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Rivers of the Alps

Diversity in Nature and Culture

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Editors' Preface and Acknowledgements

Rivers are the lifelines of any landscape; that is especially true for the Alps. It was along rivers where humans first settled the Alpine sphere, and even today these waterways still shape our lives and economic activities in this region. Alpine rivers are diverse, dynamic ecosystems that provide habitats for a plethora of organisms and species communities.

Conjuring up an image of the Alps, most will focus on their peaks. There are a great number of books available on the mountains of the Alps, but only very few on the rivers of this region at the centre of Europe. Following a lengthy planning period, we, the editorial team, were able to include 150 authors hailing from all countries of the Alpine sphere in order to contribute their expertise and personal perspectives on Alpine rivers. Thirty-four expert chapters illuminate riverscapes from the viewpoints of natural, cultural and social sciences. There follow portraits of a selection of 54 Alpine rivers.

It was particularly important to us that this book, which is being published in a German and an English language version, will not only serve professionals as a reference work but also appeal to a wider public. The careful preparation of the texts by the editing and translation team as well as an attractive, richly illustrated book design are geared towards achieving this aim. We hope that this volume will trigger our readership's interest and delight, thereby contributing to a greater awareness of the unique nature and value of Alpine rivers as well as the ways in which they are endangered. We hope to motivate our fellow humans to stand up for a sustainable use and the protection of these unique waters.

We want to express our gratitude to all those who have contributed to the creation of this book: the authors of expert chapters and river portraits, contributors of images as well as the competent team in charge of project organisation, comprehensive graphic design, editing and translation. This project could not have been realised without financial support. We therefore extend our heartfelt thanks to the Bristol Foundation and its director Mario Broggi. Finally, we want to thank our publisher Matthias Haupt in particular for the motivation and patience he has offered us along the way.

Susanna Muhar, Andreas Muhar, Gregory Egger, Dominik Siegrist



Markus Reiterer

Secretary General of the Alpine Convention

‘A river is a personality, it has rage and love, it has force, a destiny, ailments, and a hunger for adventures.’ This is how the renowned French author Jean Giono describes the multi-faceted nature of rivers in his 1934 novel *Le chant du monde* (The Song of the World). As Jean Giono originated from Manosque, a small town in the French Alps, we may assume that he had an Alpine river in mind when writing these words.

So indeed, water from the Alps and Alpine rivers do have many faces. Water is stored as ice and snow in the mountains and released to the rivers in spring and summer. Alpine rivers provide drinking water for millions of people, irrigate our fields, are a major attraction for sports and leisure and constitute a climate-friendly energy supply. And on top of it all, they are hotspots of biodiversity and living ecosystems. In short, rivers of the Alps are the defining lifelines of our society.

Against this background, the Alpine Convention, as the first international treaty for the protection and sustainable development of an entire mountain region, aims ‘to preserve or re-establish healthy water systems, in particular by keeping lakes and rivers free of pollution, by applying natural hydraulic engineering techniques and by using water power, which serves the interests of both the indigenous population and the environment alike’ (see Article 2 of the Alpine Convention).

I am intrigued to see that this book tackles so many of these important water questions in the Alps and manages to present them with research, data and views that will, I am sure, also serve as food for thought for each of you: readers, researchers, policy makers and stakeholders. For this, we owe a debt of gratitude and acknowledgement to the authors and editors of this volume; also for taking on the challenge of creating such a comprehensive and attractive publication.

I wish you all an enjoyable read; may this book be a fresh stream of knowledge for you.



Klement Tockner

President of the Austrian Science Fund (FWF)

The Alps are frequently called the ‘playground’ or the ‘water tower’ of Europe, reflecting their pivotal role in sustaining the social and economic well-being of an entire continent. The Alps cover an area of about 200,000 square kilometres and are home to more than thirteen million people. Moreover, a further twenty million people inhabit the area within a short distance of forty kilometres from the perimeter of the Alps, and 120 million tourists visit their valleys and mountains every year. This clearly reflects the multiple values and services the Alps provide for people and nature alike. At the same time, these values are increasingly under threat. Climate change, for example, affects the Alps more than most other regions in Europe, with an average temperature increase already exceeding the maximum 2°C target of the Paris Agreement. In 1876, glaciers covered a total area of 1,800 square kilometres. Since then, the total glaciated area has retreated by forty per cent in Austria and thirty per cent in Switzerland, with an almost complete loss of glaciers anticipated by the end of the century.

