



DOCUMENTATION

8th

Living Lakes Conference

**Climate Change and Governance -
Managing the Impacts on Lakes**

and

EU LIFE Workshop Session

September 8th-12th

2003

Norwich, England, UK





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Global Nature Fund
Fritz-Reichle-Ring 4
78315 Radolfzell,
Germany
ph. : +49 (0)7732-99955-0
fax : +49 (0)7732-9995-88
e-mail: info@globalnature.org
www.globalnature.org
www.livinglakes.org

Editor in charge

Udo Gattenlöhner
ph. : +49 (0)7732-99 95 80
gattenloehner@globalnature.org

Editorial team

Bettina Jahn
ph. : +49 (0)7732-9995-84
jahn@globalnature.org
Sabine Jantschke
ph. : +40 (0)7732-9995-81
jantschke@globalnature.org

Layout/Design

Didem Sentürk

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Wachter GmbH

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Content

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„Climate Change and Governance - Managing the Impacts on Lakes“

Pages

Norwich, England

5	1 Preface
8	2 History of Living Lakes
12	3 Summary of 8th Living Lakes Conference
15	4 Welcome Statements
15	Prof Kerry Turner, Chairman of the Broads Authority, UK
16	Marion Hammerl-Resch, President of the Global Nature Fund, Germany
19	5 Keynote Speech on „Governance of Protected Areas“
19	Alun Michael, MP, Minister of State for Rural Affairs, Department for Environment, Food and Rural Affairs, UK
25	6 Speeches of Supporters
25	Dr Graham Gladden, Global Water Initiative Coordinator, Unilever, UK
29	Sir Frederick Holliday, Chairman of Northumbrian Water Ltd, UK
32	Dr Klaus Rick, Director Environmental Department, T-Mobile, Germany
35	7 Governance of Lakes and Wetlands
35	Overview of Governance of Each Living Lake; Andrew Moore, Environmental Consultant
39	Conserving Lakes and Wetlands: The Art and Practice of Good Governance; Prof Tim O' Riordan - University of East Anglia, UK
43	Inspiring People, Improving Places - Engaging Stakeholders across Society; Tom Flood, BTCV Chief Executive, UK
44	Managing the Broads: Developing Structures and Processes to Engage with its Stakeholders; Dr John Packman, Broads Authority, UK
50	8 Panel Presentations on Governance
50	Letting The Dead Sea Live - Challenges in Governance; David Katz, Friends of the Earth Middle East (FoEME)
51	Governance of Poyang Lake; Dai Xingzhao, MRLSD, Jiangxi, China
53	Lake Peipsi; Margit Säre, CTC, Estonia and Russia

55	9 Climate Change and Lakes
55	Overview of Climate Change and its Impacts on Living Lakes; Prof Mike Hulme, Tyndall Centre, University of East Anglia (UEA)
62	10 Case Studies on Climate Change and Lakes
62	Lake Victoria, East Africa; Marisa Goulden, Tyndall Centre, University of East Anglia, UK
63	Experience across European Lakes; Dr David Viner, Climate Research Unit, University of East Anglia, UK
64	Flooding and other Climate Impacts in the Broads; Steve Hayman, Environment Agency, UK
66	Local Government Action Plan for Climate Change in the Columbia Wetland Region; Mark Shmigelsky, Mayor of Invermere, Canada
68	11 Solar Lakes
70	12 EU LIFE Workshop
70	From Vision to Action; Cath Johnson, Conservation Officer Trinity Broads Project Manager, Broads Authority
73	Managing the Steppe Lakes: La Nava and Boada; Eduardo de Miguel, Fundación Global Nature, Palencia, Spain
77	Sustainable Wetland Management and Restoration Measures at Nestos Lakes and Lagoons; Hans Jerrentrup, Greece
82	13 Outlook
82	Ibero American Living Lakes Conference in Mexico
82	The 9 th Living Lakes Conference in Canada
84	Addresses and Contacts



1 Preface

Marion Hammerl-Resch

President of Global Nature Fund

Earth's climate has always been changing - ecosystems and species had to adapt and develop according to climatic conditions. Lakes formed or disappeared, became smaller or larger, due to climate changes. But today's situation cannot be compared with the past. Present climate changes are due to human interferences, the rate of warming is much higher than in the past 10,000 years and extreme temperatures occur more often.

The 8th Living Lakes Conference in the Broads National Park in East Anglia dealt with the implications of the climate change for lakes and wetlands. Lakes are particularly sensitive to changes in precipitation and temperature - the Living Lakes representatives of 25 lake regions from all over the world, and especially the European delegates, confirmed this fact from their own experience.

What will be the impacts of ongoing climate changes on the water quality, ecosystems, fauna and flora, agriculture, fishery, tourism and last but not least the drinking water supply? How can we minimize the climate change effects? Are the consequences of climate variability incorporated in the long-term lake management plans? How can the Living Lakes network support the lake partners?

The Tyndall Centre, renowned English Institute for Climate Change Research, on behalf of the Global Nature Fund and the Broads Authority, carried out a study on possible impacts of climate change on the Living Lakes and presented a prognosis for 23 lakes at the international Living Lakes Conference.

According to this study, Lake Constance and other European lakes will experience warmer winters and a rise in precipitations and warmer summers with less precipitations. The snowmelt-dominated period will start earlier in the year and getting shorter but more intensive - with effects on the Alpine tributaries to Lake Constance, especially on the Rhine. In future, extremely low lake levels over a longer period are expected in summer, with severe consequences for the water quality, shore vegetation, water birds and possibly also economic activities such as tourism.

The restoration of deteriorated shore areas, the installation of efficient sewage plants, reduced input of agricultural fertilisers and pollutants may create additional habitat for fauna and flora, and partly compensate for the negative impacts of the climate change. Unfortunately, the authorities responsible for the lake management are often not very much concerned about that problem, nor do they consult environmental organisations on this topic.

Responsible, sustainable management in the long run is the approximate translation of the English term „governance“. Governance was the second focus of the Living Lakes conference. One of the few positive examples is the Broads Authority, a Special Statutory Authority for the management of the Broads National Park. Currently the Broads Authority is elaborating the management plan for the coming five years. This plan sets out the overall strategy involving representatives and people from all walks of life. It contains measurable targets, concrete measures and significant control indicators. The „Broads Forum“ offers the local people and private organisations the opportunity to discuss, on a regular basis, all park-related problems and make suggestions.

The international Unilever Group, global partner of Living Lakes, participated in the Living Lakes conference with representatives of five national Unilever companies and presented concrete examples of the Corporate's commitment in sustainable lakes management. These include environmentally friendly products and manufacturing processes as well as financial support of conservation projects and the input of expertise. Other supporters of the Living Lakes network - T-Mobile, DaimlerChrysler and Kärcher - presented their contributions to nature conservation and sustainable management of lakes.

During the Living Lakes conference, the members of the network agreed to admit four more lake partners into the network: Lake Poyang in China, Lake Victoria in East Africa, Lake Peipsi and Lake Võrtsjärv in Estonia and Russia, and Lake Chapala in Mexico. Lake Titicaca in Bolivia and Peru as well as Lake Balaton in Hungary were accepted as candidates.

Finally, as part of the conference a workshop funded under the EU-LIFE Programme provided insight in wetland management and planning in Europe. Particular focus was put on case studies from the steppe lakes La Nava and Boada in Spain and the Nestos wetlands in Greece.

I would like to especially thank our local partners from Broads Authority and BTCV for hosting the 8th Living Lakes Conference. Many thanks also to our local and German supporters of this conference.

The present brochure gives detailed information on the results of the 8th Living Lakes conference. I hope it will be useful to you.

Marion Hammerl

President of Global Nature Fund

Die Erde war immer Klimaschwankungen unterworfen - zumindest seit es Leben auf unserem Planeten gibt. Ökosysteme und Arten mussten sich anpassen und haben sich abhängig von den klimatischen Verhältnissen weiterentwickelt: Auch Seen wurden kleiner oder größer, entstanden oder verschwanden aufgrund von Klima-Veränderungen. Doch die heutige Situation ist nicht mit der Vergangenheit zu vergleichen. Im Gegensatz zu früher sind die Klimaveränderungen durch den Menschen verursacht; die Erwärmung ist höher als alle Veränderungen in den letzten 10.000 Jahren, und extreme Wetterverhältnisse treten immer häufiger auf.

6

Die 8. internationale Living-Lakes-Konferenz im Broads Nationalpark an der Ostküste Englands beschäftigte sich mit den Auswirkungen des Klimawandels auf Seen und Feuchtgebiete. Seen reagieren besonders sensibel auf Veränderungen bei Niederschlägen und Temperaturen - das konnten die Seenvertreter der 25 Living-Lakes-Seen aus aller Welt und speziell die Repräsentanten aus Europa aus eigener Erfahrung bestätigen.

Welche Konsequenzen sind für die Wasserqualität, Ökosysteme, Fauna und Flora, Landwirtschaft, Fischerei, Tourismus und nicht zuletzt für die Trinkwasserversorgung zu erwarten, wenn sich das Klima weiter wie bisher verändert? Wie reagieren wir darauf, wie können wir negative Auswirkungen auffangen oder zumindest abmildern? Werden die Folgen des Klimawandels in den langfristigen Managementplänen der Seen berücksichtigt? Was kann das internationale Seennetzwerk Living Lakes beitragen, um die Partner an den Seen zu unterstützen?

Das Tyndall Centre, ein renommiertes englisches Institut für Klimaforschung, realisierte im Auftrag des Global Nature Fund eine Studie über die Veränderungen des Klimas an den „Living Lakes“ und stellte seine Prognosen für 23 Seen auf der internationalen Living-Lakes-Konferenz vor.

Danach werden für den Bodensee und andere europäische Seen mildere Winter mit höheren Niederschlägen und heißere Sommer mit geringeren Niederschlägen erwartet. Die Schneeschmelze beginnt früher und wird kürzer und heftiger sein - mit den entsprechenden Auswirkungen am Bodensee auf die Zuflüsse aus den Alpen und speziell den Rhein. Im Sommer sind extrem niedrige Wasserstände des Sees über längere Zeiträume zu erwarten mit bedenklichen Folgen für Wasserqualität, Ufervegetation, Wasservögel und möglicherweise auch für wirtschaftliche Aktivitäten wie den Tourismus.

