

Editorial

Preface to “Advances in Sustainable River Management: Reconciling Conflicting Interests under Climate Extremes”

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Safeguarding optimal living conditions for aquatic organisms is one of the most important principles of sustainable water management. The conservation and wellbeing of freshwater ecosystems are closely linked to the preservation of the natural hydrological regime. On the other hand, human activities often alter the natural hydrologic regime and habitat conditions for aquatic ecosystems by substantially affecting several essential life-stages of aquatic organisms, such as migration and spawning of fish macroinvertebrates and other aquatic species. Ever-increasing water exploitation, mainly for water supply, irrigation, and renewable energy, has degraded freshwater ecosystems, notably rivers. Thus, planned or existing hydraulic structures, such as hydropower plants, dams, and water intakes, among others, may adversely affect aquatic organisms' living conditions.

Further, the climate extremes and water scarcity exacerbated by climate change induce additional stress in freshwater ecosystems and may stimulate conflicts among water users. Therefore, ensuring optimal living conditions for aquatic organisms is one of the most critical sustainable development goals to stop biodiversity decline.

Additionally, we are aware that water is needed for several vital human activities, where agricultural and industrial seems to be primary water consumers; in a situation in which the world has observed more frequent droughts and moments of water scarcity, water systems management requires the most advanced approaches and tools for rigorously addressing all dimensions involved in the sustainability of its development.

This book presents nine chapters featuring some of the main lines of research around sustainable river management, emphasizing international experiences across several countries. These chapters represent a collection of articles published in a Special Issue entitled “Advances in Sustainable River Management: Reconciling Conflicting Interests under Climate Extremes,” published by *Sustainability* (MDPI) in 2020 and 2021. The editors of this book would like to acknowledge the excellent guidance and efforts from the editorial team at MDPI and the quality of the experience and research presented by the 24 authors who have contributed to this Special Issue's academic and technical success.

This book covers a wide range of literature reviews and original research interventions. Moreover, it presents studies about practical problems with the use of rainfall-runoff models to simulate floods, a new approach to the design of flood zone areas that can help with the assessment risk of flood disaster, as well as discussions about more reasonable hydrological methods for the assessment of e-flows, a crucial issue regarding optimal assurance conditions in aquatic organisms. This book also presents modern tools to support water management and the prediction of water resources. It explores the use of sediment and geotextiles in water engineering, human pressure on the ecological status of rivers, and the importance of proper water management when using rivers.



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We hope that this collection of papers will be of use to academics and practitioners in helping to provide sustainable water management strategies under different natural and artificial conditions.

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