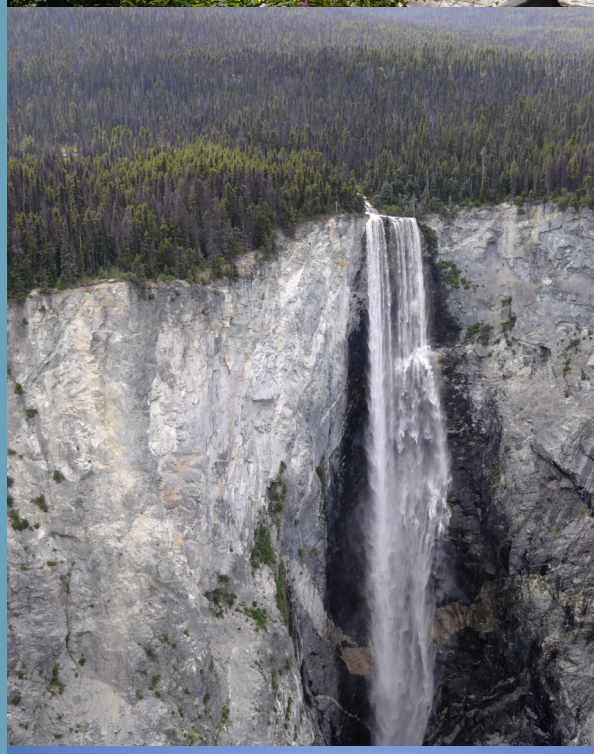
The **PCIC Strategic Plan** 2012-2016

providing user-motivated climate science



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PACIFIC CLIMATE
IMPACTS CONSORTIUM

I. INTRODUCTION

The Pacific Climate Impacts Consortium (PCIC) is a regional climate service that was established to act as an interface between climate research and climate applications within British Columbia and surrounding areas, referred to as the Pacific and Yukon Region of Canada. Planning for the impacts of climate change and variability requires practical information on how the climate system affects the local landscape in the near and distant future. This information is generally not specifically available for the Pacific and Yukon Region of Canada. Further, the region presents significant climatological challenges that complicate the use of climate information. These challenges are beyond the capacity of most organizations to overcome, thus they require an interface with the climate science community to understand the impact of climate variability and change on their organization.

Consequently, PCIC undertakes applied research that is motivated by stakeholder needs, on the physical impacts of climate variability and change in the Pacific and Yukon Region of Canada. We do this by both maintaining strong resident expertise and by fostering collaborative relationships with climate researchers and regional stakeholders to produce knowledge and tools that are useful to stakeholders in the region.

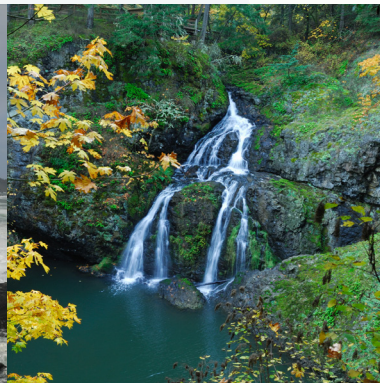
PCIC is first and foremost a service provider that delivers an array of quantitative climate information for a variety of needs. This strategic plan details three service objectives for the coming five years that encompass the spectrum of information delivery from data to user-specific interpretation.

Achieving our service objecives requires a focused program built around three strategic objectives. Since the information that PCIC seeks to deliver to its users is not directly available "off the shelf," it is necessary to make strategic investments in applied climate research and development in order to meet the service objectives.

PCIC has three applied research themes: Climate Analysis and Monitoring (CAM), Regional Climate Impacts (RCI) and Hydrologic Impacts (HI) with clearly defined research plans for the 2012-2016 period. These research plans are designed to guide future research activities of PCIC regional climate service delivery. Our commitment to collaboration and operational excellence further supports our service mandate.

The remainder of the strategic plan is structured as follows. It begins with a synopsis of PCIC, its history, governance and guiding principles. This is followed by descriptions of PCIC service objectives and modes of delivery for those services. The plan then summarizes the strategic goals that must be achieved to meet our service objectives.





II. ABOUT PCIC

HISTORY

Established in 2005, PCIC is a regional climate service provider that is federally registered as a not-for-profit corporation of the University of Victoria (UVic). Since its inception, PCIC has grown significantly while maintaining focus on its original vision to "bridge the gap" between the climate science community, which is largely based at universities and large international climate modelling and analysis centres, and regional users of climate information. The vision was defined in a 2005 meeting of climate researchers and regional stakeholders who recognized the need for an organization to support the BC region, with its unique topography and climatic diversity, in its efforts to prepare for the impacts of future climate change.

An initial strategic plan for the development of PCIC and its programs was finalized in 2007. This plan defined PCIC's applied research themes as Regional Climate Impacts, Hydrologic Impacts, Climate Analysis and Monitoring, and Ocean Influences. During this time, PCIC's reputation as a user-focused organization began to take hold. In 2007, BC Hydro and PCIC entered into a four-year research agreement, marking the beginning of a very important and enduring relationship. The *2007 Strategic Plan* also had an influence on the 2008 BC Government announcement to endow UVic with funding to provide long-term support to PCIC and create the Pacific Institute for Climate Solutions (PICS).

The endowment provided PCIC with base funding and solidified the Province of British Columbia as a long-term stakeholder in PCIC and the provision of regional climate information. PCIC grew rapidly with the advent of the endowment, and thus prepared a second strategic plan, the *2009-2013 PCIC Strategic Plan*, which focused the mission of PCIC and laid out a strategy for ongoing program development. The goal was to build the first three of the applied research themes to fully functional programs. PCIC has grown to meet these expectations. Work in the Regional Climate Impacts and Hydrologic Impacts themes supported stakeholders in BC communities, the provincial government and industry. Both have enjoyed considerable backing from stakeholders, including renewal of the BC Hydro agreement with a substantially higher level of support. Work under the Climate Analysis and Monitoring theme was also initiated with support from PICS and provincial government stakeholders. This theme took on additional importance with the 2010 signing of the Climate Related Monitoring Program agreement that positioned PCIC as the data centre for climate-related data in the province. The Ocean Influences theme has remained an element of the three research programs but did not develop into an independent PCIC program due to resource constraints.

