher.

COLD WAVE WARNING

Arctic frontal passage.
Temperature dropping in excess of 15C in next 12 hours.
Wind chill may also be mentioned if appropriate.

TORNADO WARNING

TORNADO WARNING (All Regions)

Warning issued when reports of a sighting have been received.

Other weather elements such as low stratus, fog and dust which may cause inconvenience but may not necessarily be a hazard will normally be covered in the body of the forecast.

All warnings except the Frost Warning will be issued using a separate message. All warnings will be updated at least every 6 hours and a final message sent ending the warning when the threat is over.

When a warning is issued, the appropiate header and warning information will be added to the body of the forecast. This may necessitate an amendment to the regular forecast.

A warning will be considered valid even though the occurrence may not quite reach the warning criteria at the regional reporting stations. In this situation there will usually be climate stations or other spots in the region where the criteria has been met.

The criteria for warnings is a guide. There will be times when the situation merits a warning but the criteria may not be met. An example would be a rainfall where less than the rain warning criteria is expected but the ground is frozen or there has already been considerable rainfall and the ground is saturated. Forecasters should use their own judgment and common sense in these situations.

5.4.1.2 PROPOSAL FOR POPS GUIDELINES

PROPOSAL FOR

GUIDELINES FOR THE USE OF POPS IN THE WSO

Sep 8/88

The use of POPS (Probability of Precipitation) should be reevaluated in the format of the forecasts issued from the WSO.

One of the goals of the WSO is to put more detail into the Day 1 forecast (some mesoscale forecasting problems may also be dealt with in the regular public forecast). The present use of the POP statement at the end of the forecast makes it very difficult to accomplish this goal. The POP statement allows the forecaster 1 POP value for each region for Day 1. This will be totally inadequate. The Day 1 forecast should have the capability to delineate areas of more frequent and heavier precipitation within any one region.

If the POP statement was moved into the body of the forecast there would be more flexibility for adding detail to the Day 1 forecast.

The present use of the POP statement gives a disjointed presentation which can be difficult for a listener to relate to. The POP statement is presently appended to the end of the forecast. The POP figure for Day 1 is separated from the Day 1 forecast. This results in the media sometimes dropping the POP statement when broadcasting. The Probability of Precipitation statement also makes the forecast unnecessarily long.

If the POP statement could be moved into the body of the forecast it would no longer be disjointed and the media and listeners could probably relate more readily to it. If the POP statement was moved into the body of the forecast it could take the place of some of the terminology now in use thus shortening the length of the forecast and also conveying a measure of the confidence or uncertainty that the meteorologist has.

Therefore the following suggestions:

1) Do not mention POP if <20% or >80%. POP would occasionally be eliminated in the Day 1 forecast as it would be outside this range. It would be more likely to be inside this range on Day 2 (just because of uncertainty in the forecast).

2) POP is now used to denote the spatial extent of precipitation. ie. the probability of precipitation occurring at any one point in a forecast region during a set time period. This definition would continue. However, by moving the POP into the body of the forecast, the use of a lot of the temporal terms would be eliminated. The forecast would read "40% chance of showers" instead of "40% chance of occasional showers".

3) Use only the following POP values: 20,30,40,60,70,80.

4) Do not use in the same time frame as a precipitation warning or when precipitation amounts are forecast. For instance, if the forecast calls for a snow accumulation, the POP would not be mentioned.

5) Moving the POP into the body of the forecast will allow the meteorologist more flexibility to put more detail into the Day 1 forecast. The present arrangement allows the forecaster 1 POP value for Day 1. By moving the POP into the body of the forecast there will be flexibility to indicate variations in POP over the Region both spatially and temporally. The forecast could read " TODAY. Cloudy. 40% chance of showers. 80% chance of showers over Rogers Pass." As another example, the forecast could read "TODAY. Cloudy. 40% chance of showers increasing to 80% this afternoon." The duty meteorologist should be given a high degree of freedom in writing the Day 1 forecast. He should be encouraged to put in as much detail as he feels is reasonable and that <u>can be verified</u>. Names of towns, lakes, etc. and other well known landmarks should be used to describe where detailed weather events will occur.

