



SIL news

Volume 65 - December 2014

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1 APRIL 2015

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Contributions on PC formatted disk, in any standard word processor or DOS (ASCII) text, or as e-mail attachments, will assist the Editor.

Editor's Foreword

This issue of *SILnews* includes, among others, articles from Tamar Zohary, the SIL Secretary, and Yves Prairie, the SIL President. Both these contributions are dedicated to revitalising the SIL. Restoring to the SIL its old glory but at the same time adapting to the present day situation, partly relating to climate change, etc. are thus the main paradigm of their messages. Tamar has, according to me, very rightly chosen the path of stimulating the students' interest to invigoratingly participate in the SIL academic activities during the upcoming meetings. It should be interesting to have a national platform of students' academic activities through which to qualify for a plenary lecture at the upcoming SIL Congress in Torino, Italy, in 2016. Such plenary lectures are normally awarded on invitation to well known experts in their respective fields of interest. Yves Prairie "reminds" us that the ASLO (which meets at Granada, Spain, in Feb. 2015) is a sister organisation of SIL. I understand that SIL will be represented at the upcoming ASLO meeting as an invited speaker in the Plenary Lecture Sessions.

Also, it is encouraging to note that the sustained efforts of the SIL Secretariat started since the SIL Congress in Montreal in 2007 have continued unabated. Consequently, the SIL has been successful in not only having its own Scientific Journal *Inland Waters* but the journal that is already recognised by the ISI and has received an Impact Factor too. The Journal has in Jack Jones not only a well-recognised Editor-in-Chief but he has an impressive list of subject editors on his editorial board. The Journal is very soon entering 5th year of publishing peer-reviewed articles. This journal accepts the manuscripts submitted for both Congress Proceedings Volumes as well as submitted directly—just as other aquatic journals accept direct submissions (read more about this elsewhere in the newsletter).

The newsletter includes a few announce-

ments and several reports of meetings that did not directly originate as SIL sponsored activities but are closely related to the activities of the SIL working groups. Two of these relate to Cladocera Meeting held in Czech Republic and the triennial Conference on Shallow Lakes in Turkey. Both these meetings are reported in this newsletter. Thanks to Dr. S.S.S. Sarma and Dr. Nandini Sarma from Mexico. Sarmas are also playing hosts to the next Shallow Lakes Meeting, to be held in Mexico in 2017. I thank them both for their help in reporting for this newsletter. Other reports in the Newsletter come from Aral Lake reported by Nikolay Aladin and colleagues. I must thank Nikolay et al. for regularly keeping us apprised of new developments in Lake Aral, which has suffered badly from climate change effects. The last biennial ILEC Meeting held in September 2014 at Perugia (Italy) is reported by Dr. Luigi Naselli-Flores (Palermo, Italy). Bob Wallace from the US and his colleagues report on their workshop deliberations on cryptic speciation in *Brachionus plicatilis* complex. Brian Moss (former SIL President) reports on "Rewilding Limnology", based on a conservation approach to shallow water bodies in Tanzania, the term *rewilding*, is apparently borrowed from terrestrial ecology.

Last but not least, I cannot refrain from a brief comment on the functioning of our SIL Working Groups: despite all the recent efforts at rejuvenating the SIL, I am perturbed to note that the group scientific activities have now dropped to a low ebb, but this based purely on my feedback from these groups. I may be wrong but as it is I am a bit dismayed. I hope this is a momentary slump. The WG Chairmen, nevertheless, need to think about it. They are always welcome to contribute briefly to the Newsletter of their scientific activities.

Ramesh D. Gulati
Editor *SILnews*,
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The SIL desk behind the scenes, a Report from the SIL Secretary

Dear SIL members,

I would like to report to you what has been going on at the SIL desk, behind the scenes, since the Congress in Budapest in 2013. Our president Yves Prairie and I have set ourselves a primary goal: to increase the SIL membership, mainly by attracting students and early-career professionals.

Our first step was to reduce the annual SIL membership fee for students to only 5 US \$, in order to give many more students an opportunity to become and experience being a SIL member. Similarly, early-career members are now entitled to a 50% concession on their regular annual dues. These changes were announced already last year.

Our second step is to announce an international competition for the best limnology paper published by a SIL student member. The winner will be invited to present a plenary at the 2016 SIL Congress in Torino, Italy. The first announcement for this competition appears in this issue, pages 2 and 3.

Our third step is to re-design the SIL website and make it more attractive, practical and user friendly. A website with a new look, where it is easier to find what one is looking for. We have already chosen a commercial company to create and program this new website and the actual work has begun. Gordon Goldsborough, SIL's website manager, is of great help here. We are checking the setup and contents of websites of similar societies and international organizations in order to assess their strength and weaknesses and apply their better approaches to the design of a website for our society. If you have suggestions for what you would like to see at SIL's website, or how you would like it to be presented – please send those to me. If you would like to become a member of the SIL website team – that would be great. Please let me know!

A further step is to reduce the time interval between congresses from three to two years. This will give more students an opportunity to participate in a SIL Congress before they graduate. The change begins with the 2016 SIL Congress in Italy. The congresses to follow it will take place in China in 2018, and then in 2020, after which the new frequency will be re-assessed.

Furthermore, we are making efforts to increase the visibility of the SIL, by sponsoring and participating in various Limnological Meetings and events. SIL sponsored the 15th ISRLE (International Symposium on River and Lake Ecosystems), held in Chuncheon, South Korea in August 2014, with ca. 350 limnologists from Japan, China and S. Korea. Our president Yves Prairie addressed the symposium and reminded the audience of the benefits of a SIL membership. A special issue of SIL's journal *Inland Waters*, is being planned on the effects of the monsoon on lakes of East Asia, based on presentations from the meeting. SIL will be sponsoring a plenary talk in the upcoming ASLO meeting in Granada in Feb. 2015, this should give us further exposure.

Another SIL sponsored event was a course entitled 'Metabolism of Inland Waters' held in July 2014 at the Ecological Station of Serido,



Caico, Rio Grande do Norte, Brazil by Dr. Sarian Kosten, Vera Huszar and Vanessa Backer (For details see also SILnews letter 64, p. 23). A Report about this course, written by its student participants, appears in this issue of *SILnews*, page 6.

Finally, much time and effort go into our journal, *Inland Waters*. Many thanks to Jack Jones, our dedicated chief editor, the journal looks good! Its quarterly issues seem to be appearing ahead of schedule, with volume 4(4) already out, and volume 5(1) – the first issue for 2015 – already under preparation. In addition to Jack, the team of associate editors does a great job, as well as Janice Faaborg, the copy editor, and Karen Rouen and Simon Pawley from the FBA, our Publishers.

The goal of attracting new SIL members is becoming more and more difficult to achieve. This, because there are several other organizations that hold international limnological meetings without charging annual membership dues, some do not even charge registration fees. I am referring to GLEON, Symposium of European Freshwater Scientists (SEFS), European Large Lakes Symposium (ELLS), Shallow Lakes Conferences, Harmful Algal Blooms symposia and the like. In order to stay relevant, SIL has to compete with such meeting platforms and prove its excellence. Its long history and tradition (SIL will be celebrating 100 years in 2022!) are apparently not enough.

Since the Budapest congress, 58 new members have joined the SIL, this is a modest start but we need more. Please encourage your students and early-career colleagues to join SIL!

Tamar Zohary

SIL General Secretary-Treasurer
tamarz@ocean.org.il

An Announcement from our Secretary International SIL student competition

The competition: best published paper in Limnology appearing as part of a recent Ph.D. or M.Sc. thesis of a SIL member.

The prize: Plenary talk at the 2016 SIL Congress in Torino, Italy with gratis participation.

We hereby announce an international competition, open to all students and early-career members of the SIL, the International Society of Limnology. In this competition, the best paper in Limnology coming out of a Ph.D. or M.Sc. study of a SIL member published recently will be chosen. The competition winner will present his/her study as a plenary lecture at the upcoming SIL Congress in Torino, Italy.

There will be two stages to organizing this competition:

Stage 1 – National: each country will choose its best paper that will enter the international competition. This stage will be organized by the national representative(s). Each country can submit only one paper, except countries with > 50 SIL members that can submit two papers for the competition. A committee will be set up in each country to rank the papers according to the scoring system detailed below and choose the paper(s) for Stage 2.

Stage 2 – International: An international jury of 7 members from 7 countries will review the papers from the different countries and choose the winner, based on a scoring system detailed below.

Conditions for participating in Stage 1 of the competition:

- The candidate must be a SIL member
- The candidate must be the first author of the submitted article
- The candidate must be a student, or an early career professional who has finished his/her M.Sc. or Ph.D. in 2012 or later.
- The article must be in the field of limnology (aquatic sciences)
- The article must be written in English
- The article must have been published or accepted for publication in 2013, 2014 or 2015
- A nomination letter highlighting the strengths of the article and explaining why it warrants being considered for this competition must be attached.

Materials to submit:

- The filled application form downloadable from: <http://www.limnology.org/studentcompetition.shtml>
- Reprint of the paper or alternatively the accepted manuscript with all tables and figures in one single PDF file accompanied by the letter of acceptance from the journal.
- Scanned copy of the degree certificate or alternatively certificate of recent student status (either Ph.D. or M.Sc.) from the relevant university. This university should be the affiliation of paper's first author)
- A nomination letter highlighting the strengths of the article and explaining why it warrants being considered for this competition. This letter should be written by the head of the higher-degree school, or by a senior colleague who is not your direct supervisor.