Now with a full staff complement that varies between about 15 and 18 people depending upon resources and current project needs, PCIC continues to develop its role as one of the primary providers of climate services for stakeholders in the Pacific and Yukon Region of Canada. PCIC's user base now includes stakeholders at the municipal, provincial and federal government levels, as well as publicly and privately owned industries and the general public.

GOVERNANCE

As a not-for-profit corporation, PCIC is committed to public and accountable access to climate information. A key component of PCIC's accountability rests in its governance structure, which includes its Board of Directors and its subcommittees. The Board of Directors is responsible for the strategic review and oversight of the PCIC program. Direction and the operation of the consortium is the responsibility of the President and CEO of the Corporation who is also the Director of PCIC. Board membership includes representatives from the University of Victoria, the Provincial Government, the Federal Government, BC Hydro and Ouranos. The Director reports to the Board of Directors and is advised by regular meetings of a Program Advisory Committee (PAC). The PAC is an advisory committee made up of PCIC stakeholders and climate researchers. Members provide advice on the PCIC scientific program and priorities, stakeholder needs and participation in projects. PAC membership, which is determined on the basis of programmatic needs, currently includes representation from several BC government ministries, BC Hydro, Environment Canada, Ouranos and the university's research community.

APPLIED CLIMATE RESEARCH

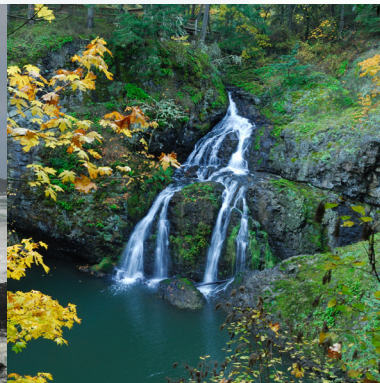
Our program is organized into three interrelated applied research themes:

- Regional Climate Impacts: making available future projections of regional climate change.
- Hydrologic Impacts: quantifying the hydrologic impacts of climate change and variability.
- Climate Analysis and Monitoring: delivering climate observations and interpreting evolving climate conditions.

The three themes provide scope for our regionally focused program, serving the needs of organizations and individuals in the Pacific and Yukon Region of Canada. This area is defined at its largest expanse as the contiguous landmass within the provincial and territorial boundaries of BC and the Yukon, respectively, plus all upstream drainage areas, and any additional 'downstream' drainage areas considered relevant by users and stakeholders (see map on next page). Nevertheless, the province of BC makes up the primary area of concern for PCIC.

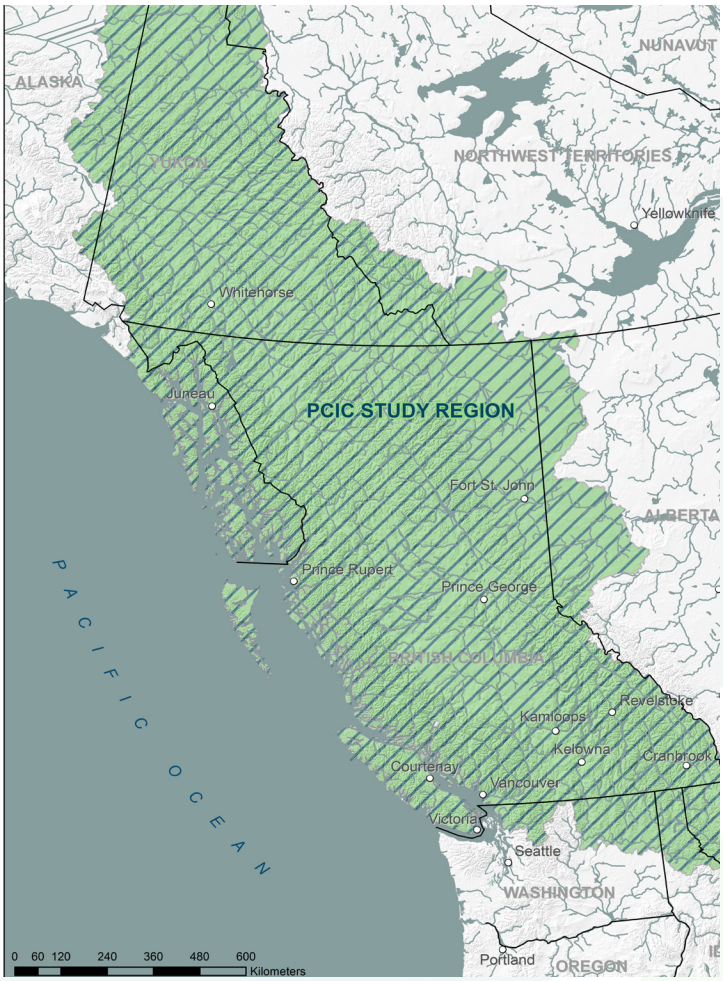
BC is characterized by climatic diversity, driven by its diverse topography and highlighted by the many ecosystems found within the province. Further, the proximity to the Pacific Ocean exposes the region to major climate fluctuations from El Niño/La Niña Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO). The three PCIC applied research themes account for these influences in their research programs.





EXPERTISE

PCIC maintains strong internal resident expertise grouped around its major programs. PCIC staff include experts in the areas of: climatology, climate change scenarios, hydrology, scientific computing, geographic information systems, and communications. PCIC staff are committed to the PCIC program and its core values.



Core Values:

Quality:

We ensure that our methods are current and relevant, and that the implications and limitations of our results are clear. We take the initiative to solve problems and eliminate errors in order to produce robust results.

Collaboration:

Collaboration is integral to how PCIC operates. We work with stakeholders to target our applied research and with other researchers to provide new solutions for practical problems that arise in meeting the needs of our stakeholders.

Respect:

We listen to the needs of others and value their opinions.

Sustainability:

We strive to set an example of wise use of resources.