Large European rivers and their tributaries arise in the Alps, connecting mountains with lowlands and, eventually, with the Black, Northern, Mediterranean and Adriatic Seas. However, only a small number of these rivers remain in a near-natural state, and many free-flowing headwaters are facing a major threat from an unprecedented boom in small hydropower plant construction, despite the tiny contribution to overall energy production provided by these plants. This reveals the unpredictable risks and future uncertainties we may expect due to climate and land-use changes and rapidly altering socio-economic conditions. The rivers in the Alps are early warning indicators of these fundamental and long-term changes. Indeed, we have to manage freshwater systems as well-balanced hybrid systems: as an essential resource for human consumption as well as a highly valuable and fragile ecosystem.

Traditionally, the Alps form the natural and cultural backbone of Europe with their high biological diversity and strong cultural identity. For the future, we need bold visions and major steps to maintain the Alps as linked biocultural systems, as well as an advanced understanding of the underlying driving forces of the coupling and decoupling of cultural and biological diversity.

Sustainable management and political decisions, however, must be based on scientific evidence. The present book integrates the collective knowledge of 150 dedicated authors from six Alpine countries as well as different disciplines and organisations. It provides a timely and comprehensive basis for developing a shared, bold vision, setting priorities for river and ecosystem management and sustaining the unique biocultural landscapes for which the Alps are famous. In this respect, the book will increase awareness of the cultural and biological heritage of the Alps.



Mario F. Broggi

Board of Trustees Bristol Foundation

Water provides the only connected, comprehensive natural network for humans, animals and plants in the Alpine sphere. Europe is traversed by large rivers that spring from the Alpine sphere: Rhine, Rhône, Drava, Durance, Inn and Po among them. The Alps are noted for their role as the ‘water tower’ of Europe. Yet we hardly heed the Alpine rivers, brooks and streams – is it because of their apparent abundance? This oversight is even more remarkable in light of the globally vital importance of a sustainable approach to water.

We have dozens of terms to describe the noise of flowing water: it may thunder, roar, gush, splash, gurgle, or even babble. In many places, we have harnessed the force of the waters’ current in order to generate energy in power plants. Hydropower is considered a ‘clean, local and renewable’ source of energy, and therefore environmentally sound. That may be true, but the affected landscapes are not renewable. The overlooked downside of the equation is damage to landscapes and their ecosystems. The natural resource ‘water’ is being over-consumed. The energy transition, moving away from fossil fuel energy, once again exposes Alpine rivers to the great danger of complete exploitation. Water has been ‘exorcised of its spirit’ in the valleys, as well. Rivers have been channelised and brooks even culverted, thereby reducing the significant formative presence of waterways in the plains.

We have gone much too far in our exploitation and structural engineering of Alpine rivers. The straightening of rivers has greatly increased their flow power and erosive force during heavy rainfall events. In the context of climate change, we must expect even further effects. We are likely to face a scarcity of the water to which we have given too little of the space that is a prerequisite for life and its diversity. We must launch a massive effort of revitalisation.

This book depicts the natural conditions of Alpine rivers, their significance as habitats, as well as economic activities that have taken place along these lifelines. The many faces of the relationships humans have forged with rivers are detailed in it. Our primary goal must now be the protection of the few remaining untouched rivers, brooks and streams. These ‘last of their kind’ must not be sacrificed for a little more electricity production or other for-profit targets. Unless we give non-commercial ideas more scope in our civil society, our entire world will be commercialised and eventually destroyed. Nature is worth so much more than its commercial value.

Rivers fascinate and invite closer inspection; their life-giving qualities are as apparent as their endangered state. This is reason enough for the Bristol Foundation to sponsor this work. Its approach to span across the Alpine sphere is both challenging and worthwhile. We hope that this clearly written and accessible book will increase the appreciation of the Alps as a ‘water tower’.

