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NEWSLETTER

INTERNATIONAL LAKE ENVIRONMENT COMMITTEE FOUNDATION

— For Better Lake Management —

This Newsletter is also available in Japanese.

ILEC/UNEP International Training Course in Hungary

Trainees and Institute Staff

The "International Training Course on Limnological Bases of Lake Management" for developing and Central/East European countries was held at Tihany, Hungary, from 11 to 23 October 1993. Due to the success of the spring course (24 May - 5 June), which followed the 5th World Lake Conference, the second one was also financed by UNEP and ILEC with the co-operation of the Balaton Limnological Research Institute of the Hungarian Academy of Sciences. Some 21 trainees from Asia, Africa and Central/East European countries participated in the training course (7 from developing, 14 from eastern European countries).

The aim of the course was to provide basic limnological knowledge on the consequences of environmental deterioration and human impacts with special foucs on lake management theories and practices.

Course lectures were on:

(1) Management of fish stocks in lakes and reservoirs (P. Bíró, Hungary)
(2) Use of algae in water quality monitoring (J. Padisák, Hungary)
(3) Function of zooplankton in lake ecosystems (L. Cruz-Pizarro, Spain)
(4) Biological monitoring of water quality (J. Salánki, Hungary)
(5) Function of bacteria and bacterial activity in lake ecosystems (V. Straškrabá, Czech Rep.)
(6) Lake/Reservoir ecotechnology (M. Straškravá, Czech Rep.)
(7) Basic principles of eutrophication (V. Istvánovics, Hungary)
(8) Use of fish in monitoring water quality (J. Nemcsók, Hungary)
(9) The Great Lakes Ecosystems: A world heritage (M. Munawar, Canada)
(10) Water quality and lake management modeling (S.E. Jørgensen, Denmark)
(11) Biomanipulation in conservation and management of lakes (R. de Bernardi, Italy)
(12) Lake restoration - from dredging to biomanipulation (K. Petterson, Sweden)

Laboratory demonstrations (8 topics) completed the subjects every afternoon together with evening lectures/workshops. Two workshops were held by S.E. Jørgensen (Denmark) (Demonstration of models in lake

management) and by M. Munawar (Canada) (The emerging field of ecosystem health).

Laboratory demonstrations were given by Hungarian experts:

(1) Measuring phytopl anktonic primary production with ^{14}C.
(2) Microscopic examination of phytoplankton samples.
(3) Collection, processing and sorting planktonic and benthic invertebrates.
(4) Use of bivalves in monitoring water quality.
(5) Measuring bacterial productivity with ^{3}H, microscopic examination of planktonic bacteria.
(6) Preparation of samples for heavy metals
(7) Studies on size-structure and growth of fish populations.
(8) Measurement of the terminal electr on transport system (ETS) - activity of the plankton and sediments.

There were field trips to Kis-Balaton Reservoir and Lake Fertö (Neusiedler See). Kis-Balaton is a new reservoir with wetlands created for sediment and phosphorus removal getting into Lake Balaton, while Lake Fertö is a shallow alkaline lake mainly used for recreation and natural reserve.

The course was successful not just for training, but also for establishing personal contacts amongst the participants which will be continued in the form of co-operation.

This course widened the views of participants in both fields of basic limnological sciences and their application in the management and restoration of lakes/reservoirs and their living world. An overall wish and intention is to hold such courses on an annual basis in Central/Eastern Europe possibly at Tihany, Hungary.

by Dr. Péter Bíró (Secretary of the Training Course)

Training Course for Remote Sensing and GIS

Training Course Participants

The training course "Application of Remote Sensing and GIS for Environmental Management of Lakes and Lake Basins", was held under the joint sponsorship of UNEP and ILEC in collaboration with the Asian Institute of Technology (AIT) at the latter's offices in Bangkok, Thailand between 4 - 22 October 1993. Fifteen participants from 6 countries attended the course.

The main lecturers were Dr. Kam (UNCRD), Dr. Nakayama (Utsunomiya University), Dr. Jaquet (UNEP/GRID) and Dr. Schumann (European Space Agency/AIT). Lecturers from related organizations also participated in the course.