Professionalism:

PCIC's staff is dedicated to its objectives and conduct their work in a competent, efficient and professional manner. PCIC recognizes that its staff is its primary asset. It supports the professional development of its staff and compensates its staff equitably for the work that they are asked to do.

III. PERSPECTIVE

PURPOSE OF THE PLAN

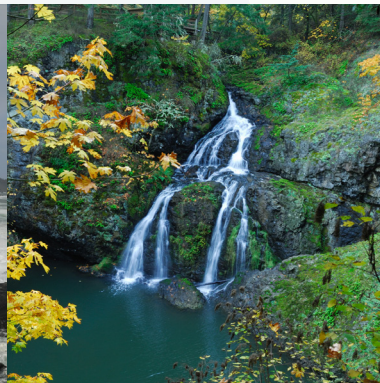
Since its inception in 2005, PCIC has developed into a mature and respected source of climate services and information. The purpose of the PCIC Strategic Plan 2012-2016 is to further solidify PCIC's role as the leading climate services delivery organization serving stakeholders in the Pacific and Yukon Region of Canada.

The PCIC Strategic Plan 2012-2016 describes the high-level service objectives that PCIC will meet during the period. We have also defined three strategic objectives that must be attained to support the successful delivery of the products and services described in this strategic plan.

The PCIC Strategic Plan 2012-2016 builds on the previous strategic plan prepared for the 2009-2013 period. While the current plan presents a five-year outlook for the development and delivery of PCIC's services, it is our intention to revisit this plan at two-year intervals so that PCIC can continually refine its short-term objectives while steering towards the evolving medium-term priorities and needs of its users.

Further information on PCIC and its programs can be found at

www.PacificClimate.org



REGIONAL CLIMATE SERVICE CONTEXT

The service objectives and strategic goals defined within this strategic plan depend on the assumption that PCIC will continue to be able to operate in an environment similar to that which has prevailed since 2008. In particular, this includes continued stable funding, and continued involvement and support, including financial engagement, by major stakeholders. It also assumes that PCIC's ability to leverage resources through the engagement of others will continue at roughly current levels (the combined value, particularly of in-kind resources from stakeholders, is easily double the value of PCIC's core funding from the endowment and stakeholders who have made long-term commitments, notably BC Hydro and Environment Canada).

PCIC operates as part of a larger informal network of climate research organizations and climate information providers. This loose network is a source of important strategic partners for PCIC, and continued development of these collaborations through institutional and other arrangements is assumed in the drafting of this plan. Partnerships with research groups at BC universities, with invested stakeholders such as BC Hydro, BC ministries, Environment Canada and Natural Resources Canada, are all expected to continue. Nevertheless, it can be anticipated that these relationships will evolve substantially over time as funding opportunities and stakeholder objectives and priorities change. PCIC will be responsive to those changes, and will manage its resources so that it can flexibly balance the requirements for long-term professional engagement with a dynamic funding situation.

A further assumption underlying this plan is that PCIC will continue to enjoy the strong institutional support of UVic. UVic is an internationally respected centre of climate-focused research and an ideal location for a climate service centre such as PCIC. This plan assumes that UVic will continue to recognize the unique nature of PCIC as a service organization that undertakes knowledge transfer from the climate science community to regional users. PCIC in turn will strive to maintain a level of excellence and activity that enhances the university's reputation as an authoritative source of climate information for users throughout the Pacific and Yukon Region of Canada.

Finally, this plan assumes that there will be a continued evolution of the climate service delivery system in Canada towards a three-tier system of federal, regional and private sector service delivery agents. It is assumed that the federal role will continue to evolve towards the provision of basic information to the public, internal federal service delivery between federal government departments in support of policy development and federal adaptation efforts, and high quality national-to-global scale information to regional service providers such as PCIC. It is further assumed that regional climate service providers such as PCIC will continue to undertake and further develop knowledge transfer between the producers of scientific information and regional users. Finally, it is assumed that the private sector will continue to provide and develop consulting services to help specific public and private sector users interpret and apply "off the shelf" technical material. These relationships are expected to evolve along the same path while all the players continue to define their roles within the national climate delivery system.

In summary, this plan is founded on the assumptions that PCIC will continue to receive stable funding; maintain strategic partnerships; receive positive reception from UVic as our host institution, maintain managerial flexibility and be part of the evolution of the climate service delivery system in Canada. From our perspective, these are sound assumptions that support the successful realization of this plan.



IV. OUR SERVICE OBJECTIVES

PCIC is committed to the timely production and delivery of useful climate information, analysis and interpretation to regional stakeholders. We provide regionally focused climate services that are tailored to stakeholders within the Pacific and Yukon Region of Canada. Selected projects and activities serve to both strengthen PCIC's core capacity and to provide climate services to address user needs. PCIC works collaboratively with stakeholders, relying on the mutual exchange of information to provide and deliver applied, authoritative climate information.

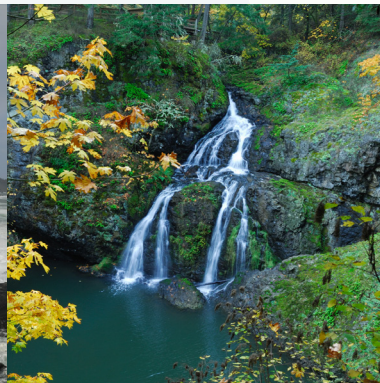
Success over the five-year period defined in this plan will be measured against PCIC's ability to accomplish three service objectives. The objectives are:

1. To provide climate observations and future climate projections specific to the PCIC study region.
2. To provide analysis of the impacts of climate variability and change on regional climate and water resources.
3. To provide interpretation of regional climate information specific to user needs.

Over the next five years, PCIC will meet these service objectives by ensuring that users have access to a variety and tools and sources of climate information. Work towards Service Objective 1 reflects PCIC's commitment to deliver recent climate observations and future climate projections, providing baseline information for a variety of user needs. Fulfilling Service Objective 2 will involve specialized regional analyses, including analysis of climate extremes, hydrological modelling and documenting uncertainty. Service Objective 3 anticipates direct interaction with users of climate information and involves the interpretation of future climate variability and change for specific user needs with the ultimate aim being the delivery of user-commissioned reports.

