APPROACHES TO COMMUNICATING CLIMATE SCIENCE THAT WORK FOR USERS

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PACIFIC CLIMATE IMPACTS CONSORTIUM

Introduction

Regional climate service providers such as PCIC often produce "gray literature," scientific project reports and impact assessments for their users. Scientists also publish many articles in the peer-reviewed literature each year that are relevant to the needs of regional stakeholders. To make the major findings from this work accessible to the broader audience of policymakers, planners and the general public, PCIC has taken three main approaches (Figure 1). These are:

1. **Developing short, high-level extension notes called Science Briefs.**
2. **Producing high-level summary reports to accompany some of PCIC's project reports.**
3. **Collaborating and co-writing project reports directly with our users.**

Science Briefs and High-Level Summary Reports

PCIC Science Briefs and high-level summary reports are developed using essentially the same process (Figure 2). PCIC Science Briefs are extension notes that cover regionally-relevant findings from the scientific community, contextualizing them and discussing what they mean for PCIC's users. They also serve as a way for PCIC to address frequently-asked questions in an in-depth manner. They generally cover one or two papers, are between two and six pages in length and are written at a level suitable for a wide audience, including policymakers, planners and the general public.

These summary reports are developed directly from technical reports produced by PCIC's Themes. The overall structure is often very similar to Science Briefs, though feedback from the researchers is more frequent and can include co-development.

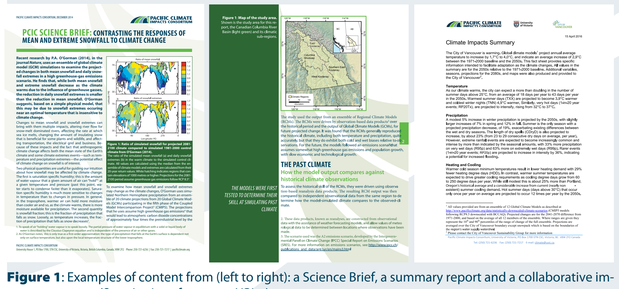

Figure 1: Examples of content from (left to right): a Science Brief, a summary report and a collaborative impacts summary. (See citations for report URLs.)

Science Summary Development

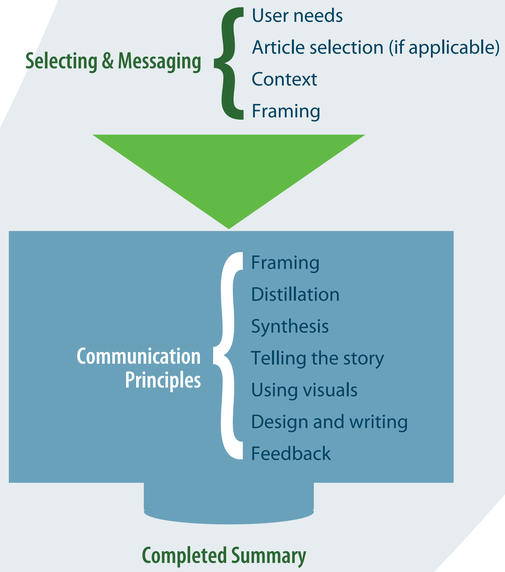

Figure 2: Science Briefs design process.

1 Select article according to user needs

- Consider geographic and scientific relevance
- Ask, "why should they care about this article?"

2 Consider context and messaging through lens of user needs

- Background material should make the article accessible
- Background material should motivate the article
- Message should relate directly and clearly to user needs

3 Distill and synthesize

- Break article into a few (around three, if possible) major, relevant points as determined by message
- Combine with context so users understand the findings and motivation for the research
- Impose structure

For Science Briefs an hourglass structure (Figure 3) is used, with relevant points communicated first for accessibility and brevity, followed by a narrative structure, in which context and motivation develop into the important findings, for knowledge retention and more comfortable reading. The structure used will depend on the goals and material in the article. Other common structures include an inverted pyramid, in which the most important information comes first, or a narrative structure, which reads like a story, with findings last.

Common structures:

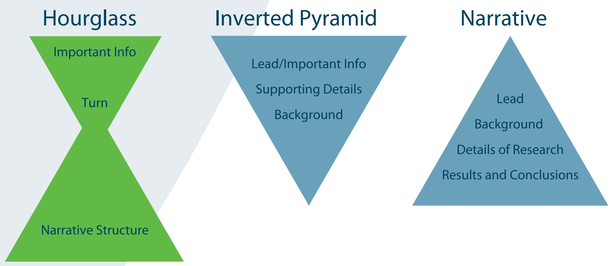

Figure 3: Common structures used in written communications materials.

