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NEWSLETTER

INTERNATIONAL LAKE ENVIRONMENT COMMITTEE FOUNDATION

— For Better Lake Management —

This Newsletter is also available in Japanese.

Water in the 21st Century

A Global Crisis on Our Hands Today

Shiga's Governor Inaba at the Opening Ceremony of the International Shiga Forum

In his keynote speech at the International Shiga Forum on Technology for Water Management in the 21st Century, Professor Biswas said, "Water management during the earlier part of the 21st century is going to be an increasingly difficult task. There is no doubt that the total global demand on water resources, both in terms of quantity and quality, will continue to increase due to increasing population, changing lifestyles and escalating human activities needed to provide more food, energy and industrial goods. Unless water management processes become increasingly more efficient at a much faster rate than has ever been witnessed in human history, the world - especially the developing world - is likely to face untold human misery more frequently and more extensively than has been recorded in the past".

Alarming words indeed, but as the feature article by Misha Datta in this issue confirms, words that need to be oft-repeated to permeate the collective consciousness of the world. The Shiga Forum, held over three days in November last year, will only be deemed a success if its message is taken seriously, that is "we have a crisis and it is here now".

The global water issue must make it on to the international political agenda. To quote Professor Biswas again, "At the Earth Summit in 1992 at Rio, issues like climate change, biodiversity and deforestation took the centre stage and water was at best a 'bit part' player in the wings. This inspite of the fact that climate change has yet to kill a single person anywhere in the world, and is unlikely to do so for at least another two decades. Yet, every year millions of people have been dying due to a lack of clean water and incidences of floods and droughts".

The truth to the last sentence is given by statistics that show that one-third of all deaths in developing countries are caused by contaminated water, the very countries that are least able to address the issues. It is our duty and responsibility to address these issues for them. We must do that by giving water a much higher profile on the global political agenda. The Shiga Forum was a start, but there is a long way to go.

IN THIS ISSUE

WINDOWS to RAISON

During mid-March ILEC hosted a visit by Mr. Andrew Fraser of the UNEP GEMS Collaborating Centre for Freshwater Quality Monitoring and Assessment. The Collaborating Centre is located at the National Water Research Institute of Environment Canada in Burlington, Ontario.

The purpose of the visit was two fold. Firstly, to revise and update the RAISON software to the latest version for the WINDOWS operating system and secondly, to install the ILEC "Survey of the Lakes of the World" database that has been converted to run under the new version of RAISON.

Mr. Fraser lead a five day training session for several ILEC staff members and other interested individuals. The course emphasized all major elements of the RAISON system from project initialization through the details of database construction, map design and editing, data analyses, statistics, graphing, data visualization, expert systems, and the use of multimedia within the RAISON system. The broad capabilities and versatility of the new WINDOWS version of RAISON made for a very full and interesting course.

At the request of ILEC, the National Water Research Institute in Canada undertook the conversion of the "Survey of the Lakes of the World" database project. The database, graphics and documents that comprise the project were provided on CD and translated into RAISON structures. Very few conversion difficulties were encountered during this procedure. The project has now been installed on the computer systems of ILEC and provides a rapid and easy platform for viewing the results of the entire lakes project.

Mr. Fraser also gave a presentation to the JICA training course in which an overview of the capabilities of RAISON for WINDOWS was described. There are many potential applications for use of the software system by the participants in the JICA training course.

Mr. Fraser demonstrates

JICA/ILEC Training Course - Brazilian participant
Marcos Gomes Nogueira gives his insight to the course

Presently environmental problems are serious issues affecting both the developed and developing countries. One of the biggest challenges in the near future is the adjustment of economic activities based on the sustainable use of resources, and also the change of our lifestyle in order to get more environmentally sound attitudes as well to get closer to nature.

JICA/ILEC Trainees

The lakes and reservoirs are inestimable resources for human beings as well for nature itself. The deterioration of these environments and loss of its biodiversity is unacceptable. Nevertheless, the environmental management of lakes is a very difficult task, demanding the use of an holistic approach which takes into account the physical and biological aspects not only in the water body, but also in the entire watershed, as well to consider the impact of the human activities.

During the 1997 JICA/ILEC Training Course of Lake Water Quality and Management the participants could deeply realize how complex are the aspects related to this subject. At the same time the rich Japanese experience, especially in relation to the Lake Biwa case, provided us with new theoretical and practical insights. Of course we cannot reproduce everything in our home countries. Firstly because each region, each lake and each watershed have their own ecological characteristics, we cannot just generalise the solutions for the same kind of environmental problem. Secondly, we came from developing countries where economic and social problems, to a certain degree, take priority for people.