The delivery of information under the three service objectives will involve a comprehensive approach that recognizes the complex and diverse user-base for climate information. Modes of delivery range from online tools to user-commissioned reports containing information that is sufficiently robust so that it can be acted upon by users.

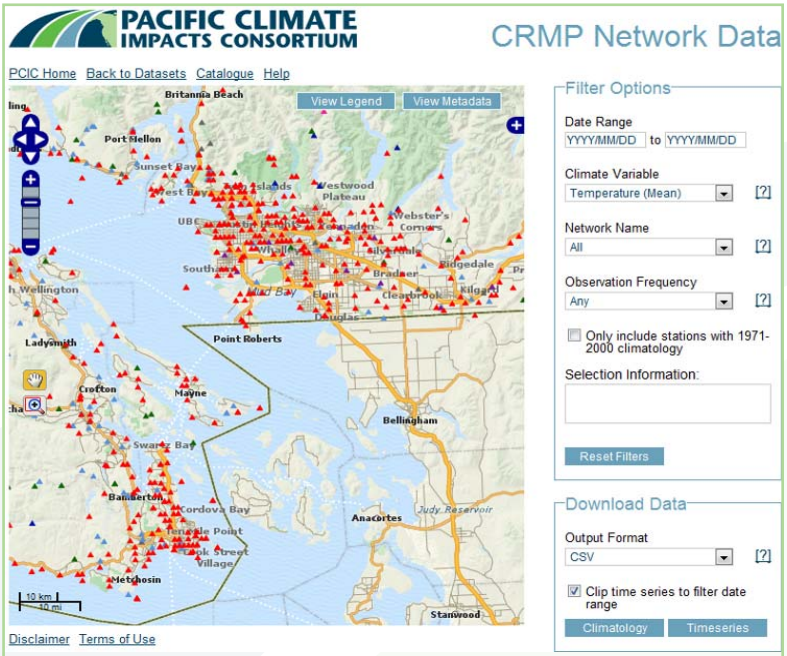




Modes of Service Delivery

ONLINE TOOLS:

PCIC online tools are designed for delivery of climate information and analysis to a wide range of stakeholders. The tools are accessible through the PCIC website and summarize information in PCIC's archives of climate change projections interactively through menu-driven user interfaces. Two tools provide access to future climate projections, serving different user-bases. The Regional Analysis Tool (www.pacificclimate.org/tools-and-data/regional-analysis-tool) serves the needs of sophisticated climate impacts and adaptation researchers. While Plan2Adapt (www.plan2adapt.ca) is a simplified tool designed for users that have less technical knowledge of climate science.



A screenshot of the PCIC Data Portal shows the stations within a selected area with available data from the Climate Related Monitoring Program network.

PCIC DATA PORTAL:

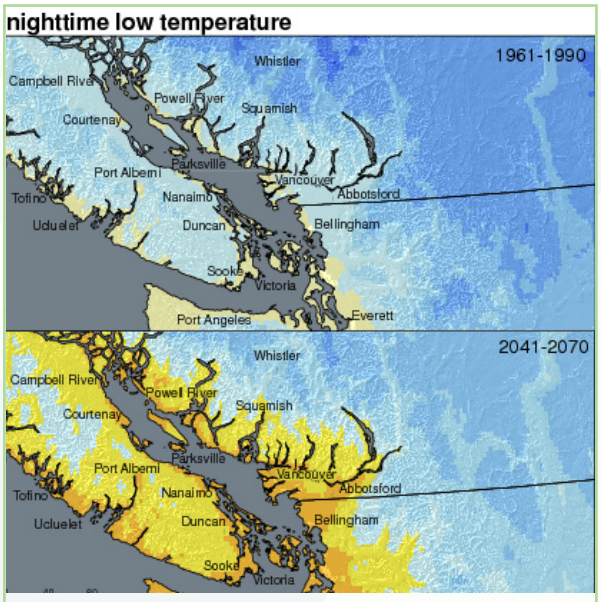
The PCIC Data Portal (www.pacificclimate.org/tools-and-data/data-portal) is a newly developed online tool that provides access to climate and hydrological data. The user interface includes map overlays that give a visual representation of the available climate data. Once the region and variable of interest has been selected, flexible export options will allow the user to receive data in formats compatible with a range of analysis tools such as Google Earth, Excel, or Matlab. The data portal will initially provide access only to station data that are held in PCIC's archives, but it will eventually also provide access to PCIC's holdings of downscaled climate change projections and other data products.

SEASONAL CLIMATE REVIEWS:

Seasonal Climate Reviews will be delivered at regular three-month intervals both in print and on the web. They will provide analyses of the previous season's weather anomalies in the context of longer-term trends, including extreme events. The Seasonal Climate Review will be of general interest as it will help the public and PCIC users understand the changing climate in which they live in the context of climate variability.

ANALYSIS
(REPORTS AND PEER REVIEW JOURNAL PAPERS):

Publishing peer reviewed articles that describe the results of the scientific work that underpins PCIC's climate services provides a means for the dissemination of scientific results to the greater scientific community. It also substantially increases the value of PCIC's climate services by demonstrating that its products are founded on scientific research and procedures that are well respected by PCIC's scientific peers. To meet the needs of users who are not climate specialists, PCIC will translate these findings for a user-audience in accessible formats such as summary documents.



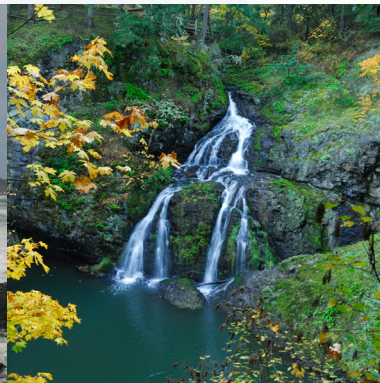
Users in the Georgia Basin region commissioned a report to inform climate adaptation planning initiatives.

