



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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CHAPTER 6

Desirable Mountain Futures

CO-LEAD AUTHORS: Keara Lightning, Eric Higgs

CONTRIBUTING AUTHORS: Leon Andrew, Stephen Chignell, Megan Dicker, Erika Gavenus, Murray Humphries, Lawrence Ignace, Aerin Jacob, Gùdia Mary Jane Johnson, Stephen Johnston, Michele Koppes, Shawn Marshall, Graham McDowell, PearlAnn Reichwein, Joseph Shea, Daniel Sims, Niiyokamigaabaw Deondre Smiles, Madison Stevens, Hayden Melting Tallow, Andrew Trant, Gabrielle Weasel Head

“The fox brought the daylight. All of the other animals came after the sun and moon had gone into the sky. All of the animals had come together to make the day, because the earth was covered, like a really foggy day. All of the animals started to jump up to try to tear away that covering on the earth. If you’ve ever watched in the autumn and winter, the ríthe (fox) jumps high and lands deep in the snow to get what they’re hunting. They’re very light and they can jump very high. So it was the ríthe (fox) that tore the membrane on this earth. We call that, kamba k’anchäl. When the earth is torn from the membrane and you have the light on the edge of the mountains, or over the prairies, or the ocean. The Raven gave a piece of that sun to the ríthe (red fox). That’s why when you look at the tail, it’s got white with red all around it, like the sun. That was his gift for giving us the daylight here on earth. The kind of work that everybody has been part of for this mountain assessment, and has thought carefully and critically about, and has celebrated over these last three years, it’s sort of like that time, where that daylight is just opening over the side of the earth and the sky. That’s the kind of work that this assessment has done, it’s given us a little bit of that daylight.”—Elder Gùdia (Mary Jane Johnson), Lhu’àn Mân Ku Daí, 12 January 2023

We have learned a great deal in these three years of the Canadian Mountain Assessment (CMA). Much was already known but not widely shared across the divides of Indigenous and Western knowledge systems. Some was new learning; not new research, but new insights from working together in a project that spanned time, cultures, and landscapes.

We learned that mountains are Homelands. Mountains are unimaginably diverse. Mountains are changing. Mountains are humbling in their vast extents and the scale of cultural knowledge about them. Mountains are boundary zones between peoples, languages, species, and movement, yet they connect us as well as divide us. Mountains are water towers that nourish lower and drier lands. Mountains are sources of livelihood. Mountains are places of envy and awe, which is why so many people flock to them. Mountains are places where we come to challenge ourselves and seek insight. Mountains are sources of inspiration for art, music, stories and writing. Mountains are spiritual both through long tradition and contemporary wonder. Mountains bear testament to colonial injustices, and cast long shadows.

The CMA had its early glimmers in 2020 as the COVID-19 pandemic was settling in. Mountain researchers and communities in Canada had not taken collective stock of mountains and the importance they place in people’s lives, despite efforts to do so in other mountain areas globally; notably, in the Hindu Kush Himalaya. A comprehensive assessment of mountain regions in Canada was overdue. Motivated by the vision of the Project Leader, and with a remarkable team of national and international Advisors, the CMA began to take shape.

It was a daunting task. An early commitment was made to an inclusive approach that brought together people from diverse backgrounds and ways of knowing. This was not to be an assessment of Western academic knowledge alone; it was also about elevating Indigenous knowledges and making space for what might be learned by bringing the two into respectful conversation. Guided by five principles (see Chapter 1, Fig. 1.10)—Service, Inclusivity, Humility, Responsibility, and Action—the work began. Much of it was done in the confines of virtual spaces dotted across mountain areas in Canada, but a face-to-face gathering in Banff in May 2022 brought people and ideas together (Fig. 6.1).