The training course was composed of lectures, computer exercises and field trips. Dr. Kam took charge of the first two weeks, giving outline lectures on remote sensing and GIS, computer exercises using IDRISI software and field trips to related areas. This method of using computer exercises and then visiting field sites was useful for participants in that it allowed them to compare theory and reality, and the subtle differences between them.

Participants looked at some case studies of actual lakes with reference to the limitation and application of remote sensing and GIS.

During his lectures Dr. Kam emphasized the most effective methods of using remote sensing and GIS. The course was an undoubted success, with all the participants appearing to be fully conversant on all the materials. Both lecturers and participants voiced a strong hope that more such UNEP/ILEC training courses would be conducted in the future.

BITEX-93 (Biwako Transport Experiment)

- A Multidisciplinary Approach to Water Quality Research -

BITEX-93 was a multi-international, inter-disciplinary experiment organized by Lake Biwa Research Institute, Japan and the Centre for Water Research, Australia, and sponsored by the Science and Technology Agency of Japan, the Local Government of Shiga Prefecture, and some Japanese companies with a strong interest in lake environmental problems.

The aim of this experiment was to examine the mechanisms of horizontal and vertical transport of mass, momentum and energy in Lake Biwa and to relate these mechanisms to the biogeochemical processes operating in the lake. The study covered the transition between the North and South basins, where the horizontal exchange and vertical mixing of water, dissolved and suspended nutrients and plankton take place most frequently. The long term strategy is to develop sustainable lake water quality management techniques.

The Lake Biwa Research Institute and the Centre for Water Research had, in combination, designed BITEX-93 which was held at Lake Biwa 21 August - 16 September, 1993. The experiment involved a large number of scientists from Japan, Australia, USA, Canada, China, Israel, Korea and Spain. It drew together for the first time some of the leading scientists in the field of water quality, and has resulted in a close-knit network of specialist expertise that can now be called upon for future environmental discussions and research problem-solving. This experiment also offered the opportunity to use state of the art modern water quality monitoring equipments. The four week study endeavored to understand the reasons for the growth patterns of blue-green algae in the lake, the transport of organic material between the South and the North basins, and the likely release of phosphorus and heavy metals from the deep sediments (redox chemistry). The data from the experiment will take a while to become available but the understanding and knowledge of the mixing processes acquired during this experiment will have wider practical applications to other water bodies experiencing similar problems around the world.

by Dr. Michio Kumagai

(Researcher, Lake Biwa Research Institute)

ILEC Activities in '93

January 3 - 7

Planning and Cooperation Meeting for Remote Sensing Training Course in Thailand

January 25 - March 25

3rd ILEC/JICA Lake Water Quality Management Training Course in Shiga

January 26 - 28

ILEC staff underwent UNEP/Database Raison Training in Shiga, with cooperation from NWR

February 28 - March 5

Mission to Italy for meeting concerning arrangement of the 5th World Lake Conference

February 28 - March 7

Mission to Canada for the Expert Meeting on GEMS/ Water project

March 1 - 6

Mission from Anhui Province, China welcomed

March 2 - 7

Mission to Canada for the meeting on Remote Sensing

March 4 - 11

Mission to Thailand on Environmental Education

March 5

Mission to Hungary for the meeting on UNEP/ILEC International Limnological Training Course

March 7 - 10

Mission from Yunnan Province welcomed

May 8 - June 6

Fact finding mission to Africa and Europe on lake related international cooperation projects

May 10 - 21

Mission to the 17th UNEP Governing Council

May 16 - 21

The 1st UNEP/ILEC International Training Course on Limnological Basis of Lake Management at Tihany, Hungary

May 17 - 21

The 5th International Conference on the Conservation and Management of Lakes (World Lake Conference) at Stresa, Italy, organized by ILEC, Istituto Italiano di Idrobiologia, Istituto di Ricerca Sulle Acque, International Association on Water Quality