Contents

<i>Forewords</i>	5	3.2 Fish	126
		Endangered aquatic biodiversity in the heart of Europe <i>Günther Unfer, Andreas Meraner, Didier Pont</i>	
1 Introduction		3.3 Crayfish	146
1.1 Rivers in the Alps – Rivers from the Alps	14	Nocturnal individualists <i>Jürgen Petutschnig</i>	
Terminology and geographical limits <i>Andreas Muhar, Georg Bautz</i>		3.4 Benthic Macroinvertebrates	150
1.2 River Names and their Meanings	22	Diversity from the source to the mouth – it all begins in the Alps <i>Wolfram Graf, Christian Moritz, Astrid Schmidt-Kloiber, Anne Hartmann, Florian Dossi, Patrick Leitner</i>	
An etymological overview <i>Thomas Franz Schneider, Simon Kistler</i>		3.5 Arachnids and Insects	162
1.3 The History of Human Use and Interference	36	Specialists at the border of water and land <i>Christian Komposch, Gregor Degasperi, Werner E. Holzinger</i>	
Alpine rivers as resource and risk factor <i>Gertrud Haidvogel, Didier Pont, Žiga Zwitter</i>		3.6 Amphibians and Reptiles	170
		Floodplain inhabitants far from the current <i>Christine Resch, Stefan Resch, Werner Krupitz</i>	
2 Biophysical Foundations		3.7 Mammals	174
2.1 The Emergence of Riverscapes	46	Shy masters of adaptation <i>Stefan Resch, Christine Resch, Irene Weinberger</i>	
Geology in the Alpine sphere <i>Markus Fiebig, Severin Hohensinner, Andreas Muhar</i>		3.8 Birds	178
2.2 Hydrology	56	Feathered commuters on Alpine rivers <i>Christian Ragger, Hans Schmid, Matthias Gattermayr</i>	
The Alps as the water tower of Europe <i>Rolf Weingartner, Josef Fürst, Karsten Schulz</i>		3.9 Riparian and Floodplain Vegetation	182
2.3 The Sediment Balance of Alpine Rivers	74	Survivor artists in an ever-changing environment <i>Gregory Egger, Anton Drescher, Patrice Prunier, Lena Gräßer, Isabell Juszczyk, Helmut Kudrnovsky, Lukas Blasel, Rosa Schönle, Christian Roulier, Norbert Müller</i>	
Dynamics of erosion and sedimentation <i>Helmut Habersack, Johann Aigner, Marlene Haimann, Mario Klösch, Marcel Liedermann, Christoph Hauer, Hervé Piégay</i>		3.10 Invasive Species	202
2.4 Morphology	86	Distribution and strategies <i>Gregory Egger, Alisa Zittel, Isabell Juszczyk, Christine Resch, Werner Krupitz, Stefan Resch, Lars Gerstner, Franz Essl</i>	
The many faces of Alpine rivers <i>Severin Hohensinner, Renate Becsi, Gregory Egger, Markus Fiebig, Friedrich Knopper, Susanna Muhar, Hervé Piégay</i>		4 Settlement and Economic Activities on Alpine Rivers	
3 Alpine Riverscapes as Habitats		4.1 Rivers and Transport Routes	214
3.1 Ecosystem Alpine River	114	The significance of river crossings for transit networks in Alpine valleys <i>Cornel Doswald</i>	
Permanent change <i>Gregory Egger, Lena Gräßer, Michael Reich, Christian Komposch, Emil Dister, Erika Schneider, Norbert Müller</i>			

4.2	Land Use and Settlements	226	5.10	Canyoning	295
	Alpine riverscapes as settlement and economic areas			Reaching hidden worlds	
	<i>Gertrud Haidvogel, Erich Tasser</i>			<i>Clémence Perrin-Malterre</i>	
4.3	Floods and Flood Protection	238	5.11	Recreational Fishing	297
	Past events and future strategies			River experiences with rod, fly and bait	
	<i>Christoph Hauer, Beatrice Wagner, Bernhard Schober, Stefan Haun, Markus Noack, Gertrud Haidvogel, Fabio Luino, Guido Zolezzi, Francesco Comiti, Severin Hohensinner, Helmut Habersack</i>			<i>Philipp Sicher</i>	
4.4	Hydropower through Time	248	6	Protection and Restoration	
	The significance of Alpine rivers for the energy sector		6.1	Status and Protection of Rivers	302
	<i>Peter Matt, Otto Pirker, Martin Schletterer</i>			A pan-Alpine overview	
5	Humans and Nature			<i>Susanna Muhar, Carina Seliger, Rafaela Schinegger, Sigrid Scheikl, Julia Brändle, Daniel S. Hayes, Stefan Schmutz</i>	
5.1	Rivers in Mythology	262	6.2	Restoration	320
	A hidden world of mystical creatures			New life for Alpine rivers	
	<i>Monika Krojež Telban</i>			<i>Susanna Muhar, Fanny Arnaud, Hugo Aschwanden, Walter Binder, Mario Broggi, Franz Greimel, Friedrich Knopper, Klaus Michor, Bertrand Morandi, Hervé Piégay</i>	
5.2	Perception of Riverscapes	268			
	Sensual experience and knowledge				
	<i>Andreas Muhar, Marylise Cottet, Matthias Buchecker, Berit Köhler, Kerstin Böck</i>				
5.3	The Source Flows Inwards	272			
	An approach from depth psychology				
	<i>Robert Michor</i>				
5.4	Painting by the Water	274			
	Thoughts on art inspired by ecology				
	<i>Hannelore Nennung</i>				
5.5	Leisure and Tourism	278			
	Experiencing Alpine rivers				
	<i>Andreas Muhar, Dominik Siegrist</i>				
5.6	Hiking in Gorges and Ravines	285			
	Daring paths and spectacular views				
	<i>Helmut Tiefenthaler</i>				
5.7	Woman of the Rivers	288			
	Hiking along rivers gives meaning to my illness				
	<i>Liliane Waldner</i>				
5.8	Cycling along Rivers	289			
	A new network of routes in the Alps				
	<i>Lukas Stadtherr</i>				
5.9	Canoeing and Rafting	292			
	Conquering the wet element by sport				
	<i>Tino Reinecke</i>				
				River Portraits	
				Fifty-four Rivers in Spotlight	346
				Aare	350
				<i>Adrian Fahrni, Franziska Witschi</i>	
				Adda	354
				<i>Oscar del Barba</i>	
				Ammer – Amper	356
				<i>Thomas C. Wagner</i>	
				Arc-en-Maurienne	358
				<i>Benoît Camenen</i>	
				Arve	362
				<i>Aude Zingraff-Hamed</i>	
				Avisio	364
				<i>Guido Zolezzi, Francesco Comiti</i>	
				Bléone	366
				<i>Frédéric Liebault</i>	
				Buëch	368
				<i>Frédéric Liebault</i>	
				Dora Baltea	370
				<i>Andrea Mammoliti Mochet</i>	
				Drac	372
				<i>Frédéric Liébault</i>	
				Drava	374
				<i>Birgit Mark-Stöbr, Michael Koschat, Michael Mark,</i>	