Each core chapter of the CMA was co-led by Indigenous and non-Indigenous individuals to support equitable knowledge co-creation, with many additional Contributing Authors support-

ing the preparation of CMA chapters. Mountain Environments (Chapter 2) described the physical characteristics and environmental significance of mountains in Canada, including their geological evolution and the importance and impact of mountain systems on local and regional climate, and ecosystems and biodiversity. Mountains as Homelands (Chapter 3) provided a vibrant account of those who live among or near mountains, and the complicated legacy of colonial governance, protected areas, private property, access to culturally important lands and waters, and “how science, labour, recreation, and art have shaped perceptions and experiences of mountains as places.” Gifts of the Mountains (Chapter 4) accounted for that which mountains provide, as gifts of sustenance, spiritual and cultural expression, and enjoyment. The chapter also acknowledged the importance and obligation



Figure 6.1: CMA contributors coming together in Banff to discuss their diverse knowledges of mountains in Canada, May 2022. Photo courtesy of David Borish.

of reciprocity, as well as difficulties in manifesting reciprocity in the context of extractive resource activities. Mountains Under Pressure (Chapter 5) examined drivers and impacts of environmental and social change in mountains, including development, recreation, resource extraction, and the cascading consequences of climate change.

More than twenty CMA participants combed through draft versions of these chapters during a workshop on 12 January 2023 to seek emergent themes that might guide us towards desirable futures for mountain people and places. The intention was not to chart exact futures or to describe one path against another, but to articulate how to *think* about desirable mountain futures. We dug deeper into the lessons that the Assessment taught us and emerged with four themes: connectivity; elevating Indigenous knowledges; access and barriers to relationships; and humility. These are ways of approaching the future, ways of guiding the work of people who think and care deeply about mountains.

6.1 Connectivity

Mountains bring connectivity into focus in several ways. The valleys and plains near mountains are places of habitation and use, while at the same time they are forbidding topographic barriers that can restrict those living in these regions from accessing adjacent mountainous regions. Mountains shape the way people and animals move across landscapes. Low points in mountain passes and corridors along ridges and valleys make travel easier. Daunting ranges of mountains, such as those along the Continental Divide, influence cultural, environmental, ecological, hydrological, and climatological transitions. Rivers flow from mountain sources to connect communities and ecosystems hundreds of kilometres apart.

Thinking about connectivity in mountain landscapes also highlights the challenges of fragmentation. Anthropogenic disruption of connectivity, through the building of roads, dams, pipelines and other oil and gas extraction infrastructure, mines, and the harvesting of forests, can produce restricted spaces and isolated communities. This loss of connectivity results in the separation of people and animals from Homelands and homes, isolation from places of learning and from other-than-human teachers and kin, and leads

to a divided and an impoverished understanding of mountains and mountain peoples. Political boundaries also disrupt connectivity when people dwell across mountains that are divided by imposed borders. Likewise, fragmentation of space through private ownership and jurisdiction can separate people from access to important mountain places. As well, researchers working on specific problems in the mountains can find it difficult to connect their work because knowledge is often organised by discipline and not by place. Such disciplinary fragmentation challenges efforts to understand mountain systems in more holistic ways. It can also be difficult to connect research insights across space, as most mountain research is focused on specific study areas, limiting understanding that comes from landscape (or larger) scale analyses.

There is a temporal dimension to connectivity, too. People cherish stories and accounts of the past as a way of maintaining deep connections to mountain places. Physical fragmentation disrupts long-standing place-based systems of knowledge transmission and separates people from each other, which can make it harder to share and maintain stories. The persistence of such knowledge requires connection between generations, yet legacies of colonialism, rapid changes in mountain livelihoods, and compromised access to the Land disrupt this continuity. Fragmentation invites us to consider how to reconnect spatially and temporally, ecologically and socially, to allow future generations to find refuge, enjoyment, and meaning in special mountain places.

6.2 Elevating Indigenous Knowledges

This assessment set out to work towards braiding Western academic and Indigenous knowledges of mountains. The relationships that have been built from this process have impacted us all. As authors we believe it important to bring our voices together to enhance our collective understanding of mountains. Throughout this assessment, we observed how many of the pressures and barriers in mountain areas have been caused by the imposition of colonial rule, whether manifest through knowledge systems, economic systems, or land management. In order to create a better future, we must come to terms with and address these issues.