6) Day 2 forecasts should be kept simple. Unless the meteorologist is <u>very sure</u> about Day 2, an attempt should be made to adopt more of a broad brush approach to the Day 2 forecast.

7) At the end of each regional forecast there should be a summary of point forecasts for 24 hour observational sites within that region. This could have a format as follows:

Station	Today Max WX&POP	Tonight Min WX&POP	Thursday Max WX&POP
Kamloops	26 Cloudy 30%	15 Cloudy	21 Rain 70%
Merritt	24 Cloudy 20%	15 Cloudy	20 Rain 70%

This would put more emphasis on point forecasting for the main population centres. Most communities with populations in excess of 3K would receive a point forecast.

The worded portion of the forecast should be restricted to a maximum of 2 words, using much the same terminology as the present Urban Forecast.

A few more options for the point forecast format are outlined below although they are probably less desirable.

i) Eliminate the worded portion and just give a temperature and a POP, ie; Kamloops maximum 23 POP 40

ii) Give only temperature values and leave the forecast wording and POP to the main body of the regional forecast, ie; Kelowna, maximum 27.

iii) Eliminate POP from the main body of the forecast and just use it in the point forecasts at the end of each regional forecast. In this case, other points in the region would not be given a POP. Revelstoke, POP 70.

8) The POP figures given in the body of the forecast could either be the "average" POP for the region or could give a range. It would not necessarily be the same POP as the main population centre or any of the other population centres in the region. For example, the forecast could read "Mostly cloudy. 30% chance of showers. 60% chance of showers over higher terrain." Another example; "Mostly cloudy. 30% chance of showers increasing to 60% this afternoon."

The main idea in proposing this change in the use of POP is to add the capability for mesoscale detail to the Day 1 forecast. The size of the present forecast would be reduced so that more detailed terminology could be introduced to help improve the utility of the Day 1 forecast.

5.5.1 WEATHER WARNING DISSEMINATION

Weather Warning Dissemination

It is imperative that warnings be disseminated quickly and efficiently. In most cases, a number of phone calls will be necessary to achieve this, and to confirm that the warning was received. The team recommends that all warning call out be automated as much as possible for level 1. A hard copy of call out lists should be available as a backup.

Wire Services

Warnings will be sent out automatically to the wire services as is now done by weather centres.

Media

To ensure that warnings are received by the media, an automated dial out system to a preselected list of numbers from an ATAD would be established and used. This would release the WSO staff to monitor the weather event and handle incoming consultation calls on the media dedicated phone line. The list should include all radio/TV stations, and all Cable TV Systems that have a community channel. The list will need to be broken up into forecast regions. The newspaper media would be fed by the wire services.

Weather Radio

If weather radio is established in the area of responsibility, warnings would be placed on this medium simultaneously with the media. Forecast regions will also need to be considered if warnings are not for all regions. Weather radio should be able to place warnings on all ATADs in the area of responsibility.

Telephone

An automated dial out system from an ATAD loaded by weather radio should be in place to handle all other users identified by the weather offices.

5.7.1A WSO METEOROLOGISTS ANALYSIS/FORECAST WORKLOAD

WORKLOAD ESTIMATES LEVEL 1 (OPTION A)

Workload estimates are for the portion of the product that would be done by the WSO.

Workload estimates assume that the products are prepared and issued using essentially the same technology presently available in the Pacific Weather Centre. Advances in technology will undoubtedly reduced the time required for preparation of forecast products and monitoring and interpreting data of various sorts.

