



THE CANADIAN MOUNTAIN ASSESSMENT: WALKING TOGETHER TO ENHANCE UNDERSTANDING OF MOUNTAINS IN CANADA

Graham McDowell, Madison Stevens, Shawn Marshall, et al.

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We respectfully acknowledge that the mountains discussed herein, which inspire and sustain us, are the traditional and ancestral territories of First Nations, Métis, and Inuit Peoples who have cared for and known these homelands since time immemorial.

We recognize that present-day Canada was formed through colonial discrimination and dispossession of Indigenous Peoples, and that these legacies of colonial harm continue to perpetuate injustices against First Nations, Métis, and Inuit Peoples across Canada.

We affirm our individual and collective responsibilities to address these harms, work towards reconciliation and healing, and build relationships among Peoples and with the other-than-human world that are rooted in reciprocity, equity, and respect. This acknowledgement is only a first step in the journey.

We gratefully honour the ancestors who light our path ahead.

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The Canadian Mountain Assessment (CMA) represents the first formal assessment of mountain systems in Canada, as well as an important effort to enhance understanding of mountains through the respectful inclusion of both Western academic and Indigenous ways of knowing. It is the outcome of over three years of work and was made possible by funding from the Canadian Mountain Network (CMN)—a member of the Networks of Centres of Excellence Canada program—and the Natural Sciences and Engineering Research Council of Canada (NSERC), institutional support from the University of Calgary, and the incredible commitment, effort, and care of an extensive and diverse group of individuals.

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While the CMA is a national scale initiative, we note that many researchers; First Nations, Métis, and Inuit individuals; and mountain professionals with knowledge of mountains in Canada were not directly involved in the project. Nevertheless, our work was informed by the efforts of this broader community; we thank all of those that create,

safeguard, and (where appropriate) share knowledge of mountains in Canada. Furthermore, while the CMA attempts to assess the state of mountain knowledge in Canada, we appreciate that knowledge of mountains is not only held by people. We recognize other-than-human Knowledge Holders in mountains and call attention to the importance and legitimacy of their knowledges, even if they are largely beyond the scope of the CMA and the realm of human experience more broadly.

Finally, we are grateful for the mountains themselves. Mountains are important to all of us involved in the CMA, in ways that are common, including as sources of freshwater, but also in ways that are distinctive and deeply personal. Regardless of our specific connections to mountains, they have inspired each of us to dedicate considerable time and effort to enhancing understanding of mountains in Canada. We benefit tremendously from mountains, and it has been an honour to work in the service of these special places.

FOREWORD

Jody Hilty, President and Chief Scientist, Yellowstone to Yukon Conservation Initiative

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Majestic and towering and yet uniquely fragile, mountains in Canada sit at the forefront of discussions about cultural regeneration, reversing biodiversity loss, and addressing climate change. Mountains are places of inspiration and rejuvenation for the mind, body, and the soul. For many Indigenous Peoples, they are also places of cultural sites and practices, and areas where cultures would meet and spend time together, to forge alliances and mark celebrations. Indigenous Peoples have long been stewards of mountain environments, and mountains have provided much in return. Today, questions about the guardianship of the mountain areas remains contentious as Indigenous Peoples assert their territories while the Government of Canada refers to much of these lands as “Crown Lands.” In this context, Indigenous Peoples and the federal government are forging new ways forward that enable joint agreements on how lands should be cared for, consistent with the government’s commitment to the United Nation’s Declaration on the Rights of Indigenous Peoples and Canada’s Truth and Reconciliation framework.

Mountains in Canada are also important centres of biodiversity; they are home to iconic species such as grizzly bears, wolverine, and mountain caribou, as well as less prominent but no less important flora and fauna. Historically, the general inaccessibility of mountains has meant that human development in the mountains—be it homes and towns, agriculture, or extractive activities—has been slower and less extensive than in more accessible valley bottoms and less topographically diverse regions. However, today mountains across Canada are seeing an increase of human activities and development, as population growth and new technologies result in develop-

ment reaching ever further into the interior of mountains, up their slopes, and across their many folds. Given Indigenous Peoples’ unique and significant knowledges of mountain ecosystems, it is promising that biodiversity conservation efforts are now advancing in more collaborative ways, leading to conservation efforts that are informed by both Western scientific and Indigenous knowledges of mountain environments, as well as the establishment of Indigenous-led protected areas in mountain regions.

Despite auspicious governance developments, climate change is rapidly transforming mountain areas in Canada, leading to growing concern about impacts on water resources, the structure and function of mountain ecosystems, and the safety and wellbeing of communities in and downstream of mountain areas. This, in turn, is raising awareness about the urgent need for both the mitigation of greenhouse gases as well as adaptation to emerging challenges and potential opportunities of climate change in mountain areas. However, changes are currently outpacing understanding of viable paths forward for mountain areas in Canada in a changing climate.