Zusätzliche Lebensräume für Fauna und Flora durch die Renaturierung von zerstörten Uferabschnitten, effizientere Kläranlagen, eine weitere Reduzierung der Einträge von Düngemittel und Schadstoffen durch die Landwirtschaft gehören zu den Maßnahmen, mit denen die negativen Auswirkungen des Klimawandels teilweise aufgefangen werden könnten. Doch wie an den meisten anderen Seen, machen sich die offiziellen Verantwortlichen für das Management des Bodensees bisher wenig Gedanken darüber oder schließen die Umweltschutzorganisationen nicht in ihre Überlegungen ein.

Langfristiges, verantwortungsbewusstes nachhaltiges Management - so lässt sich der englische Begriff „Governance“ am besten umschreiben. Governance war der zweite Schwerpunkt der Living-Lakes-Konferenz. Eines der wenigen positiven Beispiele ist die Verwaltungsbehörde des Broads-Nationalparks, die derzeit an einem neuen Managementplan für die kommenden fünf Jahre arbeitet. Dieser Plan wurde in einem umfangreichen Partizipationsprozess unter Mitwirkung von Vertretern aller Interessengruppen erarbeitet und enthält messbare Ziele, konkrete Maßnahmen und aussagekräftige Indikatoren für eine konstante Überprüfung. Das „Broads-Forum“ gibt der lokalen Bevölkerung und den privaten Organisationen die Möglichkeit, regelmäßig mit der Nationalparkbehörde zu diskutieren und Vorschläge einzubringen.

Das internationale Unternehmen Unilever, globaler Partner von Living Lakes, nahm mit Vertretern aus fünf Ländern an der Konferenz teil und zeigte mit konkreten Beispielen, wie sich dieser global player in das nachhaltige Management von Seen einbringt. Umweltfreundlichere Produkte und Produktionsabläufe gehören ebenso dazu wie die finanzielle Förderung von Umweltschutzprojekten und das Einbringen von Fachwissen. Auch T-Mobile, Daimler Chrysler und Kärcher - ebenfalls Förderer des Living-Lakes-Netzwerks - stellten ihre konkreten Beiträge für den Schutz und ein nachhaltiges Management von Seen vor.



Lake Titicaca: A new member of the Living Lakes network.

Auf der 8. internationalen Living-Lakes-Konferenz beschlossen die Netzwerk-Mitglieder die Aufnahme von vier weiteren Seenpartnern: den Pojang-See in China, Victoria See in Zentralafrika, die Seen Peipsi und Võrtsjärv in Estland und Russland sowie den Chapala-See in Mexiko. Der Titicaca-See in Bolivien und Peru sowie der Plattensee in Ungarn wurden als Kandidaten aufgenommen.

Als ein Teil der Konferenz ermöglichte schließlich ein vom EU-LIFE Programm unterstützter Workshop Einblick in das Management und die Planung von Feuchtgebieten in Europa. Besonderer Schwerpunkt waren die Fallbeispiele der Steppenseen La Nava und Boada in Spanien sowie die Nestos Feuchtgebiete in Griechenland.

Ich möchte besonders unseren einheimischen Partnern der Broads Authority und des BTCV für die Organisation und Durchführung der 8. Living Lakes Konferenz in Norwich danken. Ein besonderer Dank geht außerdem an alle britischen und deutschen Förderer für Ihre Unterstützung dieser Konferenz.

Die vorliegende Broschüre informiert ausführlich über die Ergebnisse der 8. Living Lakes-Konferenz. Ich hoffe, die Informationen helfen Ihnen bei Ihrer Arbeit.

Marion Hammerl

Präsidentin des Global Nature Fund

2 History of Living Lakes

Living Lakes is an international network and partnership whose mission is to enhance the protection, restoration and rehabilitation of lakes, wetlands, other freshwater bodies of the world and their catchment areas. The Living Lakes partnership promotes voluntary international collaboration among organisations that carry out projects benefiting lakes, wildlife, and people. Living Lakes is created and co-ordinated by the Global Nature Fund (GNF), an international non-governmental and non-profit organisation, located in Radolfzell at Lake Constance in Germany.

The project was started with four partner lakes in four different continents: Lake Constance (Germany, Switzerland, Austria), Mono Lake (California, USA), Lake St. Lucia (South Africa) and Lake Biwa (Japan). At present the network consists of 35 organisations in 28 lake and wetland areas. And the network is growing continuously.

Until 2002, the Living Lakes Network consisted only of partner organisations, which are either full members or candidates for full membership. There are, however, organisations which would like to join the Network but do not fulfil the requirements for full membership. Therefore the Living Lakes delegates decided to introduce the „Associated Membership“. The current Associated Partners in the Living Lakes Network are the Kolindsunds Venner Wetlands in Denmark, Lake Sapanka (Turkey), the lake complex Lac Azuéi (Haiti) and Lago Enriquillo (Dominican Republic).

Current full members of the Lake Network are Mono Lake (USA), Lake Constance (Germany, Switzerland, Austria), St. Lucia Lake (South Africa), Lake Biwa (Japan), La Nava Lake (Spain), Nestos Lakes (Greece), Lake Baikal (Russia), the Norfolk & Suffolk Broads (UK), the Pantanal-Wetland (Brazil, Bolivia, Paraguay), Lake Tengiz (Kazakhstan), Dead Sea (Jordan, Israel and Palestine), the Milicz Ponds (Poland), Mar Chiquita (Argentina), Columbia River Wetlands (Canada), Mahakam Lakes (Indonesia), Lake Uluabat (Turkey), Laguna Fuquene (Colombia), Laguna de Bay (Philippines), Lakes Võrtsjärv/Peipsi (Estonia/Russia), Lake Victoria (Kenya, Tanzania, Uganda), Lake Chapala (Mexico) and Lake Poyang (China). Candidates are Lake

Balaton (Hungary) and Lake Titicaca (Peru/Bolivia). The first honorary member is Lake Vostok (Antarctica).

At the lakes GNF is cooperating with local NGOs, who very often collaborate with scientific institutions, governmental authorities or businesses. They share their experience and know-how in the field of lake conservation and management.

Annual Living Lakes conferences are held, thereby promoting the exchange of experiences, formulate statements, co-ordinate activities and decide about further steps for common activities. Three internet websites (www.globalnature.org, www.livinglakes.org and www.livingwetlands.org) and an intensive PR are crucial instruments to present the activities and results of the international cooperation to a wide public.

Recent highlights of Living Lakes were the 7th Living Lakes Conference at Lake St. Lucia and the presentation of the project at the World Summit (WSSD) in South Africa in the year 2002.

In cooperation with Unilever, GNF and Living Lakes partner organisations developed guidelines for the establishment of partnerships between environmental organisations and businesses. In March 2003, the English guidelines entitled „Toolkit“ were presented at the 3rd World Water Forum in Japan. With over 10,000 participants, the Forum was one of the most important international water conferences.

In cooperation with the Japanese foundation ILEC, the International Environment Technology Centre UNEP-IETC, LakeNet and others, the Living Lakes network took part in the elaboration of the World Lake Vision. The World Lake Vision was presented to the public in 2003 and is an important call for sustainable use of lakes and underlines the great importance of lakes for men and ecosystems.

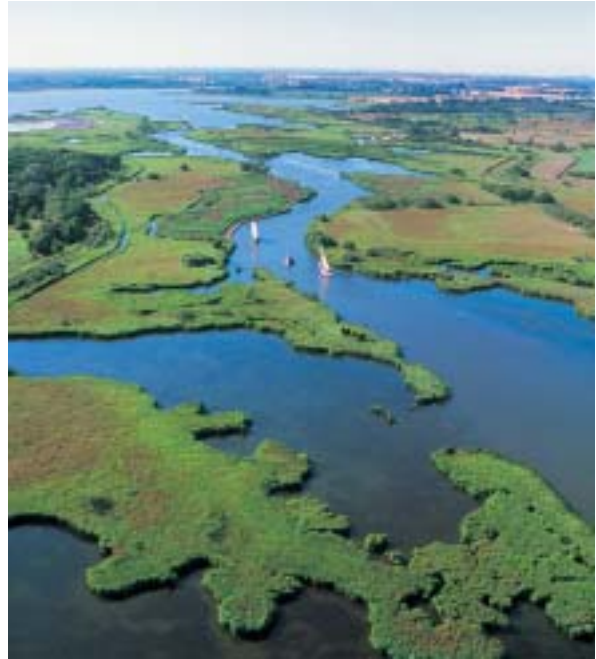
Global partner of the Living Lakes project is Unilever, a Global Player itself. Unilever supports the world-wide activities of the Global Nature Fund. Sponsors at international level are DaimlerChrysler and the German airline Lufthansa. Living Lakes is also supported by telecommunication company T-Mobile, Deutsche Bundesstiftung Umwelt (German Federal Foundation for Environment), Kärcher, Ethikbank, GLS Gemeinschaftsbank, Ziemann and middle-sized companies such as Kopf AG (Sulz), a pioneer in the field of solar energy devices. Media partners of the Living Lakes

project are the nature magazine natur&kosmos and the publishing house Gruner+Jahr, publishing the well-known magazine GEO.

Geschichte von Living Lakes

Das Projekt Living Lakes, ein internationales Netzwerk bedeutender Seeregionen, ist vom Global Nature Fund (GNF) im Jahr 1998 gestartet worden. Eine Untersuchung der UN besagt, dass schon heute über 1,4 Milliarden Menschen zu wenig oder schlechtes Wasser haben. Hier setzt das internationale Seennetzwerk „Living Lakes“ an und zeigt Wege zum wirkungsvollen Schutz der größten und wichtigsten Seen unserer Welt auf.

