

**REGIONAL CLIMATE IMPACTS
MEETING REPORT**

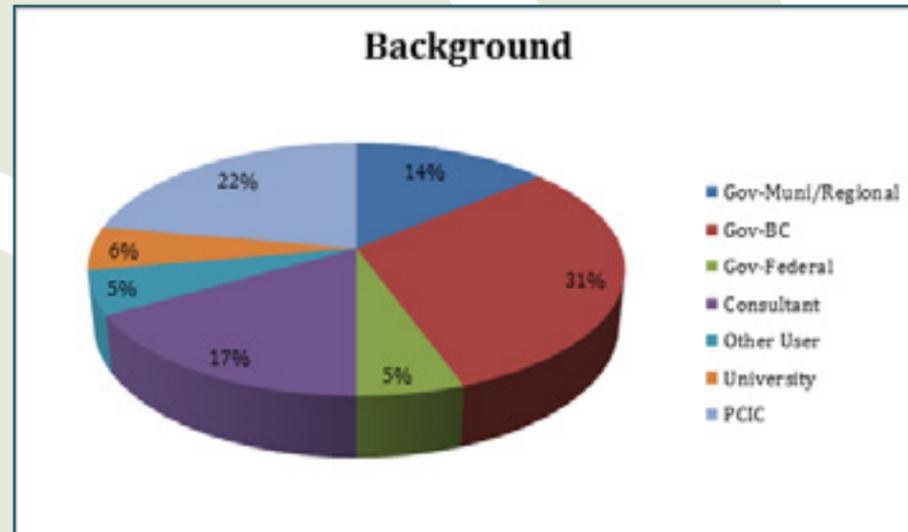


INTRODUCTION

On November 19, 2013, the Pacific Climate Impacts Consortium (PCIC) held a meeting on its Regional Climate Impacts (RCI) theme. It was the second in a series of three workshops intended to introduce some of the latest work of the themes and to gather feedback about directions for future activities. The focus of the RCI theme is to help inform regional decision-making by producing future climate change projections at high resolution (in both time and space) and conducting analysis of climate and climate impacts scenarios based on them. The discussion and conclusions from the workshop will help to inform the biennial planning process for the RCI theme.

ATTENDEES

The RCI theme serves a broad array of users. Attendees of the workshop came with a range of perspectives and expertise (Figures 1 and 2), helping to ensure the meeting was representative of a range of users of RCI products and services. PCIC also invited some potentially new climate information users who have not previously worked closely with the RCI theme to ensure some feedback from an independent perspective.



PCIC HELD THE SECOND OF THREE MEETINGS FOCUSED ON THE CONSORTIUM'S THEMES ON NOVEMBER 19TH, 2013, TO SHARE ITS REGIONAL CLIMATE IMPACTS WORK WITH USERS AND GATHER FEEDBACK ABOUT DIRECTIONS OF FUTURE ACTIVITIES

Figure 1: Participants by organization type.

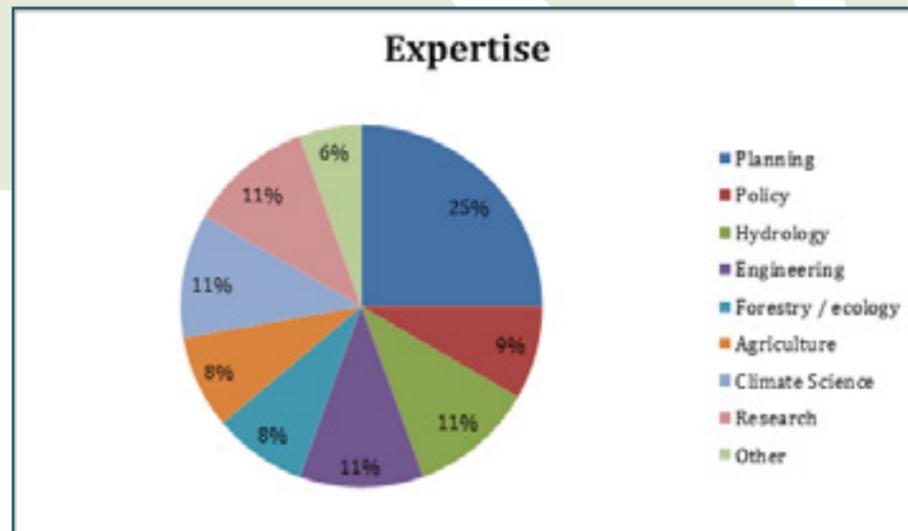


Figure 2: Participants by area of expertise.

