

Volume Preface

The enduring changes in the aquatic environment and the increasing input of contaminants require research on novel conceptual and methodological approaches in relating chemical pollution and ecological alterations in ecosystems. Improving environmental risk assessment based on the analysis of priority pollutants or other preselected contaminants and extending the risk evaluation to new pollutants are essential for a better understanding of the causes of ecological quality loss and the cause–effect relationships of pollution.

At the same time, a great effort has been undertaken by European Member States to implement the Water Framework Directive. The ultimate goal of this Directive is the achievement of the “good quality status” of water bodies in EU river basins by 2015, it being understood as the combination of both “good ecological and chemical status.” Whereas the connection between these two dimensions of water quality is accepted as one of the underlying premises of the WFD, there is still a lot to know on how it is produced. But in any case, there is little doubt that it has practical consequences for a proper river basin management. Therefore, it is of great interest to bring the increasing pool of scientific knowledge to water managers, providing a link between the scientific research and management practices aiming to evaluate the effects of emerging and priority pollutants in river ecosystems. With this aim, the Marie Curie Research Training Network KEYBIOEFFECTS organized the workshop “Emerging and Priority Pollutants: Bringing science into River Basin Management Plans” (Girona, Spain, 2010).

This book provides an overview of the main outcomes of the KEYBIOEFFECTS project as they were reflected in the aforementioned workshop. It includes scientific advances concerning the sampling, analyses, occurrence, bioavailability, and effects caused by emerging and priority pollutants in European rivers, the current status of the River Management Plans in Europe, and the applicability of the newly developed techniques for water monitoring purposes. These scientific advances are presented in the context of the Water Framework Directive evaluating their missing gaps and providing the basics for filling them.

A special attention is dedicated to report the occurrence and elimination of emerging pollutants such as pharmaceuticals during conventional wastewater treatment. Assessing the bioavailability of organic contaminants is also presented, highlighting the difficulties for regulation, more specially in the case of emerging contaminants. The book presents an extensive set of newly developed methods to assess ecological integrity in multistressed rivers. Different ecological perspectives: heterotrophic, phototrophic, and macroinvertebrate community indicators, laboratory and field investigations, as well as multibiomarker approaches are reviewed providing, in each case, the pros of cons for their application. Finally, a specific case study of river quality status assessment performed by a river basin water authority following the principles of the Water Framework Directive is presented.

It is not always evident how science returns its value to society. We hope that the results presented in this book will serve as a good example of how scientific research is able to provide support to issues of public concern, as it is the management of the water cycle and hence contributing to the preservation of ecosystems health and human welfare.

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