Competing candidates should submit the above to their SIL national representative. Competing candidates from countries with no national representative should submit their documents to Prof. Judit Padisák, the overall competition coordinator.

Deadlines:

30 September 2015 – deadline for articles and accompanying documents to the National Representative (NR) or to Judit Padisák in countries with no NR

15 December 2015 – deadline for submission of the winner article from each country to the SIL student prize competition coordinator, Judit Padisák.

15 March 2016 – The competition winners (1st, 2nd and 3rd places) will be announced.

August 2016 – Awards will be given to the competition winners at a special session, dedicated to this student contest, at the SIL Congress in Torino.

Criteria for evaluating the publications during the national screening and again at the international stage will be:

- Scientific/technical quality (score 0-20),
- Methodological approach (0-20)
- Relevance and potential scientific impact of work carried out (0-20).

Contact details:

Prof. Judit Padisák
Coordinator for the student competition
padisak@almos.uni-pannon.hu

Awards

The awards will consist of one main and two additional prizes, plus merit certificates to all those participating at Stage 2 of the competition:

- The main prize will consist of a certificate and a SIL grant to attend the August 2016 SIL Congress in Torino, including registration fee and travel costs.
- During this meeting, the winning author will be required to give a dedicated Plenary Lecture (30 min) on his/her winning article.
- The winners of the second and third prizes will receive certificates and grant money to cover their registration fee to attend the SIL Congress. They will be required to present their papers as regular presentations
- All participants of Stage 2 will receive a certificate and be invited to present their papers (oral or posters) in the special session.

Dr Tamar Zohary

SIL General Secretary-Treasurer
tamarz@ocean.org.il

Message from our SIL President Yves Prairie

The next international Association for the Sciences of Limnology and Oceanography (ASLO) meeting will be in Granada, Spain. The meeting theme is "Aquatic Sciences: Global and Regional Perspectives – North Meets South". We promoted plenary talks and special sessions on global and regional patterns of aquatic systems in diverse northern and southern inland waters.

We see this theme as a critical scientific challenge as our discipline moves to understand and confront human accelerated environmental change. Along with ASLO members from North America and Europe, we anticipate Granada will be a joined place for Iberoamerican, African and Middle Eastern aquatic scientists. This meeting in Granada will contribute to the ongoing international development of ASLO by bringing together a diverse group of participants at a site where many cultures have engaged through the centuries.

SIL has been involved in the organization of this meeting and is contributing with one of the plenary speakers Dr. Antony Turton from the University of the Free State, Bloemfontein, South Africa with a seminar entitled: "*The Need for Transdisciplinarity Arising from the Holocene/Anthropocene Transition – Some Ideas from Water Conflict Resolution in South Africa*".

Please visit the web page: <http://sgmeet.com/aslo/granada2015/> to have more details on this event. (See also page 4 in this newsletter).



Yves Prairie

President, International Society of Limnology (SIL)
prairie.yves@uqam.ca



Announcements

Announcement of ASLO MEETING at Granada, Spain (February 22-27, 2015)

(See also the message from our SIL President Yves Prairie on page 3)

The next ASLO Meeting (Association for the Sciences of Limnology and Oceanography) will be held in Granada, Spain, from 22th to 27th February, 2015. The meeting theme is “Aquatic Sciences: Global and Regional Perspectives – North meets South”. Plenary talks and special sessions on global and regional patterns of aquatic ecosystems in diverse northern and southern inland waters will be promoted. This theme is a critical scientific challenge as our discipline moves to understand and confront the human accelerated environmental change. Along with ASLO members from North America and Europe, we anticipate Granada will be a place for linking for the Aquatic Scientists from Ibero-American, African and Middle Eastern. This meeting in Granada will bring together a diverse group of participants at a site where many cultures have engaged through the centuries.

SIL has been involved in the organization of this meeting and is contributing with one of the plenary speakers, Dr. Antony Turton, from the University of the Free State, Bloemfontein, South Africa, with a lecture entitled: “*The Need for Transdisciplinarity Arising from the Holocene/Anthropocene Transition – Some Ideas from Water Conflict Resolution in South Africa*”.

Please visit the web page: <http://sgmeet.com/aslo/granada2015/> for details on this event.

Dr. Isabel Reche (ireche@ugr.es)

Co-chair of the ASLO-2105 Aquatic Sciences Meeting



View of the Alhambra, the palace and fortress constructed by Yusuf I, Sultan of Granada during the Moorish dominion in Spain, and the Palace of Charles V, inserted within the Nasrid fortifications after the Catholic Reconquista. Behind these emblematic monuments are the Sierra Nevada Mountains. Photo courtesy: Provincial Tourism Board of Granada.



33rd Congress of the International Society of Limnology (SIL) Torino, Italy, July 31 - August 5, 2016

The Italian limnologists, aware of the importance of scientific research on inland waters, greatly appreciate the opportunity to host the 33rd SIL Congress in Italy, and welcome in Torino the colleagues from all around the world.

The Congress will be addressed to highlight what water science can do to allow us regain possession of the vital resource made up by freshwater ecosystems. The congress title “Science for a sustainable freshwater regain” expresses this idea in short.

The basis for this choice is the awareness that our planet is under pressure due to increased demand for freshwater. The availability and suitability of water resources are threatened by human influences, directly through globally unbalancing the slow and fast water cycles and impairing water quality, and indirectly through the adverse effects of climate change. Many freshwater ecosystems are deteriorating in quantity and quality. As a result, an increasing number of people are chronically short of water. In this context, limnology must provide the answer to the planetary water crisis as we need more science and more scientists to urgently face a sustainable and effective freshwater recovery. This need can be satisfied only by improving our knowledge in Limnological Sciences and the people awareness of what science can do for a more sustainable use of freshwater ecosystems.

Thus, as water scientists we have two missions: 1) to improve our knowledge of freshwater ecosystem functioning and 2) to make our knowledge a tool handy for environmental managers and friendly for people. We are confident that this Congress will help us accomplish these missions as scientists and as human beings.

We have made every effort to keep the cost of the conference as low as possible, which is particularly difficult with the current economic crisis. We will also do our best to make this conference a “young” conference. The SIL board helped a lot in this, by promoting a “Student international competition” awarded with a plenary lecture (see the announcement on pages 2 and 3 in this issue of *SIL news*).

We made a tentative list of thematic sessions but we will also open a call for special sessions to be proposed and handled by delegates. Hopefully this will make the 33rd SIL Congress an active conference where everyone can find suitable space for their scientific interests. The proposed thematic sessions are:

1. Freshwater scarcity: a natural or a human-made phenomenon?
2. The freshwater micro eukaryotic world: role and relevance for the ecosystem

3. The borderline word on inland waters: wetlands and estuaries
4. Aquaculture in fresh waters: resource or problem for the ecosystem?
5. The impact of global change on inland waters
6. Atmospheric deposition effects in aquatic ecosystems
7. The time line of lake ecosystem evolution: the role of long-term ecological research
8. Lakes in the extreme and remote environments
9. Biogeochemistry and ecology of inland waters
10. Organic matter dynamics and microbial diversity in freshwater environments
11. Drivers and triggers of cyanobacterial blooms
12. The molecular tools in freshwater ecology
13. Remote Sensing of lakes: state of art and future perspectives
14. Synthetic organic compounds effects on trophic chains
15. Experimental limnology: from microcosms to in-lake interactions
16. Forecasting models for the management of lakes
17. Groundwater and dependent ecosystems
18. From springs to lakes
19. Physical limnology
20. Microbial Biodiversity, Bioinformatics, and Biotechnology in freshwaters
21. Underwater light climate: implications for ecosystem processes
22. Phytoplankton and zooplankton spatial and temporal heterogeneity
23. How the lake physics drives the lake biota
24. Freshwater science education: expanding science literacy
25. The dissolved organic matter (DOM) in inland waters: sources and fate

The website of the congress is already online at www.sil2016.it. There you will find updated information on the National Scientific and Organizing Committee, the International Scientific Committee, and the SIL Congress Committee, coming to operation since this Congress. You will also find details on the congress fees and deadlines, as well as information on the venue and on the hosting town. The registration and accommodation sections will be activated soon, as the suggestions for pre post congress excursions. So please regularly check the 33rd SIL website for updates.

Arrivederci a Torino!

Roberto Bertoni,

Chair, CNR Institute of Ecosystem Study, Verbania
(r.bertoni@isr.cnr.it)

Luigi Naselli-Flores,

Co-chair, University of Palermo

Cristiana Callieri,

Co-chair, CNR Institute of Ecosystem Study, Verbania

Block Course on Physical Limnology:

A block course on physical limnology (physics of lakes) will be held at the Heidelberg University (Germany) during the spring break 2015 from 16th - 20th March. The course is part of the Physics Master Program and will be held at the Institute of Environmental Physics.

This block course aims at presenting the basics about physical processes in lakes, such as stratification, waves, currents, turbulence, mixing and matter transport. The course will consist of 14 lectures of 90 minutes each accompanied by short exercise sheets. Lectures will be held in English. Most lectures will be given by Dr. Bertram Boehrer (UFZ, Priv. Doz. Univ. Heidelberg) and Prof. Andreas Lorke (Univ. Landau), but we will complement our competence by inviting active scientists in the field physical limnology to present their specialty.

A detailed program will be issued closer to the block course on <http://www.ufz.de/index.php?de=18470>. Students and scientists interested in attending the course are requested to contact us by email no later than the 2nd Feb 2015. Thanks to our sponsors, we can offer this course FREE of charge also to external participants. Attendees must only fund their travel and accommodation by themselves. For further information, please address Bertram. Boehrer@ufz.de.