WHAT WAS PRESENTED?

The meeting consisted of a series of seminar-style presentations, each followed by a group discussion. First, theme lead Trevor Murdock gave an overview of the three RCI theme objectives (Table 1) including a brief history and summary of recently completed projects. Subsequent discussion provided an opportunity for users to comment on the overall objectives of the theme.

REGIONAL CLIMATE IMPACTS THEME OBJECTIVES

- ▶ **Downscaling:** increase the resolution of the most recent future climate change projections to relevant regional scales.
- ▶ **Extremes:** extend the analysis of projected future climate change to include regional extremes.
- ▶ **Impacts:** extend the analysis of projected future climate change to include regional impacts relevant to ecosystems, resource management, infrastructure, and local government.

Research climatologist Dr. Alex Cannon gave a presentation on new high-resolution daily ~10 km gridded statistical downscaling products, including an overview of how to obtain them from the PCIC data portal. In the discussion that followed, a key area of concern was for the timely documentation, in a publicly available form, of scenarios selection and validation. Attendees also discussed the level of cross-boundary collaboration that occurs presently and expressed a desire for downscaling products that cross the Canada-US border.

Four users then gave presentations about their collaboration with the RCI theme. The presenters were asked by the meeting organizers to discuss how they used PCIC products and services to meet their information needs and how those products and services could be improved.

Dave Spittlehouse (Ministry of Forests, Lands, and Natural Resource Operations) began this session with a talk on incorporating climate change into forestry planning. He used the examples of PCIC's Plan2Adapt online tool¹ and the Resource Region Summaries² as ways of focusing on the key ideas and keeping messages simple for people with limited experience using climate information. Dave also noted the importance of collaboration between PCIC and impacts researchers in producing these products.

Maggie Baynham (City of Surrey) described how Surrey staff used PCIC products in constructing the city's climate change adaptation plan. Their work included data from Plan2Adapt, a regional analysis of extremes by PCIC for the Georgia Basin, and the BC Ministry of Environment Sea Level Rise Adaptation Primer. The staff particularly liked Plan2Adapt, with its easy to use interface and ability to look at a wide range of projections. They would also have liked information on climate extremes in the same format.

Table 1: Objectives from the current RCI theme research plan.

THE PRESENTERS DISCUSSED STATISTICAL DOWNSCALING PRODUCTS, THEIR COLLABORATIONS WITH THE RCI THEME, HOW REGIONAL CLIMATE PROJECTIONS CAN INFORM PLANNING AND PLANS FOR THE FUTURE

1. Plan2Adapt is an online tool for assessing regional climate change throughout BC. For more information about Plan2Adapt, see: www.Plan2Adapt.ca

2. A set of climate summaries on the eight resource regions of BC. For more information about these summaries, see: www.pacificclimate.org/news-and-events/news/2013/regional-climate-summaries

3. www.surrey.ca/community/14146.aspx

4. <http://env.gov.bc.ca/cas/adaptation/pdf/SLR-Primer.pdf>

Jeff Zukiwsky (Columbia Basin Trust) presented on the Communities Adapting to Climate Change Initiative (CACCI), which translates scientific information from PCIC for use by residents of the Canadian Columbia Basin. Their work involved creating summary reports, video presentations and workshops to assist people in the Basin with understanding the potential effects of climate change. Jeff's wish list included: increased precision of localized climate data and projections, trends and projections of extremes including intensity-duration-frequency (IDF) relationships, and continued assistance with capacity building.