PRODUCTS PREPARED FOR TRANSMISSION	PERIOD OF ISSUE	ISSUE TIME PER PRODUCT (in hours)	TOTAL TIME PER 24 HR DAY
ANALYSIS PRODUCTS			
Surface analysis	4 times daily	1.00	4.00
Satellite analysis	4 times daily	1.00	4.00
GUIDANCE PRODUCTS			
FXCN1 (Guidance discussion)	4 times daily	.50	2.00
18 and 30 Hour progs	once daily	2.00	2.00
24 and 36 Hour progs	once daily	2.00	2.00
AVIATION PRODUCTS			
FACN2 (Area forecast)	4 times daily	1.00	4.00
FTs for 6 terminals	4 times daily (3 terminals have less than 24 hours coverage)	1.00	4.00
FUCN1 (Mid-level weather)	4 times daily	.25	1.00
WSCN1 (Sigmet)	as required	.50	2.00
PUBLIC PRODUCTS			
FPCN12 (One line weather)	2 times daily	.10	.20
FPCN52 (3-5 Day outlook)	2 times daily	.50	1.00
FPCN53 (3-5 Day outlook French)	2 times daily	.25	.50
FPCN13 (Public forecast)	4 times daily	2.00	8.00
WWCN1 (Weather warning)	as required	.50	2.00
WPCN1 (Weather advisory)	as required	.50	2.00
FORESTRY PRODUCTS			
FPCN32 (Fire weather forecast)	2 times daily during fire weather season	2.00	4.00
Lightning strike map	3 times daily April - Sept	.25	.75
FPCN39 (Smoke control)	as required	1.00	1.00

	April - Sept		
FPCN38 (Lightning assessment)	once daily April - Sept	.50	.50
MOUNTAIN PRODUCTS			
FPCN50 CWVR (Mountain Forecast)	4 times daily	combined with Public	
SPECIAL PRODUCTS			
WBCN2 (Press bulletin)	2 times daily	automated	
WBCN1 (Point temperature)	once daily	.50	.50
FMCN1 (YKA temp)	once daily	.10	.10
WBCN5 (BC Hydro temps)	once daily	.50	.50
Inland Gas Temperatures	once daily	.25	.25
CXCN1 (Climate message)	as required	.25	.25
CXCN2 (CLimate message)	as required	.25	.25
INTERNAL PRODUCTS			
Intermediate analysis	4 times daily	.75	3.00
Intermediate prog	4 times daily	.75	3.00
LOCAL FORECAST PRODUCTS			
Spring Frost Program	3 times daily April and May	.80	2.50
Summer Farm Weather	2 times daily June - August	.50	1.00
Summer Recreation Pgm	once daily June - August	.25	.25
Fall Frost Program	2 times daily Sept - October	.50	1.00
OTHER RELATED DUTIES			
Weather watch	continuous	(2 hours per individual)	6.00
Monitoring and interpreting all types of information	continuous	(2 hours per individual)	6.00
Amendments	as required	(.50 hours per individual)	1.50
SUPERVISORY AND TRAINING DUTIES	as required		3.00
TOTAL			74.05

This workload would be divided among 3 forecast desks as follows:

Supervisory desk		
Analysis	8.00 hrs	
Guidance	6.00 hrs	
Special products	1.85 hrs	
Other duties	4.50 hrs	
Supervisory	3.00 hrs	
Total		23.35 hrs
Public forecast desk		
Public products	13.70 hrs	
Other duties	4.50 hrs	
Forestry products	6.25 hrs	(April - Sept)
Local Forecast Products	(Okanagan)	
Spring Frost program	2.50 hrs	(April + May)
Summer Farm Weather	1.00 hrs	(June - August)
Summer Recreation pgm	.25 hrs	(June - August)
Fall Frost program	1.00 hrs	(Sept - Oct)
Total for peak period (April/May)		29.15 hrs
Aviation forecast desk		
Aviation products	11.00 hrs	
Internal products	6.00 hrs	
Other duties	4.50 hrs	
Total		21.50 hrs
Total for peak period (April/May)		71.80 hrs

During April and May when both the forestry and the frost programs are operating, there would be a total workload of close to 72 hours in a 24 hour day in the southern interior prototype WSO. During the winter months, when the seasonal programs are not operating, the workload would be reduced to 63 hours. This would require the equivalent of just under 3 forecast positions staffed 24 hours. This does not include handling consultation requests or providing weather services.