Das Projekt wurde von vier Seenpartnern in vier Kontinenten gestartet: Bodensee, Mono Lake (USA), St. Lucia See (Südafrika) und Biwa See (Japan). Derzeit sind 28 Seen am Projekt beteiligt. Und das Netzwerk wächst kontinuierlich. An den Seen kooperiert der GNF mit lokalen Umweltgruppen, die wertvolle Erfahrungen und wichtiges Know-how im Gewässerschutz in das internationale Netzwerk einbringen.



The Broads, located about 200 kilometres north-east of London, is one of Britain's finest wetlands with a surface area of about 300 square kilometres and precious for its rich wildlife and landscape.

1 The wilderness of the **Columbia River Wetlands**, Canada, is home to 100,000 mammals such as the Grizzly Bear.



Columbia River Wetlands, Canada

2 **Mono Lake** is located in the Californian desert and threatened by excessive diversion of water from its tributaries to the megalopolis Los Angeles.

3 **Chapala**, the largest lake of Mexico, is under severe threat of drying up within the next few years if water consumption is not drastically reduced.

4 **Laguna Fuquene** is a shallow water lake situated in the Colombian Andes at an altitude of 2,500 metres.

5 According to the legend, it is the sacred water body, where the Inca Empire was founded: **Lake Titicaca**, the highest navigable lake in the world in the Bolivian and Peruvian Andes Mountains.

6 The **Pantanal**, situated in the heart of South America, is the world's largest wetland.



Pantanal, Brasilia, Bolivia, Paraguay

7 **Mar Chiquita** in Argentina is breeding place for up to 50,000 pairs of Chileflamingo.

8 The British **Norfolk and Suffolk Broads** are a prime example for the restoration of lakes exposed to eutrophication.

9 Years ago, the Spanish steppe lake **La Nava** was drained. Thanks to our Spanish partners, it is a living lake again!

Living "A network f

12 **Lake Balaton** is one of the most significant natural treasures of Hungary, attracting millions of visitors every year.



10 Five million people from three countries, Germany, Switzerland, Austria, get their water from **Lake Constance**.

11 The rich fish stocks of the Estonian-Russian **Võrtsjärv-Peipsi** lake system provide livelihood for many local families.

13 Monks in the middle ages made the bird paradise of the **Milicz Ponds** in Poland.



Milicz Ponds, Poland

Lakes or the future”

14 Intensive farming and illegal rubbish dumps are a big problem for the Greek **Nestos Lakes**.

16 Eco-tourism creates jobs in the Greater **St. Lucia** Wetland Park, South Africa's oldest nature reserve.



St. Lucia Wetland Park, South Africa

18 The **Dead Sea**, 417 metres below sea-level, is in danger of drying up.

19 The Kazakh **Lake Tengiz** is the largest intact steppe lake left in Asia.

20 **Lake Baikal**, the „pearl of Siberia“, is the deepest lake of the world and home of the rare Baikal seal.



Lake Baikal, Russia

21 95 % of the world population of the endangered Siberian Crane winter at **Lake Poyang-hu**, China's largest fresh water lake.

22 Every year, 24 million tourists visit **Lake Biwa**, Japan's largest lake.



Lake Biwa, Japan

15 The protection of **Lake Victoria**, Africa's largest lake, requires immediate international action.

17 No other lake in Turkey is covered with as many water lilies as **Lake Uluabat**.



Lake Uluabat, Turkey

23 The largest lake of the Philippines, **Laguna de Bay**, is highly threatened by the untreated sewage of the metropolis Manila.

24 The Indonesian **Mahakam Lakes** are the home of the very rare Irrawaddy freshwater Dolphin.



3 Summary of the 8th Living Lakes Conference



Press Conference with Minister Alun Michael, Prof Kerry Turner, Marion Hammerl-Resch, Tom Flood, Prof Mike Hulme (from left to right).

12

130 participants from 30 different countries took part in the 8th Living Lakes Conference in Norwich England, from 7th to 12th September 2003. The conference was organised by the Living Lakes partner organisations Broads Authority and BTCV in cooperation with the Global Nature Fund (GNF), the coordinator of the Living Lakes partnership. The two conference themes „Managing the Impacts of Climate Change“ and „The Governance of Lake and Protected Areas“ were explored in relation to lakes and wetlands, in particular from the Living Lakes network, with the objective of developing brief, focused guidance. Participants had the opportunity to learn more about how these two themes are being addressed by the Broads Authority



The conference participants experience ways of sustainable tourism activities like canoeing on a field trip in the Broads National Park.

during the optional field trips prior to the conference. These were held in the Broads National Park, a Living Lakes partner since the year 2000 and a Ramsar wetland of international importance.

Climate change will have an increasingly major influence on lake regions all over the world. It is predicted that lakes will be affected by changes in water levels and water quality. Changes in global temperatures will have impacts on the rich biodiversity of lakes and wetlands and hence on fisheries. People might face severe reductions in drinking water supplies and food. By the year 2080 the world's lakes will experience a temperature change of up to 5.7 °C caused by greenhouse gas emissions, according to a study by the renowned Tyndall Centre for Climate Change Research delivered to the 8th international Living Lakes Conference in Norwich, England.

Governance is crucial to the successful management of protected lakes and wetlands and requires careful nurturing and tuning to meet local circumstances. Governance covers the ways in which decisions are made, who makes them, who is accountable, funding arrangements and organisational structure. Trends include greater participatory management and partnerships. At the conference, strategies for effective stakeholder participation and managing change processes were highlighted.

With Lake Victoria, Africa's largest lake, Lake Poyang, China's largest freshwater lake, the Lakes Peipsi and Vortsjärv of Estonia and Russia, as well as Lake Chapala, Mexico's largest inland water body, four new lakes were admitted into the international network Living Lakes at the Conference. The network run by the Global Nature Fund consists now of 35 organisations from 28 lake regions.

The Living Lakes new partner organisations are the Kenyan non-governmental organisation (NGO) OSIENALA at Lake Victoria, the Chinese NGO MRLSD (Promotion Association for Mountain-River-Lake Regional Sustainable Development) at Poyang-hu, the Amigos del Lago Chapala and the Fundación Lerma at Lake Chapala. The Estonian Fund for Nature (ELF) and the Peipsi Center for Transboundary Cooperation (CTC) are partners of Living Lakes for the Baltic lake complex. New candidates to the network are Lake Titicaca represented by the Bolivian organisation TROPICO and Lake Balaton represented by the Association of Civil

Organisations of Balaton in cooperation with Lake Balaton Development Coordination Agency.

During the Conference GNF's „Best Conservation Practice Award“ was awarded to Dr Martin George, Barry Brooks, Richard Southwood and George Batchelor for their exceeding achievements and efforts in the field of nature conservation and environmental education.

In the framework of the Living Lakes Conference a Workshop „Planning and Implementation of Wetland Management“ was offered to wetlands managers and experts. This workshop took place in the context of the



EU LIFE Workshop. Hans Jerrentrup, Eduardo de Miguel, Cath Johnson and Aitken Clark (from left to right).

GNF coordinated project „Living Lakes: Sustainable Management of Wetlands and Shallow Lakes“ for which the GNF secured a grant under the EU LIFE III programme.

At the 8th Living Lakes Conference it was announced that the next international Living Lakes Conference will be held in the Columbia River Wetlands area, Canada, from September 26 to October 2, 2004.

The conference was sponsored by the Norwich City Council, Suffolk County Council, Norfolk County Council, South Norfolk District Council, Broadland District Council, Northumbrian Water, Federal Nature Conservaton Agency of Germany and Witley Press of Hunstanton.

Other supporters were Unilever, Lufthansa, Daimler Chrysler, T-Mobile, Kärcher, Ziemann, natur&kosmos, GLS Gemeinschaftsbank and Ethikbank.

Zusammenfassung der 8. Living Lakes-Konferenz

130 Experten und Umweltschützer aus 30 Ländern nahmen an der 8. Living Lakes-Konferenz teil, die vom 7. bis 12. September 2003 in Norwich, England, abgehalten wurde. Die Konferenz wurde von den Living Lakes-Partnerorganisationen Broads Authority and BTCV, gemeinsam mit dem Global Nature Fund (GNF) als Koordinator der Living Lakes-Partnerschaft, organisiert. Die beiden Konferenzthemen „Managing the Impacts of Climate Change“ (Auswirkungen des Klimawandels) und „The Governance of Lake and Protected Areas“ („Governance“ von Seen und Schutzgebieten) wurden in Bezug auf Seen und Feuchtgebiete behandelt, mit dem Ziel kurzfristig Leitlinien zu entwickeln. Im Vorfeld der Konferenz konnten die Teilnehmer sich an Exkursionen beteiligen und so Einblick gewinnen, wie die Broads Authority diese Themen angeht. Die Ausflüge fanden im Broads Nationalpark statt; seit dem Jahr 2000 ein Living Lakes-Partner und Ramsar-Feuchtgebiet von internationaler Bedeutung.

Seenregionen in der ganzen Welt werden immer stärker vom Klimawandel betroffen sein. Es wird vorausgesagt, dass die klimatischen Auswirkungen eine Änderung des Wasserpegels und der Wasserqualität zur Folge haben werden. Globale Temperaturänderungen werden die reiche Pflanzen- und Tierwelt in Seen- und Feuchtgebieten und auch die Fischerei beeinträchtigen. Die Menschen müssen mit Trinkwasser- und Nahrungsmittelknappheit rechnen. Gemäß einer Studie des renommierten Tyndall Centre for Climate Change Research, die auf der Konferenz in Norwich vorgestellt wurde, wird bis zum Jahr 2080 weltweit ein Temperaturanstieg von 5.7 Grad Celsius in Seengebieten durch Treibhausgasemissionen zu erwarten sein.

Governance ist äußerst wichtig für ein erfolgreiches Seen- und Feuchtgebietsmanagement und erfordert sorgfältiges Vorbereiten und Abstimmen, um den örtlichen Gegebenheiten gerecht zu werden. Governance beinhaltet den Weg, wie Entscheidungen gefunden werden, wer sie trifft, wer die Verantwortung trägt, Finanzierungsvereinbarungen und Organisationsstruktur. Auf der Konferenz wurden auch Strategien für eine effektive Beteiligung von Betroffenen und Interessenvertretern sowie der Umgang mit Änderungsprozessen behandelt.