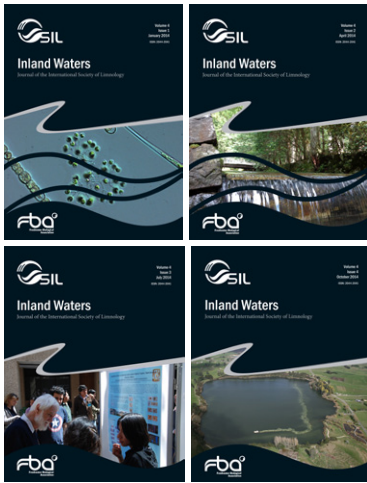
Dr. Bertram Boehrer

Helmholtz-Zentrum für Umweltforschung – UFZ
www.ufz.de/limnophysik



Reports

Inland Waters, a Report from the Editor-in-Chief



Volume 4 of *Inland Waters* (2014, 444 pages) has been published (www.fba.org.uk/journals/index.php/IW). It includes 3 plenary lectures from the Congress in Budapest covering topics on morphological analysis of phytoplankton by Luigi Naselli-Flores, impact of climate warming by Martin Dokulil, and the estranged twins – limnology and oceanography by John Downing. The 34 published articles cover a broad range of topics, including nutrient loading, carbon and

methane flux, invasive species, radiocesium contamination, paleolimnology, stream invertebrates, hydroacoustic estimates of fish stocks, and numerous others. Nine Articles in 4(3) are publications resulting from the Plankton Ecology Group Workshop in Mexico City (12–18 February 2012); the special editors for that collection were SSS Sarma, Ramesh Gulati and S Nandini. Four Research Briefs were published in 4(4) addressing geoengineering in lakes, biochemical composition of *Microcystis*, impacts of food quality and quantity on *Daphnia* life history, and carbon dioxide emissions from dry watercourses. These short submissions are intended to promote communication of emerging issues.

All SIL members now have individual accounts that provide full access to all articles published in *Inland Waters*. Usernames and passwords were emailed to SIL members on 25 September 2014 from Rosalind Maberly and Karen Rouen of the FBA. Tamar Zohary followed with an email to members describing this new system and the benefits of SIL membership, which includes full access to the journal.

The goal of *Inland Waters* is to foster scientific communication of original work, primarily by SIL members, and especially to provide opportunities for SIL early career scientists to publish. Manuscripts can be submitted any time using the online journal system maintained by the Freshwater Biological Association. *Inland Waters* is an 'online first' journal, publishing papers online consecutively and subsequently in 4 printed issues per year. *Inland Waters* is listed in Science Citation Index Expanded and Current Contents; all papers from Issue 1 onwards are indexed. The journal contents and citations are tracked by Google Scholar, Scopus, Aquatic Sciences and Fisheries Abstracts, among others. The current Impact Factor is 1.43, positioning the journal in the top half of aquatic publications. We expect this metric will increase given the interesting material published in *Inland Waters*.

Jack Jones, jonesj@missouri.edu
Editor-in-Chief

David Hamilton, davidh@waikato.ac.nz
Senior Associate Editor

A Report on Course on Metabolism of Brazilian Semiarid Inland Waters 14-20 July, 2014 (Ecological Station, Seridó (ESS), Brazil)

The course was attended by the following 19 persons from the universities and institutions of Brazil, Uruguay and the Netherlands as indicated.

Michaela Ladeira de Melo¹, Rafael M. Almeida¹, Aline do Vale Figueiredo², Anízio Souza Andrade², Caroline G. B. de Moura², Denise Tonetta³, Ernandes Sobreira Oliveira Junior⁴, Fabiana Oliveira de Araujo Silva², Felipe Rust¹, Gabriel Nuto Nóbrega⁵, Juan Manuel Piñeiro-Guerra⁶, Jurandir R. Mendonça Júnior², Leonardo Rafael Medeiros², Lorena Pinheiro Silva⁷, Marcela Miranda¹, Mariana Rodrigues Amaral da Costa², Pedro C. Junger⁸, Regina Nobre², Thiago Benevides Fernandes⁸

1. Federal University of Juiz de Fora, Brazil
2. Federal University of Rio Grande do Norte, Brazil.
3. Federal University of Santa Catarina, Brazil
4. Radboud University, the Netherlands
5. University of São Paulo, Brazil
6. Universidad de la República, Uruguay
7. Federal University of Rio de Janeiro state, Brazil
8. Federal University of Rio de Janeiro, Brazil

Between July 14th and 20th of 2014, the first of four planned courses by a cooperation between CAPES (Brazil) and NUFFIC (Netherlands), coordinated by Dr Vera Huszar, was held at the Ecological Station of Seridó (ESS) (06°34'49,05"W; 37°15'25,86"S), in the semiarid Northeastern Brazil (Caatinga biome). The Course was entitled "*Metabolism of inland waters: feedbacks between climate change and aquatic greenhouse gas balance*". The course given by Dr Sarian Kosten (Radboud University Nijmegen, the Netherlands) and Dr Jeroen de Klein (Wageningen University, the Netherlands). The Course aimed at young scientists and master's and Ph.D. students from South America. Through theoretical and practical exercises, the objectives of the course were to enable the participants to identify major metabolic processes operating in inland waters, experimentally determine the process rates, assess the greenhouse gas balances and evaluate the (potential) impact of climate change on the greenhouse gas balance in inland waters.

The course schedule included lectures by several researchers: Dr Vanessa Becker (Universidade Federal do Rio Grande do Norte, Brazil), Dr Raquel Mendonça (Uppsala University, Sweden), Dr Nathan Barros (Universidade Federal de Juiz de Fora, Brazil) and Dr Fabio Roland (Universidade Federal de Juiz de Fora, Brazil). The practical part involved several field samplings and experiments to determine the rates of methane oxidation, water-atmosphere gas fluxes, sediment respiration rates, plankton production and respiration rates, oxygen curves and gas diffusion in a small, shallow, eutrophic man-made lake in the ESEC, located at Caatinga biome.

The Caatinga covers an area larger than France, and is characterized by low rainfall (400 - 800 mm per year) and high evapotranspiration rates (1.250-1.500 mm). Rainfall is not only scarce, but also



FIGURE 1 – Participants of the course. By MICHAELA LADEIRA DE MELO



FIGURE 2 – Participants doing a methane oxidation experiment in the lake.

irregularly distributed over the year, which results in an annual hydric balance deficit at least for nine months. Temperatures are typically above 25°C, and the landscape is characterized by intermittently flowing streams (Barbosa et al., 2012). To compensate for the overall water deficit, many water supply reservoirs have been constructed in the Caatinga, such as the ESEC lake. Although the number of studies on the limnology of these reservoirs is now increasing, they are still highly under-studied, especially considering their importance for local populations.

A large fraction of Caatinga reservoirs does not have a river inlet, i.e. they depend for their water supply on exclusively rainfall. Thus, the amount of outflowing water in these reservoirs is low, resulting in high residence times. This, together with the high temperatures and nutrient inputs, creates optimum conditions for eutrophication. Although eutrophication is already observed in most of Caatinga reservoirs, they are expected to become even more eutrophic on the basis of current climate change scenarios (Roland et al., 2012).

The whole team is now working to publish the data generated during the course. Our preliminary results raise some interesting

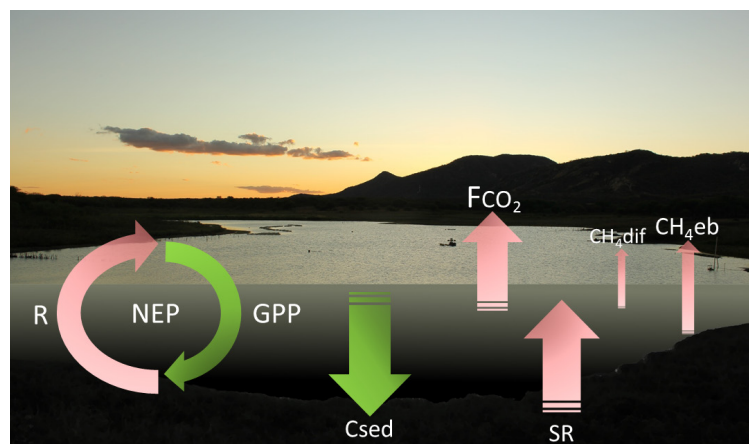


FIGURE 3 – Schematic diagram showing pathways of carbon cycling in the ESS lake. The thickness of the arrows are proportional to the magnitude of the processes. R = ecosystem respiration, GPP = gross primary production, NEP = net ecosystem production, Csed = organic carbon sedimentation, SR = sediment respiration, FCO₂ = CO₂ flux, CH₄dif = CH₄ diffusion, CH₄eb = CH₄ ebullition. By GABRIEL NUTO NÓBRÉGA.

points for discussion: although the ESEC lake is highly eutrophic, we observed substantial carbon dioxide emissions during the course period. Also, as expected, high methane emissions were recorded. These findings are not in line with recent results from temperate lakes suggesting that eutrophication may reverse the role played by lakes in carbon cycle by sequestering atmospheric carbon as organic carbon in lake sediments (Knoll et al., 2013; Pacheco et al., 2014). This reversal may be true for temperate lakes, but is possibly not repeated in some tropical systems, where high temperatures favor the mineralization over permanent burial of organic carbon (Mendonça et al., 2012). In the shallow ESEC lake, carbon emissions may be supported by a high, rapid mineralization of organic carbon in sediments (Figure 3).