For these reasons and more, the timeliness of the Canadian Mountain Assessment (CMA) could not be better. It is more imperative than ever that we have clarity about what we know, do not know, and need to know about mountains areas across Canada. It is only with such knowledge that we can make prudent decisions about how we as a society—in all our diversity—can move forward to care for mountains into the future.

The CMA represents a tremendous effort to advance understanding of mountains in Canada, and assessment practices more broadly, through the respectful inclusion of multiple ways of knowing.

This involved developing new approaches to bring together Indigenous knowledges with insights from Western academics, including by organizing project governance through a ‘Stewardship Circle’; convening a ‘Learning Circle’ with First Nations, Métis, and Inuit individuals from across mountain areas in Canada; ensuring that chapters were co-led by Indigenous and non-Indigenous authors to support equitable knowledge co-creation; and sharing oral knowledges through embedded videos to respect and support oral knowledge sharing traditions. It also involved significant attention to the protection of Indigenous knowledges, including by developing a publication model that allows for the removal of content into the future, if deemed necessary, consistent with the principle of ongoing consent. Another welcome aspect of the CMA is that those involved with the project explicitly recognize the limits of their individual and collective understanding across different mountain regions, Indigenous territories, and ways of knowing and connecting to mountains. This extends to the

overall contribution of the CMA, which is framed as a beginning rather than the final word. Those involved with the CMA should be commended for their humility, and for leading the way in demonstrating how to engage respectfully with a diversity of knowledges in such a major assessment.

Given the many issues facing mountain areas in Canada, it is necessary to both broaden and deepen our understanding of mountains in the country. The CMA’s thoughtful examination of diverse knowledges of mountains in Canada gives us an opportunity to do just this. It also gives us reasons to be hopeful about the future; it provides a very real example of how embracing multiple ways of knowing can enhance our collective understanding of mountains, while also leading to new insights about how we might move forward together in a good way. We are reminded of the words by the late ecologist E.O. Wilson who stated “We are drowning in information, while starving for wisdom.” The Canadian Mountain Assessment provides ample food for thought.

EXECUTIVE SUMMARY

The Canadian Mountain Assessment (CMA) provides a first-of-its-kind look at what we know, do not know, and need to know about diverse and rapidly changing mountain systems in Canada. The assessment includes insights from both Indigenous and Western academic knowledge systems and represents a unique effort to enhance understanding of mountains through respectful inclusion of multiple bodies of knowledge. The CMA is a text-based document, but it also includes a variety of visual materials as well as access to video recordings of conversations with First Nations, Métis, and Inuit individuals from mountain areas in Canada. The CMA is the country's first formal assessment of mountain systems knowledge; it is guided by five overarching principles (Figure 0.1).

The CMA is composed of six chapters, summarised below.

Chapter 1. Introduction

This chapter provides the context and rationale for the assessment, as well as details about the

CMA's governance, conceptual and ethical foundations, methodology, and structure. It also calls attention to important caveats and limitations as well as salient innovations and contributions of the CMA.

Chapter 2. Mountain Environments

The Mountain Environments chapter examines the biogeophysical characteristics of mountain regions in Canada. It assesses the state of knowledge for a wide range of environmental topics including geology; weather and climate; snow, ice, and permafrost; water; hazards; ecosystems and biodiversity; and connections between mountains and lowland/coastal environments. While demonstrating a significant amount of scientific work related to mountain environments in Canada, the chapter also illustrates the general lack of engagement with Indigenous knowledge systems in relation to mountain environments in existing Western academic research. Contributions from Indigenous Peoples are nevertheless included in the chapter by way of CMA authors

1 – Service

The CMA is guided by service to mountains and mountain-connected communities — Indigenous, non-Indigenous, and non-human — now and into the future.

2 – Inclusivity

The CMA celebrates the diversity, depth, and specificity of First Nations, Métis, Inuit, and Western academic knowledges related to mountains in Canada, and aspires to demonstrate the breadth of these knowledges, as well as points of tension, synergy, and emergence.

3 – Humility

The CMA aspires to collaboratively advance a good effort, acknowledging that our assessment of what we know, don't know, and need to know about mountains in Canada inherently reflects structural disparities, procedural limitations, and our own positionality.

4 – Responsibility

The CMA is committed to upholding the integrity of diverse knowledges shared into the assessment; respecting the privacy of culturally protected knowledges; enacting on-going consent; and ensuring open-access publication, traceability, and transparency.

5 – Action

The CMA aims to enhance understanding of the importance of mountains in Canada, and to stimulate relationships, research, and action that support the realization of desirable mountain futures.

Figure 0.1: CMA Guiding Principles

as well as knowledges shared during the CMA's Learning Circle. In its conclusion, the chapter identifies gaps in our current understanding of mountain environments and invites mountain researchers to engage with Indigenous communities to learn more about their unique perspectives and understandings of mountain environments in Canada.