Vier neue Seen wurden auf dem internationalen Meeting in das weltweite Seennetzwerk aufgenommen: Afrikas größter See, der Viktoria See, der Poyang-See, größter Süßwassersee in China, das estnisch-russische Seengebiet Peipsi/Vörtsjärv und der Chapala-See, Mexikos größter Binnensee. Das vom GNF koordinierte Seennetzwerk besteht nun aus 35 Organisationen in 28 Seenregionen.

Die neuen Partnerorganisationen sind die kenianische Nichtregierungsorganisation OSIENALA am Viktoria See, die chinesische NGO MRLSD (Promotion Association for Mountain-River-Lake Regional Sustainable Development) am Poyang-See, und am Chapala-See die Amigos del Lago Chapala und die Fundación Lerma. ELF (Estonian Fund for Nature) und CTC (Peipsi Center for Transboundary Cooperation) sind die Partner des baltischen Seenkomplexes. Neue Kandidaten für das Netzwerk sind der Titicaca See, vertreten durch die bolivianische Organisation TROPICO und der Plattensee, vertreten durch die ungarische Association of Civil Organisations Balaton, in Zusammenarbeit mit der Lake Balaton Development Coordination Agency.

14

Während der Konferenz wurde der „Best Conservation Practice Award“ an Dr. Martin George, Barry Brooks, Richard Southwood und George Batchelor für außerordentliche Leistungen und besonderes Engagement auf dem Gebiet des Naturschutzes und der Umweltbildung überreicht.

Die nächste internationale Living Lakes-Konferenz wird im kanadischen Feuchtgebiet Britisch Kolumbien, vom 26. September bis 2. Oktober 2004 stattfinden.

Die Konferenz wurde gesponsert durch Norwich City Council, Suffolk County Council, Norfolk County Council, South Norfolk District Council, Broadland District Council, Northumbrian Water, das Bundesnaturschutzamt und Witley Press of Hunstanton.

Die Konferenz wurde gefördert von Unternehmen wie Unilever, Lufthansa, DaimlerChrysler, T-Mobile, Kärcher, Ziemann, natur&kosmos, GLS Gemeinschaftsbank und Ethikbank.



The British Minister Alun Michael and the four laureates of the GNF's „Best Conservation Practice Award“.

4 Welcome Statements

Prof Kerry Turner

Chairman of the Broads Authority, UK



Prof Kerry Turner, chairman of the Broads Authority, is convinced, that through a partnership ethic adopted across business, government, academia and civil society, a more just and sustainable future is a realistic future for us and our descendents.

Climate change and its impacts and the governance of lakes and wetlands, it is particularly appropriate that we are meeting in the new Zuckerman Institute here at UEA. This University's School of Environmental Sciences and its component research centres have built up an international reputation for excellence in research into environmental science and management issues - and the two foci of climate change and governance in the context of environmental change are core elements in our research programme.

The debate about the nature and severity of climate change and its consequences continue to reverberate around scientific and political circles. A majority (but not a unanimous) view in science is that there is sufficient evidence to show that climate change is a real effect and that some of its consequences pose significant future environmental, and socio-economic damage and loss risks from a global through to a local scale. But for those of us who also have to deal with the

day-to-day management of precious environmental assets there is another relevant 'angle' in this debate. That is that many of the policy options being suggested as part of a response to climate change are worthwhile actions in their own right (many are „win/win“ actions) e.g.: energy efficiency measures (of which this building is a good example); or a more rigorous application of the Polluter Pays Principle which results in technological and other innovations which over time can reduce a company's resource cost bill - The Factor Four - effect.

All this is NOT to say that all policy responses are win/win and will not involve net costs to some stakeholders; or that these are the only type of responses that are required to meet the overall goal of more Sustainable Development.

But they do serve to highlight the fact that such policy debate need not be overly adversarial and always cast in the context of inevitable winners and losers. It is my own firm belief that through a partnership ethic adopted across business, government, academia and civil society, a more just and sustainable future is a realistic future for us and our descendents.

This brings me to the second focus of this conference - governance. The need for a more inclusionary approach in this context is, I think, widely accepted. But designing and implementing decision making processes that can truly engage with and win the trust of multiple stakeholders (with different, sometimes competing intents) remains a challenge. Perhaps if I may just mention the efforts that we in the Broads Authority are making in this context. We have already reorganised the way our Authority works and hope to make further changes in the future, in order to ensure that organisationally we are better suited to take forward sustainability principles and strategy. As part of our „sustainability“ reorganisation we have set up a Broads Forum, to which twenty or so representatives come to debate the main policy issues that face the Authority. The Forum members represent all the main stakeholder interests in the Broads and their 'advice' is presented by their independent chair at the full Broads Authority meetings before the Broads Authority members themselves debate matters. We intend to take this consultation and real dialogue process further in the future by engaging more with local individuals and parish councils; as well as on a sub-catchment level to produce management plans that represent a consensus view.

What we can achieve will not be a utopia. We will never please all of the stakeholders all of the time, but our intention is that levels of trust and accountability will be significantly enhanced and that a partnership ethic and practice will become the norm in the Broads, to everyone's long-term benefit. Through our discussions over the coming days I hope we will deepen our understanding of these challenges and how they can be met.

Prof. Kerry Turner, Vorsitzender Broads Behörde, England

Die Debatte um den Klimawandel und seine Konsequenzen beschäftigt kontinuierlich wissenschaftliche und politische Kreise. Die mehrheitliche Meinung innerhalb der Wissenschaft ist, dass es ausreichende Belege für tatsächliche Auswirkungen des Klimawandels gibt und dass diese ernsthafte Umwelt- und sozioökonomische Schäden mit sich bringen können.

Viele der empfohlenen Handlungsmaßnahmen als Reaktion auf den Klimawandel können sich jedoch als lohnende Aktionen im eigenen Interesse (win-win-Situationen) erweisen, wenn z.B. durch Energieeffizienz-Maßnahmen oder strengere Anwendung des „Polluter-Pays Principle“, die zu technischen und anderen Neuerungen führt, langfristig die Produktionsmittelkosten eines Unternehmens gesenkt werden können. Das bedeutet nicht, dass alle Handlungsmaßnahmen diese Vorteile mit sich bringen oder dass nur solche Maßnahmen benötigt werden, um das Endziel von nachhaltiger Entwicklung zu erreichen. Aber es zeigt, dass diese Grundsatzauseinandersetzung nicht unbedingt nachteilig sein muss. Ich glaube fest daran, dass durch eine ethische Partnerschaft von Unternehmen, Regierungen, Universitäten und Gesellschaft eine gerechtere und nachhaltige Zukunft für uns und unsere Nachkommen realistisch wird.

Das bringt mich zum zweiten Thema dieser Konferenz: Governance. Der Bedarf an ein umfassendes Herangehen wird weitgehend erkannt. Entscheidungsprozesse zu entwerfen und einzuführen, die auf die verschiedenen Interessengemeinschaften (mit unterschiedlichen, manchmal auch konkurrierenden Absichten) eingehen und ihr Vertrauen gewinnen, bleibt jedoch eine Herausforderung.

In diesem Zusammenhang haben wir innerhalb der Broads Authority schon einige Veränderungen vorge-

nommen und hoffen auf weitere in der Zukunft, damit wir noch besser die Prinzipien und Strategien von Nachhaltigkeit vorantreiben können. Es wurde daher ein Broads Forum eingerichtet, in dem etwa 20 Vertreter der verschiedenen Interessengruppen Entwicklungsvorschläge erarbeiten, die dann der Broads Authority vorgestellt werden. In Zukunft sollen vermehrt Einzelpersonen und Gemeindevräte in den Dialog mit einbezogen werden, um konsensfähige Managementpläne zu erstellen.

Dabei werden wir niemals alle Interessengruppen zufrieden stellen können. Unser Ziel ist es, das Vertrauen und die Verantwortlichkeit deutlich zu steigern und dass eine Partnerschaft zwischen Ethik und Praxis zum Nutzen aller Beteiligten die Norm in den Broads wird.

Marion Hammerl-Resch

President Global Nature Fund, Germany



Marion Hammerl-Resch during a field trip on the solar boat „Electric Eel“.

Over the past 100 years the global mean temperature has increased by 0.6 °C and in Europe by about 1.2 °C. The 1990s were the warmest decade over the past 150 years. Temperatures are projected to increase further by 1.4 to 5.8 °C by 2100, with larger increases in Eastern and Southern Europe. It is evident that most of this warming can be attributed to the emission of greenhouse gases and aerosols caused by human activities. Warming-up of the atmosphere is part of changes in climate and (extreme) weather conditions. If these changes persist, they will influence water availability, flood hazards, agricultural productivity, and natural areas.

Since some years in Central Europe and especially in Germany, we have to deal with natural disasters, specifically high water and floods, low water and droughts. To be honest, in Germany we all enjoyed this year the century summer - the hottest summer in the history of weather recording. Sometimes a little bit of climate change might not be so bad at first view.

It will require substantial further reductions of the emissions to achieve the Kyoto Protocol target for greenhouse gas emissions for all signing countries - including the EU. However, energy and transport demands, and the associated carbon dioxide emissions, are likely to continue to increase. It is unlikely that current measures, including improvements of energy efficiency and increasing the share of renewable sources of energy, will achieve enough to offset these increases. Major policy changes will be needed beyond the Kyoto target dates if sustainable development is not to be seriously jeopardised by climate change.

During the World Summit on Sustainable Development, the Living Lakes network attested that nations failed to agree on global time tables and targets for boosting the level of renewable energy. It has been agreed that there is a need for regional and national targets for renewable energy. But how can we expect that third world countries start to implement solar energy or other renewable sources, if the industrialised countries are not implementing these sources seriously by themselves.