Under Other Related Duties there has been only 2 hours per individual allotted for weather watch, and 2 hours per individual for monitoring and interpretation. A portion of these duties is also built into the times allotted to produce the forecast products.

The estimated times listed above would handle most weather situations.

In the event of very severe weather, the top priority products like warnings would be issued promptly while other less important duties like production of internal products would be delayed. There would also be flexibility to redistribute duties among the duty meteorologists.

In the event of very good weather, there would be some time made available as follows:

PRODUCT	PRODUCTION TIME REDUCED BY	TOTAL TIME SAVED PER 24 HR DAY
Prog	.50 hr	1.00 hr
Sigmet	not required	2.00 hr
Public forecast	.50 hr	2.00 hr
Weather Warning	not required	2.00 hr
Weather Advisory	not required	2.00 hr
Fire Weather forecast	.50 hr	1.00 hr
Amendments	not required	1.50 hr
Possible net savings per 24 hr day		11.50 hrs

In a good weather situation, by redistributing the duties among the meteorologists on duty, there could possibly be a meaningful amount of time such as a few consecutive hours made available for one of the meteorologists to work on a project or marketing activities.

5.7.1B WSO METEOROLOGISTS ANALYSIS/FORECAST WORKLOAD

WORKLOAD ESTIMATES LEVEL 1 (OPTION B)

Workload estimates are for the portion of the product that would be done by the WSO.

Workload estimates assume that the products are prepared and issued using essentially the same technology presently available in the Pacific Weather Centre. Advances in technology will undoubtedly reduced the time required for preparation of forecast products and monitoring and interpreting data of various sorts.

PRODUCTS PREPARED FOR TRANSMISSION	PERIOD OF ISSUE	ISSUE TIME PER PRODUCT (in hours)	TOTAL TIME PER 24 HR DAY
GUIDANCE PRODUCTS			
FXCN1 (Guidance discussion)	4 times daily	.50	2.00
AVIATION PRODUCTS			
FACN2 (Area forecast)	4 times daily	1.00	4.00
FTs for 6 terminals	4 times daily (3 terminals have less than 24 hours coverage)	1.00	4.00
WSCN1 (Sigmet)	as required	.50	2.00
PUBLIC PRODUCTS			
FPCN13 (Public forecast)	4 times daily	2.00	8.00
WWCN1 (Weather warning)	as required	.50	2.00
WPCN1 (Weather advisory)	as required	.50	2.00
FORESTRY PRODUCTS			
FPCN32 (Fire weather forecast)	2 times daily during fire weather season	2.00	4.00
FPCN39 (Smoke control)	as required April - Sept	1.00	1.00
FPCN38 (Lightning assessment)	once daily April - Sept	.50	.50
MOUNTAIN PRODUCTS			
FPCN50 CWVR (Mountain Forecast)	4 times daily	combined with Public	
SPECIAL PRODUCTS			
WBCN1 (Point temperature)	once daily	.50	.50
FMCN1 (YKA temp)	once daily	.10	.10

WBCN5 (BC Hydro temps)	once daily	.50	.50
Inland Gas Temperatures	once daily	.25	.25
CXCN1 (Climate message)	as required	.25	.25
CXCN2 (CLimate message)	as required	.25	.25
INTERNAL PRODUCTS			
Surface analysis	8 times daily	.75	6.00
Intermediate prog	4 times daily	.75	3.00
LOCAL FORECAST PRODUCTS			
Spring Frost Program	3 times daily April and May	.80	2.50
Summer Farm Weather	2 times daily June - August	.50	1.00
Summer Recreation Pgm	once daily June - August	.25	.25
Fall Frost Program	2 times daily Sept - October	.50	1.00
OTHER RELATED DUTIES			
Weather watch	continuous	(2 hours per individual)	4.00
Monitoring and interpreting all types of information	continuous	(2 hours per individual)	4.00
Amendments	as required	(.50 hours per individual)	1.00
SUPERVISORY AND TRAINING DUTIES	as required		2.00
TOTAL			56.10