We observed many strengths, but also limitations in the Western academic paradigm. Disciplinary approaches are inherently limited compared to more encompassing approaches that understand mountains as complex systems, including human elements. Many mountain researchers (Indigenous and non-Indigenous) are driven by a felt sense that is not acknowledged in the traditional scientific/academic systems of recording knowledge. Several authors spoke about their own deep spiritual connection to mountain places. There is also a sense that something is deeply wrong in the way mountain spaces are currently treated, an awareness that drives many of us in this work. Non-Indigenous researchers spoke of academic knowledge alone failing to account for the diversity of ways people experience mountains. The process of working across and between knowledge systems is also an internal process of deconstructing key assumptions to evaluate what is worth keeping and what is best to let go.

While the original language used in our process was “knowledge co-creation” and “knowledge braiding,” our discussions during the workshop highlighted the importance of *elevating* Indigenous knowledge systems. This does not mean elevating Indigenous knowledges to the exclusion of Western academic knowledge, but rather seeking to unpack such discursive boundaries while prioritising Indigenous-led efforts. For example, the language such as co-creation and braiding can reinforce a binary that obscures the ways that Indigenous knowledge and science have long been entangled and co-produced, such as the presence of processes similar to those used in Western academic inquiry that are already within Indigenous knowledge systems, as well as the widespread scientific methods used by Indigenous communities to benefit their governance and livelihoods. In discussing the importance of building community capacity through scientific training, Gabrielle Weasel Head acknowledged, “Some of the knowledge that [science] is now generating is knowledge that has been held in our communities for thousands of years... there’s a lot of stories in our Nations [and] they are the blueprint for our scientific worldview” (LC 6.1).

By casting certain forms of technical and academic knowledge as exclusively non-Indigenous,



a binary view can reinforce a static notion of Indigenous knowledges and constrain the creative capacity of Indigenous knowledge systems in ever-shifting global systems of governance. A few of the Knowledge Holders participating in the Learning Circle referred to the importance of scientific and technical training to support their communities’ governance systems. Brandy Mayes (Kwanlin Dün First Nation) described how Kwanlin Dün First Nation members were trained in the skills necessary to run their own resource management projects in their territory: “taking that science-based information and teachings to mentor our own people so we could do this on our own... we are using that science, but we’re also being led by some of our own traditional knowledge” as well as “a lands vision from our Elders and our citizens” (LC 6.2). The binary also fails to recognize the individuals who are informed by both Western academic training and Indigenous ways of knowing, which includes many of this CMA’s authors, as well as the distinctions between different Indigenous knowledges and distinct Western academic traditions. Many Indigenous scholars have made significant contributions and theoretical interventions into Western academic disciplines, which can inform the methods and frameworks used in such disciplines and offer productive avenues of inquiry. Western knowledge systems are similarly diverse, with markedly different cultures and approaches in natural, social, and health sciences.

Elevating Indigenous knowledge systems takes many forms (see e.g., McGregor, 2021). Some ideas of what this looks like are: directing resources towards research and training opportunities within Indigenous communities, supporting Indigenous-led documentation of Indigenous knowledges, enabling the resurgence of Indigenous stewardship practices, and conducting collaborative projects in a way that cultivates Indigenous communities' capacity. For Indigenous students and scholars, employing the tools and techniques of Western scientific methods, in a manner aligned with their philosophies and protocols while addressing questions their communities define, may also serve this purpose. These efforts are necessary to allow research that, rather than using decontextualized Indigenous knowledges to satisfy non-Indigenous curiosities, can instead pursue the questions and issues that are important to Indigenous communities.