One very positive aspect about this course was the reunion of students and scientists in a place having limited communication with the outside world, because there were no telephone and internet facilities in the surroundings of the ESEC. This enabled everyone to commit themselves to only the course. In addition to being a good opportunity for training future scientists, the outcomes of the course will add to the current understanding of the eutrophication-

carbon cycle relationship and global changes through a peer-reviewed publication of the data collected.

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Development of IL²BM platform for Transboundary Lake Aral¹

The Aral Sea is a terminal lake, lying amidst the vast deserts of Central Asia. From the 1600s to the 1960s, the hydrological regime of the Aral Sea was in reasonable balance. Since 1960, the anthropogenic regression and salinization of the Aral Sea have not been underway. These changes have not resulted in the disappearance of most of its species of invertebrates and fish. At the end of the 1980s the Aral Sea divided into a northern Small Aral and southern Large Aral, which have different hydrological regimes (Micklin, Aladin and Plotnikov, 2014, Chaps. 1&15).

Regression and salinization of the Large Aral continue unabated. After construction of the Kokaral dam (Aladin, 2014) the Small Aral Sea level began to rise and a gradual decline in its salinity ensued. To date, salinity of the Small Aral Sea is lower than it was before the 1960s. A process of restoration of the former biodiversity of this water body is underway. Many invertebrate species are reappearing. Commercial freshwater fish species returned into the Small Aral from the Syr Darya River and lakes in its lower reaches. Fisheries are recovering and catches are growing (Aladin, Plotnikov, 2012; Aladin et al., 2012; Plotnikov et al., 2012).

At present the Aral Sea is divided into a number residual parts. The Large Aral Sea is the most ecologically devastated part of the lake. At the beginning of the 21st century it was divided into three parts: Western Large Aral Sea, Eastern Large Aral Sea and Tsche-Bas Bay (Micklin, Aladin and Plotnikov, 2014, Chaps. 6&14).

¹ In our studies of Aral Sea we are using IL²BM platform (Integrated Lotic/Lentic Basin Management) (<http://www.ilec.or.jp/en/>).



Fig.1. Spillway of Kokaral dam.



Fig.2. MODIS image of the Aral Sea acquired on August 19, 2014 (250 meter resolution; true color using bands 1-4-3): (1) dried Eastern Basin of the Large Aral Sea, (2) Western Basin of the Large Aral Sea, (3) New Central Aral Sea, (4) Small Aral Sea, (5) Tsche-Bas Bay. (A) Kokaral dam (Central dam), (B) Northern dam, (C) Southern dam. The faint line shows the 1960 dimensions of the Aral Sea. Source: NASA Earth Observatory (<http://earthobservatory.nasa.gov/IOTD/view.php?id=84437>).

Over the last decade, a new fourth part of the Large Aral Sea has appeared: the Central Aral Sea. It owes its origins to outflow from the Small Aral via the Berg Strait (Kokaral) dam (Figure 1). It has great seasonal variation in area: largest in spring (April and May) when outflow is highest and lowest in summer (late August and September) when outflow is very low. On April 17, 2014, the area of the Central Aral, determined by analysis of Landsat 8 satellite imagery, was just >1000 km², but by August 29 it had shrunk to around 300 km². When the Central Aral is largest, it connects through a narrow channel with Tsche-Bas Bay and supplies that water body with some water. This new water body is shallow, also because it loses a great deal of water via



Fig. 3. Fresh fishes from the Small Aral Sea.



Fig. 4. White sacks with *Artemia* cysts collected in Western Large Aral Sea in Chernyshov Bay.

evaporation and evapotranspiration from the extensive reeds that grow in it.

Summer 2014 marked another milestone for the Large Aral Sea. For the first time since late Medieval times, the Eastern Large Aral Sea completely dried up (Figure 2). So we have now again only three parts (Western Large Aral Sea, Tsche-Bas Bay and New Central Aral Sea).

Earlier, in September 2009 the Eastern Basin had shrunk to two very shallow residual lakes with an aggregate area of around 860 km² but have not completely disappeared (Micklin, Aladin and Plotnikov, 2014, Chap. 5).

From May to September 2014, a number of field trips around the Small Sea were made to study Small Aral Sea, Tsche-Bas Bay; Western Large Aral Sea (only Chernyshov Bay); and New Central Aral Sea.

Salinity in the Small Aral Sea ranged from 1 g/l to up to 8 g/l. The lowest level was observed in May near the Kokaral dam and the highest – in August in Butakov Bay. The level of the Small Aral ranged from 42.1 to 42.6 m a.s.l., the lowest was in August, the highest was in May.

In the Small Aral Sea the most numerous zooplankton species are: *Keratella quadrata*, *Brachionus plicatilis*, *Evadne anonyx*, *Calanipeda aquaedulcis*, *Cyclops vicinus* and an unidentified species of *Synchaeta*

rotifers. Besides Rotifera, Cladocera and Copepoda in zooplankton, there were found a few species of freshwater and brackish water planktonic Protozoa. Four species of zoobenthos were numerous: *Hediste diversicolor*, *Chironomus plumosus*, *Syndosmya segmentum*, *Cyprideis torosa*. In addition to, Polychaeta, Diptera insects, Mollusca, and Crustacea in Small Aral Sea zoobenthos, we detected a few species of freshwater and brackish water unidentified benthic Protozoa.

In Small Aral Sea, 14 commercial fish species that were numerous are: pike, bream, asp, crucian carp, shemaya, carp, grass carp, sabrefish, roach, rudd, wels, perch, zander, Black Sea flounder (Figure 3). Six non commercial fish species were also abundant: ruff, nine-spined stickleback, atherine, bubyr goby, sand goby, round goby (Ermakhanov et al., 2012).

Salinity in Tsche-Bas Bay ranged from 78 g/l to 89 g/l. The lowest salinity was observed in May near the connection to the New Central Aral Sea and the highest in August near the northern coast of Tsche-Bas Bay. The water level ranged from 28.7 to 29.1 m a.s.l. The lowest was in August, the highest in May. Two zooplankton species were numerous: brine shrimp *Artemia parthenogenetica* and halophilic ciliate *Fabrea salina*. Three zoobenthos species were plentiful; halophilic ostracod *Eucypris inflata*, euryhaline ostracod *Cyprideis torosa* and halophilic larvae of *Chironomus salinarius*. There were no fishes in Tsche-Bas Bay owing to high salinity (Ermakhanov et al., 2012).

In the northern part of the Western Large Aral Sea (Chernyshov Bay) salinity ranged from 143 g/l in May to 169 g/l in August (Fig. 4). The water level varied from 24.9 to 25.5 m a.s.l. The lowest was in August and the highest was in May (data by Ermakhanov and Mangistau Bioresource Company). Only one zooplankton species – brine shrimp *Artemia parthenogenetica* was numerous. One zoobenthos species was abundant from: halophilic larvae of *Chironomus salinarius* (Micklin, Aladin and Plotnikov, 2014, Chap. 6). Fish are absent in Chernyshov Bay due to high salinity (Ermakhanov et al., 2012).

Salinity in the New Central Aral Sea varied from 6 g/l to 77 g/l. The lowest salinity was observed in May near the Kokaral dam and the highest in August near the connection to Tsche-Bas Bay. Zooplankton, zoobenthos and fishes were studied only in these two places. The New Central Aral Sea compared with the described parts of Aral is studied very poorly and more studies are needed to be done as soon as possible.

Preliminary results from the recent work on the New Central Aral Sea are as follows. Biodiversity of zooplankton, zoobenthos and fishes are the highest near the Kokaral dam. Three Rotifer species were numerous: *Keratella quadrata*, *Brachionus plicatilis*, *Calanipeda aquaedulcis*. Four zoobenthos species were also abundant: *Hediste diversicolor*, *Chironomus plumosus*, *Syndosmya segmentum*, *Cyprideis torosa*. Nine commercial fish species that were quite common are: pike, bream, shemaya, carp, roach, wels, perch, zander, flounder. Biodiversity near the connection to Tsche-Bas Bay is the lowest. Abundant zooplankton species are: *Artemia parthenogenetica* and *Moina mongolica* from May till September, halophilic ciliate *Fabrea salina* from June till August. Only one commercial fish species, Black Sea flounder, was present in this part of the New Central Aral Sea but it was very rare and caught several times only in May-June.

From the above mentioned data collected this year (2014) from May till September the great practical and commercial importance is evident of all four Aral Sea areas in Kazakhstan: Small Aral Sea, Tsche-Bas Bay, Chernyshov Bay and New Central Aral Sea.

Major positive changes in the Small Aral Sea environment and in the Aral Sea fisheries happened immediately after the construction of

12th International Conference on Salt Lake Research: summary and analysis

Kokaral dam in the Berg strait. Today local people and the Kazakhstan Government are discussing the idea to improve this dike. We are supporting this discussion and we advise to raise the dike from 42-43 meters above ocean level to up to 46-48 meters as it was advised earlier by us in 1992.

We also propose to build two more dams (Figure 2) in addition to this (A) Central dam. The Northern dam (B) could be placed at the entrance to the Bolshoy Sarychaganak Bay near Trekhgorka, which literally means three peaks in English. A canal from Kamyslibash Lake to Bolshoy Sarychaganak Bay is also required. The dam should be 49-50 meters a.s.l. The Southern dam (C) could be built at the southern edge of the New Central Aral Sea where it joins the Tsche-Bas Bay. This dam will allow keeping in the Republic of Kazakhstan water that is flowing over the Kokaral dam via its spillway rather than let a part of it flow southward into the now dry Eastern Basin of the Large Aral. However, this proposal needs detailed ecologic, engineering, and economic analysis before going forward with it. The Aral Sea in Kazakhstan in the future should have three levels: 1). 49-50 m a.s.l. with freshwater ecosystem, 2). about 42-48 m a.s.l. with brackish water ecosystem, and 3). about 29-32 m a.s.l. with marine-hyperhaline ecosystem.