However, even in developing countries, the recent increase of environmental consciousness in society has become a source of considerable pressure on government policy and decisions of private enterprises.

I am absolutely sure that the knowledge we have acquired on this course will be very useful, because we have strong references that will certainly bring new ideas and understanding for our own environmental problems.

Profile on Professor Sven Jørgensen Chairman - ILEC Scientific Committee

Professor Sven Jørgensen, the present chairman of ILEC's scientific committee, was a founding member of the Committee in 1986 and has been a member of ILEC since. He has been very active in ILEC particularly in the publication of the Guideline Book series and in ILEC's educational program and has participated as lecturer in many of ILEC's courses all over the world. He is a professor at the Royal Danish School of Pharmacy (RDSP), where he is in charge of a masters course in environmental chemistry with degree students from the RDSP, Copenhagen University and the Agricultural University of Denmark. At present he is responsible for the research of a staff of six and also has eight Ph.D. students and 14 masters students.

His on-going research program focuses on Ecological Modelling, Ecotechnology and Ecosystem Theory. All three areas are highly integrated in his research which has been mainly based on many real environmental management problems. In this context he has been particularly interested in lake problems and many of the models he has developed are concerned with eutrophication, acidification or toxification of lakes. One of his recent developments is a model of wetlands developed for the assessment of its removal capacity for non-point sources of nutrients. Lately, the wetland model has been linked with a GIS program by one of his co-workers to find the optimum strategy for the geographical situation of wetlands, a typical holistic approach where the entire catchment area is considered.

Professor Jørgensen

It is his idea that good ecological models should be based on sound knowledge about the ecosystems and therefore there should be an interaction between models and ecosystem theory and vice versa. Models could be used to test a new hypothesis in systems ecology and ecological theories should be used to make our model more ecological.

Recently he has developed what is called 'structural dynamic models' by use of the latest development of thermodynamics in ecosystem theory. This type of model attempts to account for changes in species composition and the changes in the properties of ecosystems which differs from the normal ecological models. These are rigid and cannot consider the current changes in the properties of the ecological components which we do know take place. This type of model has been used on ten case studies, five of which were concerned with lakes.

Professor Jørgensen is Editor-in-chief of Ecological Modelling and has published more than 200 papers with more than 60% in refereed journals. He is a busy author as he has written, edited or co-edited 36 books. His four most important recent books are "Handbook of Ecological Parameters and Ecotoxicology" (together with two coworkers), "Handbook of Ecological and Environmental Modeling" (together with two coworkers), Fundamentals of Ecological Modelling and Integration of Ecosystem: Theory a Pattern.

His strong engagement in ecological modelling can be seen from his list of papers, of which more than 60% focus on model developments and model problems. He finds also teaching in modelling very important as he has giving modelling courses in 26 countries on six continents. It is not surprising to hear him often called "Mr. Ecological Modelling".

Professor Jørgensen is currently visiting professor at the Research Center for Environmental Quality Control, Kyoto University, Japan.

New Director at UNEP-IETC

Mr. John Whitelaw

The following quote is taken from the press release provided by UNEP's Executive Director's office on the announcement of the new Director of UNEP-IETC.

"I am pleased to announce the appointment of Mr. John Whitelaw as the new Director of UNEP's International Environmental Technology Centre (IETC), in Japan.

