

## Preface

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The 2nd European Large Lakes Symposium (ELLS) 2009, which took place on Campus Roslagen in Norrtälje, Sweden, on 10–14 August 2009, focused on the ecosystems of European large lakes and their functioning, and especially on monitoring, management and measures. The symposium was organized by the international Organising Committee including the following members: Prof. Kurt Pettersson (Chair, Sweden), Dr. Markku Viljanen (Vice-chair, Finland), M.A. Tuula Toivanen (Secretary, Finland), Dr. Thorsten Blenckner (Sweden), Dr. Daniel Gerdeaux (France), Dr. Tiina Nõges (Estonia), Dr. Dietmar Straile (Germany), Dr. Arkady Terzhevik (Russia), Prof. Lars Tranvik (Sweden), Dr. Gesa Weyhenmeyer (Sweden).

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Vulnerability of large lake ecosystems – Monitoring,  
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Although considerable cooperation in lake-related issues already exists in Europe, as elsewhere, e.g. North America, a special forum focusing on large lakes is certainly needed. This cooperation provides a basis for elaborating the best strategies for communicating the risks of human activities regarding large lake ecosystems to public stakeholders, including policymakers on a European and a regional scale.

ELLS, having its first symposium in Tartu 2006 (Proceedings of the ELLS symposium in 2006 appeared as a dedicated volume of *Hydrobiologia, Developments in Hydrobiology* 199), grew out of the International Lake Ladoga Symposia organised in 1993, 1996, 1999, and 2002, which have improved our understanding of the structure and functioning not only of Lake Ladoga but also of other large lake ecosystems in Northern Europe. As the problems

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concerning the prevailing situation and the changes related to status, threats, protection, and use are much the same in all large European lakes, a need for an international exchange of scientific results from large lake research in general has emerged.

ELLS 2009 provided a platform (i) for discussing new scientific findings regarding the functioning of large lake ecosystems under the influence of anthropogenic and climatic stressors, (ii) for enhancing the communication and exchange of ideas among scientists, water management authorities and politicians, and (iii) for fostering international networking in all aspects of monitoring and management of both national and transnational European water bodies.

Large lakes are defined by their size and ecological uniqueness as well as their local, regional, national or trans-national economic and cultural value. Optimal management of large lakes demands proper understanding of the anthropogenic risks both to the lake ecosystems as such and to the socioeconomic services they provide. The specific structural and functional properties of large lakes, e.g., their morphology, hydrography, biogeochemical cycles, and food-web structure, are all directly related to their size. These vulnerable ecosystems often suffer from accelerated eutrophication, overfishing, toxic contamination, and invasive species. The effects of global climatic change must also be taken into account. Large lakes offer socio-economic benefits and possibilities for multiple uses and are often the regional centers of economic, agricultural, and political activities. These multiple uses form potential risks to their structure and functioning. Therefore, efficient communication and careful management of the risks are needed to enable the sustainable use of these ecosystems. The dissemination of information concerning the risks caused by human activities provides a way in which many people in Europe can be brought to perceive the risks related to water use. Any management measures that are taken to alleviate anthropogenic pressures on large lakes and to achieve or retain their “good status” must necessarily embrace the entire catchment area. As several of the most famous large lakes in Europe (Lakes Geneva, Constance, Peipsi, and Maggiore, for instance) or the catchment areas of such lakes (those of Lakes Ladoga, Vänern, and Saimaa) are shared between two or more nations, international cooperation is an indispensable prerequisite for considering their sustainable management.

The symposium programme included invited and other lectures and posters under the themes:

1. Monitoring of large lakes (keynote speaker Erik Jeppesen, Denmark).
2. Global change impacts on large lakes (keynote speaker John Magnuson, USA).
3. Invasive species and their impacts (keynote speaker Ian J. Winfield, England).
4. Biogeochemical cycling in large lakes (keynote speaker Vera Istvánovics, Hungary).
5. Water management strategies for large lakes (keynote speaker Geoffrey Gooch, Sweden).

The symposium was attended by 140 participants from 18 countries: Russia, Estonia, Sweden, Finland, Germany, Belarus, Switzerland, France, Hungary, Poland, Israel, Italy, Latvia, Lithuania, The Netherlands, USA, UK, and Denmark.

The guest editors were Thorsten Blenckner (responsible editor, Global change impacts on large lakes), Kurt Pettersson (Monitoring of large lakes), Lars Tranvik (Biogeochemical cycling in large lakes), Rahmat Naddafi (Invasive species and their impacts), and Tiina Nõges (Water management strategies for large lakes). Our special thanks go to Dr. Judit Padisák for her valuable advice during the editing process.

This volume presents a selection of 12 review and original research papers coming out of the presentations given at the ELLS symposium. As in the previous volume, this current volume is structured around the themes (see above) of the symposium. Jointly the papers contribute to our understanding of large lake ecosystems, monitoring programs, global warming effects, biogeochemical processes, the role of invasive species, and management.

The participants are grateful to the Swedish Institute and to the Swedish International Development Cooperation Agency, which co-financed this symposium. The assistance of staff members of the Erken Laboratory was priceless: without their dedicated contribution, the success of this symposium would not have been possible. Furthermore, special thanks should be given to the outstanding secretary Tuula Toivanen from the University of Joensuu, Ecological Research Institute, Finland. In addition, we wish to thank the numerous referees who invested their precious time in preparing reviews of the manuscripts of this special issue, helping to bring this volume to its present standard.