What we need is a coalition of like-minded partners for the promotion of renewable energy. I hope that the International Conference for Renewable Energies as announced by German Chancellor Gerhard Schröder at the World Summit on Sustainable Development in September 2002 in Johannesburg, will lend further impetus to the dynamic process for the global development of renewable energy. This conference will be hosted by Germany from June 1 to 4, 2004 in Bonn. GNF will present some best practice examples from the Living Lakes network at this event.

Most natural lakes are used to climate changes because they are of catastrophic origin, being formed by glacial, volcanic or tectonic processes that left depressions or basins in the land surface. But in the past, all creatures had much more time to adapt to climate changes than today.

Today there is evidence of global and regional impacts on natural ecosystems, human health, agriculture,

forestry, and fisheries, water resources, energy production and use as well as vulnerable areas like the Arctic.

Experts predict that global climate change will affect lake water levels, water temperatures, precipitation and evaporation rates, chemical budgets, water quality, and biodiversity. Increases in global temperatures are expected to lead to significant local changes in precipitation and evaporation. Lake levels are highly sensitive to fluctuations in climate.

Taking into account all this knowledge, it is even less understandable, what is happening with Lago de Chapala, Mexico's biggest lake that remains at 25 % of its natural water volume. Lago de Chapala is in severe danger of being dried up, because the water from River Lerma is retained for agricultural needs in the upper stream regions. The lake is essential for many reasons, one of them are the climatic conditions in the whole region. Up to now, Chapala was known as the place in the world with the best climate. If the Mexican government will not stop the destruction of the lake immediately, Chapala will be known in the future as another deserted region. So, during this conference we will discuss about climate change on global and - very concrete - at local level.

Climate change - alike education - is a long-term challenge. One important reference to start with strategies and actions to change the negative climate change trend is the World Lake Vision, initiated by the International Lake Environment Committee (ILEC). The Living Lakes Network is proud to be member of the drafting committee in cooperation with UNEP, LakeNet, Lake Biwa Research Institute and other organisations. I am sure that the principles for action of the World Lake Vision will accompany us during this conference.

Individuals, economy, and governments need to take steps today - before our window of opportunity closes. This brings me to the second topic of this Living Lakes Conference: Governance.

It is not so easy to translate „governance“ properly into German. And so is to find good examples of „good governance“. Maybe our Living Lakes partner organisation and one of the two local hosts of this conference, the Broads National Park Authority, is one of the few positive examples of good Governance worldwide.

To elaborate a long-term management plan within a participatory approach, to create efficient organisational structures, to introduce and use a monitoring system, to maintain a common vision and an atmosphere of trust between all stakeholders - all these are important elements of good governance.

During the Third World Water Forum in March 2003, Living Lakes and our global partner UNILEVER presented the Living Lakes Toolkit. This toolkit gives practical instructions and examples how to set up and to realise projects in collaboration between NGOs, enterprises and the administration, a precondition to improve governance.

Dear John Packman and the whole team of the Broads Authority, particularly Lydia Taylor, Lesely Sayer, Racheal and Karen Sayer, dear Anita Prosser and Kate MacKenzie from the BTCV, dear Stefan, Bettina and Udo from GNF - thank you all for the good preparation of this conference.

Dear supporters (Unilever, T-Mobile, Kärcher, DaimlerChrysler, German Federal Agency for Nature Conservation and Northumbrian Water, to name just a few), thank you for your important support and assistance.

18

Marion Hammerl, Präsidentin Global Nature Fund, Deutschland

In den letzten 100 Jahren ist die globale Durchschnittstemperatur um 0,6 °C und in Europa um etwa 1,2 °C gestiegen und man nimmt an, dass sie weiter ansteigen wird. Es ist erwiesen, dass vom Menschen verursachte Treibhausgasemissionen dafür verantwortlich sind. Die Folgen sind Klimaveränderungen, extreme Wetterbedingungen, Flutkatastrophen und Dürren sowie eine Beeinflussung der Wasserversorgung und der Agrarwirtschaft.

Um das Kyoto-Protokoll zu erfüllen, müssen Treibhausgasemissionen drastisch reduziert werden. Doch der Energie- und Transportbedarf und die damit verbundenen Kohlendioxidemissionen werden voraussichtlich weiter ansteigen. Es ist unwahrscheinlich, dass diese Zunahmen mit den momentanen Maßnahmen, einschließlich der Verbesserungen der Energieeffizienz und der Nutzung erneuerbarer Energien, aufgehalten werden können. Daher müssen umfassende politische Strategieänderungen umgesetzt werden.

Wir brauchen eine Koalition von Gleichgesinnten für die Förderung von erneuerbaren Energien. Auf der „Konferenz über Erneuerbare Energien“, die im Juni 2004 in Bonn stattfinden wird, stellt der Global Nature Fund einige vorbildhafte Beispiele für den Einsatz nachhaltiger Energien im Rahmen des Living Lakes-Netzwerkes vor.

Experten sagen als Folge der Klimaerwärmung tiefgreifende Veränderungen in vielen Bereichen der globalen Kreisläufe sowie unseres Lebens voraus. Trotz dieses Wissens ist zum Beispiel der Lago de Chapala, der größte See Mexikos, ernsthaft vom Austrocknen bedroht, da ein großer Teil des Wassers aus dem Zufluss für die Bewässerung in der Landwirtschaft abgeleitet wird. Doch der See ist unter anderem für das Klima der Region ausschlaggebend.

Klimawandel - wie auch Bildung - sind langzeitliche Herausforderungen. Einen wichtigen Anstoß für die Entwicklung neuer Strategien zur Verminderung der negativen Auswirkungen des Klimawandels bietet die „Welt Seen Vision“, die vom Internationalen Umweltkomitee für Seen (ILEC) und dem UN-Umweltprogramm in Zusammenarbeit mit dem Living Lakes-Netzwerk erstellt wurde.

„Governance“, das zweite Konferenzthema, kann man nur schwer ins Deutsche übersetzen. Ein wichtiges Element von Governance ist die Entwicklung von Langzeitplänen und effizienten Organisationsstrukturen unter Beteiligung aller Interessengruppen.

Auch der von Living Lakes und unserem globalen Partner Unilever entwickelte Leitfaden, das „Toolkit“, gibt konkrete praktische Anleitungen, wie man Projekte in Zusammenarbeit mit NGOs, Unternehmen und Regierungen durchführen kann.

5 Keynote Speech on Theme: Governance of Protected Areas

Alun Michael

MP, Minister of State for Rural Affairs, Department for Environment, Food and Rural Affairs, UK



The British Minister Alun Michael, welcoming the delegates at the conference.

Before I turn to the specific topic of my contribution - the designation and Governance of protected areas - I just want to set the context in personal and political terms. I am not referring so much to party political perspectives, although as a Labour and Co-operative politician I have a well-developed perspective that is grounded in the sense of the relationship between social, economic and environmental priorities. The Co-operative movement in the United Kingdom has been promoting sustainable development since the days of the Rochdale Pioneers, much more than a century and a half ago, even if the terminology is rather different nowadays. No, my point is that all of us who want to see change achieved need to understand the politics of change, the obstacles to be overcome, the opportunities to be seized and the need to create partnerships and consensus in order to create long-term strategies; and I think that echoes one

of the points you were making. We need those who say „this is urgent, please get on with it“, but cooperation, like sustainable development itself, is easier to say than to deliver. And it involves a lot of listening, a lot of hard work, and a lot of communication as well as idealism, and that is a challenge for all of us. The sort of coalition that Marion [Hammerl, President of Global Nature Fund] referred to needs to be good at those things as well as in its ideals.

Targets set worldwide and in Europe are driving improvements on environmental issues, on emissions, on air quality, on a whole range of issues and yet those who fully understand the impact of pollution on health and issues like global warming will say: „we must go faster“, while ordinary people very often would say „what's this got to do with me?“, as if air quality and recycling are just matters for governments rather than the outcomes of an aggregation of millions of individual decisions and choices. Issues for all of us, issues for government, issues for the people, issues for collective action and for individual action.

This conference today is important as a part of the communication of the challenges and the opportunities which makes it appropriate to look at the designation and the governance of the areas we need specifically to protect and to set that in the context of our whole planet, not least the threat of global warming to wetland treasures like the Norfolk Broads. It is important to have the powerful intellectual challenge that I know David Bellamy will be bringing to the conference shortly.

I would also like to pay personal tribute to the University of East Anglia: 35 years ago I started, as a youth worker, to run a project, an annual camp, on the Heritage Coast in South Wales, the South Glamorgan Heritage Coast, where young people, many of them young offenders, worked on a conservation programme with myself and with John Howden, the Heritage Coast Officer at the time, and his team. It gave the Cardiff police a rest for a few weeks, it had environmental benefits and it cost very little because volunteers and students, including seven from this university, came as volunteers. And it wasn't just their time that they contributed but the engagement of minds. Gavin Hudson, a student who came back year after year, made both the professionals and the youngsters think about the food that they were eating, about their own lifestyles, as well as the use of the landscapes that we were working on and the tasks

of the day. I am pleased to see the British Trust of Conservation Volunteers are co-hosts of this conference as they bring a lot of experience from that particular field.

We need vision and we need organisation and structures too, for if 'without vision so shall the people perish', then without organisation and without structures to deliver the vision, it will disappear or it won't be pursued sustainably over the long-term that Marion referred to. In our case, the 1945 Labour government took the decision to set up National Parks and started to provide the machinery to deliver on the vision of protected landscapes. The present government is refreshing both the vision and the machinery for our generation and that fits with the key vision of sustainable development with which I've started.

So that brings me to the issue of the governance of protected areas. In the United Kingdom we have a range of environmental protection designations, but I want to focus on two which are particularly important in the context of this conference: Sites of Special Scientific Interest (SSSIs) and National Parks. I also want to say a little bit about my department's aims to promote sustainability in the wider context, because protected areas don't exist in a vacuum and other measures are also necessary to achieve our environmental and related social and economic objectives. And I want to look at the bigger picture and give one or two examples of how we are applying the principles of sustainability both within and outside our protected areas.