May
Guideline Book Vol. 5 on lake acidification published
June 4
Indonesian trainees from ICETT welcomed
June 9 - 14
Participation in Ramsar Conference in Hokkaido
June 9 - 17
Mission to Canada for the meeting on UNEP/GEMS Water Project
June 14 - 18
Mission from Thailand ERTC welcomed
June 21-25
Mission to Germany for UNEP/GEMS meeting on Early Warning
June 28-29
Participation in UNEP/GEMS Water Steering Committee meeting in Switzerland
July 17 - 19
Mission to Switzerland for the meeting on Remote Sensing
July 17 - August 4
Mission to Brazil on Environmental Education Project
July 25 - 31
Mission to Thailand for preparation of Remote Sensing Training Course
July
Guideline Book Vol. 1 (Japanese, French and Thai versions) published
August 2
Cooperation in "Lake Biwa Water Festival"
August 12
Ground-breaking Ceremony of UNEP International Environment Technology Center (IETC) office in Shiga
August 24
Mission from Rio Grande do Sul State, Brazil welcomed
September 11
Mission from the Dutch Environment Ministry welcomed
September 27
Mission from U.S. Environment Protection Agency welcomed
September
Guideline Book Vol. 1 (Spanish Version) published
October 4 - 22
Remote Sensing Training Course held in Thailand
October 5 - 17
Mission to Thailand and Ghana on Environmental Education
October 6
Mission from Rio Grande do Sul State, Brazil welcomed
October 11 - 23
The 2nd International Training Course on Limnological Basis of Lake Management at Tihany, Hungary
October 21
Fact finding mission to Vietnam for "Survey on the State of World Lakes"
November 2 - 24
Fact finding mission to southeast Asia for the state of lakes in developing countries
November 26
International Environmental Cooperation Forum, West Japan, the 2nd meeting held by ILEC in Otsu, Shiga
December 7-10
Cooperation in New Earth '93 Exhibition

Southeast Asia Wetland Management Training Needs Workshop

A Workshop on Training Needs for Wetland Conservation and Management in the Southeast Asian Region was held in Kuala Lumpur, Malaysia on 2 - 5 November 1993. It was organised by the Asian Wetland Bureau in association with the Institute of Advanced Studies (IPT) and the University of Malaya by mobilising funds from UNEP and WWF-International.

One specific aim of the workshop was to identify common regional problems to enable future planning and development of relevant training acitivities. Over twenty participants attended the course and countries represented included Cambodia, Malyasia, Philippines, Thailand, Indonesia and Vietnam. ILEC was also represented.

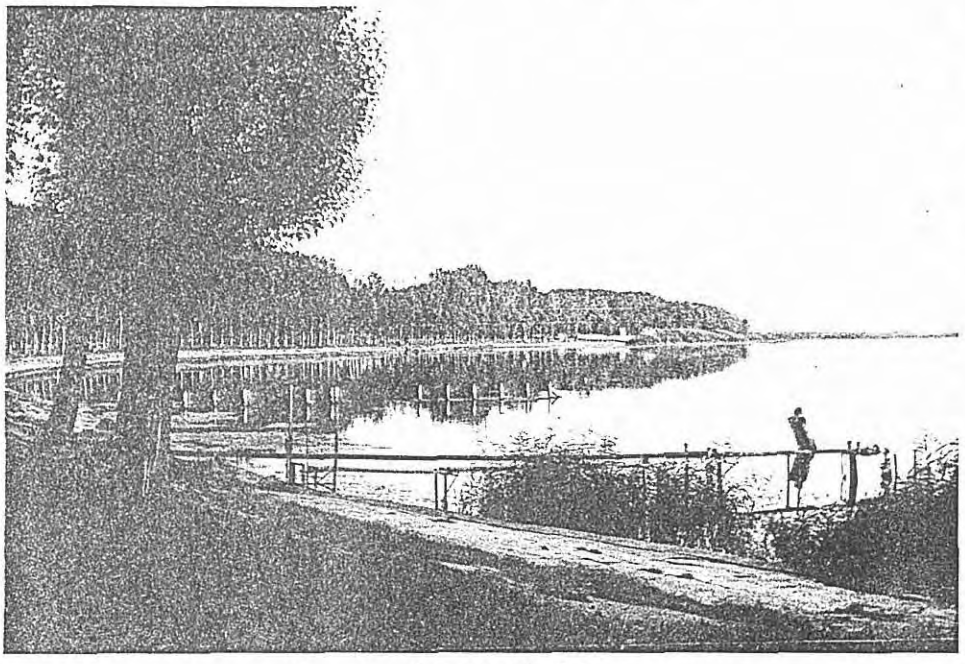
Papers were presented by each country with topics ranging from assessment and monitoring, community development and management, and wetland policy. Some of the points brought up for discussion included the significance of biological and water management functions of wetlands and the need for greater understanding of these functions by managers and engineers.