Importantly, a focus on elevating Indigenous knowledges does not preclude advancement and continued learning within the context of Western academic institutions and paradigms. Indeed, this assessment has illustrated that among Western academic fields of inquiry there is much we still do not know about the mountains in Canada. For example, this assessment has demonstrated that humanities and social science inquiries into the pressures affecting mountain systems remain limited compared to work in the physical sciences. Limitations in long-term monitoring networks in mountains mean that there is also considerable uncertainty in what the future could hold for mountain hydrological systems, biodiversity, and snow and ice amid rapid environmental change. Enhancing Western academic understandings of mountain systems—particularly by urging academics to work across siloed disciplines and to approach their scholarship with awareness of its underlying assumptions and limitations—will also be crucial to realising desirable mountain futures. Ultimately, we aspire to ensure that “all boats float” when it comes to supporting diverse ways of knowing mountain systems in Canada.

We argue that achieving equitable sharing of knowledges across ways of knowing requires particular attention to elevating First Nations, Métis, and Inuit knowledge systems which have long been delegitimized in the dominant paradigm of

producing knowledge. Given the asymmetries in how knowledge is currently defined, a desirable future requires all of us to dig deeper than the goal of acknowledgement or inclusion—to think beyond Western academic constructs to see how different ways of knowing hold a different understanding of where we place ourselves in this world. This is also relevant to thinking about what sustainability might look like as “sustainability requires recognition and restoration of reciprocal relationships between peoples and places (Wildcat, 2013).”

6.3 Access and Barriers to Relationships

Many authors and Learning Circle participants stressed the importance of fostering relationships between people and the mountains. Indigenous contributors expressed the importance of mountains as spaces for ceremony, medicines, food, and as storied places with deep generational connections that are vital for their survival. And most of us depend on mountains for clean water, spiritual connection, mental health and wellbeing, foods and medicines, and more.

Recreational activities such as mountaineering, climbing, skiing, running, canoeing, and kayaking have led many people to develop an appreciation for the gifts of the mountains. Developing this sense of connection to mountain landscapes through recreation can engender a respect and emotional connection to mountains. However, there is also a history of mountains being governed as exclusive spaces. Recreation, tourism, resource development, and sport hunting were encouraged to the exclusion of Indigenous Peoples' access and livelihoods. This exclusivity of space has also extended to exclusion on the basis of racialization, gender, age, class, and ability.

Intergenerational relationships are especially important to uplift going forward, to carry forward the knowledge of the older generations and mentor new generations in mountain knowledge and relationships. Lhu'ààn Mân Ku Dañ Elder Gùdia Mary Jane Johnson spoke of how young people generally have more energy and physical strength than older people, while elders carry mental and spiritual strength developed through their years. Just as we bring different forms of



Gùdia Mary Jane Johnson,
Lhu'ààn Mân Ku Daí, 2022, [LC 6.3](#)



Leon Andrew, Nę K'á Dene
Ts'íli, 2022, [LC 6.4](#)



Gabrielle Weasel Head,
Kainaiwa Nation, Blackfoot
Confederacy, 2022, [LC 6.5](#)



Daniel Sims, Tsay Keh Dene
First Nation, 2022, [LC 6.6](#)



knowledge together to enhance understanding, bringing these different experiences and abilities together makes our collective efforts stronger and supports the action needed to move forward ([LC 6.3](#)).

There is a balance still to be found in considering the negative impacts of human access to mountain places. The language of access can imply an entitlement to the gifts of the mountains. We emphasise that the issue of access is one of identifying barriers to relationships, and importantly, finding ways to enact these relationships that respect the presence and needs of diverse human values in the landscape as well as the needs of other-than-human beings that dwell in mountain places. Nę K'á Dene Ts'íli Elder Leon Andrew describes this need to co-exist in partnership between different peoples and wildlife: “One thing we know for sure is Mountain Dene people coexist with wildlife for how long—we’re like partners. So now you guys learn to coexist with us too” ([LC 6.4](#)).

Animals and plants also depend on mountain spaces. As people take up more and more space, the relative remoteness of mountains has provided vital habitat even to species not originally associated with mountain environments. For the future of ecologically and culturally important species, such as bison and grizzly bears, mountain-dwelling remnant populations and the relative connectivity found across mountain habitats make these places vitally important for the success of ecological restoration efforts. Building relationships to the mountains should thus also embody an ethic of care, reciprocity, and gratitude.