National Parks and Sites of Special Scientific Interest are central to Britain's system of protected areas for wildlife and landscape. The SSSIs in particular are a key component to meeting our obligations to the European legislation and wider international agreements on protected areas as well as safeguarding nationally important sites. National Parks and Sites of Special Scientific Interest are not mutually exclusive in terms of coverage. For example, in the Broads, which is a member of the National Park family, there are SSSIs, and also Special Areas of Conservation and Special Protection Areas - two of the European designations. The Broads area also contains internationally important wetlands sites designated under the Ramsar Convention and it is a protected area in its own right established under its own Act of Parliament.

So why this multiplicity of designations? Well the answer is each serves a different purpose and we need the full

suite to ensure that different areas get the kind of protection that they need. For example, National Parks are concerned with conservation in a wider sense and with promoting opportunities for open-air recreation and helping people to understand more about the special qualities of these areas. On the other hand SSSIs provide the legal basis for safeguarding important ecosystems, including habitats such as wetlands, and important species and geological features. So the fact that an SSSI might be in a National Park does not lessen the need for both designations.

Effective governance is essential to successful management of protected areas: that means how you involve people in taking the decisions that bring the thing alive. In Britain, some of the land in these areas is in public ownership, some is owned by voluntary bodies but most is privately owned. Some of the landscape has been shaped over the centuries by agricultural and other economic activities so the habitats and the landscapes which our protected areas conserve are often man-made, as is the case with the Broads, and need to be looked after by a range of different management techniques. And that requires widespread stakeholder involvement not only by central and local government but also by land managers and the voluntary sector. Kerry referred to the forum and the engagement of stakeholders.

England now has over 4000 SSSIs covering over a million hectares or about 7% of the land area. These are designated by English Nature, which is a government agency funded by my department. In part these SSSIs underpin 87 special protection areas, 220 candidate areas of special conservation and 78 wetland areas designated under the Ramsar Convention. Now, I am saying that not only to give you some statistics, but it is evidence of the importance we attach to the safeguarding of the best of our wildlife habitats. We reinforced this commitment three years ago by bringing in new legislation to improve the effectiveness of the SSSI regime. I believe that we now have a very effective system for protecting and managing our important sites. Now the main features of this regime include these things:

- * Consultation with landowners at key stages of notification process with emphasis on partnership and cooperation. There are some very good examples of farmers, for example, getting involved

in improvements of their land for environmental reasons that follow on from Stewardship and then finally that actually works economically as well. So the engagement of the land managers has a benefit for them as well as for all of us.

- * Secondly the statutory requirements for landowners and public bodies to consult nature conservation agencies before they carry out or consent to any operations that could harm the sites.
- * Thirdly the powers for entering into management agreements with the landowners and to provide funding in return for positive management actions.
- * And finally robust enforcement powers for the statutory conservation bodies to be used sparingly as a last resort, but there to be used as and when needed.

Legislation also places a statutory duty on all government departments and public bodies to further conservation and enhancement of SSSIs when they are exercising their functions, when they are doing their daily job. Now that is a very robust system and it works. Over the last two years, less than 1% of the operations noted by owners and occupiers of sites in England have been refused consent. More than £ 8 million has been spent through direct management agreements. That is because the consensus is being worked towards.

SSSIs provide important protection to lakes and to wetlands, the key theme of this conference. We cannot compete with other countries for sheer area of wetlands, but the fact that we have more Ramsar sites than any other contracted party to the convention reflects, I believe, our commitment to the convention's aims and it shows how much we cherish our wetland and lake ecosystems.

We also cherish our finest landscapes. The first National Park in England was designated over 50 years ago. There are now 13, covering over 8 % of England, Wales and Scotland. The most recent, the Caingorms in Scotland, came into being only last week; in Scotland there weren't any National Parks until very recently. Part of the promise of devolution, one might say if, like me, you were an advocate of devolution. Proposals have been made for two more National Parks in the South of England, although the final decisions at the end of a very careful process are a little way off yet.

Our National Parks are areas of exceptional natural

beauty but, although the landscape of most has a wild and remote quality, British national parks are not true wilderness areas - they do not have the remoteness of the National Parks in some parts of the world, even in Scotland or Wales or Northumbria. They are landscapes where local culture and traditions are still strong. The Parks contain important species and habitats but they are designated for wider purposes. There are two main objectives - the first is to conserve the landscape, wildlife and the cultural heritage, and the second is to increase people's knowledge and enable them to enjoy the magnificent scenery at first hand. And those objectives have to be pursued in ways that promote the economic and social needs of local communities.

That is why last year I brought together our National Parks Authorities with our Regional Development Agencies, comparatively new bodies that have the economic lead, so that we could look at the environmental and social and economic purposes - the sustainable development purposes - of those designations and look at them together - because we want a living countryside, not museums of the landscape. So the governance of the parks is in the hands of these special bodies which are technically local government bodies, but because of the national importance of these areas the bodies responsible for the day-to-day administration are grant aided by my department, by central govern-



Broads Nationalpark attracts more than a million visitors a year.

ment and a significant proportion of the members are appointed by Ministers.

Now I said earlier that the protection which designation gives to our finest landscapes and wildlife habitats is not in itself enough to secure a healthy environment in which people and wildlife can thrive. For example,

migratory and other wide-ranging species need more elbow room than some protected areas can provide and climate change, which you are going to be discussing in this conference, does not respect administrative boundaries.

So we have to think holistically. Protected areas play an essential environmental role but we couldn't claim to be good stewards if our conservation policies relied on them alone. And that is why Defra has a single overarching aim against which we test all the work that we do.

„Our aim is sustainable development, which means a better quality of life for everyone, now and for generations to come, including:

- * A better environment at home and internationally, and sustainable use of natural resources,
- * economic prosperity through sustainable farming, fishing, food, water and other industries that meet consumers' requirements and
- * thriving economies and communities in rural areas and a countryside for all to enjoy“.

22

Balancing the sustainable triangle of environmental, social and economic objectives must be understood as the key to our future and governments must take the lead in promoting both the principle and the practice of sustainable development. In protected areas, environmental objectives carry a high premium but it will also be a factor in how we use natural resources generally. Sustainability has to be at the centre of Government policy, not wheeled out only when convenient and ignored when it uncomfortably challenges the status quo.

Now I believe we are facing up to that responsibility through a number of initiatives. I'll just mention a few. The UK's Biodiversity Action Plan, first published in December 1994, now involves over 400 plans for conserving species and habitats. It makes the condition of Sites of Special Scientific Interest one of our overall indicators of sustainability and shows how sustainability can be made to work both within and outside protected areas. This is also a major theme of the biodiversity strategy for England that we published last year. This strategy set out objectives and a five-year programme of action to ensure biodiversity is an integral part of other key policies such as agriculture, woodland development, water, wetlands, urban areas

and the marine and coastal environment. It also identifies ways in which the business sector and local communities can play their part.

I'm talking in this section a lot about targets and objectives and how we manage these things. And that doesn't set the world alight but, frankly, there's an old saying that 'what isn't measured, doesn't get done' and unless we are clear about the targets we are trying to achieve and the means by which we will achieve them - and make sure that that is fed into related policy areas - we will end up only having aspirations and not succeeding on delivery. So again the targets: the World Summit on Sustainable Development established a target to reduce biodiversity loss by 2010 and we already have our own target to get 95% of the SSSI area in England into favourable condition by then. That is a very challenging task. There are over 32,000 site owner or occupier relationships to manage and complex policy issues to be addressed. The influence of agriculture is a key factor and we are now considering how best to implement the reforms of the Common Agriculture Policy agreed this summer to facilitate a sustainable and environmentally sound agricultural industry. Incidentally, I am really going back to the point I made at the beginning about recognising the politics of change. We shouldn't underestimate some of the things that have been achieved in recent times. I was struck by the fact that Charles Clover of the Daily Telegraph - not a man who it is easy to persuade that things are being done positively by Government - referred to the outcome of Johannesburg as 'a Marshall Plan for the environment' and the achievements regarding the reform of the Common Agricultural Policy in the talks this summer should not be underestimated given the major forces against change that range right across the European Union.

Touching on climate change, low-lying areas like the Broads are particularly vulnerable to impact of rising sea levels and this has profound implications for coastal defence management. We know that we cannot stop the sea rising and yet many of our coastal landscapes are protected by national and international designations. In this part of the world we also have a highly dynamic shoreline and concrete defences designed to stop the sea would destroy many of the environmental features that we cherish and value. To resolve this problem we have developed a series of

Coastal Habitat Management Plans with support from the EU LIFE Nature Programme.

The plans that I refer to provide the information necessary that flood management schemes comply with the Habitats and Birds Directives, taking account of coastal evolution, sea level rise and the need to continue to reduce the risks of flooding to people and property. In other words, we are fully integrating habitat protection into our coastal defence policy and planning rather than seeing it as something that is aspirational and external. Because Coastal Management Plans look to long-term sustainability - we're talking about periods of 30 to 100 years - they force us to think about overall sustainability of the landscape with its people and with its environment. As with lakes this depends on our working with natural processes dynamically, taking account of a wide range of objectives including environmental, social and economic drivers.

We are also taking action in the National Parks. In June last year I launched the National Park Sustainable Development Fund. This enables Park Authorities to fund projects in the community aimed at developing and testing new ways of achieving more sustainable living in the countryside. The aim is to encourage those

who live, work or have other interests in the Parks to come up with ideas for integrating the environment, communities and the economy in a way that will boost the enjoyment of their special qualities while conserving and enhancing their natural beauty. The fund is open to individuals or organisations from private or voluntary sectors, and from within or outside National Parks. But as far as I'm concerned its main aim is to reach young people and to link those who live in the countryside and those who live in our towns and cities in order to overcome some of the false perceptions of the rural-urban divide. And to overcome that perceived urban-rural divide means engaging individuals. To date, over 100 projects have received support from the fund, focusing on a range of issues including regeneration, recycling, renewable energy, and the food supply chain. It is actually very encouraging to see the way in which people have engaged and responded to that opportunity - the power of individuals responding is very exciting and one of the most important influences that we have.

