

# Preface

Throughout the first decade of the twenty-first century, we have witnessed unprecedented growth in the exploration and development of natural resources. Previously untouched landscapes are now the focus of government and industry, both racing to supply resources to growing, international economies, often without a full understanding of the implications of their actions. One need only look to western Canada, the central United States, or northern Australia to witness how the rapid extraction of petroleum and mineral reserves is outpacing our ability to measure and manage the corresponding environmental, health, and social impacts. For some locations, the development of natural resources has followed traditional patterns that have long supported communities. For other locations, development is a new and quickly evolving proposition, with numerous industries seeking a range of resources, from minerals and forest products to hydroelectric power. Those projects are superimposed on past land use and development activities, and the superimposition has implications, both positive and negative, for local ecosystems, people, and communities. The many consequences of multiple natural resource development projects are *cumulative impacts*.

The concept of cumulative impacts is not novel nor is it difficult to appreciate. The rancher struggling with shale-gas exploration and development and the community planner attempting to facilitate the growth of a transient workforce both understand the implications and complexity of the rapid development of natural resources. Since the 1970s, regulatory agencies from around the globe have recognized and struggled to identify, assess, and manage cumulative impacts, although largely from an environmental perspective. Despite that 40-year history, cumulative impacts remain one of the most pressing and complex challenges facing governments, industry, communities, and conservation and natural resource professionals. Although research and practice have improved our ability to assess and manage cumulative environmental impacts, much improvement is needed to account for the integration of communities and people within the cumulative impacts equation. Informed by our experiences in northern British Columbia (BC), a Canadian hotspot for these cumulative impacts, we have applied an integrative lens in this book to develop a broader and more holistic understanding of the full range of cumulative impacts that result from the development of natural resources.

This book responds to a series of long-standing demands and opportunities that are particularly timely in BC, but that are also relevant across Canada and internationally. Indeed, the needs of our communities echo a deep academic literature that has called for more holistic and ultimately effective approaches for assessing and managing cumulative impacts. For us, the local relevance and urgency of this challenge became obvious at a workshop held at the University of Northern British Columbia (UNBC) in January 2014, where we discussed the *Cumulative Environmental, Community and Health Effects of Multiple Natural Resource Developments in Northern British Columbia*. This event was hosted jointly by three UNBC research institutes—the Community Development Institute, Health Research Institute, and Natural Resources and Environmental Studies Institute—to provide a broad perspective on the development of natural resources. This was one of the first opportunities in BC to shift the discussion of resource development from a polarized and narrow focus on environmental impacts and economic opportunities to include a fuller set of challenges and solutions that encompass a wider range of cumulative impacts. The workshop involved a suite of focused presentations and facilitated discussions that were directed at generating ideas for maintaining ecological resilience and sustainable and healthy communities within the context of long-standing, but rapidly expanding natural resource activities. Participants came from both Aboriginal and non-Aboriginal communities, local and provincial governments, and the research and business sectors to meet, talk, and learn. This was a unique opportunity for cross-disciplinary and cross-sectoral dialogue that clarified the need to communicate, develop, and promote these ideas to a wide audience.

The ideas explored during the workshop underscored the timeliness of this issue and the demand for a broader perspective and more integrative approach to understanding the cumulative impacts of natural resource development. Informed by these concerns, and recognizing that the full range of impacts were disconnected and isolated in the policy, practice, and academic sectors, we focused on the challenge of integrating our multidisciplinary perspectives. Those early and heartfelt public discussions were the genesis of this book. Although the main authors provided research expertise in community development, public health, and environmental processes and change, we sought to bring a broader set of voices to the book. In the spirit of the complex and interconnected discussions that took place at the workshop, we invited colleagues to provide different perspectives on the concept of cumulative impacts. For some, cumulative impacts was a new term; however, given the breadth of the topic, their experiences in environmental, community, and health research and practice were highly relevant and added considerable insight. Based on that collective knowledge, both formal and informal, the book's chapters address a number of key challenges and potential solutions for addressing cumulative impacts:

- Understanding the cumulative impacts of natural resource development will require an integrative understanding of environmental, community, and health dynamics.
- Current regulatory approaches have a place in addressing the impacts of development, but we require a revolution in strategy, not an evolution of current practice, to develop an integrative framework capable of addressing cumulative impacts.

- An effective framework must be participatory and must involve all parties who create or are influenced by cumulative impacts.
- Cumulative impacts occur in a temporal context that connects past, present, and future impacts; thus, a strategic vision and long-term planning are essential.

Our collective experiences, both locally and internationally, suggest that these challenges and the implementation and testing of solutions will be relevant to researchers and students from a broad range of disciplines, as well as to policy makers and an educated lay public, including nongovernmental organizations. Although much of the text refers to natural resource development in BC, this provides examples of circumstances and specific challenges that are global in scope. The book has relevance to anyone whose work considers the implications of natural resource development for people and the environment.

The influence of the January 2014 workshop, the ongoing interactions among authors with diverse backgrounds and interests, and the scope of the challenge have resulted in a book with four interconnected themes that progress from a description of the problem to recommendations for addressing cumulative impacts at broad spatial and temporal scales. Part I of the book (Chaps. 1 and 2) includes two chapters that introduce the overall structure of the text, make a strong case for better assessment and decision-making processes, and provide a description of the essential terminology. The second part of the book (Chaps. 3–5) examines cumulative impacts from a multidisciplinary perspective, starting with the environment and progressing to a discussion of community and then health impacts. In Part III (Chap. 6), we present a series of vignettes that illustrate how these cumulative impacts shape and influence the environment, communities, and people. These contributions provide a human perspective on an often technical issue. This diversity of voices is supplemented by shorter inset boxes that are interspersed throughout Chaps. 3–5. The two chapters (Chaps. 7 and 8) in Part IV of the book revisit the limitations of the current philosophy and technical approaches for addressing cumulative impacts. We finish with a set of recommendations that are based on key principles and elements that could serve as an integrative framework for addressing the cumulative impacts of natural resource development at regional scales.

Both the origins and structure of the book represent a learning journey among a group of colleagues who are committed to addressing complex issues in a way that reflects our interrelated realities. Our hope is that the book will create a space in which others can re-think and re-envision our understanding of cumulative impacts, prioritize decisions that increase our options, and encourage a view of environmental, community, and health dynamics as parts of an integrated whole that will determine our collective future.

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