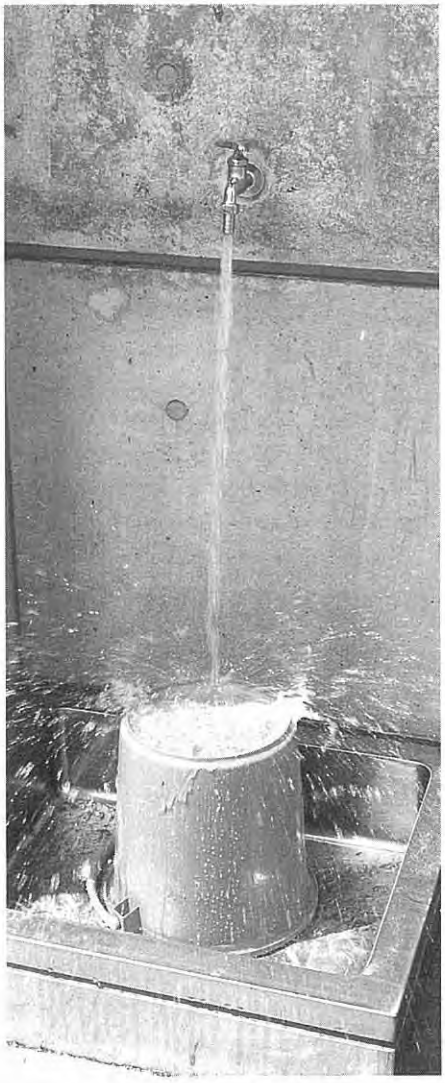
He brings to this position extensive experience in strategic planning, policy analysis and management of environmental issues at national, regional and international levels. His distinguished career spans a period of 20 years, marked by positions in advisory capacity to ministers and heads of organizations and has extensive knowledge in international negotiations proven by his election to the Chair of Executive Committee of Multilateral Fund of the Montreal Protocol. Especially relevant to this post is Mr. Whitelaw's experience with the Japanese Government on joint science and technology programmes."

Mr. Whitelaw started his career with the Australian Government. From 1972 to 1987 he held positions in the Primary Industries, Environment and Science Departments covering such areas as Antarctic operations, Australia's meteorology program and international science cooperation. After holding various other posts, since February 1996, he was based in Geneva as special advisor to the Executive Director of UNEP on the evolving chemical agenda.

Water, water everywhere, but ...

by Misha Datta

In its treatment of the issue of water resources preservation, Agenda 21 at the Rio de Janeiro Earth Summit (UNCED 1992) called for "continuous control of the sources, volume, flow and quality of the waters and of the human activities that affect them". As with many of the other objectives concerning global issues, it seems evident that the world's governments are failing in their implementation of the Agenda's aims.



Crisis? What Crisis?

Since Rio, the world population has seen an increase of 450 million. Not surprising therefore that governments will charge headlong into increasing the economic growth rate at almost any price. Unfortunately as with any type of gain, short term is more appealing than long term and, when it comes to water resources the inevitability of this type of counter productivity can already be seen. In the past five years we have seen an ongoing expansion of agriculture and of human settlements, but growths of this kind also necessitate a greater demand for water for both economic and general living purposes which our present resources simply cannot cater for. Compounded by the fact that the increase has in turn caused water diversions, it seems that, in some areas, water supply is not far off from crisis. Indeed Professor Biswas in his concluding remarks at the Shiga International Forum on Water last year went further by saying "everybody agrees that there is now a global water crisis, and that this crisis is likely to become more serious during the next 20 to 50 years".

Spring and summer of 1996 saw the setting of record highs in world wheat and corn prices. At the start of the year's harvest, the amounts of grain left in the world's grain bins were at their lowest recorded level. This classic example of an ever increasing demand exceeding supply is due in part to the scarcity of fresh water for irrigation. The amount of water needed for germination is comparatively phenomenal and commodities including pork, poultry, beef, eggs and beer are all dependent on grain production.

World-wide, our principal food producing areas, such as the Great Plains in the U.S., and much of India and China, are seeing a huge depletion in water supply. Irrigated areas in major agricultural states in the U.S. have been seeing a steady and worrying decline in irrigated areas for some time now.

In view of universal water supply problems, irrigation is becoming increasingly difficult. Water shortages in many cities, including Los Angeles, are being abated by the utilisation of water initially intended for farm irrigation.

Constraints on food production relating to water manifest themselves in other ways. Offshore, difficulties in the fishing industry, caused by both water pollution and the fact that fisheries are being exploited beyond their capacity, are not helping to aid onshore shortages by expanding food supply.

It is estimated that more than two million deaths a year have their origins in water scarcity and pollution. However, cleanup operations in many countries are often too expensive to even contemplate. In these cases, the fact that it makes good economic sense to maintain the natural habitat is not simply being ignored but is being treated as an impossibility. However, the economics can be exploited, for example in New York City, with its population of ten million, rural watersheds around reservoirs are used to cleanse the water supply to the city, costing only a tenth of the $7 billion which would be necessary to commence water treatment processes.