This paper is dedicated to the memory of Dr. Sandeep Joshi, Director of SERI (India) who passed away on 23rd September 2014 in Delhi due to sudden cardiac arrest.

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The 12th International Conference on Salt Lake Research was successfully held from July 14 to 18, 2014 in China. The conference was jointly organized by the International Society for Salt Lake Research (ISSLR) and Research and Development Center for Saline Lake and Epithermal Deposit of the Institute of Mineral Resources (Chinese Academy of Geological Sciences).

Since the First International Conference on Salt Lake Research held in Australia in 1979, about every three years, salt lake researchers have met in international conferences in various countries rich in both salt lakes and scientific interests in saline lakes. The informal group of scientists that organized the meetings was renamed the International Society of Salt Lake Research in 1994 and was officially registered as society in 2000.

The conference was opened with plenary talks by Dr. Aharon Oren (Israel) and Dr. Mianping Zheng (China). During the following five days, the participants focused on limnology, sedimentology, geology, geochemistry, biology, ecology, management and conservation issues of such saline lakes. They presented about 100 talks and a similar number of posters. The topical sessions were organized on the 1) Global Change and Salt Lake Record; 2) Salt Lake Ecology and Biological Resources; 3) Geochemistry and Biochemistry; 4) Salt Lakes, Surrounding Environments and Environmental Management; 5) Salt Geology and Resource Prospection; 6) Chemistry and Chemical Engineering; and 7) General Issues.

The detailed overview of the conference is not necessary as the extended abstracts of the conference were published in the Acta Geologica Sinica (Vol. 88, Supp. 1, 2014). Selected papers presented at the Meeting will be published in the proceedings of the conference in special issues of the Chinese Science Bulletin and the Chinese Journal of Oceanology and Limnology. It is worth mentioning the winners of Bill Williams awards for the best young scientists talk and poster. Awards were established to keep the memory on the founder of ISSLR, outstanding salt lake scientist Bill Williams (Australia). This year the winners were: Luo Jiaoyu from Anhui Institute of Optics and Fine Mechanism (Chinese Academy of Sciences), for the poster "Preliminary measurements of boundary layer reactive halogens based on MAX-DOAS technique over Salt Lake in West China" and Wang Shuli from the Institute of Mineral Resources (Chinese Academy



Photo 1. Opening ceremony



Photo 2. The President of the ISSLR Prof. Aharon Oren presents Bill Williams awards to young scientists: Luo Jiaoyu (best poster, left) and Wang Shuli (best talk, right).

of Geological Sciences), for the talk “The Cambrian Brine Origin in Tianba County, Chongqing City, China.” The conference was dominated by geology and paleolimnology, chemistry and chemical engineering talks. This is quite understandable as China’s vast present and former saline lake resources are used for salt extraction and processing. The post conference field trip to Quinxai-Tibet province with the visit to several salt extraction plants confirmed the trend. The salt lake resources discovered by Chinese scientists in previous years are now the basis for the growing economy of the extensive region. This development reminds one of the Soviet industrialization in the 1930s, when all efforts of the society, from science to art and ideology, were directed toward the economic development and transformation of the country.

The dominance of geological and engineering topics at the conference can be only partly related to the national priorities. Saline lake research in general is quite different from its freshwater aquatic counterparts. It is worth remembering a recent publication by the president of American Society for Limnology and Oceanography (ASLO) John A. Downing (Downing, 2014). In his paper “Limnology and Oceanography: two estranged twins reuniting by global change” he discusses the differences between these two branches of aquatic sciences.

“Limnology and Oceanography” is often considered as a brand that combines various aquatic sciences into one discipline. In spite of a number of general problems and concepts, the fields are still quite separate. Oceanography, from the point of view of inland water researchers, is a healthy, wealthy and self-sufficient and vast area of research. As it was demonstrated, sea and ocean scientific papers have rarely cited inland water studies (Kavanaugh et al., 2013). The scale of the ocean/sea ecosystems and their significance to mankind (global climate system/global carbon cycles/aquatic resources) automatically make this area of research important and well-funded. Inland water research is considered less valuable. There is less money, the ecosystems are smaller, and the journals are not so prestigious. Inland water research papers very often cite ocean/sea research (probably they hope to catch the attention of the ‘big brother’, but there is no response.

However, the picture can be even more complicated if we divide the inland waters into saline and freshwater. In this case, we can talk about triplets – an old and respectful oceanography, a younger but ambitious freshwater research, and a small and lagging behind saline research. We have scanned the programs of the recent SIL (Budapest, 2013) and ASLO (New Orleans, 2013) meetings. Out of almost 400 talks and posters at the SIL meeting only about 10 concerned-

salt lakes/marshes. A similar proportion was observed for the ASLO meeting – about 60 «saline lakes/marshes» presentations out of 1700 presented at the conference. This 2-3% strictly (and probably just coincidentally) matches the proportion of “salt/saline lake” papers in the Web of Science compared with “sea/ocean” and “lake” counts (in 2013 there were about 30000 “sea/ocean” papers, 9000 – “lake” papers and 1100-1200 “salt/saline lake” papers). Such a ratio is disappointing as the per cent of saline lakes out of total water on the earth is just slightly lower (0.0006) than the per cent of freshwater ones (0.0008) (Williams, 1998). Nevertheless, the result is that for those who study the sea/ocean, salt lakes are just small lakes; freshwater researchers consider saline lakes not relevant for their research, as they are saline. Being somewhere between saline open waters and inland freshwater lakes, salt lakes finally get less attention.

Zadereev blogged at www.saltlakescience.com the brief analysis of saline lake publication activity for three consecutive years (2011-2013), the trendy topics were the organisms that live in extreme environments (usually in hypersaline or anoxic habitats); paleolimnology and reconstruction of the historical levels of salt lakes; geochemistry and salt engineering. Out of these three trendy topics, two were well presented at the 12th International Conference on Salt Lake Research.

What are the missing areas of research that might be of great interest to the wider scientific community? There are two topics that should probably get more attention.

What is specific for salt lakes is that water in these lakes is salty. This is true, but the statement needs explaining. There are two main factors that control water density in aquatic ecosystems – temperature and salinity. The stable or temporal variations in density between different water masses (vertically and/or horizontally) are the drivers for many hydrophysical and related ecological processes. Currents, stratifications, internal waves, turbulence, seiches, low oxygen (or anoxic) zones – the list of phenomena can be expanded. All these are of great importance for any large volume of salty water (ocean or sea). All this is present in any smaller saline volume of water (lake). There is no approach or theory to scale processes from lakes to the ocean. However, a small saline lake with internal waves, stratification, and a low oxygen zone is easier (and cheaper) to study comprehensively than the much larger oceans. We believe that those who want to understand hydrophysics in the ocean might get good answers and comprehensive understanding of the processes by studying small saline lakes as models of the bigger water bodies.

Saline lakes are very sensitive to climatic variations. Located in arid climates they depend on the amount of precipitation/run off and the rate of evaporation and can change in size and volume in a relatively short time. The examples of the Aral Sea (see pages 8, 9 and 10 in this newsletter), Lake Urmia and the Dead Sea shrinking or expanding (in the past) are well known not only because of intense scientific research but also because of mass media attention. Variations in lake levels/volumes lead to changing salinity that shapes the biology of lakes. These changes can be dramatic both in terms of severity (the variation of salinity from several grams per liter to hundreds of grams per liter) and rate (the significant change in salinity can happen just in a few years). Even though these changes are evident and very often recorded, it seems that they are not explicitly analyzed. Rapidly changing in volume and salinity, salt lakes are perfect natural laboratories that demonstrate how the food web and regional species pool adapt to this environment. The ecological concepts of stability, resilience, steady state, and adaptation

The 8th International Shallow Lakes Conference: October 12-17 2014, Antalya (Turkey)

The 8th triennial international shallow lakes conference, *Ecology of Shallow Lakes in a Fast-Changing World*, was held from October 12 to 17, 2014, in Antalya, Turkey. The previous shallow lakes conferences have been held in different parts of the world: 7th International Shallow Lake Conference at Wuxi (China, April 24-28, 2011); 6th at Punta del Este (Uruguay, 23-28 November, 2008); 5th at Dalfsen (The Netherlands, 5-9 June, 2005), 4th at Balatonfüred (Hungary, 25-30. May 2002), 3rd at Blossin near Berlin (Germany, 3- 8 August, 1998), 2nd at Mikolajki (Poland, 20-26 August, 1995) and the 1st at Silkeborg (Denmark, 16-20 August, 1992).

The present shallow lakes conference, the third such meeting held outside Europe, was organized by Meryem Beklioğlu in Akka Antedon, a 5-star hotel situated in Beldibi region of Antalya. Though most participants resided at the hotel during the session, there were also options to stay at nearby hotels. The conference was attended by >300 participants from 34 countries (Photo 1). The largest number of participants were from Hungary, Brazil and Mexico constituting, 20% of the attendees. The conference opening ceremony was held on Sunday the 12th October 2014 with introduction to the symposium by Beklioğlu. In an interesting departure from the usual practise, this conference had plenary talks by both junior and senior researchers.