The proceedings and recommendations of the workshop will be available in January, 1994.

LAKES OF THE WORLD

SALINE THERAPEUTIC LAKES IN ROMANIA

by V.-A.C. Bulgreanu (Geologist engineer, Member of S.I.L. & I.C.S.L.R.)



Amara Lake

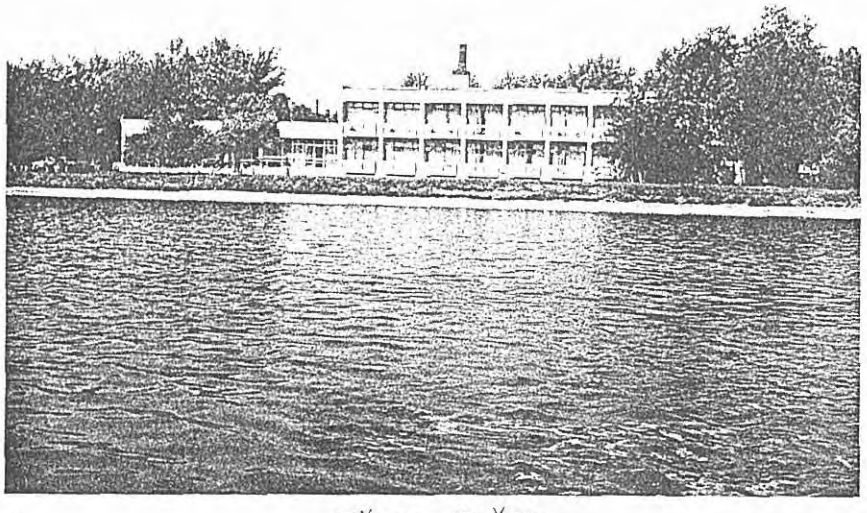
The lacustrine patrimony of Romania includes 2,300 natural lakes, most of them with freshwater; only ca. 90 are saline (TDS>3g/l). About 40 saline lakes are *pelogenous* (= they contain black and/or gray, unctuous, organic (sapropelic) muds with a minimum thickness of 1-2 cm). About half of these last are suitable to be exploited for therapeutic purposes, having adequate accumulations of salt water (over 0.5m max. depth) and organic, unctuous mud (usually over 10 cm thickness), and well - tested therapeutic qualities. The knowledge and empirical therapeutic use of saline lakes with or without sapropelic muds are very old; as an example, the saline lakes in Ocna Sibiului (Transilvania), seem to be used by bathers as early as in the Daco-Roman period (ca. 2,000 years ago). As concerns the muds, the beginning of their use is located in Balta Albă (a village on the shore of one of the biggest therapeutic saline lake in Romania) in 1840.

Among the most important salt pelogenous therapeutic lakes are Tekirghiol, Balta Albă, Sărat - Brăila, Amara and the lacustrine areas of Sovata, Ocna Sibiului, Ocna Sugatag and Slanic - Prahova. Some of these lakes have a marked stratification as seasonal heliothermy; sometimes (i.e. at the beginning of this century) the temperature of the metalimnetic water reached 70°C. The therapeutic qualities recommend them for the healing of various diseases mainly of rheumatic, traumatic, dermatologic and gynaecologic nature. The ways of curative administration are both *outdoor* (simply bathing in the lake water; open-air mud unctions followed, when dry, by immersion into salt lake water) and *indoor* (simply bathing into heated lake water; heated mud applications and mud + water baths within sanatory).

According to numerous core drillings, the lithostraigraphic sequence generally includes, from bottom to top

- the lakebed (losses-like/clayey/calcareous/salt deposits, etc.);
- the argillized mud level;
- the black/gray/olive, unctuous, rich-organic muds (more or less therapeutic);
- the yellow/beige silt.