Kristi Tatebe (BC Agriculture Climate Action Initiative; CAI) explained how the CAI produced regional reports on climate adaptation for the agriculture sector. PCIC acted in an advisory role, providing climate data, interpretation and review, while the CAI produced the reports. Kristi noted that it was important to include local, historical data in the analysis so that users could relate it to their own experiences of how things have already changed in their regions. She also found it was effective to translate climate change projections into the possible agricultural impacts that could result from them. These sectoral impacts were more readily understood than the standard indices of extremes used in climate research. Finally, Kristi indicated that users regarded PCIC as credible and authoritative source of climate change projections.

The discussion following the user presentations centered on how regional climate projections can inform decision making. Some users pointed out that PCIC needs to continue to do as much as possible to improve the utility of climate information for application to decision-making. However, the attendees also recognized that climate information is never the only factor in a decision and that there is also an onus on the user to define how climate information is being used in conjunction with other information. For example, in some cases a best estimate is required with an analysis of sensitivity about a central value. In other cases, planning is for the worst case scenario. Ultimately, even with detailed guidance, some level of collaboration between PCIC and users is essential to ensure that two-way learning, by users about climate scenarios and by PCIC about applications of climate information, continues to occur.

FEEDBACK ON FUTURE DIRECTIONS

The final workshop session focused on obtaining feedback on the objectives of the RCI theme over the next two to five years, to help with PCIC's planning cycle. Trevor began the session with a presentation on possible future objectives in which he noted that PCIC's research is influenced by the Climate Model Inter-comparison Project (CMIP) modelling cycle. Recent work has therefore focused on downscaling the latest output from CMIP5. As such, a natural progression for the theme is to move more towards data dissemination, analysis, and impacts assessments in the coming years. Collaboration with impacts researchers to broaden the use of PCIC's data could also receive increasing attention and result in the analysis of impacts in areas that have not been extensively studied yet by PCIC, such as wind projections, wildfire, or heating and cooling demands as well as applications to new sectors, such as health impacts.

PCIC WILL USE FEEDBACK GATHERED FROM THE RCI MEETING TO INFORM THE DEVELOPMENT OF FUTURE RCI SERVICES AND RESEARCH

The presentation was followed by a panel on users' views about possible directions. The speakers were Dirk Nyland (BC Ministry of Transportation and Infrastructure), Sarah O'Keefe (BC Climate Action Secretariat), Norma Miller (BC Real Estate Association), and Don Nash (Urban Systems Consulting). Each presented their experiences in planning for climate change and suggestions for future priorities.

Dirk raised the issue of communication between engineers and climate scientists as a potential area where misunderstandings can occur. He would like to see more work on communication practices in climate science in general and on how to work with PCIC in particular.

Sarah noted that the Climate Action Secretariat has become the primary provincial source for climate change guidelines for anyone working with the province. She also noted that public access to climate change data is becoming more important and that a number of new users are becoming more interested in climate change information, such as the financial sector, the insurance industry, and environmental assessments.

Norma spoke about how realtors make use of climate change information when working with their clients. Her main wish was for simplified, straightforward representations of climate change and also maps of vulnerability (e.g. water quality, slope stability, species at risk, invasive species, etc.).

Don described his perspective as a consultant who has worked with smaller cities and towns and noted that projects increasingly need to consider climate change, including questions about the potential legal liabilities for governments and consultants if they do not take due care in analyses of climate change. Don would like to see updated IDF curves, custom climate indices such as freeze/thaw cycles or extremes above project-specific thresholds, and accompanying estimates of uncertainty, though he recognized that customization could undermine the possibility of comparing results across jurisdictions and sectors.

The panel was followed by a group discussion and the day wrapped up with each attendee giving a brief description of what they took away from the meeting. Feedback focused largely on how climate change information should be presented. Users noted that planning processes use specific values as thresholds for when action must occur and updating those values to incorporate climate change usually demands a single number rather than a range, the latter being what PCIC normally provides. Despite a broad interest in 'single numbers' it was recognized that providing them is difficult to justify since ranges represent uncertainty associated with the climate system, climate models, and future greenhouse gas emissions. Reconciling the need for single numbers in decision-making without misrepresenting projected change and uncertainty led to a larger question of how risk is represented in planning processes. The group tended to agree that this must be collaboratively determined by PCIC and users. Finally, there was some discussion about how to direct PCIC's efforts on impacts and whether such efforts should be motivated by the potential for financial consequences.