Chapter 3. Mountains as Homelands

The Mountains as Homelands chapter considers how mountains in Canada are experienced and shaped as Homelands by Indigenous Peoples and homes by non-Indigenous people. The chapter approaches this broad topic by considering how mountainous environments are made into significant places through practice, representation, and relations among people. It weaves together knowledge from Indigenous Peoples and scholarly literature, and draws on conceptual approaches offered by relational thinking, multi-species scholarship, and ontologies studies. The chapter begins by examining storytelling as an important means of place-making in mountain Homelands. It then considers how an emerging field of mountain archaeology corroborates and supports Indigenous presence in mountain Homelands. Moving beyond strict divisions between nature and culture, a substantial portion of the chapter explores how multispecies relations underpin mountains as homes and Homelands. The chapter then examines the forms and ongoing impacts of colonialism and power in Canadian mountain places. This includes the role of parks and protected areas, and private land, in mountain regions, and how science, labour, recreation, and art have shaped perceptions and experiences of mountain places. It assesses how such practices can contribute to discrepancies in access to mountains as homes and Homelands. The chapter concludes with the topic of Indigenous governance in mountain places. Overall, the chapter finds that the literature on these topics is better represented in the western mountain regions, that the role of private land in constituting mountain places is generally under-examined, and that there are opportunities for scholarship that documents and explores Indigenous resistance to incursions on mountain Homelands and the reassertion of Indigenous governance in mountains.

Chapter 4. Gifts of the Mountains

The Gifts of the Mountains chapter explores the contributions of mountains to the wellbeing of human communities. It uses the framing of gifts as an alternative to the conventional descriptions of resources or ecosystem services, and reveals how, for many people in Canada, mountains provide material, artistic, pedagogical, emotional, and spiritual gifts. The chapter also discusses how particular users and communities receive benefits derived from energy, minerals, and forests found in mountains. Importantly, the chapter calls attention to the idea that many gifts from mountains are situated in reciprocal relationships where users receive foods, medicines, water, or recreational space, as personal gifts which, in turn, inspire wonder, awe, respect, and care. Such reciprocity is often, but not exclusively, associated with Indigenous worldviews. Ultimately, the chapter demonstrates that gifts from mountains are unevenly distributed and that some benefits derived from mountains may come at a cost to others seeking to enjoy the same mountain spaces. Furthermore, many gifts of the mountains are under increasing pressure from drivers of environmental and social change.

Chapter 5. Mountains Under Pressure

The Mountains Under Pressure chapter examines the drivers of recent and future change in mountain systems in Canada, as well as impacts to mountain ecosystems and communities, focusing on the period from the “great acceleration” of increasing human population and activity in 1950 out to 2100. Key issues assessed include climate change, land use development, resource extraction, pollution, tourism and recreation, population growth, invasive species, and governance practices, including associated threats to the sustainability of mountain environments, livelihoods, and gifts of the mountains. The chapter demonstrates that these pressures are often interconnected and compounding, and describes how each drives biophysical, political, socio-cultural, and ecological changes, with effects that vary from region to region. However, while changes have been acutely observed and felt by many Indigenous Peoples as well as non-Indigenous mountain communities, monitoring

of both anthropogenic pressures and their implications is currently limited across mountain systems in Canada, making prediction of future threats difficult to assess, particularly in mountainous areas of northern Canada. The chapter concludes by calling attention to the need for enhanced research and monitoring efforts, as well as the importance of supporting adaptation to the challenges (and opportunities) posed by increasing rates of climate and anthropogenic change in mountain areas in Canada.

Chapter 6. Desirable Mountain Futures

The Desirable Mountain Futures chapter reflects on the CMA's knowledge co-creation process and the findings of its substantive chapters. It discusses how much was already known about mountains in Canada, but also how divides between Indigenous and Western knowledge systems have

limited appreciation for the depth and diversity of existing mountain systems knowledge. It also describes how, in coming together across time, cultures, and landscapes, the CMA led to new insights about mountains in Canada. The chapter then discusses four cross-cutting themes that emerged from the CMA: Connectivity; elevating Indigenous knowledges; access and barriers to relationships with mountains; and humility. Ultimately, this chapter reveals how the CMA is only a beginning. It concludes by calling attention to opportunities for research, relationships, and actions that support ideals of the CMA.

By way of these chapters, the CMA aims to enhance appreciation for the diversity and significance of mountains in Canada; to clarify challenges and opportunities pertinent to mountain systems in the country; to motivate and inform mountain-focused research and policy; and, more broadly, to cultivate a community of practice related to mountains in Canada.

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River flowing into kokKuk (Southwest Arm), Saglek Fiord, Tongait KakKasuangita SilakKijapvinga (Torngat Mountains National Park). Photo courtesy of Darroch Whitaker (Parks Canada), 2013.