In an age where natural human reproduction is having severe repercussions on the very fine balance of nature, a chain of events or rather a vicious circle is being created by the inter-linking of a variety of issues from water scarcity through to food shortage and water pollution. It goes without saying that world governments should be implementing the objectives of the Agenda, but at this stage in a society gone too far, one can understand how the economic strains needed to achieve what would ultimately be an economic good, are far greater than most governments would like or can afford. Progress towards a sustainable society through meeting the objectives of the Agenda must be achieved, but it comes at a price; a price we must look toward paying now or will no doubt be pushed into paying at some point in the future.

Major ILEC Activities over the previous 12 months

7-9 August 1996 - 1st Training Course on Environmental Education (Chiang Mai, Thailand)
A short training course attended by Professor Kawashima of Shiga University and Mr. Kashiro of ILEC. Participants from Philippines, Thailand and Japan exchanged ideas and information on the teaching of environmental science in schools.

Participants at the 1st Training Course on Environmental Education in Chiang Mai, Thailand

4-5 November 1996 - Workshop on Lake Management (Antalya, Turkey)
This Workshop was organised by ILEC with funds from the Japanese Environment Agency. Some 12 to 13 professionals gave papers on lakes, reservoirs and wetlands in Turkey. ILEC was represented by Mr. Shimazu, and Mr. Fukada from the Shiga Prefectural Government. This workshop is a continuing project dealing with developing countries. Previous countries that have participated in this kind of workshop include the Philippines, Indonesia and India.

25-27 November 1996 - International Shiga Forum (Otsu and Kusatsu, Shiga, Japan)
Possibly the most important meeting of the year. Academics and experts from around the world gathered in Shiga to discuss problems related to global water issues. (See Front Page and Misha Datta's article for related stories).

8-9 January 1997 - 2nd Training Course on Environmental Education (Pattani, Thailand)
This course followed on from the 1st Training Course held in Chiang Mai (see above). Some 30 participants attended, with ILEC being represented by Professor Kawashima.

20 January - 19 March 1997 - JICA/ILEC Training Course on Lake Water Quality Management (Japan)
A total of 10 students from around the world attended the now firmly established course on Water Quality. Read a trainee's viewpoint of the course on page 3.

PLEA for BOOKS and PERIODICALS

The ILEC Secretariat would like to hear from you if you have any books or periodicals that you would like to donate to the ILEC Library. We would be happy to send you ILEC publications in exchange. Donations will be gladly accepted from institutions and individuals. Contact us by mail/phone/fax or email at the addresses given on the final page.

Ibaraki Kasumigaura Award

The Ibaraki Prefectural Government is sponsoring the Ibaraki Kasumigaura Award to be presented at the 7th World Lake Conference, Lácar '97. The government's stated objectives in presenting this award are to support the participation at the Conference of researchers from developing nations, to contribute to the exchange of information and the advancement of research and technological development related to the conservation of lake environments, and to make an international contribution to developing nations.

To be eligible for the award, candidates must be from countries or regions included on the list of assistance issued by the Organisation for Economic Cooperation and Development. Furthermore, candidates must present the results of their research or activities at the World Lake Conference, Lácar '97.

Papers submitted to the Conference will first be screened by the Argentine Organising Committee and recipients will then be chosen by the Selection Committee from the papers that pass the first screening. No special procedures are necessary to apply for the award.

A maximum of 10 awards will be given which will consist of an award certificate, a trophy and 500,000 Japanese Yen. A winning research team will receive one award. The Award ceremony will be held as part of the Opening Ceremony of World Lake Conference. The Award will be withdrawn if the winning paper is not presented at the Conference. Award winners will be notified by the Governor of Ibaraki Prefecture.

For further information on the Award, please contact:

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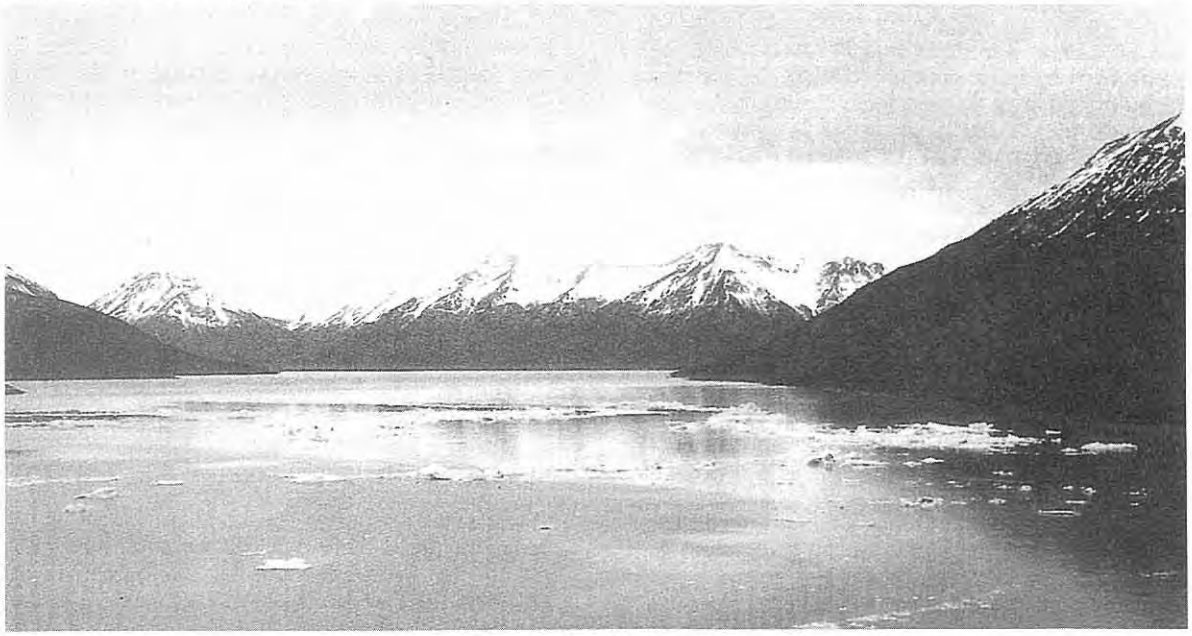
LAKES OF THE WORLD

A Look at Five Water Bodies in Argentina

Argentina, the host nation of the next **World Lake Conference**, is a vast country covering some 2.7 million km^2. The differences in climate, hydrology, geomorphology and economic development give rise to a variety of environmental conditions for the large number of lakes and reservoirs in the country.

It is unfortunate that basic information on those conditions and on the water bodies themselves is lacking. That is not to say that research activities or management actions have not been undertaken on lakes and reservoirs, just that the information available is neither extensive nor continuous. However, with the **Lácar '97 Conference** just six months away this edition of "Lakes of the World" takes a look a five Argentinean water bodies - **Lago Argentino, Lago Musters, Lago Colhué Huapi, Laguna Mar Chiquita** and **Embalse Salto Grande**.

Most of the information presented here is taken from the Databook of Lakes and Reservoirs of Argentina - **Catálogo de Lagos y Embalses de la Argentina.** ILEC encourages countries to undertake surveys similar to that of its **Survey of the State of World Lakes** - a publication produced in cooperation with the United Nations Environment Programme, which provides systematic geographic, limnological, socio-economic and environmental information on the world's main natural and man-made lakes. The Argentinean Databook is an ambitious project in response to such encouragement. It is the first stage of a larger project which seeks to promote the generation, dissemination and the use of basic environmental data on the lakes and reservoirs in Argentina. We hope to keep ILEC Newsletter readers informed on the progress of these projects in the future. But onto the lakes themselves ...



Lago Argentino

Lago Argentino is located in the "Los Glaciares" National Park, which in 1981 was declared a monument of Natural World Heritage by the UNESCO. It has a surface area of 1,466 km^2 and a volume of 219,900 10^6m^3. The lake can be divided into two sections as delimited by the eastern end of the Avellaneda Peninsula. It is surrounded by hills exceeding 2,500 m in height with the western section sub-divided into a series of channels and small bays. The eastern section is characteristic of "terminal" Andean lakes: its configuration resembles a trough extending into a broad bed with regular shorelines surrounded by terraced plateaus. The western section opens up in two arms running north and south. The latter, "Canal de los Témpanos" (Floes Channel), is wider and more tortuous; it rises in Punta Banderas and is bounded on the north and south by the Avellaneda and Magallanes Peninsulas. Along the "Canal de los Témpanos", there is a depression occupied by the Ameghino Glacier, separated from the lake by a stretch of stony valley formed by the retreat of the glacier. The "Canal de los Témpanos" is blocked off by the advance of the great ice mass of the Perito Moreno Glacier.

Its main affluent is the La Leona River which rises in Lake Viedma. Other relatively important tributaries are the Centinela and Frías rivers. The outlet is the Santa Cruz River, which empties in the Atlantic Ocean.