In all, there were 8 plenary talks (Erik Jeppesen, Denmark) (Trophic structure and metabolism); Luc De Meester (Belgium) (Ecological and evolutionary responses); Meryem Beklioğlu (Turkey) (Water level and salinity changes); Kendra Spence Cheruvilil (USA) (Landscape limnology); John Smol (Canada) (Paleoecology); Laurence Carvalho (UK) (Ecosystem services); Dennis Trolle (Denmark) (Mathematical models) and Brian Moss (UK) (Closing Remarks of Shallow Lakes 2014). In addition, there were two informal activities; a discussion and a workshop during the lunch breaks by Brian Moss (Future of shallow lake research) and by Kendra Spence Cheruvilil (Collaborative Research Teams), respectively.

Some of the highlights of plenary talks may be helpful for those who could not attend the meeting. Jeppesen's talk concerned lake metabolism. Ecosystem functions such as primary production and respiration are strongly affected by light regime, nutrient status, and temperature. Based on empirical data as well as data from climate warming and space-for-time experiments, Jeppesen mentioned how some of the ecosystem functions differ between shallow lakes in turbid and clear states. De Meester emphasized that shallow lakes and ponds offer good model systems to explore the eco-evolutionary interactions under field conditions. He showed evidence for rapid local genetic adaptation using *Daphnia* as a model, explore its implications for community composition in a meta-community and landscape genetic structure. Beklioğlu discussed the role of water level fluctuations in shallow lakes based on regional climatic conditions and anthropogenic changes including irrigation activities. She also mentioned the relevant features from the latest report of Intergovernmental Panel on Climate Change, which documented the unprecedented global changes in temperature and precipitation patterns. Cheruvilil opined the need for the development of a broad, landscape perspective, which considers lakes as hierarchical systems. Smol mentioned a few case studies assessing the long-term effects of multiple stressors in shallow lake ecosystems. He also highlighted the issues related to climatic change and blending archaeology with paleolimnology. Carvalho elaborated the concept of ecosystem services. He presented a case study of Loch Leven (Scotland) with the relationships between freshwater biodiversity and the



Photo 3. The field trip to Quinxai province. At the drilling site of the Institute of Mineral Resources (Chinese Academy of Geological Sciences) where geologists are extracting ca. 3000 meter core to study the geology and sedimentary history of the region.

can be tested and probably defined more precisely by studying such systems.

The next International Conference on Salt Lake Research will be held in three years. The meeting in Beijing demonstrated that the community of salt lake scientists is strong and growing in numbers. The contacts with the global saline system (ocean/sea) scientists and theoretical biologists should strengthen the field. Let us hope that in 2017, we will have another great conference!

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Photo 1. Group photo of Participants of the 8th International Shallow lakes Meeting.

lake ecosystem services. Trolle addressed some of the recent advances in aquatic ecosystem modelling, especially with the proliferation of toxin-producing cyanobacteria in lakes, and the ability of the models to project effects of climatic changes. He also stressed the need for international collaboration for the development of robust ecosystem models.

The regular technical sessions, both oral and poster, started on Monday (13th October) onwards. There were 3 parallel sessions in lecture halls, which were located nearby. The oral sessions were well-organized with specific theme and aptly chosen chairpersons. In all, there were 14 Oral and 2 Poster sessions. The oral sessions had about 115 presentations in total while there were 100 poster presentations. The oral sessions on Monday had three themes (*Restoration, conservation, recovery and sustainability; Structures function and metabolism of polar temperate subtropical tropical and arid ecosystems; Interactions adaptations and evolution of organisms; and Biodiversity and invasive species*) that had > 20 presentations per theme. There was also a session on new methods.

On the last day of the Conference (Friday), Brain Moss critically reviewed the works presented during the symposium and identified lacunae in our understanding of the role of shallow lakes in general limnology. According to him, (i) experimental studies, capable of revealing mechanisms, declined but were replaced by observational studies and (ii) European freshwater lake research has been largely guided by Water Framework Directive. He also cautioned against the excessive use of models in predicting lake physico-chemical variables such as temperature and nutrient dynamics.

Towards the end of the meeting, Beklioglu announced that, as in the previous conferences, the selected peer-reviewed papers from both oral and poster presentations will be considered for publication in the *Hydrobiologia*.

The venue of the 9th International Shallow Lakes Conference in 2017 was also discussed during the Friday. The scientific committee received proposals from Mexico, Estonia and Germany. It decided to offer the opportunity to host the 9th Meeting for Mexico for the year 2017 (S.S.S. Sarma & S. Nandini for organising the event). The City for the 2017 Shallow Lakes Meeting in Mexico will be decided during early 2015 and will be announced in *SIL News*. Brazil has opted to host the 10th Shallow Lakes Conference in 2020.

There were adequate social activities during the conference: *Latin Dance Night* (Monday), *Beach Party* (Tuesday) and *Gala Dinner*

(Thursday) kept the participants cheerful. For the Mid-Conference Excursion (full Wednesday), the participants were given the option to visit one of the four sites: Termessos - Duden and Kurşunlu Waterfalls; Perge – Aspendos - Köprülü Canyon Tour, Phaselis – Olympus - Yanartas Tour and Lake Avlan, Arycanda and Highland Wandering. These tours were excellent and allowed the participants to have a glimpse of the wonderful countryside and history of Turkey.

Because of the large number of participants (about 300), it was necessary to employ full time agencies that are specialized in conference organization. Beklioglu utilized the services of *ARBOR Professional Congress Services*, an Ankara-based Turkish Agency who organized the meeting very well. All in all, the Shallow Lakes Meeting in Turkey was a memorable one for all the academic (and not so academic) interactions that the participants enjoyed.

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The 10th International Cladocera Symposium, a Report (28th September-3rd October, 2014)

The 10th International Cladocera Symposium was held from 28th September to 3rd October 2014 at the historical town Lednice (Czech Republic), a UNESCO World Heritage Site. The meeting was attended by 124 participants representing 30 countries (Photo 1). Almost 30% of the participants were from Russia and Poland, both countries with 18 each. The main organizer of the event, Dr. Adam Petrussek initiated the Symposium proceedings with registration and an informal get together on the evening of 28th of September 2014 in the spacious Raroque Riding Hall of the Lednice Chateau. All sessions and the gala dinner were held in this hall. The participants were comfortably accommodated in the nearby hotels.

The scientific sessions consisted of invited talks, oral and poster presentations. In the inaugural presentation on Monday the 29th September, Dr. Petrussek mentioned some historical aspects relating the previous Cladocera meetings. Thereafter, regular oral sessions were opened. The first invited talk, a keynote address, was presented on Tuesday, the second day of the symposium, by Dr. Luc De Meester (Belgium) on *Eco-evolutionary dynamics featuring Daphnia and other cladoceran zooplankton*. In this keynote address, De Meester talked about the existing evidence that *Daphnia* populations can genetically adapt to local environmental conditions within relatively short time spans. Using the conceptual framework he also showed how this affects metapopulation and metacommunity structure. This presentation lasted about an hour including a brief discussion. The second invited talk / keynote address was given by Dr. Michael Lynch on the fourth day of the meeting; it was related to *The 5000 Daphnia pulex Genomes Project*. Dr. Lynch mentioned the recent advances in the ecological and evolutionary genomics of *Daphnia pulex*. He highlighted the current project to sequence the genomes of 96 genotypes from 50 populations. The project aimed to address some complex problems, including, but not limited to the genomic consequences of the loss of meiosis, the origins of introns, and the impact of long term population bottlenecks.

There were 16 sessions in all (12 oral sessions, 2 poster sessions and 2 poster talk sessions, about 115 presentations). The poster talks allowed only 2 minutes per talk. The poster sessions were lively and interactive where



Photo 1: Group photo showing most of the participants of the 10th International Cladocera Symposium.

the young scientists had the opportunity to extensively interact with senior researchers. Dr. Vladimír Kořínek (Emeritus Professor, Charles University, Prague), one of the oldest cladoceran researcher of Czech Republic also attended the symposium (Photo 2).

The sessions had diverse themes ranging from, but not limited to Morphology, Taxonomy, Systematics, Molecular and Evolutionary aspects, Body Size, Food and Feeding habits, Predator-Prey interactions, Community structure, Parasitism, Paleolimnology and Toxic effects of cyanobacteria and man-made chemicals. Though diverse themes were presented in the meeting, a few of them did not receive adequate representation. There was a distinct bias towards *Daphnia* in all the themes discussed during the meeting, including keynote addresses and oral presentations. Interestingly, the family Daphniidae is neither rich in diversity of genera (5 genera only) nor in species (120+ species) compared with Chydoridae, which contains 49 genera and 269 species (Forró et al., 1998). The increased attention of the world's cladocerotologists during this meeting to *Daphnia* is possibly due to the ease with which this genus can be cultured and the large database of information available on it. A quantitative analysis of the presentations shows the following trends:

- More than 40% of the works contained *Daphnia* as the key word
- Cladoceran species diversity, including new records and range extensions contributed to about 15% of the studies presented
- Research works involving life history traits, molecular genetics & evolution and toxicity evaluations comprised 10% each of the total presentations
- Morphology & Systematics and cyanobacterial effects on feeding and reproduction together contributed to about 15% of the talks.

Biochemical affects, nutrition studies, role of infochemicals, vertical migration, parasitic infections and interaction of cladocerans with other zooplankters (e.g. copepods and rotifers) received little attention.