Drôme <i>Claire Eme, Chrystel Fermond</i>	378	Nadiža/Natisone <i>Raffaella Zorza</i>	442
Durance <i>Margot Chapuis</i>	380	Noce <i>Guido Zolezzi, Francesco Comiti</i>	444
Eisack/Isarco <i>Francesco Comiti, Guido Zolezzi</i>	384	Piave <i>Bruno Boz</i>	446
Emme <i>Verena Lubini</i>	386	Reuss <i>Peter Gisler, Stefan Flury, Barbara Leuthold</i>	448
Enns <i>Karin Hochegger, Clemens Gumpinger, Kerstin Böck</i>	388	Rhine <i>Sandra Hocevar, Irene Bühlmann, Verena Lubini</i>	452
Etsch/Adige <i>Francesco Comiti, Guido Zolezzi</i>	392	Rhône <i>Jérémie Riquier, Marylise Cottet</i>	456
Gail <i>Wolfgang Honsig-Erlenburg</i>	394	Saane <i>Pascal Mulattieri, Claudia Zaugg</i>	460
Großache – Tiroler Achen – Alz <i>Thomas C. Wagner</i>	396	Salza <i>Andreas Muhar</i>	462
Gurk <i>Wolfgang Honsig-Erlenburg</i>	398	Salzach <i>Kerstin Böck, Andreas Muhar, Susanna Muhar</i>	464
Idrijca <i>Jurij Krajčič</i>	400	Sava <i>Mojca Hrovat, Marija Habinc, Nataša Smolar Žvanut</i>	468
Inn <i>Gregory Egger, Angelika Abderhalden, Thomas Herrmann, Andreas Muhar</i>	404	Savinja <i>Saša Starec</i>	472
Isar <i>Aude Zingraff-Hamed, Gregory Egger</i>	408	Soča/Isonzo <i>Raffaella Zorza, Sašo Šantl</i>	474
Isel <i>Walter Hopfgartner, Wolfgang Retter, Susanna Muhar</i>	412	Steyr <i>Stefan Schneiderbauer, Franz Überwimmer</i>	478
Isère <i>Philippe Belleudy</i>	416	Tagliamento <i>Walter Bertoldi, Nicola Surian</i>	480
Kamniška Bistrica <i>Petra Repnik Mah</i>	420	Tessin/Ticino <i>Alma Sartoris</i>	484
Kander <i>Willy Mueller, Lukas Hunzinger</i>	422	Toce <i>Paolo Sala, Pietro Volta</i>	486
Kleine Emme <i>Verena Lubini</i>	424	Traun <i>Clemens Gumpinger</i>	488
Lech <i>Gregory Egger, Michael Reich, Isabell Juszczyk</i>	426	Var <i>Margot Chapuis</i>	490
Linth <i>Dominik Siegrist</i>	430	Verdon <i>Margot Chapuis</i>	492
Loisach <i>Thomas C. Wagner</i>	432	Vispa <i>Roni Hunziker, Dirk Schroer, Georg Heim</i>	494
Maggia <i>Roberto Buffi</i>	434	Ybbs <i>Stefan Guttmann</i>	496
Mur <i>Clemens Ratschan</i>	438	Additional References for the River Portraits	498
		List of Figures	501
		Authors	505