To close, then, I have given a very brief survey of our approach to safeguarding areas in Britain. I have left a lot out. For example, Areas of Outstanding Natural



Traditional reed harvesting in the Broads.

Beauty, which are broadly similar to National Parks but historically have not had the same cash support or the systems of governance which the Parks enjoy also are deserving of attention. New legislation enables us to correct some of the anomalies and we are working on that with the local authorities concerned.

Alun Michael, Minister „Department for Environment, Food and Rural Affairs“, England

Nationalparks (NP) und Sites of Special Scientific Interests (SSSIs) sind die Kernpunkte von Englands Schutzgebietsystem. Im Broads NP gibt es außer SSSIs noch Special Areas of Conservation (SAC) und Special Protection Areas (SPA) - zwei europäische Schutzkategorien - und Feuchtgebiete nach Ramsar. Jede einzelne Ausweisung dient unterschiedlichen Zwecken. Somit wird sichergestellt, dass die verschiedenen Gebiete den Schutz erhalten, den sie brauchen. Effektive „Governance“, beinhaltet, dass man betroffene Menschen bei der Entscheidungsfindung mit einbezieht, das ist essentiell für erfolgreiches Management von Schutzgebieten. In England gehört ein Teil der Fläche in Schutzgebieten der Öffentlichkeit, ein Teil gehört gemeinnützigen Organisationen, aber der größte Teil ist in Privatbesitz. Meistens handelt es sich um Kulturlandschaften, die über Jahrhunderte hinweg durch landwirtschaftliche oder andere ökonomische Nutzung gestaltet wurden. Diese müssen mit verschiedenen Managementstrategien gepflegt und dabei Interessenvertreter der Landes- und lokalen Regierung sowie der Grundstücksverwaltungen und des gemeinnützigen Sektors involviert werden.

In England gibt es zur Zeit 4000 SSSIs. Vor drei Jahren wurde eine neue Gesetzesgebung eingeführt, um die Effektivität des SSSI Systems zu verbessern.

Die wichtigsten Punkte sind:

- * Kontakt und Rücksprache mit Landeigentümern zu einem frühen Zeitpunkt im Ankündigungsprozess mit Betonung auf Partnerschaft und Kooperation.
- * Gesetzliche Pflicht für Eigentümer und öffentliche Institutionen zur Rücksprache mit Naturschutzorganisationen, bevor sie Maßnahmen zustimmen oder durchführen, die dem Gebiet schaden könnten.
- * Befugnis, mit den Landbesitzern zur Finanzierung von positiven Managementmaßnahmen zu verhandeln.
- * Durchsetzungsbefugnis der Körperschaften des öffentlichen Rechts für Naturschutz, die als letztes Mittel eingesetzt werden kann.

NP dienen zum einen dem Schutz und Erhalt von Landschaften, Wildtieren und Kulturerbe, zum anderen der Erholung und der Bildung der Menschen. Diese Ziele müssen so verfolgt werden, dass sie den ökonomischen und sozialen Bedürfnissen der Bevölkerung entsprechen. Dafür wurden letztes Jahr die Nationalparkbehörden mit neuen Gremien zusammengeführt, den „Regionalen Entwicklungsbüros“, um die ökologischen, sozialen und ökonomischen Ziele gemeinsam zu verfolgen. Die Governance der NP liegt somit in der Verantwortung dieser speziellen Einrichtungen.

Eine weitere Aktivität auf NP-Ebene ist der im letzten Jahr eingerichtete „Sustainable Development Fund“. Dieser ermöglicht den NP-Verwaltungen, Gemeindeprojekte mit Schwerpunkten wie Erholung, Recycling, erneuerbare Energien oder Nahrungsversorgungskette finanziell zu unterstützen.

Die Ausweisung von Schutzgebieten reicht nicht aus, um eine gesunde Umwelt mit Platz für Menschen und Wildtieren zu erhalten. Nachhaltige Entwicklung ist das oberste Ziel, aber es ist nicht einfach, ein Gleichgewicht zwischen den unterschiedlichen Ansprüchen zu bewahren.

6 Speeches of Supporters

Dr Graham Gladden

Global Water Initiative Coordinator, Unilever, UK



Dr Graham Gladden, Unilever Global Water Initiative Coordinator, UK. In developing markets, Unilever has been involved in raising awareness at a local level helping to build more sustainable communities.

Water for Everyday Needs - A Company's Contribution

We live in a world full of people, a world where many regions are under serious water stress. In this world Unilever meets the everyday needs of some 150 million consumers with food brands like Lipton and Knorr, and Home and Personal Care brands like Omo, Dove, Lux and Lifebuoy.

Its business is inextricably linked with water. Almost all our products need water: to grow the ingredients, to make them in our factories or for consumers to be able to use them. Without water there is no tea, no soup, no bath and no washing: it is that simple.

Further the water issues we face are huge and complex. They are linked to poverty and health, economic development, involve all members of society, and cross country borders.

Unilever brands are sold in 150 countries around the world, many of them among those predicted to suffer high water stress by 2025 - of course there are implications for our business. As a consequence, Unilever has a corporate responsibility towards water. We are already playing our part - and we want to do more - to help ensure that in the future there is enough clean water to meet people's everyday needs - everywhere.

Since 1998, we have been focusing on water through our Sustainable Water Initiative which is one of three Unilever sustainable development initiatives - the others being fisheries and agriculture.

Looked at from Unilever's point of view, the apparent dilemma is this: ever-wider access to our products helps more and more people improve their lives. But consumers depend heavily on water to use our products successfully. As our business grows, so - in theory - does pressure on water availability.

Our thinking on this has led us to two conclusions:

- * We need to make our own water imprint sustainable so that our business growth and success does not mean more pressure on water availability.
- * Secondly, we need to work to raise awareness about water with consumers so that increased use of our products does not increase the pressure on clean water.

The task which arises is not an easy one, especially since Unilever's imprint goes from irrigating tea in Tanzania and tomatoes in Brazil, to water used by consumers washing their hair in India, or doing their laundry in Japan. This is not a task for businesses like Unilever to tackle alone; the core of our approach is to work in wide-ranging partnerships which we are looking to develop, replicate and make ever more effective.

The first step to making the water imprint more sustainable is simply to measure, as well as possible, the current imprint of the business on water. For Unilever's water imprint, the water use for all our products is analysed across the full life cycle from raw material sourcing to consumer use. It may not be completely accurate, but it provides a firm basis for moving forward.

The water imprint analysis confirms that most of the water impact is in two areas upstream - in the production and sourcing of ingredients - and downstream, in consumer use of products.

The biggest user of water is ingredient production in the Foods business. Two-thirds of raw materials come from agriculture and this accounts for about half of the overall water imprint.

In Home and Personal Care, by far the biggest part of our water imprint is the water that consumers use when using products. We all need clean water to shower or

bathe, do our laundry and clean our teeth. Without clean water much of the portfolio of products would be unusable.

„In house“ manufacturing operations account for only 3% of the total water imprint. Even so this is an area that has been worked on for a long time, and improvements are still being made. It's important to remember that although the impact is a small part of the overall picture at the local level it can be much greater. Last year, water consumption was reduced by 16% compared with 2001 and overall, it's been reduced by 37% since systematic measurement started in 1997. Similarly, energy consumption has reduced by 16% since 1998 and nearly 10% now comes from renewable resources.

Where possible wastewater is regarded as a useful resource leading to a target, for many of our sites, of liquid effluent. For example this has been achieved already in 53 out of 76 sites in India. Treated wastewater there is recycled, or used to irrigate land on the site.

It is clear that **upstream** water use must be a big priority, and the sustainable agriculture team is working closely with our growers with a focus on the key raw materials of tea, palm oil, spinach, peas and tomatoes.

26

Agriculture is the biggest user of freshwater overall, and getting more 'crop per drop' is one of the priorities highlighted by the UN Year of Freshwater. Tomatoes are particularly demanding because they need lots of water to achieve both yield and fruit quality. Unilever is one of the world's largest producers of tomato-based sauces and pastes and some of the tomatoes are grown on over 4,000 hectares of farmland in Australia. There, where drought is a problem, we have worked with our growers to reduce water consumption by converting from furrow to drip irrigation. So far, some 80% of the land has switched to drip irrigation and water consumption has more than halved. What is more, our farmers in Australia discovered that not only has drip irrigation cut their water use, it also resulted in better yields - fully 100% better.

Based on the success in Australia, trials of drip irrigation have been carried out in Brazil where yields increased by as much as 50% and enabled a 25-50% reduction in fungicide application and a 25% reduction in insecticides.

For the Home and Personal Care Division, the issue and the opportunities are downstream in consumer use

where complex issues of sustainable consumption arise and where there is a need to encourage the sustainable supply and management of water that promotes economic development.

Here businesses like Unilever have a responsibility to develop products and services that allow consumers to meet their aspirations but with less water. At the same time there is a need to raise awareness with our consumers about sustainable water issues and the consequences of the choices they make.

On the product innovation side, the big challenge is to design products so they need less water to function and have less impact on water without compromising on performance or value. That is at least as important in developing markets as in developed ones.

Back in 1998, when addressing the World Detergents conference, our other chairman, Niall FitzGerald, challenged the detergents industry to „raise the priority of product development for the toughest conditions, including washing in little water, cold water, grey water... even salt water.“

There is still a lot more to do. It is not something that one company can do alone. It involves working in partnership with appliance manufacturers and others to determine what might be the wash process of the future. Sustainable consumption must be firmly in innovation processes and in all everyone's minds. Companies need to rethink the boundaries of competition and to see where co-operating on sustainable development advances benefits all.

As for raising awareness, the issues are even more difficult. People do have genuine concerns about sustainability issues and the world they will leave to their children. Yet they don't always make the link between that and their desire to drive their four-wheel drive people-carriers to the supermarket and what they buy when they get there. Nor their wish to get those clothes washed today even though the machine's not full yet.