The present Symposium contributed significantly towards the molecular and evolutionary aspects of *Daphnia* species and Cladocera diversity in diverse water-bodies around the world. It also left a gap in improving our understanding of the functional role of cladocerans in freshwater ecosystems due to low representation of such works in the meeting. We hope that next symposium (to be organised by Max Rabus

and Christian LaForsche (Ludwig-Maximilians-University, Munich in 2017) would fulfil these requirements.

On Tuesday evening we had a guided tour of the Lednice Chateau. The second mid-conference excursion was organized the next afternoon with a choice to attend one of the three sites: (1) historical town of Mikulov; (2) hike across the limestone Pálava hills; and (3) bird-watching in the nearby landscape. In addition, there were daily activities that included excursions for the accompanying persons.

As in some previous Cladocera symposia, the student presentations, both oral and technical, were evaluated by different committees, each with 3-4 senior workers to recommend the awards of best presentations. The results of the winners were announced at the Gala Dinner on Thursday: for oral presentations: Liron Goren (Israel), Katie Sirianni (USA) and Sven Teurlinckx (The Netherlands) and for posters: Bernard Wolfschoon Ribeiro (Germany), Jacek Radzikowski (Poland), and Francisco Diogo Rocha Sousa (Brazil). During the symposium there was adequate time during coffee and lunch breaks for interactions among the participants, including possible collaboration with the *Daphnia pulex* Genome Project (Dr. Michael Lynch). The closing part of the symposium was a simple event in the Paroque



Photo 2: Dr. Vladimír Kořínek (Emeritus Professor, Charles University, Prague) and Dr. H.J. Dumont (Emeritus Professor, University of Ghent, Belgium) during the symposium.

Riding Hall on Friday afternoon when Dr. Petrusek thanked all the participants and those who helped him in realizing this pleasant and interesting symposium.

As a tradition for the Cladocera Symposia, the proceedings of this 10th meeting will also be published in *Hydrobiologia*, after a peer review of the papers submitted. Dr. Adam Petrusek, Dr. Veronika Sacherová and Dr. Piet Spaak will be guest editors for the Cladocera special issue in *Hydrobiologia*. The deadline for submitting the manuscripts is 20th December, 2014.

The professional conferences organizing agency (*The b.i.d. services*) offered the necessary administrative help including transport facilities to and from the Conference site. Overall, the conference was well organized and participants will have nice memories of this meeting as well as the beautiful Symposium venue.

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A report on the *B. plicatilis* species complex workshop

Cryptic Speciation in *Brachionus plicatilis*: A workshop to describe species within the complex

What's in a name? That which we call a rose by any other name would smell as sweet — The Bard

It is axiomatic that many studies of aquatic ecology begin with identification of specimens from a discrete community and assigning them to specific taxa. Depending on the taxon being considered this can be a serious obstacle because there is disparity in the application of criteria to use in diagnosing species. Here we address issues in phylum Rotifera, a group whose older literature is notorious for poorly written descriptions and scant documentation. Of course this has led to misidentification and confusion. Recently a working group has begun to rectify this situation by establishing a candidate list of available names (LAN) for Rotifera (Segers et al. 2012). Nevertheless, other practical problems exist in rotifer identification.

While we recognize the biological species concept (BSC) as a useful criterion, its application for rotifers is often impossible. Of course, what remains is identification based on morphology (alpha-taxonomy) (Koste and Shiel 1989) coupled with ecological data and/or genetic data. Regrettably, recognition of subtle variations in morphology has complicated this task, frustrating taxonomists to extremes.

In rotifers the best characteristics for species identification are overall morphology coupled with details of their jaws (trophi) structure. Indeed features of the trophi can be so unique that families, and genera, and even species may be identified simply by careful examination. Unfortunately, a critical character described by one worker to separate species may amount to intraspecific variability to another. Indeed, during the first few meetings of the International Rotifer Symposium (IRS) time was set aside for consulta-

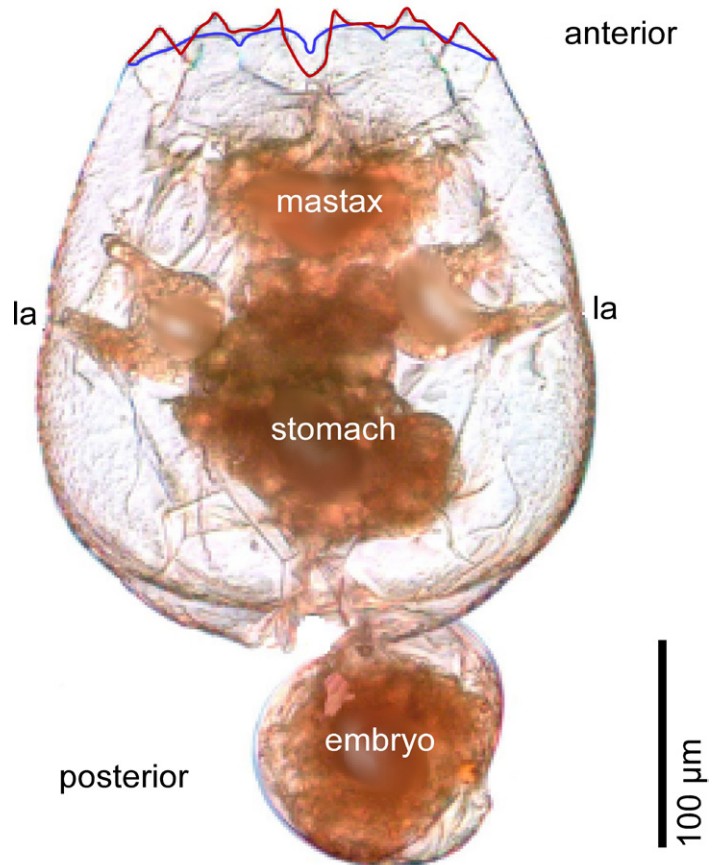


Figure 1. An example of a specimen from the *Brachionus plicatilis* complex (ventral view). Overall body size and shape, and shape of the dorsal (margin highlighted in red) and ventral anterior spines (margin highlighted in blue), as well as morphology of the trophi are critical in species diagnosis. Photograph from Mills (2006).

tion about specimens that were particularly difficult to identify. Exactly what characteristics warranted a new species designation has been a recurring theme in all of the IRS. Yet, morphology remained our *lingua franca* for species diagnosis.

Within Rotifera, genus *Brachionus* comprises ~75 species (Segers 2007), with similar characteristics: small (<500 μm); loricate; free-swimming; malleate trophi. *Brachionus plicatilis* has been particularly valuable because of its use in aquaculture and eco-toxicological studies. This species represents the quintessential morphological species problem: do subtle variations in morphology represent different species or phenotypic variation (Fig. 1)? Up until the 7th IRS, different strains of *B. plicatilis* used in aquaculture were considered to belong to two morphological variants: L- and S-types. However, based on detailed analysis of existing data Segers (1995) concluded that these forms were separate species: *B. plicatilis* O. F. Müller, 1786 and *B. rotundiformis* Tschugunoff, 1921, respectively. Our understanding of these taxa was improved by designating additional species (Ciros-Pérez et al. 2001). Yet the matter was not settled. Additional species have been added to the *B. plicatilis* complex (Fontaneto et al. 2007) and because others are present within the complex, the debate continues (Alcántara-Rodríguez et al. 2012, Malekzadeh-Viayeh et al. 2014). In the most recent IRS it was suggested that a workshop should be held before the next one to address the *B. plicatilis* species complex question, and to work towards a functioning nomenclatural tool for the recognized species in the group. Elizabeth Walsh volunteered to host the workshop, which was held on the campus of the University of Texas at El Paso 5–10 August 2014. A

total of 26 people from six countries took part in the workshop, which had five purposes.

1. Review the history of the *B. plicatilis* species complex problem and the nomenclature of the *Brachionus plicatilis* group.
2. Reconstruct phylogenetic relationships using mtDNA COI and ribosomal ITS1 sequence data and conduct tests of DNA taxonomy to determine phylogenetically distinct lineages.
3. Analyze the morphology of trophi and loricas from geographic isolates of *B. plicatilis* from across the globe using scanning electron microscopy to identify fine morphological variability among putative cryptic species.
4. Train the participants in preparation of permanent whole mounts of fixed specimens; for all putative new species prepare permanent slides to serve as type specimens.
5. Begin formal descriptions of the unnamed species, as identified based on the morphology of their trophi and loricas, as well as their COI and ITS1 phylogenetic lineages.

The workshop included several presentations. Elizabeth Walsh and Scott Mills provided a short introduction to the *B. plicatilis* taxonomic problem. Hendrik Segers made several presentations on how to describe and name species, as well as tips for publishing species descriptions. Diego Fontaneto presented on biogeography, molecular phylogenetics, and how metagenetics can be applied to rotifers and other small taxa. Hendrik Segers also spoke about the Intergovernmental Panel on Biodiversity and Ecosystem Services and Scott Mills provided an overview of simple, inexpensive technologies for aquatic studies that can be made from 'off-the-shelf' electronics. The major product of the workshop will be a manuscript that describes new species within the *B. plicatilis* complex. Another outcome of the workshop is the creation of a general protocol for additional workshops to address other problematic species: chief among them would be a close examination of the *B. calyciflorus* species complex (Xiang et al. 2011). We hope that this overview of the *B. plicatilis* species complex workshop will be useful to researchers planning similar workshops on other taxa.

