

Stephen J. Carver
Steffen Fritz *Editors*

Mapping Wilderness

Concepts, Techniques and Applications



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Mapping Wilderness

Robert George Lesslie

This book is dedicated to the memory of Rob Lesslie, who sadly died in March 2014 during the writing of this book.

Rob was a leading Australian geographer and ecologist whose working career spanned more than 30 years in natural resources evaluation and management in government, education, and the private sector.

Throughout his career he published numerous book chapters, journal papers, and many technical reports, though Rob's impact went well beyond this, with his being significantly involved in some of the most pressing natural resource management policies throughout his extensive career.

Rob was instrumental in developing and delivering the Australian Government's National Wilderness Inventory programme (1986–1996) and more recently led an advisory team that developed legislation for wilderness protection in South Australia, the Wilderness Protection Act. Currently some 1.8 million hectares of wilderness in SA is protected under the Act as a result of a state-wide assessment based on Rob's work.

Rob played a significant role in several initiatives: shaping the Australia-China Environment Development Program (ACEDP), developing the scientific framework for the WildCountry project, and initiating the development and ongoing enhancements and applications of the Multi-Criteria Analysis Shell for Spatial Decision Support. Rob was also the driving force between the establishment of a memorandum of understanding between ABARES and the Chinese Forestry Economics and Development Research Centre to support future cooperative research.

Of particular relevance to this book is how Rob's early work on mapping wildness has influenced many of those who followed, including both of the book's editors. We both met Rob on separate occasions and were touched by his open friendship, generosity, gentle encouragement, and willingness to share his ideas and experience. Rob's work developed an important foundation for the mapping, identification and management of the world's wilderness areas that are considered in this book.

Preface

Wilderness mapping may sound like a bit of an esoteric topic, but when you think carefully about it, it ought to be a fundamental theme within environmental science and management. Wilderness is in many ways the pristine resource. It is where we as humans have historically derived all of our goods, services, and resources, save perhaps for human ingenuity itself – though one might argue that the development of even that has its origins in our distant wild past wherein survival and development as a species depended on intelligence and invention. Even today in our advanced technological society, we derive so much from wilderness and wild landscapes that we often take for granted. Clean air and water are the most obvious, but we must not forget the other regulating and supporting services provided by wilder lands including flood retention, carbon storage and sequestration, wildlife habitats, and recreational environments. Wilderness also provides us with subjects of scientific study where we can observe natural processes and wildlife free from human interference. We should also acknowledge their importance as a source of not only scientific knowledge but also artistic and personal inspiration.

Today, wilderness is a shrinking resource. There are few areas on the planet that we have not explored or exploited to some degree or another. Even the world's last great wilderness areas are known, mapped, and studied. Indeed, many show signs of irreversible impacts from climate change and global pollution. This is only likely to increase in the future as population growth generates ever-increasing demands for land and resources. Mapping what is left and using the knowledge and information thus derived are therefore essential if we are to protect and preserve wilderness in the future for the benefit of both humans and wildlife.

This book has been a bit of a slow train coming. It was several years ago now that a chance conversation between one of the editors and the publishers suggested that a PhD could be turned into a book. That in turn changed into the idea for a volume on the broader topic of wilderness mapping, which then in turn morphed into the edited volume you now have before you. The book attempts to give a comprehensive overview of the topic area covering the conceptual and philosophical foundations, techniques and methodological approaches, and applications at a variety of spatial scales. In doing so we have brought together a range of contributors who are

both experts in their field and cutting-edge thinkers in the wilderness and spatial mapping domain. Spatial information technology and mapping science is a rapidly expanding and developing field, and so we expect to be able to add to this in the future. For now, the book provides a record of the ‘state of the art’ and will, it is hoped, enable you the reader to follow our lead and map your wilderness.

Leeds, UK
Laxenburg, Austria
Spring, 2015

Stephen J. Carver
Steffen Fritz

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There are many people we ought to acknowledge in the journey of this book from idea to reality. Firstly, we would like to thank Margaret Deignan from Springer for her initial suggestion and then her patience and tenacity in seeing the book through to completion. Margaret and her team at Springer including Takeesha Moerland-Torpey and Corina van der Giessen have been helpful all the way, not least in being relaxed about deadlines that came and went. Secondly, we would also like to thank Rachael Unsworth for volunteering – without being asked – to proofread all the text which she has done expertly and with such a careful eye for detail. There are many others deserving of thanks, but from the editors to our authors, again we would like to thank you for your patience and hope the wait to see your work in print has been worth it.

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Rob Lesslie Rob was a geographer and ecologist with interests in natural resources evaluation and management in government, education, and the private sector. He was instrumental in developing and delivering the Australian Government's National Wilderness Inventory programme (1986–1996) and more recently led an advisory team that developed legislation for wilderness protection in South Australia, the Wilderness Protection Act. Sadly Rob passed away during the production of this book.

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Michael Zika Michael is an ecologist with a focus on human influence on ecosystems. He is working for WWF for over 6 years on conservation projects in the Alps and the Greater Mekong region and on nature conservation policy. His special interests are on wilderness, landscape integrity, PAs, and sustainable land-use practices, linking biodiversity protection and footprint reduction. From 2015 she holds the position of state secretary affiliated to the Ministry of Environment, Waters and Forests (MMAF). During the past years, he also developed or contributed to projects on sustainable land-use planning, ecosystem restoration, connectivity, and ecosystem service valuation.

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Chapter 1

Introduction

Stephen J. Carver and Steffen Fritz

Abstract Wilderness and wilderness definitions are complex and problematic and therefore present particular difficulties for mapping and GIS, both of which depend largely on carefully defined attributes and discrete criteria. The rationale for mapping wilderness is described and our interest in the topic justified in terms of wilderness protection, conservation, human benefits and nature. The threats to wilderness are legion and somewhat obvious to anyone with even a basic understanding of the planet. Human population growth and associated demand for land, food and resources is the key impact on wilderness. Road construction opens up wilderness areas for exploitation, farming and settlement. Even our attempts to lessen our impact on global climate and ecosystems can lead to further reductions in wildness (e.g. renewable energy technologies while reducing our carbon footprint can have marked impacts on wild landscapes). The basic concepts of wilderness mapping are outlined and a brief history of wilderness mapping described including key developments at global, regional and local scales. The structure and contents of the book are given.

Keywords Wilderness • Definition • Mapping

1.1 Towards a (Spatial) Definition of Wilderness

One man's wilderness is another's roadside picnic ground (Nash 1993, p. 1)

As definitions of wilderness go, this is perhaps both helpful and problematic in equal measure. It is helpful in that it underlines the vagueness of the concept and the fact that different people, with different backgrounds and life experiences, will perceive wild landscapes in different ways. Ultimately it is our familiarity with the wilderness condition that will determine where on a scale of human modification from most to least modified that

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