Barriers to relationships include not only those which limit physical access to land in a recreational sense, but also the lack of access to political power needed to carry out the responsibilities of land stewardship that maintain intergenerational relationships to place. Both parks and private land ownership have imposed distant governance systems on Indigenous homelands in mountain spaces. Gabrielle Weasel Head highlighted the ways in which such impositions have infringed on the rights set out in treaties: “Our treaty rights with regards to land access have been infringed on... We need to get a really good understanding of how the legalities of access are structured, and really tie that back to treaty... People’s responsibilities to treaty [are] not common knowledge” ([LC 6.5](#)). However, as Dr. Daniel Sims (Tsay Keh Dene First Nation) reminds us, not all Indigenous nations in Canada have treaties with the Crown, and many still maintain inherent Indigenous rights. While for treaty Nations, treaties set out a Nation-to-Nation relationship with the Crown, without a treaty, Canada has no legal standing to enforce its presence: “There’s no pretence of treaty. It’s just we are here, we have always been here, and you guys are the new arrivals” ([LC 6.6](#)). This also reminds us that lands that have been constructed by Western culture as wilderness have in reality been occupied by Indigenous Peoples for a very long time. The restoration of such ecosystems is intertwined with the restoration of Indigenous knowledge systems, stewardship, and governance. Some promising areas where this is advancing are Indigenous Protected and Conserved Areas (Artelle et al., 2019; Zurba et al., 2019) as well as Indigenous governance established through land claims such as in Tongait KakKasuangita SilakKijapvinga (Torngat Mountains National Park).

6.4 Humility

Mountains are sacred, old places of ceremony and story, creation and rebirth; they humble us in their size and stature. Looking up at the mountains, they remind us of how small we are as individuals, of how short a time we have to make our contribution in this life.

This assessment set out to evaluate what we know, what we do not know, and what we need to know about mountains in Canada. This has been a humbling task. Over and over again we have come back to recognizing just how much we do not know. We've come across many people and places that are under-represented in the academic literature that is currently available. With humility, the CMA aimed to identify those gaps in order to point directions for future projects and necessary partnerships to move forward together.

This humility extends to the relationships that have been built during the assessment, as we have worked to create a shared body of knowledge from a team of 75 authors from different disciplines, backgrounds, and geographies. Nurturing these relationships with a shared desire to learn and build trust has been crucial to working together to bring together a systematic review of the literature with the knowledge shared in the Learning Circle. The content of this report is the result of collaboration and compromise, and the humility required to allow multiple perspectives and understandings to coexist.

Humility is important in acknowledging the changing dynamics of mountain ecosystems. In writing about desirable mountain futures, we operate from humility and respect for how little we can know about the future. While collecting the best information to plan for the future, we embrace uncertainty. As mountain systems change, we must also change. Lhu'ààn Mân Ku Daí Elder Gùdia Mary Jane Johnson described how to shift our approach to planning: "You need to start from [observing] the roots of the trees and the plants, the soil, the water that comes and feeds them. What kinds of animals come, and need life and sustain themselves on that land and water. And then, you put people beside that, and you say I'm going to manage the people's activity, not the animals. You are not managers of any animals,



*Gùdia Mary Jane Johnson, Lhu'ààn
Mân Ku Daí, 2022, LC 6.7*

any other ones except for yourself" (LC 6.7). As much as we try to plan for, predict, and shape the future, we are going to be living with mountain ecosystems that are full of novelty: novel ecosystems and assemblages of species, as well as new ways of relating to and being in the mountains. Humility calls for each of us to take on our individual and collective responsibilities to the mountains from our respective positions, understanding that while no one person alone can see the whole picture, together with many perspectives, the view becomes clearer.