Lake Musters has a surface area of 414 km^2 and a volume of 8,280 10^6m^3. It flows into Lake Colhué Huapi through an arm called Falso Senguerr. In spite of its dimensions, it does not affect the climate of the area; in fact, it has the largest thermal amplitude recorded in Argentina.

Through an aqueduct built in 1966, the lake supplies drinking water to a number of

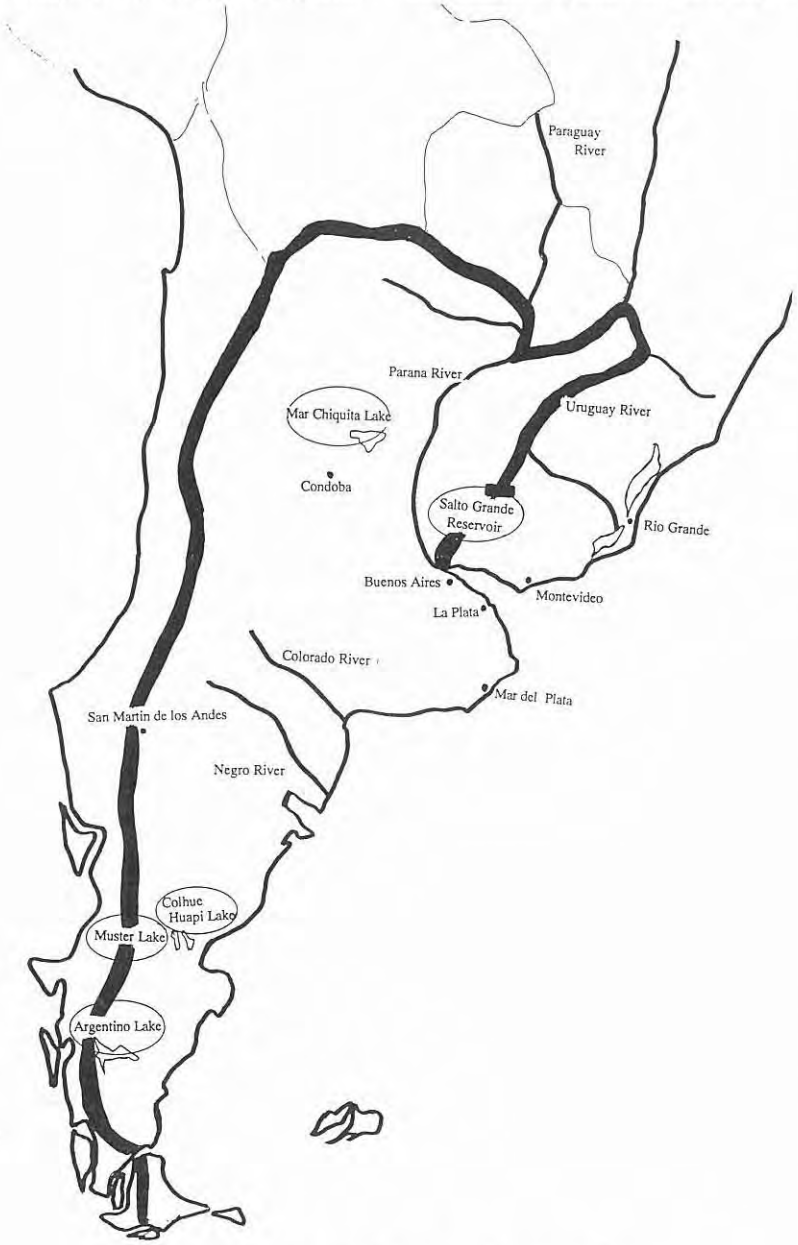
cities located on the Patagonian Coast on the Atlantic Ocean. The lake is used for both sports and commercial fishing, with the latter accounting for some 120 tonnes of fish per annum.

Towards the end of the summer Lake Musters exhibits a great saturation deficit of dissolved oxygen in the hypolimnion. It is classified as a mesotrophic lake because of its nutrient and chlorophyll levels and its algae biomass.

Occupying a large shallow depression of structural and eolic origin, **Lake Colhué Huapi** has a similar climate to that of Lake Musters. It has a surface area of 810 km^2 and a volume of 1,620 10^6m^3. In the past its waters fed the Chico River, which ran in a south-north direction to discharge into the Chubut River, but low water conditions in the 1930s led to dunes being formed, blocking off passage to the outlet. Flows into the Chico River ended in 1939.