The *peloidogenesis* processes are transformations of organic and inorganic material into rich - organic, sapropelic mud. The increase of *peloidogenesis* and the decrease of mud degradation were the major purposes of the first specific recommendations of protection and management made for the saline lake Tekirghiol. Our researches carried out during the last 22 years allowed us to synthetise the factors with positive and negative influence upon both *peloidogenesis* and diagenetic degradation of therapeutic muds in almost all the Romanian saline lakes. The favourable and unfavourable influences on heliothermic lakes were also established.



Sărat - Brăila

In order to reduce the consequences of therapeutic mud degradation, we proposed the following measures (part of these were confirmed in the field):

a) the control of littoral/slope runoff processes in accordance with the peloidogenetic capacity of the lake;
b) the control of freshwater inputs according to the optimum level of the chemical and physical features of the lake water (= peloidogenetic optimum); only at this level, therapeutic muds are forming and their argillization is avoided;
c) the pollution sources (temporary or permanent) must be neutralized or removed and the hygienic state of the lake muds must be periodically determined;
d) the vegetal invaders (mostly *Potamogeton pectinatus*) must be removed only mechanically and not by chemical agents which may alter the hydrochemical and hydrobiological conditions;
e) the littoral reed belts (mainly *Phragmites*, *Typha*) must be preserved for their triple role:
- to protect the lake shore from exaggerative abrasion;
- to provide easy - decaying organic matter (their rhizomes);
- to enhance the evapotranspiration thus reducing the lake freshening;

f) the filamentous algae (*Cladophora*, *Spirogyra*) and the brine shrimp (*Artamia salina*) must be preserved for their major contribution to peloido-genesis;
g) the use of seines must be replaced by adequate fishing tools which do not disturb the top sediments; more recommendable is to encourage angling;
h) the mud exploitation must be planned according to the mud-forming rate and to the isopach map of the muds; the introduction points into the lake of the used mud (from therapeutics) must be located only in the areas of peloidogenetic optimum to ensure the mud regeneration;
i) to prevent the penetration via influx waters of the plankton-eating fish species, the use of adequate grates is recommended.

As regards the heliothermic lakes, there are some particular measures in order to improve the heliothermy:

1) the decreasing of lake turbidity by :
- reducing the shore erosion;
- exploiting the mud only with devices not disturbing the mud layer or during the cold season;

2) limiting both the number of swimmers and the number of bathing hours, in order to not disturb the "hot layer" of metalimnion;
3) preserving the freshwater input and saltwater output flows at the required levels to produce heliothermy.

As compared to the strategies of conservation and management early formulated for various saline lake ecosystems over the world, our recommendations are specific measures suitable in the particular case of *therapeutic* saline ecosystems.

The observing of the above-mentioned proposals can be better materialized within the so-called "hydrogeological and sanitary perimeters of protection", recommended in our country as far back as in 1924, and further stipulated and detailed by various ordinances. Within such a perimeter (covering the lake and totally or partially its catchment area) the environmental characteristics must be preserved unchanged as much as possible, otherwise the lake ecosystem will be negatively affected.

New Publications from Ramsar Conservation Bureau

Proceedings of the Fifth Meeting of the Conference of the Contracting Parties, Kushiro, Japan, June 9-16 in 1993, volume I (Ramsar Convention Bureau, 1993), 358 pages, US$ 30, available in English, French, and Spanish.

This volume includes summary reports of plenary sessions and workshops and the full texts of all recommendations and resolutions and their important annexes. Volumes II and III, workshop papers and national reports, will be published in 1994.

Towards the Wise use of Wetlands, edited by T.J. Davis (Ramsar Convention Bureau, 1993) 180 pages, US$ 20.

The final report of the Ramsar Convention Wise Use Project, this volume contains the Ramsar guidelines for the wise use of wetlands (1990) and the full text of the 'additional guidance for implementation' adopted at Kushiro, as well as seventeen case studies at the international, national, and local levels covering a wide range of situations and wetland types.

The Ramsar Convention of Wetlands: its history and development, by G.V.T. Matthews (Ramsar Convention Bureau, 1993), 120 pages, US$ 15.

An analysis of the eforts that led to the adoption in 1971 of the first global treaty for nature conservation, and a thorough history of the development of that Convention to the present. A German translation is also available free of charge, by courtesy of the Austrian Government

Correspondence: Ramsar Conservation Office, Rue Mauverney 28, CH-1196 Gland
Switzerland
Tel: 022-999-01-70

LAKE SUPERIOR PROTECTED AREAS WORKSHOP

The 1990's present an opportunity to protect representative and unique ecosystems and natural areas. A protected areas network in the Lake Superior basin would include ecological reserves, national and state forests, conservation areas and private land holdings.