PLAIN LANGUAGE COMMUNICATIONS:

PCIC is committed to keeping users up-to-date with our applied research in accessible formats. To this end, PCIC will produce quarterly newsletters, public presentations, webinars, and continue to host an up-to-date website. In addition, PCIC will continue to support the development of the PICS "Climate 101" series of online courses on climate change.

USER-COMMISSIONED REPORTS:

User-specific reports are custom products that PCIC produces in response to a user's expressed needs. The reports are written in plain language to provide analysis and interpretation based on the user's business or sectoral context. In most cases these reports are published for public use.



Service Objective 1

To provide recent data and future climate projections specific to the PCIC study region

BASELINE HISTORICAL CLIMATE DATA, PROVIDING AUTHORITATIVE CLIMATE DATA

PCIC will update and maintain the Provincial Climate Data Set (PCDS), a database of weather and climate observations for the Pacific and Yukon Region of Canada. With quality control and station homogenization efforts, improvement to the data will be an ongoing project. Where sufficient temporal coverage exists, the data will be used to calculate station climate normals for as many locations in British Columbia as possible. The PCDS will be continuously updated in a near real-time fashion by the automated transfer of data from Environment Canada and British Columbia's Climate Related Monitoring Program (CRMP) contributors at hourly and daily intervals.

PCIC will also build and maintain interpolated baseline data sets required for hydrological modelling. This data will be high-quality and spatially distributed (gridded), available at a daily temporal resolution and a spatial resolution of 1/16 of a degree, and will be supported by accompanying uncertainty estimates.

Delivery Mode: PCIC Data Portal

PCIC will begin to provide public access to the PCDS in the spring of 2012 through the PCIC Data Portal. The available data will initially be provided on an "as-is" basis without quality control or homogenization. Users will be provided with appropriate caveats warning of potential quality problems. Data quality and homogeneity will be assessed throughout the life of this strategic plan, with the objective of producing adjustments to the PCDS that will improve homogeneity and the suitability of the dataset for analyses of climate change and variability. All adjustments will be fully documented and an archive history of changes will be maintained to ensure that the original observations are not jeopardized in the adjustment process.

Delivery Mode: Seasonal Climate Reviews

The data from the PCDS, including data incorporated in real-time, will be used to issue reports on weather anomalies from the preceding three-month period at intervals corresponding to the ends of three month seasons. These reviews will include details on selected stations distributed throughout the eco-provinces of BC with maps of the distribution of anomalies in space. Station and regional descriptions will be accompanied by a description of atmospheric circulation and connections will be made between circulation and observed seasonal weather.



CLIMATE MAPPING, PROVIDING HIGH RESOLUTION CLIMATOLOGICAL MAPS

Using sophisticated spatial mapping techniques, we will produce high resolution climatological maps of maximum, minimum, and mean temperature and precipitation in British Columbia on a monthly and annual basis. Work on this project will also involve the generation of time series of monthly maps. Initially, monthly time series of maps of temperature and precipitation variables will be generated for the period 1971 to present. Future work will explore production of monthly maps into the early and mid-twentieth century, and the possibility of eventually producing maps at a daily temporal resolution.

The new climate maps, the monthly time series, and eventually time series of daily maps will be used for everything from driving hydrologic models and deriving basic almanac information about the province, to enhancing the seasonal climate review process.

Delivery Mode: The PCIC Data Portal

The PCIC Data Portal will play host to the climatological maps produced using spatial interpolation methods. Available through a user-friendly interface, the user will be able to select data from his or her area of interest and have that data delivered in one of several widely used formats.

REGIONAL DOWNSCALING, IMPROVING HIGH SPATIAL RESOLUTION CLIMATE INFORMATION

High spatial resolution climate information is required for many applications. The global climate modelling community has recently developed a new generation of climate models and new scenarios of future greenhouse gas emissions. These tools are presently being used by modelling centres the world over to produce new global climate change projections. These developments make it imperative that PCIC invest in the derivation of a new collection of downscaled climate change scenarios for the region based on these new global climate change projections. Working with partners at UVic, Ouranos and elsewhere, we will use regional climate model (RCM) simulations and statistical downscaling to deliver state-of-the-science projections at 50 km, 15 km and 1/16 degree resolution for the 21st century. Updating PCIC's holdings of regionally downscaled information serves the needs of an extensive cross-section of users and provides the basis for PCIC to continue to conduct sophisticated analysis and interpretation.

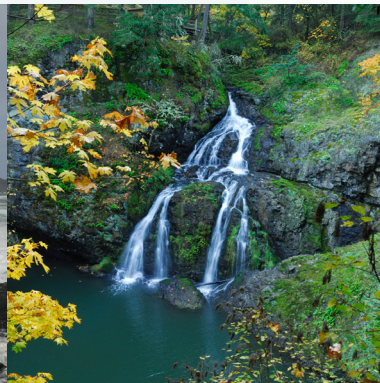
Delivery Mode: Online Tools

We will incorporate delivery of the high resolution downscaling results into PCIC's online tools.

Delivery Mode: The PCIC Data Portal

Users will be able to access downscaled climate change scenarios data produced via the PCIC Data Portal.





Service Objective 2

To provide analysis of the impacts of climate variability and change on the regional climate and water resources

REGIONAL ANALYSIS, SUMMARIZING THE REGIONAL CLIMATE'S RESPONSE TO CLIMATE CHANGE AND VARIABILITY

We will document projected changes in climate, including variability and extremes, on a regional basis within the Pacific and Yukon Regions of Canada. The analyses will include assessments of the uncertainty in the projections that arises from multiple sources in the downscaling process. We will also consider the impacts of the projected changes, both physical and ecological, where collaboration permits. The updated high resolution downscaled information will provide the basis for this work. By including analyses of climate extremes the relevance of the climate information to the user will be improved. PCIC will support decision making by providing this information in a usable form and documenting the uncertainties that affect the downscaled climate change projections.

Delivery Mode: Reports and peer review journal papers

PCIC climate scientists will produce peer reviewed reports and journal papers describing innovative and novel aspects of the work that is undertaken at PCIC in support of user needs. This will provide a scientific outlet for PCIC's work, and will assure users of the quality of the work that underlies the information that they receive from PCIC.