The lake has had a negative water balance over the second half of this century and there are extensive coastal quagmires. Between 1984 and 1989 evaporation reduced the lake's water level by 1.1m.

Due to progressive desiccation and concentration of salts, the zooplankton biomass grows while diversity diminishes. Its highly turbid waters are rich in fish with commercial fishing yielding about 100 tonnes of fish per annum. The lake is of special interest for the presence of three autochthonous species, the most important being "perca de boca grande" (*Percichthys colhue-huapensis*).



Location of the five water bodies

Lake Mar Chiquita, in the northeastern part of the Province of Córdoba, has a surface area of 1,984 km^2 and a volume of 14,483 10^6m^3. Its main tributaries are the Suquía and Xanaes rivers, which drain into it from the south and the Dulce River, which contributes the largest volume from the north.

The lake is characterised by large water-level fluctuations. In the 1970s and 1980s, for instance, there was a considerable increase in the lake's water level; between March 1977 and February 1979 alone, its average level rose by more than 2 m.

The **Salto Grande** bi-national hydroelectric complex on the Uruguay River has been built upstream of the cities of Concordia (Argentina) and Salto (Uruguay). Though designed mainly for power generation, it is also used for water supply and navigation. With a surface area of 783 km^2 and a volume of 5,000 10^6m^3, the construction of the reservoir required the relocation of an urban settlement of some 20,000 inhabitants, fauna rescue activities, deforestation of the areas to be submerged, and delimitation of protected areas.

The reservoir's main problem is sedimentation, as a result of accelerated soil erosion of the vast plains upstream of the lake during the rainy season. In that area there are several settlements and agricultural activities are carried out. Despite forestation activities in areas around the reservoir, the problem still persists. Due to its configuration, the lake has differentiated trophic conditions. According to its chlorophyll "a" concentrations, it can be considered as oligotrophic-mesotrophic; yet, its total phosphorous concentrations correspond to a higher

Do you have something to say about your lake? The Lakes of the World series is a regular feature of the ILEC Newsletter and we welcome contributions from our readers. Please send your article with photographs to the ILEC Secretariat at the address given on the next page.

New Publications

Lakes & Reservoirs - Research and Management - Volume 2, Issue 1/2, March/June 1996.

ILEC's Journal grows in stature with every publication. This latest issue contains some 12 feature articles and one review article. Subjects dealt with include "Abatement of acidification in mining lakes in Germany", and "Limnological regionalization of Mexico".

Directrices para La Gestión de Lagos - Volumes 1-5 and 7.

The Spanish version of the Guidelines of Lake Management have been published and, in some cases reprinted, to coincide with the World Lakes Conference to be held in Argentina.

Atlas of Russian Wetlands: Biogeography and Metal Concentrations. A. V. Zhulidov, J.V. Headley, R.D. Robarts, A.M. Nikanorov and A.A. Ischenko. National Hydrology Research Institute, Environmental Canada, Saskatoon, SK, Canada.

A reference book on Russia containing information not previously available in English. Gives detailed descriptions of the biogeography and geology of Russia and the concentrations of cadmium, copper, lead, mercury and zinc in the wetlands.

Freshwater Quality: Defining the Indefinable? P.J. Boon and D.L. Howell (eds.) ISBN 0 11 495754. The Stationary Office, Edinburgh, Scotland.

Based on a conference organised by the Scottish Natural Heritage, it sets out to examine the concept of "quality" in fresh waters. The books gives an up-to-date account of current interpretations of the term "freshwater quality", describing a range of techniques for evaluating quality.

Forthcoming Events

ANSWER '97
International Symposium on A New Strategy for Water Environmental Research, 1997

Theme: How can we save lakes and rivers from progressive environmental deterioration?

20-25 July, 1997.
Shanghai.

Contact: Ms. Michiko Nakagawa,
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1-10 Uchidehama, Otsu 520, Shiga, Japan.
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CALL FOR PAPERS:
The 7th International Conference on Lakes Conservation and Management.

26-31 October, 1997 (six days)
San Martin de los Andes, Provincia de Neuquén, Argentina.
Official languages: Spanish and English (simultaneous interpretation provided)

Sessions include:
Lake Water Resources Assessment and Monitoring;
Management of Lake Freshwater Resources; and
Sustainable Utilization of Lakes

Deadline for submission of papers: 30 June 1997

Contact: Comision Organizadora Lácar '97
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