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Jorge Ciro-Pérez
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Scott Mills
Hendrik Segers
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A Report on the Worlds Lake Conference (1-5 September 2014): *The Mirror of the Earth* *Balancing Ecosystem Integrity and Human Well* *being, Perugia, Italy*

The World Lake Conference celebrated its thirtieth anniversary in Perugia, Italy, during September 1-5, 2014 under the title *LAKES: The Mirrors of the Earth - Balancing Ecosystem Integrity and Human Wellbeing*. 791 delegates from 45 countries in 5 continents attended the meeting convened by the Umbria Scientific Meeting Association (USMA – www.usma2007.it) and the International Lake Environment Committee Foundation (ILEC – www.ilec.or.jp/en), and contributed 450 presentations in 36 sessions, under 8 main themes spanning from biological to governance issues, which were run in parallel during four days. During the Conference, several art exhibitions related to lakes and to their fundamental role in human, cultural and social development were opened to the delegates and to the Perugia citizens. A beautiful scientific exhibition on freshwater shells worldwide was also set up to increase the awareness of school students and citizens on the importance of biodiversity.

On September 3, technical excursions were conducted and the delegates had the chance to visit the Lake Trasimeno, an historically and economically important shallow lake close to Perugia, and the Marmore Waterfall, a 165 m high artificial cascade built by the Old Romans about 2,300 years ago to drain some wetlands and reclaim the area for agriculture, now used for hydro power plants.

The Conference opened with a plenary lecture given by András Szollosi-Nagy, the Rector of the UNESCO-IHE Institute for Water Education

in Delft, the Netherlands. In his speech, key issues related to water scarcity and uneven distribution of the freshwater resources, to the conflicts generated by the need to access freshwater, and to the urgent need to find a way to increase the resilience of the global freshwater system through a fully shared governance were appealed to the audience.

These issues were further discussed during the International Policy Forum held on September 2, which was attended by government representatives from Kenya, Japan, India, Indonesia, Mexico and Italy. The main outcome of the discussion was the need to focus the global water debate on the importance of lakes and on the challenges of their sustainable management and use. Governance practice based on the Integrated Lake Basin Management (ILBM –www.ilec.or.jp/en/activity) based on participatory actions involved Institutions, Policies, Participation, Technology, Information and Finance.

The Local Policy Forum gave an opportunity to citizens directly and actively involved in the management of Lake Trasimeno, Italy, and Lake Biwa, Japan, to meet and to share experiences. From the beginning of the discussion, it appeared that the interests of citizens (the need for clean and safe water and food, and for a sustainable exploitation of water resources) are the same everywhere in the world and citizens have often to provide for what the governments are unable to offer. An alarming gap between citizens' needs and current politics was the main outcome of the meeting.

“Healthy food from healthy lake” was the main theme for one of the side events of the Conference, at which event some medical scientists demonstrated how an healthy diet, favoring local and seasonal products, is of paramount importance in preventing diseases such as diabetes, auto-immune syndromes and infertility, increasingly affecting the “developed” countries.

Cultural aspects of lakes as promoters of human technical and cultural development were also discussed in the sessions open to historians and landscape architects.

A special workshop on legal aspects of freshwater management was held to discuss issues related to national legislations and management of transboundary waters.

All the themes discussed at the Conference were summarized, as usually done in the series of World Lake Conferences, in a Declaration from the participants (the Perugia Declaration) containing a list of messages addressed to governments and decision-makers. Here, we would like to quote one of the premises that accompanies the Perugia Declaration:

“...the Conference participants manifest this declaration of Perugia, and hereby:

Acknowledge that freshwater is fundamental for all life, finite in quantity, extremely vulnerable to human activities, and irreplaceable in its many uses;

....

Are deeply concerned about the increasingly consumptive attitude of civil society throughout the world, and the impacts this trend can exert globally on the integrity of the aquatic ecosystem services that support and enrich human culture and livelihoods;”

The Conference was closed by a presentation given by Prof. Balthasar Kambuaya, Minister of the Environment of the Republic of Indonesia. The Minister introduced the rich lake heritage of Indonesia to the audience and officially announced that Indonesia will host the 16th World Conference in two years.

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Rewilding Limnology

‘Rewilding’ is a term bandied about in terrestrial ecology, but I have not yet heard freshwater ecologists use it. In its original meaning (like all bold concepts it has become watered down to meet particular preferences) it is an approach to conservation where the former large mammals (or their nearest equivalents) have been reintroduced to large enough tracts of land, and the system then left to manage itself. It has been achieved in parts of Africa, where new game reserves have been established, but the closest in Europe has been the Oostvaardersplassen in the Netherlands, where Heck cattle, Konik ponies, roe and red deer, but not their wolf predators, have been introduced to a reclaimed coastal area, about 52 km² in size, that was intended for agriculture but proved unsuitable. The lack of large predators means that some management is needed, but it is much less than the finicky gardening needed for most of the usually far-too-small nature reserves that we are largely left with in Europe, and indeed central and eastern North America. The biodiversity of the Oostvaardersplassen has become spectacular and the rewilding concept raises the issue of just how abnormal are the lakes and rivers on which most of our conventional wisdom of limnology is based.

I have had a chance to look at a floodplain system in Tanzania, with a set of shallow lakes, which has not been engineered in any way. Its river, the Rufiji, shows all the geomorphology of the seasonal flood pulse; its lakes, Tagalala, Manzi, Nzerekela, Siwandu and Mzizima, all unknown to published limnology, rise in the wet season and fall in the dry, leaving still substantial water bodies surrounded by mud flats. The outlines of the lakes change with the violence of the flood so that tracts of once savannah woodland are sometimes flooded, leaving dead trees on which the vultures and fish eagles perch, whilst sometime mudflats are left dry and regain their land vegetation.

To windward, the edges of the lakes show scums of cyanobacteria; the water appears turbid in satellite photographs; there are no windrows of dislodged submerged plants and the littoral is bare bar some floating water lettuce (*Pistia stratiotes*). A huge variety and abundance of herons, egrets, plovers, hammerkop, spoonbill, ibis, storks and other waders jostles the shorelines, especially of the smaller lakes and bays, clearly finding a richness of invertebrates on which to feed. That productivity is seen too in the crocodiles and the pelicans (Fig. 1) and the insistence of the local guides that tiger fish are abundant. Yet the catchment of the Rufiji, an area the size of Switzerland or Denmark, is entirely



Fig. 1: Flocks of two species of pelican (the great white and the pink-backed) and of African open billed stork) occupy a corner of Lake Manzi, whilst the crocodiles wait in the foreground, partly camouflaged by water lettuce.



Fig. 2 Hippos forage on land, mostly by night, returning to the water at dawn and contributing large quantities of nutrients in their faeces.

undeveloped with no agriculture or settlements, beyond a very few safari camps, whose total nutrient load cannot add up to more than that of a handful of the hundreds of hippopotami that bask in the waters. The catchment has grasslands, thickets and sparse woodlands, with dry streambeds beyond the main river channels; nutrients cannot run off for most of the year into these isolated lakes and our knowledge of natural vegetation suggests that nutrient loading from it will never be high, even when the rain is falling. Yet these lakes (perhaps, with those of the Poles and remoter tundras and boreal forests, the closest to pristine of anywhere) show the characteristics that we would associate with a lake that we would call degraded and hypertrophic in the north temperate region and which we would seek to 'restore'.

Limnology done from a vehicle, because the lions and the over-nervous guides discourage a closer look, has its limitations, but the source of the nutrients seems clear. By night the hippopotami move onto the land, bringing back, in the dawn, some tens of kilogrammes of dung from their night's grazing (Fig. 2). By day the need for water brings giraffe and impala, kudu, waterbuck, zebra, buffalo and elephant to cross the mudflats, leaving their abundant droppings as they go (Fig. 3). When, in the last century, large reservoirs like Kariba had been formed on Africa's other rivers, algal blooms often formed as the water levels rose and the dung of animals that had frequented the edges in the dry season was taken up into the waters (McLachlan, 1974). It is around the lake edges that most of the large mammals congregate and it is there that the lions make most of their kills (Spong, 2002), adding even more nutrients to the lakes' supply.

So how does this help us understand better our temperate zone limnology? Perhaps it alters it completely. We are familiar with the changes that agriculture and urbanisation have wrought and we seek to annul these effects by reducing nutrient loads. We have a concept of shallow lakes that prizes clear water and submerged plants. But perhaps this is just a modern fantasy, a construct born of our ordered and controlled garden mentality. Long ago we removed the herds of tarpan, aurochs and wizen from Europe, the bison and pronghorn from the lowlands of America. Earlier we had hunted out an even greater variety of large mammals from the continents (Martin, 1967; Rule et al., 2012). Long ago we tamed our floodplains, so that the rise and fall of the water in the most characteristic of our shallow lakes was no more. No longer



Fig. 3 Elephants take a daily mud-bath on the flats that surround Lake Nzerakela, amid dead trees killed by wet season floods in a system that continually changes.

are the mudflats exposed and the herds driven to risk their lives from the wolves in the fringing damp grasslands.

Of course water is not so scarce in northwestern Europe, but in central Europe and America, the river floodplains must have been as central to the survival of the natural system as they still are in parts of the tropics. There is plenty of evidence for key transfers of nutrients between land and water where the original mammal (and bird, and even fish) populations persist (Baxter et al., 2005; Bump et al., 2009; Cole et al., 2007; Fitkau, 1970; Helfield & Naiman, 2006; Moss & Leah, 1982; Naiman et al., 2002). Perhaps in our concept, for the Water Framework Directive in Europe, of 'high ecological quality', defined as 'no or negligible human influence', our current ideas, based on our only recent experience of a long depredated and deficient system, and our limited lifetimes, are vastly wide of the mark.

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