HYDRO-CLIMATE PROJECTIONS, QUANTIFYING THE HYDROLOGIC IMPACTS OF CLIMATE CHANGE TO YEAR 2100

PCIC will deliver updated projections of hydrologic impacts due to anthropogenically induced climate change over the period 2030 to 2100 for the entire PCIC study region. These projections will exploit the new suite of global climate change projections that is currently being developed by the climate modelling community, using newly developed statistical models and new greenhouse gas emissions scenarios. Projections will be based on improved hydrologic modelling, with more explicit emphasis on accurately modelling potential glacier and ice-cap changes within the PCIC study region. Projections explore potential changes in hydrologic variability, including changes to extreme phenomena (floods and droughts), and the underlying physical mechanisms affecting such changes (e.g., changes in the frequency of synoptic events controlling local or regional flooding).

Delivery Mode: Reports and Peer Review Journal Papers

Leading up to the production of the BC Climate Assessment Report, PCIC hydrologists will produce reports and journal papers and subject them to external peer review as results are produced.

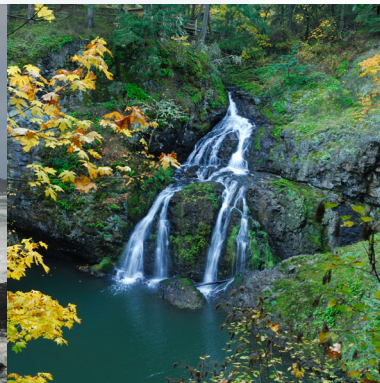
HYDRO-CLIMATE FORECASTING, EVALUATING MEASURES OF HYDRO-CLIMATE FORECAST AND PREDICTION SKILL

PCIC will explore and assess the skill of hydrologic forecasts up to one year in advance for watersheds in BC based on deterministic forecasts from modern climate models that have a demonstrated capability for forecasting the El Niño/ La Niña phenomenon. The intent is to complement and inform current in-house forecasting capabilities of PCIC stakeholders, such as BC Hydro, the BC Ministry of Environment, and Environment Canada.

Delivery Mode: Reports and peer review journal papers

PCIC hydrologists and climatologists will deliver a complete assessment of the hydrological forecasting skill, based on the coupled seasonal forecasting system developed at the Canadian Centre for Climate Modeling and Analysis, and recently implemented operationally at the Canadian Meteorological Centre of Environment Canada.





Service Objective 3

To provide interpretation of regional climate information specific to user needs

USER-SPECIFIC ANALYSIS, INTERPRETING THE REGIONAL RESPONSE TO CLIMATE CHANGE AND VARIABILITY

PCIC will extend the services described in Service Objectives 1 and 2 as required to meet the needs of specific users. Users from different sectors such as agriculture and mining may have different information needs and require different types of interpretation and presentation. By working with these users, PCIC can determine their specific needs and build on previous applied research to produce user-specific results. It is anticipated that PCIC will be continually engaged in a small number of user commissioned projects that will typically have a duration of less than one year. They will often involve custom analyses and the development of new capabilities such that they contribute to the overall improvement of PCIC's capabilities. These projects are generally user supported on an incremental cost basis, and will often include active user participation.

Delivery Mode: User commissioned reports

Interpretation is best provided through dialogue and partnership. PCIC will continue to work directly with users to produce user-commissioned reports and summary information.

USER-MOTIVATED INTERPRETATION, MAINTAINING A TWO-WAY DIALOGUE WITH USERS TO UNDERSTAND THEIR CLIMATE INFORMATION NEEDS

PCIC's service provision is user-motivated, meaning that we maintain a clear perspective on the users of our results throughout our planning, research and dissemination of findings. To properly serve users, we must know how regional climate information is used, what additional information is needed, and in what form it would be most useful. This is achieved by participating in user-led projects such as vulnerability and adaptation assessments as well as by maintaining two-way communication with the user community

Delivery Mode: Plain language communications

An important part of maintaining a dialogue is keeping users up-to-date on PCIC's applied research via plain language communications. PCIC will co-host a workshop that will engage users and providers of climate information in a dialogue on advancing the use of climate information in planning.



V. OUR STRATEGIC OBJECTIVES

Achieving our service objectives requires a focused program that has three strategic objectives:

1. Ensure that PCIC has the scientific and information resources that are necessary to support its service delivery objectives.
2. Build partnerships that enable service delivery and support our applied science program.
3. Maintain operational and managerial excellence.

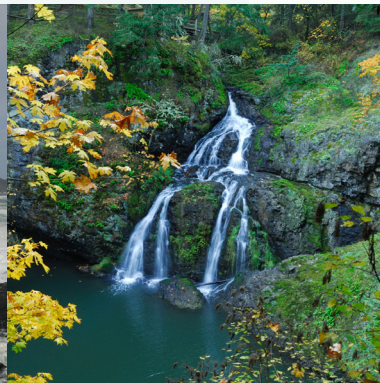
Structured around the three research themes at PCIC, our applied research program is the foundation for the successful delivery of regional climate services to the public. As such, Strategic Objective 1 will be realized through research activity under the three research plans (Regional Climate Impacts; Hydrologic Impacts; Climate Analysis and Monitoring) in partnership with our collaborators and stakeholders. Corresponding to our goal to revisit the strategic plan every two years, research objectives are defined on two- and five-year time scales.

It is strategically important to build and maintain effective relationships with users and climate researchers in the course of developing and delivering regional climate services to ensure that the services are as useful and relevant as possible, that they answer user needs, and that resources and effort are leveraged as effectively as possible. The activities in support of Strategic Objective 2 strengthen PCIC's strategic partnerships.

Achieving operational excellence, Strategic Objective 3, builds on the foundation of PCIC's successful organizational growth, maintaining the highest degree of professionalism and accountability regarding our financial accounts, operating procedures and human resources management.

The next section elucidates the strategy and activities in support of the three strategic objectives.