SUMMARY

Attendees expressed satisfaction with PCIC's work and were interested in giving feedback to make sure that success continues. The proposed plan to shift the RCI theme's main focus from producing new downscaled results to making use of those results for regional analysis including climate impacts scenarios was welcomed. The main points of discussion and feedback as they apply to the three objectives (Table 1) of the RCI theme were as follows:

- ▶ **Downscaling:** use recent products for regional analyses and produce guidance materials on use of downscaled PCIC products
- ▶ **Extremes:** consider custom indices in addition to standard indices
- ▶ **Impacts:** collaborate with users to produce projections of climate impacts

PCIC would like to thank those who took the time out of their schedules to participate. The meeting was very helpful in defining the direction of the RCI theme as part of the current biennial theme planning process, and user feedback is welcome at any time.

Participant List, RCI Meeting The Inn at Laurel Point, Victoria, BC — November 19th, 2013

| Last Name | First Name | Organization | Position |
|---------------|------------|---|--|
| Anslow | Faron | Pacific Climate Impacts Consortium | Climatologist |
| Barnes | Jim | BC Ministry of Transportation and Infrastructure | Manager, Corporate Initiatives |
| Campbell | David | BC Ministry of Forests, Lands and Natural Resource Operations | Section Head, River Forecast Centre |
| Cannon | Alex | Pacific Climate Impacts Consortium | Research Climatologist |
| Dewis | Cassbreea | Pacific Climate Impacts Consortium | Lead, Planning and Operations |
| Ellis | Erica | Kerr Wood Leidal | Fluvial Geomorphologist |
| Foord | Vanessa | BC Ministry of Forests, Lands, and Natural Resources Operations | Research Climatologist |
| Fraser | Jenny | BC Ministry of Environment | Adaptation Specialist, Climate Action Secretariat |
| Gagne | Marie-Eve | CCCMa | NSERC Visiting Fellow |
| Hember | Robbie | Natural Resources Canada | Postdoctoral Fellow |
| Hiebert | James | Pacific Climate Impacts Consortium | Lead, Computational Support |
| Larock | Michael | Association of BC Forest Professionals | Director of Professional Practice and Forest Stewardship |
| Lewis | Ted | Rescan Environmental Services | Hydrologist |
| Miller | Kate | Cowichan Valley Regional District | Manager, Environmental Initiatives |
| Murdock | Trevor | Pacific Climate Impacts Consortium | Lead, Regional Climate Impacts |
| Nielson | Denise | Agriculture and Agri-Food Canada | Research Scientist |
| Nyland | Dirk | BC Ministry of Transportation and Infrastructure | Chief Engineer |
| O'keefe | Sarah | BC Ministry of Environment | A/Sr. Climate Change Policy Advisor |
| Pitt | Lawrence | Pacific Institute for Climate Solutions | Associate Director |
| Pouliotte | Jennifer | Climate Change Adaptation, BC Ministry of Environment | Senior Policy Analyst |
| Schnorbus | Markus | Pacific Climate Impacts Consortium | Lead, Hydrologic Impacts |
| Shumlich | Michael | Pacific Climate Impacts Consortium | Scientific Information Specialist |
| Smiley | Bruce | BC Hydro | Manager, Generation and Hydrometric Information |
| Smith | Stephanie | BC Hydro | Manager, Hydrology & Technical Services |
| Spittlehouse | David | BC Ministry of Forests, Lands and Natural Resource Operations | Climatologist, Competitiveness and Innovation Branch |
| Tam | Stephanie | Sustainable Agriculture Management, Ministry of Agriculture | Water Management Engineer |
| van der Gulik | Ted | BC Ministry of Agriculture | Senior Engineer |
| Walker | Simon | BC Ministry of Transportation and Infrastructure | Avalanche & Maintenance Weather Specialist |
| Watts | Martin | FORCOMP Forestry Consulting Ltd. | President |
| Weick | Ted | BC Ministry of Environment | Unit Head - Air and Climate |
| Wong | Pat | Atmospheric Monitoring Section, Pacific and Yukon Region | Manager |
| Zwiers | Francis | Pacific Climate Impacts Consortium | Director |

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