6.5 Endings as Beginnings

This chapter concludes the Canadian Mountain Assessment, but endings are also beginnings. The CMA brought together people from diverse backgrounds and viewpoints to assess, for the first time, mountain systems in Canada. In the writing of this assessment, boundaries separating disciplines and cultures were traversed, and the result is something new: an account of landscapes where history and experience are shaped by mountains. In many ways this constitutes a baseline, a moment in time, against which future efforts will be compared. In the future we hope people will look back upon this compilation as a reservoir of helpful knowledge, and as a starting point (Fig. 6.2).

Thinking about the assessment as a baseline focuses attention on the *product* of the knowledge and less on the *process* by which it came about. While always intending to present multiple ways of knowing mountains, few participants were prepared for how profound this exchange of knowledges would be, and what it would spark. Working in this space was new terrain for many



Figure 6.2: The CMA provides an opportunity to learn, reflect, and be inspired to work for desirable mountain futures. Photo courtesy of Paul Zizka, 2014.

who contributed to the Assessment, and it has been a learning journey for all involved. As with many significant journeys, the final outcome was often uncertain. As Gùdia remarked, “[S]ometimes when we undertake hard work, we want to see the end result, we want to get it done, but sometimes it doesn’t happen quickly. We have to pass it along to the next generation, like a good story.”

A mark of accomplishment for the CMA will be the extent to which it finds its way back into the hands of scholars, communities, and policy makers, and from there stimulates efforts that address the needs and opportunities identified in the assessment. As a starting point:

- We ask that mountain researchers, communities, and policy makers in Canada reflect on the findings of the CMA, and resolve to attend to key issues in ways that manifest the spirit and intent of the CMA.
- We emphasise that appropriate and effective inclusion of Indigenous knowledges in these efforts requires recognition of the governance systems and worldviews that underpin such knowledges, which in turn requires support for Indigenous self-determination. This should be foregrounded in conversations about ethical engagements with Indigenous Peoples and their diverse knowledges.
- We challenge the national research community to embrace transdisciplinary approaches to advancing understanding of mountain systems in Canada. Here, meaningful collaboration with local and Indigenous communities; decision-makers; and humanities, social, natural, and health sciences scholars provides an opportunity to improve understanding of many dimensions of mountain systems in the country.

- We call on the Government of Canada to outline commitments to action for mountains in their next Sustainable Development Strategy (and other relevant policy frameworks), and, furthermore, to join the UN's Mountain Partnership. These are important steps in formalising Canada's commitment to the health, well-being, and resilience of mountain systems in the country, and are cogent actions given the findings of the CMA, including the fact that Canada is the 4th most mountainous country globally.
 - We request that all levels of government, intergovernmental and non-governmental organisations, and philanthropic groups increase their support for mountain communities and mountain researchers in their efforts to better understand and steward mountain systems in Canada.
 - We propose that the CMA should be an ongoing initiative, and that subsequent assessments be conducted every ten years. Like other large-scale assessment platforms (e.g., IPCC, IPBES), this approach will support efforts to track progress in addressing gaps and opportunities identified in earlier reports. Importantly, subsequent iterations of the CMA should build upon and improve (rather than duplicate) the methodology followed herein according to feedback based on this report and in accordance with future norms and aspirations.
 - We suggest the establishment of a national institute for mountain studies, which would serve to support, mobilise, and grow the network of mountain researchers, Indigenous Knowledge Holders, and prominent thinkers that the CMA has convened. Such an institute would be a champion for mountain systems in Canada, interface with international efforts such as the Mountain Research Initiative and the UN Mountain Partnership, and could coordinate future iterations of the Canadian Mountain Assessment.
 - Finally, we invite those involved with major assessment activities in Canada and abroad to consider how the CMA's approach might inform their own activities going forward. The CMA is not a blueprint to be mapped onto other contexts, but its normative commitments, attendant methodologies, and subsequent findings are instructive and can inform future knowledge assessment initiatives.
- We are grateful for the opportunities and learning that the CMA has provided for each of us. Our hope is that what we have prepared will inspire new research, relationships, and actions that help to secure desirable futures for mountain systems in Canada, and beyond. The story is yours to carry forward.

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