Strategic Objective 1

Ensure that PCIC has the scientific and information resources that are necessary to support its service delivery objectives

This objective will be realized by undertaking an applied climate science program that fulfills the goals of the PCIC research plans that have been developed to support its service objectives.

REGIONAL CLIMATE IMPACTS RESEARCH THEME

The Regional Climate Impacts research theme is focused on improving the availability and relevance of future projections of climate change and impacts. To accomplish this, we require a comprehensive foundation of climate information and downscaling capability that must be continually improved in step with the evolution of climate modelling and downscaling science. Consequently, the next five-years of research will invest significant effort in strengthening and updating this information base.

Activity over the first two years (2012-2013) will be focused on evaluating the emerging international archive of the World Climate Research Program Coupled Model Intercomparison Project Phase 5 (WCRP CMIP5) and developing strategies to efficiently represent the diversity of results that CMIP5 will provide under the new "Representative Concentration Pathways" greenhouse gas emissions scenarios. Current impacts research is largely based on the WCRP CMIP3 experiment that was developed for the *IPCC 4th Assessment Report* (published in 2007). With the new climate modelling experiments (CMIP5) that exploit updated greenhouse gas forcing scenarios at our disposal, PCIC will maintain and improve our ability to provide relevant future projections. Further development of the research program (2013-2016) will extend the updated scenarios to the analysis of indices of extremes and will allow the analysis of climate change impacts on the physical environment of the PCIC study region.

This work is facilitated by the knowledge and experience obtained through previous applied research projects and significant user interest in regional climate analysis results. Previous projects documenting and researching the performance of a range of statistical downscaling tools have provided PCIC with insights that allow for an informed choice of tools and improved characterization of uncertainty. As well, user interest in understanding projected changes to rare or extremely rare climate events is increasing as users develop plans for reducing the risks associated with the changing incidence and intensity of extreme climate and weather events.

Research objectives

2-year research objectives (2012-2013)

- Downscaling: create statistically downscaled results over the Pacific Yukon Region of Canada from the CMIP5 ensemble.

5-year research objectives (2014-2016)

- Extremes: extend the analysis of projected future climate change to include changes in the frequency and intensity of extreme events in our region.
- Impacts: extend the analysis of projected future change to include regional impacts relevant to ecosystems, resource management, infrastructure, and local government.



HYDROLOGIC IMPACTS RESEARCH THEME

The Hydrologic Impacts applied research activity will expand the spatial and temporal hydrologic modeling domains, building on previous applied research. Spatially, the hydrologic modeling capability previously applied to the Columbia, Fraser and Campbell basins will be expanded to include all drainage areas encompassed by the Pacific and Yukon Region of Canada. The spatial extension will coincide with improvements to PCIC's hydrologic modeling technology. In particular, we will be including the capability to simulate changes in glacier and ice-cap mass balance in order to better represent variation in the long-term storage and release of water in basins containing glaciers and ice-caps.

The Hydrologic Impacts theme also anticipates that there will be stakeholder requirements for hydro-climatic information on multiple time scales and defines applied research objectives to address this need and the possible extension of results to assess impacts on water resources. The first two years of activity (2012-2013) will focus on both the short-term and long-term time scales by: (i) evaluating the potential for a dynamical hydro-climatological forecast system and (ii) providing projections of hydro-climate variability to year 2100 including extreme hydrologic events. In the longer term, the plan anticipates the more experimental problem of assessing the skillfulness of near-term hydrologic predictions (2014-2016).

This work is facilitated by the previous PCIC hydrological modelling and analysis work completed in support of BC Hydro and the BC Government that included watersheds chosen for their importance to hydro-power generation. Future work will continue to consider these needs and the increasing needs of other sectors and stakeholders to understand changes to future hydro-climatic conditions in BC.

Research objectives

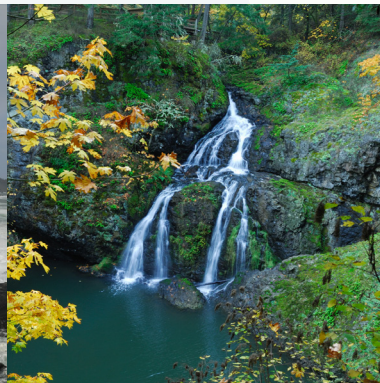
2-year research objectives (2012-2013)

- Glacier Modelling: obtain and operationalize the ability to represent changes in glacier and ice-cap mass balance and dynamics, in order to better represent variations in the long-term storage and release of water in catchments containing glaciers and ice caps.
- Short-term Forecasting: Skill assessment and demonstration of monthly, seasonal and annual hydrologic forecasts; continued development of capacity to develop a test bed hydro-climatological forecast system.

5-year research objectives (2014-2016)

- Long-term Projection: Comprehensive projections of hydrologic impacts to year 2100 due to anthropogenic climate change using updated climate change projections and improved hydrologic modelling tools, including the projection of changes in hydro-climate variability and extremes, and the identification of the causes of changes in extreme behaviour.
- Near-term Prediction: Diagnosis, evaluation, and skill assessment of decadal and multi-decadal hydrologic predictions including hydro-climatic predictions to year 2035.





CLIMATE ANALYSIS AND MONITORING RESEARCH THEME

The Climate Analysis and Monitoring (CAM) theme at PCIC is focused on providing reference climate data to users and interpreting recent seasonal weather in light of climatology using climate data available for the province.

This first two years of activity (2012-2013) will be aimed at establishing the PCDS and generating high-resolution climate maps from those data. Analysis of seasonal weather and issuance of Seasonal Climate Reviews (SCRs) will accompany this work from the onset. Much of this work is governed by pre-existing agreements with the BC government and Oregon State University's PRISM Climate Group. Further development of the program (2014-2016) includes expansion of the SCRs, generation of time-series maps of monthly and then daily weather variables, examination of specific scientific questions that arise from CAM activities, and the introduction of new ways to serve the public's need to access the work of CAM.

This work is enabled by CRMP through a joint data sharing agreement between the province of British Columbia, Rio Tinto Alcan, BC Hydro, and PCIC. The CRMP agreement which also has Environment Canada support, provides PCIC with station observations from more than 6,000 sites across the province of BC.