This workload would be divided among 2 forecast desks as follows:

Supervisory desk		
Guidance discussion	2.00 hrs	
Aviation products	10.00 hrs	(This is less than if the MT
Internal products	6.00 hrs	Formula was used)
Other duties	4.50 hrs	
Supervisory	2.00 hrs	
Total	24.50 hrs	
Public forecast desk		
Public products	12.00 hrs	
Forestry products	5.50 hrs	(April - Sept)
Special products	1.85 hrs	
Internal products	3.00 hrs	
Other duties	4.50 hrs	

Local Forcast Products (Okanagan)		
Spring Frost program	2.50 hrs	(April + May)
Summer Farm Weather	1.00 hrs	(June - August)
Summer Recreation pgm	.25 hrs	(June - August)
Fall Frost program	1.00 hrs	(Sept - Oct)
Total for peak period (April/May)	29.35 hrs	

Total for peak period (April/May) 53.85 hrs

During the spring months when both the forestry and the frost programs are operating, there would be a total workload of close to 54 hours in a 24 hour day in the southern interior prototype WSO. During the winter months, when the seasonal programs are not operating, the workload would be reduced to 46 hours. This would require the equivalent of just over 2 forecast positions staffed 24 hours. This does not include handling consultation requests or providing weather services.

Under Other Related Duties there has been only 2 hours per individual allotted for weather watch, and 2 hours per individual for monitoring and interpretation. A portion of these duties is also built into the times allotted to produce the forecast products.

The estimated times listed above would handle most weather situations.

In the event of very severe weather, the top priority products like warnings would be issued promptly while other less important duties like production of internal products would be delayed. There would also be flexibility to redistribute duties among the duty meteorologists.

In the event of very good weather, there would be some time made available as follows:

PRODUCT	PRODUCTION TIME REDUCED BY	TOTAL TIME SAVED PER 24 HR DAY
Sigmet	not required	2.00 hr
Public forecast	.50 hr	2.00 hr
Forestry forecast	.50 hr	1.00 hr
Weather Warning	not required	2.00 hr
Weather Advisory	not required	2.00 hr
Amendments	not required	1.00 hr

Possible net savings per 24 hr day 10.00 hrs

In a good weather situation, by redistributing the duties between the 2 meteorologists on duty, there could possibly be a meaningful amount of time such as a few consecutive hours made available for one of the meteorologists to work on a project or marketing activities.

5.7.2 WEATHER SERVICE WORKLOAD AND STAFFING REQUIREMENTS

The following is an estimate by the staff of the Kelowna Weather Office of the average time required to perform the various "service" workload in one 24 hour period for the Okanagan AES service area. These staff members rotate through the Penticton Weather Office operation. Also included is an estimate of the weather service workload changes as a result of additional ATAD's. During events of adverse weather, these workload times would increase.

Media Support including Dissemination

Radio Broadcasts to Vernon, Kelowna & Penticton(8 stations)	2.00
TV Support	0.25
Cable TV Support (once weekly from Penticton)	0.10
Newspaper Support	0.25
Total	2.60

Consultation

Agriculture	0.50
Air Quality(includes Forestry & Smoke Management)	0.50
Climatological	2.00
Economic/Safety	0.50
Environmental	0.25
General Public	1.50
Marine	0.50
Media	0.50
Special Events	0.50
Total	6.75

Aerological Observations(2)	4.00

Weather Watch	2.00

Other Weather Services Provided

Monthly and Annual Meteorological Summaries(2)	1.25
ATAD loading and updating (15 units at least)	6.00
Local Forecast Verification	0.25
Tours of facilities	0.25
Full moon, clear night, UFO calls	0.05
School and other project requests	0.10
Total	7.90

Based on the time required to operate Weather Radio in the Victoria Weather Office, an additional 2.00 hours per day will be utilized by the establishment of Weather Radio in the WSO. This however may be offset by a reduction in ATAD service as the Weather Radio operation should be able to support ATADs automatically.