4 Tell the story

- Style and ordering of findings and background material will depend on the structure, and user needs/values
- Present less technical points first
- Avoid or translate technical terminology
- Educate, but don't "talk down"; use footnotes if necessary
- Signpost misconceptions and place facts first

5 Use visuals

- Incorporate visuals to show things that are hard to put into words and to illustrate key points
- Use legends, labels and captions as necessary (less important for some infographics)
- One way to develop visuals: choose important points, choose format, make a simple wire-frame/storyboard, feedback and iterations, add style to make a rough draft, feedback/testing and iterations, final product
- Use figures with sufficient resolution (important for raster)

6 Design and writing

- Use consistent style, including colours, voice and fonts

7 Feedback

- Gather feedback, do user testing (if possible), iterate

Further resources on science communication:

Blum, D., M. Knudson and R.M. Henig, 2005: *A Field Guide for Science Writers: The Official Guide of the National Association of Science Writers*. Oxford University Press, 321 pp.

Hancock, E., 2003: *Ideas into Words: Mastering the Craft of Science Writing*. Johns Hopkins University Press, 162 pp.

Tufte, E.R., 2001: *The Visual Display of Quantitative Information*. Graphics Press, 213 pp.

Collaborative Reports

In recent years, PCIC has moved toward including users in the production of technical reports on regional climate projections. Increasingly, co-written materials (Figure 4) are produced in collaboration with users. The form, length and structure of these reports varies (from as short as 2 pages to over 60). The common feature among these reports is that they are generated as the result of a process of intense, iterative feedback between PCIC researchers and the users that they are serving.

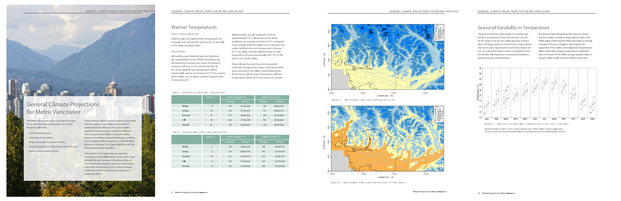

Figure 4: Content from Climate Projections for Metro Vancouver collaborative report.

This collaborative development insures that reports are tailor-made, with the level of context, technical detail and explanation appropriate to the user. This presents several advantages:

1. **Reports are tailored to user needs and hence, immediately useful for their intended audience.**
2. **Users can include discussion of what climate impacts will mean for them and some possible responses which could not be included if solely authored by PCIC researchers, as this would be well beyond our mandate and expertise.**
3. **The involvement of PCIC researchers ensures accurate interpretation of climate projections, including uncertainty.**
4. **PCIC's capacity to contribute to more regional assessments is increased by focusing on the aspects of the assessment that are directly relevant to the users.**

The development process for these reports shares similarities with used for Science Briefs and other summaries, in that the context and user needs motivate the work and the determination of the information that is conveyed. Framing, distillation, synthesis and feedback are used, and visuals are incorporated. Collaborative reports differ in that feedback is constant through the development process, users contribute to the message development and choosing how the work is framed, and the distillation and synthesis steps draw upon the expertise of both PCIC researchers and the users.

Cited Reports

The Pacific Climate Impacts Consortium, 2014: *Climate Extremes in the Columbia Basin Summary Report*. The Pacific Climate Impacts Consortium, 12 pp.

The Pacific Climate Impacts Consortium, 2014: *Contrasting the Responses of Mean and Extreme Snowfall to Climate Change*. The Pacific Climate Impacts Consortium, 3 pp. <https://www.pacificclimate.org/sites/default/files/publications/PCIC_Science_Brief_December2014.pdf>

The Pacific Climate Impacts Consortium and the City of Vancouver, 2016: *Climate Impacts Summary*. The Pacific Climate Impacts Consortium, 3 pp. <https://www.pacificclimate.org/sites/default/files/publications/VancouverSummary_Final.pdf>

The Pacific Climate Impacts Consortium, Metro Vancouver and Pinna Sustainability, 2016: *Climate Projections for Metro Vancouver*. The Pacific Climate Impacts Consortium, 80 pp. <http://www.metrovancouver.org/services/air-quality/AirQualityPublications/ClimateProjectionsForMetroVancouver.pdf>

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