Research objectives

2-year research objectives (2012-2013)

- Development of the PCDS: Initialize, update and maintain the database of station data including implementation of near real-time data ingestion and further steps toward quality control and station homogenization.
- PRISM Climatology Mapping: Application of the PRISM technology to the generation of 30 arcsecond resolution climatological maps of maximum, minimum, and mean temperature and precipitation in British Columbia on a monthly and annual basis.

5-year research objectives (2014-2016)

- PRISM Time-series Mapping: Generation of a time series of 30 arcsecond maps of temperature and precipitation in British Columbia on a monthly basis. Initially, these maps will be produced for the period 1971 to present. Future work will explore production of monthly maps into the early and mid 20th century with a long-term focus on producing maps at a daily temporal resolution.
- Develop Seasonal Climate Reviews: Issue reports at three month intervals analyzing the previous season's weather anomalies using data in the PCDS, PRISM maps, and publicly available atmospheric analyses.



Strategic Objective 2

Build partnerships that enable service delivery and support our applied science program

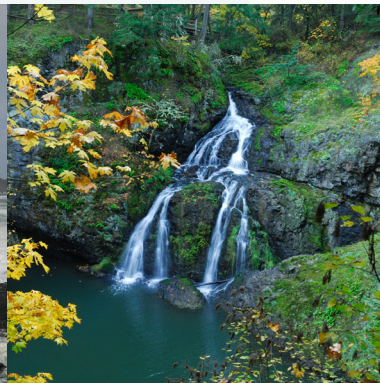
PARTNER WITH USERS

PCIC's research programs, projects and products are user motivated, meaning that we maintain a clear perspective on the users of our results throughout our planning, research and dissemination of findings. Over the next five years (2012-2016), PCIC plans to maintain and improve its two-way dialogue with its user community. The results of this dialogue will be demonstrated in PCIC's products and communication materials.

Specific activities in support of this objective include:

- Foster user-partnerships: PCIC will continue to foster partnerships with its user and stakeholder community by attending sector specific events as speakers and participants, by responding to user requests, and by including the most active stakeholders on the PCIC PAC.
- Co-host a second workshop exploring regional climate services: Building on the success of the 2011 Regional Climate Service workshop, PCIC will work with other regional climate service providers and provide a forum to engage users and providers of climate information in a dialogue on advancing the use of climate information in planning.
- Extend scientific publications: PCIC scientific publications convey the findings of major research projects and programs to a scientific audience. To meet the needs of users who do not have specialized climate science expertise, PCIC will translate these findings into a more accessible format for users in collaboration with users.
- Continue to improve our website and online interfaces that allow users to access results and employ PCIC tools.





LEVERAGE RESEARCH PARTNERSHIPS

Located at UVic, an internationally respected centre of climate-focused research, PCIC is uniquely positioned to translate the results of academic climate research into information tailored to the needs of users. PCIC undertakes innovative science when it is necessary to do so to meet user needs. This user-motivation provides scope to organize our research programs and core scientific staff. However, it does not encompass all the work that contributes to the scientific basis that PCIC relies on to produce results. In this regard, maintaining strong collaborative relationships with research institutions performing leading edge research allows PCIC to continue to produce applied research results that meet contemporary standards.

Our relationships with leading climate research institutes provides PCIC the opportunity to engage academic research groups on collaborative research projects that expand PCIC's knowledge base, and provide it with access to new scientific data and results, and to state-of-the-art modelling technology.

PCIC's current collaborative research arrangements include joint activity with UVic (Pacific Institute for Climate Solutions, School of Earth and Ocean Sciences, Department of Mathematics and Statistics, Department of Geography), Environment Canada units at UVic (Canadian Centre for Climate Modelling and Analysis, Water and Climate Impacts Research Centre), and in Toronto (Climate Data Analysis Section), Ouranos, Oregon State University, and the Provincial Ministries. These relationships include exchanges of expertise, data, climate model output, joint authorship on papers and reports, and in some cases, shared supervisory responsibilities for students and postdoctoral researchers.



Strategic Objective 3

Maintain operational and managerial excellence

As a not-for-profit corporation, PCIC is accountable to its Board of Directors, its stakeholders and the general public. We maintain a high degree of accountability in pursuit of operational excellence. Further, our success rests on maintaining a critical mass of scientific expertise in order to develop and maintain leading edge expertise in our research program areas. This means that recruitment and retention of exceptional personnel while recognizing the need to maintain operational and programmatic flexibility is a key component to achieving operational excellence.

PROMOTE STAFF PROFESSIONAL DEVELOPMENT

PCIC is dedicated to developing resident staff expertise. Through a commitment to professional development, PCIC provides our staff with the opportunity to build their professional expertise through challenging and stimulating work assignments, participation in coursework as appropriate to the needs of the position, and attendance of conferences and workshops.

MAINTAIN A LONG-TERM BUDGETARY OUTLOOK

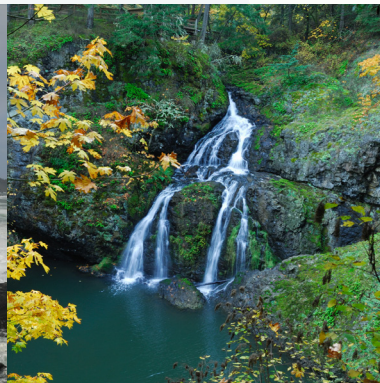
PCIC management will develop a plan to coincide with the Strategic Plan 2012-2016 that anticipates strategic human resource needs and other budgetary concerns for the period.

ADAPT AND RESPOND TO CHANGE

PCIC will continue to adapt and respond to external and internal changes that influence operational processes. It will maintain flexibility and agility by maintaining a balance between the long-term retention of key expertise and leadership, and the engagement of younger professionals who are developing career pathways in climate science and related areas. Measures will be taken in the pursuit of accountability and transparency to the general public through the maintenance and development of corporate systems that adhere to accepted standards, such as the Public Service Accounting Board standards. Such systems include:

- Project management
- Financial management
- Quarterly progress reporting





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