The present local forecast program will be rolled in with the routine forecast duties. The daily weather watch duties will become 2 hours with the 24 hour operation of the WSO. This then should leave approximately 23.25 hours (or one desk) daily of weather service requirements to be covered by the WSO staff.

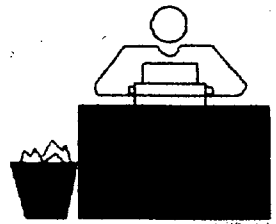
SPECIAL STAFFING REQUIREMENTS

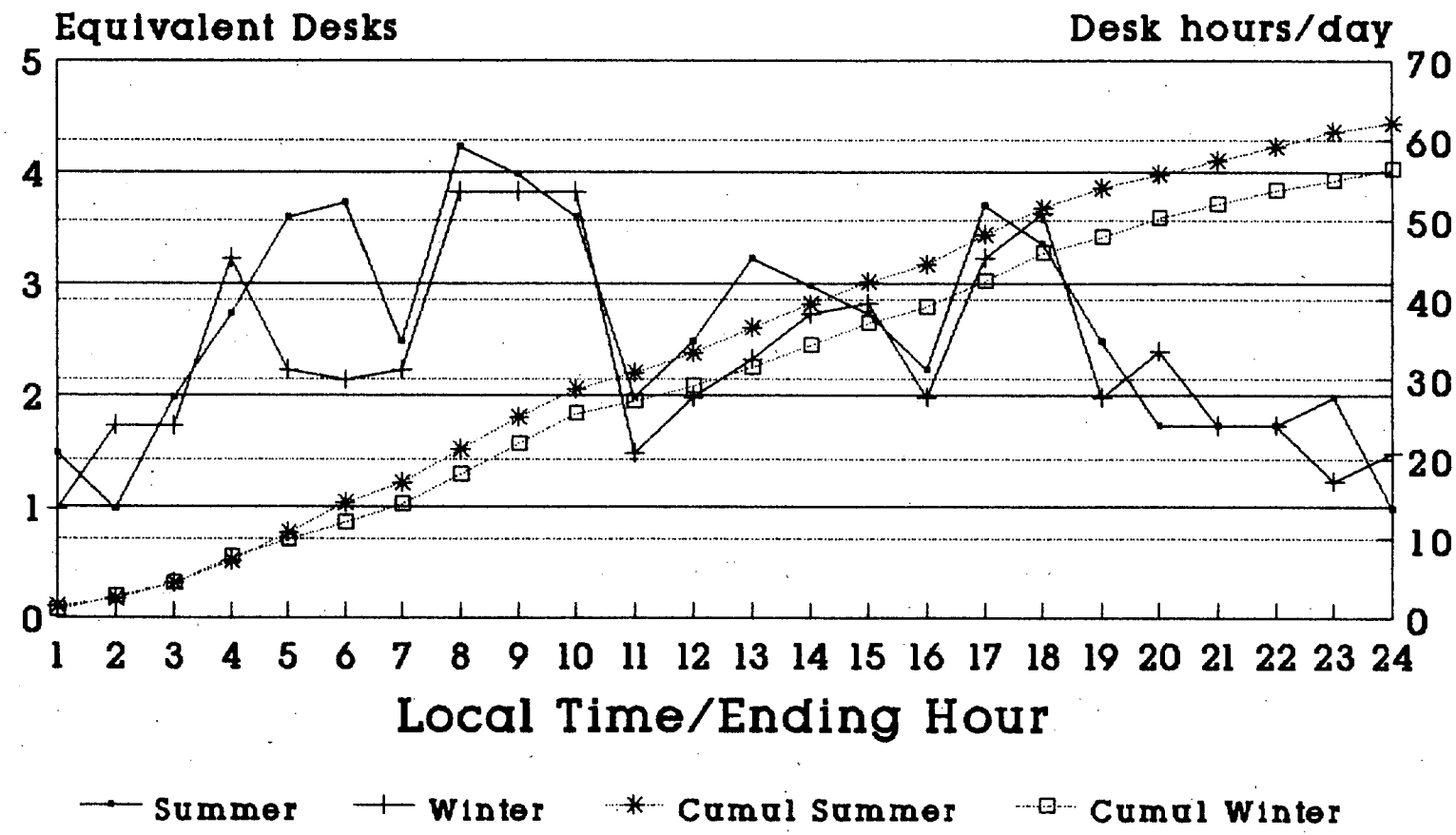
At present, a Kelowna staff member provides the Cariboo BCFS weather support at Williams Lake from April through September each year. Under the WSO, 3 options can be considered to fill this special staffing requirement;