Parks Canada and the Lake Superior Binational Program hosted a Lake Superior Protected Areas Workshop in Thunder Bay, Ontario on 11 and 12 of November 1993. The goal of the Workshop was to explore the opportunity for a protected areas network in the Lake Superior basin.

Fifty five managers of protected areas, including state, provincial and national park representatives attended the event, along with academic advisors, habitat specialists, and leading conservation organizations. Although most participants were from the Lake Superior region, participants came from as far away as Washington, D.C. and Ottawa.

Speakers introduced participants to the Lake Superior ecosystem, the value of protected areas and some of the initiatives under the Binational Program to Restore and Protect the Lake Superior basin. A model for a Biosphere Reserve nomination was presented, and the role of the Nature Conservancy and the Lake Superior Resource Management Co-operative in protecting "special" areas was defined. The Mott and Laidlaw Foundations outlined their respective roles in Great Lakes conservation issues, and indicated that they would view Lake Superior as a priority in their funding allocations.

Workshop participants felt a need to integrate and co-ordinate basinwide activities. Co-operation would be the key to success. There was general consensus that "protected areas" should be driven locally, at the community level, and supported by governments where appropriate.

As a result of the workshop, a number of initiatives were proposed;

1. to develop a formal means of accessing information possibly through a basinwide Geographic Information Systems network
2. to develop a stronger communications network to link the Lake Superior community
3. to organize a special designations committee to explore co-operative opportunities
4. to focus research on protected areas in the Lake Superior basin.

This group will have an opportunity to further network at the upcoming Ecosystem Management Strategies for the Lake Superior Region Conference (Duluth, 16-19 May 1994) and a combined Lake Superior National Parks Research Conference/Watershed Interpretive Educations Workshop tentatively scheduled for 31 October - 4 November 1994.

by Dr. Bill Stephenson (Regional Conservation Biologist, Ontario Region - Parks Canada)
and Dr. Gail Jackson (Environment Canada, Lake Superior Programs Office)

Forthcoming Meetings

6TH INTERNATIONAL SYMPOSIUM ON SALINE LAKES

Date: July 14-19, 1994
Venue: Beijing, China
Organizer: Chinese Academy of Geological Sciences
Language: English
Correspondence:
Zheng Mianping, Zhang Fasheng
Organizing Committee of 6th ISSL
Chinese Academy of Geological Sciences
Baiwanzhuang Road 26
Beijing 100037, P.R. China
Fax: 0086-1-8310894

WETLAND ENVIRONMENTAL GRADIENTS, BOUNDARIES

Date: April 22-23, 1994
Venue: Sheraton Fallsview Hotel, Ontario, Canada
Organizers: Wetland Reseach Cenre
University of Waterloo
Language: English
Correspondence:
Wetland Research Centre
Faculty of Environmental Studies
Environmental Studies Building I
University of Waterloo
Waterloo, Ontario N2L 3G1, Canada
Tel: 519-885-1211
Fax: 519-746-0658

INTERNATIONAL CONFERENCE ON TROPICAL LIMNOLOGY

Date: July 4-8 1994
Venue: Satya Wacana Christian University, Salatiga, Central Java, Indonesia
Organizer: Faculty of Science and Mathematics, Satya Wacana Christian University
Co-organizers: Institute for Limnology of the Austrian Academy of Science Biologische Stati, Department of Limnology & Institute of Zoology of University of Vienna and Section Of Liomnology of University of Helsinki
Language: English
Correspondence:
Faculty of Science and Mathematics,
Satya Wacana Christian University
Jl. Diponagoro 52-60, Salatiga 50711, Indonesia
Tel: 0298-81362
Fax:0298-81420

INTERNATIONAL LAKE ENVIRONMENT COMMITTEE FOUNDATION
Secretariat
3-13-25 Kusatsu, Kusatsu-city, Shiga 525, Japan
Tel : +81-775-67-2155, Fax : +81-775-67-2156

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