1. provide service from the Prince George Weather Office
2. provide MT from the Kelowna WSO to Williams Lake for 6 months each year
3. maintain responsibility for service and contract out

The team recommends following option 3.

WSO Prototype
Daily Workload Estimate





Average Conditions Only

W S O

Implementation

Plan

October 4, 1988

A stated requirement to establish a Weather Service Outlet in the southern interior of the Pacific Region in 1991 will need a phasing or implementation plan. A study on the feasibility of a WSO operation is nearing completion and has been used in developing a draft phasing plan. A number of tasks have already been identified, and are listed below. This plan then will provide chronological time frames to these tasks based on the WSO being operational by December 1991.

Tasks

1. Site selection - specific site to be selected in the vicinity of Kelowna by January 1989. This will include environmental screening requirements.

2. Facility planning - done by the UBC School of Architecture has started and will be completed by the end of December 1989.

3. Workstation Development - on going from the beginning.

4. Workstation prototype - to be completed by October '89.

5. Workstation Final - begins with completion of prototype and continues until final completion in June '91.

6. Testbed poster - to canvass those interested in operating in testbed. Would include a few Okanagan WO staff.

7. Testbed at PWC - for two months after prototype workstation in operation. Could be small scale, with limited personnel and reduced hours.

8. Testbed evaluation - for one month following testing at PWC.

9. Refine staffing requirements and issue staffing poster in Sept 1990.

10. Staffing action - in October 1990, develop list of; Okanagan incumbents, others in region interested, competition if necessary to fill remainder of positions. Positions offered should be contingent on trainability and personal suitability of individuals. A list of reserves from both career streams should be established, and a few of these on the list trained at the same time.

11. EG home training - could begin in January 1990 and continue for 11 months.

12. Training 1 EG - first group of 5 to 7 EG's to be trained is scheduled for the spring of 1991 to reduce the time between training and the operation.

13. Training 2 EG - follow first group in spring of '91, but may require a space of a week or two for logistics.

14. Training 1 MT - first group of 5 to 7 MT's to be trained beginning in April '91.

15. Training 2 MT - second group of 5 to 7 MT's to be trained 2 weeks following completion of first course.

16. Facility construction - to follow facility planning and be completed by March 1991.

17. Fitup - furnishing and equipment installation.

18. Relocate Vernon Aerological staff and operation to the WSO in Aug 1991. It would not be practical to do this before the facility was ready.

19. Relocate the Kelowna/Penticton Weather Office staff and MT staff to the WSO in late August 1991. Close down Kelowna and Penticton Weather Offices.

20. WSO startup - take over Kelowna/Penticton WO responsibilities up on closing these sites. Begin to issue all forecast products for the southern interior area of responsibility, initially using PWC as a backup during startup phase beginning in September 1991 and continuing until Nov 30/91.

21. WSO fully operational by December 1, 1991.

22. Official opening of the WSO December 5, 1991.