In Europe there has been a detergents industry approach (the voluntary Code of Good Environmental Practice) agreed with the European Commission. This led to the introduction of new formulations and innovative products. In parallel, consumers have been provided with useful information on how to optimise their washing habits. This was achieved through a unique pan-European

communications campaign called 'Washright', using on-pack advice, an internet site and TV advertising. Over the 5-year period from 1997 to 2001 a significant reduction in the consumption of Household laundry detergents, poorly biodegradable ingredients and the use of energy and packaging have been achieved. The focus has been very much on helping consumers to wash more effectively and more efficiently whilst at the same time helping to protect the environment.

Therefore, much of the effort goes into raising awareness from the bottom up. Working together with others, on shared issues and needs, from a local perspective.

That may mean - in developed markets - partnerships like the one we are involved with in the Mersey Basin in the UK, looking at local river catchment conservation.

In developing markets, Unilever has been involved in raising awareness at a local level helping to build more sustainable communities; for example in Indonesia with the Clean Brantas river basin project. The Brantas is 300 km long, the most urbanised river basin on Java, including the industrial city of Surabaya, but still with extensive rice cultivation.

A close partnership has been built up with the villagers, a local university, NGOs and government agencies. Unilever Indonesia has focused much of its effort on how to motivate the four villages to use and maintain the sanitation units, waste bins, and composting facilities that have been introduced. As a result the riverbank has been cleaned up and the villagers have been encouraged to turn their houses round so they face the river. What had been a dump waste is now, effectively, the front yard! Merinda trees, whose fruit is prized for export, have been planted and some small-scale fish farming commenced, thus providing an element of economic development. It may only be a small part of the catchment, but the idea is that the project can be replicated, by encouraging other companies along the river to 'adopt' their local villages.

Looking even further downstream, we know we need to do more to understand the impact of our products on water in water-stressed areas. We're very good at understanding the fate of our products where there's effective wastewater treatment, but what about where there isn't? Unfortunately this situation often happens in areas that also suffer water stress, and where concentrations of salts are likely to be higher.

Recognising this concern, Unilever South Africa has developed a partnership with Rhodes University to open the Unilever Centre for Environmental Water Quality, with the aim to improve environmental water quality management in South Africa. Researchers at the centre are investigating the effects of chemicals in water ecosystems, and developing a new method of combining water chemistry, biomonitoring and ecotoxicology information. The centre also offers training to students and employees of the Department of Water Affairs and Forestry.

As mentioned briefly before, our water projects all have one other thing in common - SWIM. SWIM - or Sustainable Water Integrated Catchment Management - was developed together with UK sustainability organisation Forum for the Future and is based on three principles:

- * Water development and management should be based on a participatory approach, involving users, planners, policymakers and all other appropriate stakeholders, at all levels, taking account of social and cultural diversity.
- * Fresh water is a bounded, finite but infinitely renewable and vulnerable resource, essential to sustain life, development and the environment.
- * Water has an economic, social and environmental value in all its competing uses.

Our SWIM principles give us a practical partnership approach to ensuring that the sustainable water efforts we engage in are firmly rooted at the local river basin or catchment level, and are effective and successful.

Against this background what can companies like Unilever contribute to meeting everyday water needs? It needs businesses to

- * focus on areas where they have influence to make a difference
- * provide people and know-how, for example
- * marketing and communications skills
- * science and technology expertise.
- * make use of the combination of global reach and local connections

There's much still to do here and we know we cannot - any of us - go it alone. We need to multiply the many

successful community-based water initiatives that are already out there. And we also need to think afresh to develop new kinds of wide-ranging and effective partnerships, all the while grounded in a river basin perspective.

Dr. Graham Gladden, Global Water Initiative Coordinator, Unilever, England

In unserer Welt gibt es Regionen mit permanentem Wassermangel. Unilever und seine Produkte haben untrennbar mit Wasser zu tun, deshalb hat unser Unternehmen eine große Verantwortung in Bezug auf diese Ressource. Wir wollen dazu beitragen, dass in Zukunft alle Menschen überall ausreichend sauberes Wasser zur Verfügung haben. So existiert seit 1998 die Initiative „Nachhaltiges Wasser“, neben Fischerei und Landwirtschaft eine von drei Initiativen zur nachhaltigen Entwicklung.

Unilever befindet sich in einem Dilemma: je mehr Menschen Zugang zu unseren Produkten haben, desto mehr Druck entsteht auf die Wasserverfügbarkeit. Das hat zu den Schlussfolgerungen geführt, dass zum einen unser Unternehmenswachstum und -erfolg nicht zu einem größeren Druck auf die Wasserverfügbarkeit führen darf und deshalb unser Umgang mit Wasser „nachhaltig“ werden muss. Zum anderen müssen wir mehr Bewusstsein beim Konsumenten wecken.

Der erste Schritt zur Senkung des Wasserverbrauchs ist herauszufinden, wie viel Wasser vom Rohmaterial bis zum Endverbraucher benötigt wird. Die Analyse hat bestätigt, dass die größte Wasserbelastung durch „upstream“-Verbrauch, also der Zutatenproduktion in der Nahrungsmittelindustrie (zu zwei Dritteln Landwirtschaft) sowie andererseits durch „downstream“-Verbrauch der Konsumenten (v.a. für Hausarbeit und Körperpflege) entsteht. Der „In house“-Verbrauch steuert nur zu 3% insgesamt bei.

Der „Upstream“-Wasserverbrauch hat eindeutig Priorität. Der Wasserbedarf in der Landwirtschaft kann z.B. durch Umstellung auf „Tröpfchen bewässerung“ mehr als halbiert werden, wie es beim Tomatenanbau in Australien sowie in Brasilien der Fall war. Der Ertrag konnte dabei sogar deutlich verbessert werden.

Im Haus und Körperpflegebereich müssen Produkte entwickelt werden, die den Wünschen der Verbraucher entsprechen, jedoch weniger Wasser benötigen.

Parallel dazu müssen wir die Verbraucher über einen alternativen Wassergebrauch informieren.

In Europa gab es 1997-2001 eine Kampagne „Washright“ von Seiten der Waschmittelindustrie in Zusammenarbeit mit der Europäischen Kommission, die zur Entwicklung neuer Waschmittelformeln und -produkten führte. Parallel dazu wurden den Verbrauchern über Internet, TV-Werbungen und Gebrauchsanweisungen Tipps zur Optimierung ihrer „Waschgewohnheiten“ gegeben. In 5 Jahren kam es so zu einer signifikanten Reduzierung des Waschmittelverbrauchs sowie des Einsatzes schlecht abbaubarer Substanzen und Verpackungsmaterialien. Dieser Erfolg ist auf eine Zusammenarbeit von vielen Unternehmen und Branchen zurückzuführen.

In Entwicklungsländern ist Unilever beteiligt an Projekten, die Bewusstsein auf lokalen Ebenen schaffen sollen. Ein Beispiel ist das Projekt „Clean Brantas River Basin“ in Indonesien, bei dem eine Partnerschaft mit den Dorfbewohnern, der Universität, NGOs und Regierungsorganisationen aufgebaut wurde, um sanitäre Einrichtungen, Mülltonnen und Kompostanlagen einzurichten und ihren Gebrauch zu fördern.

In Südafrika wurde zusammen mit der Rhodes Universität das „Unilever Centre for Environmental Water Quality“ aufgebaut. Erforschung der Wirkung von Chemikalien auf Wasser und Entwicklung von neuen Methoden, die Kenntnisse aus Wasserchemie, Biomonitoring und Ökotoxikologie vereint sind Arbeitsschwerpunkte des Zentrums.

Unternehmen wie Unilever sollten Personal und Know-how im Bereich Marketing, Kommunikation, Wissenschaft und Technologie bereitstellen, sich auf Gebiete konzentrieren, wo sie Einfluss haben und somit etwas bewirken können, und sie sollten ihre lokalen Beziehungen und globale Reichweite nutzen, um einen Beitrag zur Reduzierung des täglichen Wasserverbrauchs zu leisten.



Tour on Solar Boat „Ra“. The use of solar powered boats is a great opportunity to make tourism more sustainable and to reduce greenhouse-gas emission.

Sir Frederick Holliday

Chairman of Northumbrian Water Ltd, UK

In the time available I must be more categorical and dogmatic than I usually am, but that can be corrected in debate. For example - I accept the phenomenon of global warming and that it is, in considerable part, the result of human activities. I accept that an ideal would be a non-carbon-burning future. I believe that the world cannot accept the present inequalities between nations in standards of personal development and standards of living. In my own limited worlds of water and waste, I have seen the dreadful effects on people that lack of easy and economic access to potable water and efficient sewerage systems can have.

It is easy to describe the condition of our present world and we can with varying degrees of uncertainty construct some ideal future world - if we can agree on what cultural paradigm it should be founded. The challenges are getting from the present to that chosen future. How long will it take? How long have we got? By which route should we travel? How much energy will the journey require and how is it to be supplied?

In considering these matters I have been greatly influenced by the works of two people. Firstly, Lord Blake (1988) who analysed what he termed 'The tyranny of Democracy' and secondly by Professor John Roberts (1985) who described 'The triumph of the West'. Lord Blake warned that, whilst democracy was perhaps the best political framework available, it had its weaknesses. Lord Hailsham named the major weakness „elective dictatorship“. It is not easy to be a minority when the

majority always has its way, e.g. in Northern Ireland, parts of the Middle East, Central Africa, and perhaps within the British legislative and planning systems. It is this inequality that has led to the creation of a Human Rights Convention to protect minorities. Human Rights are one thing but what rights do trees and birds have? Or a fragile coastline? I shall return to that issue in a moment. For his part, Professor Roberts postulated that the ideologies and lifestyles of the West (ie Europe and latterly the US) are being adopted world-wide; adopted even when the historical cultures are very different.

When the two philosophies are combined, ie democracy and westernisation, then a future is foreshadowed that needs approaching with caution. It will, for example, demand high and constant levels of energy input. I know from experience in the water industry that adopting standards such as those in the Urban Waste Water Directive has boosted energy requirements considerably (circa 20%) - and that is but a tiny example of what will be a world-wide feature. A sustainable future cannot be built on low or unreliable energy levels. Thus we must pursue energy efficiency and new sources of energy as a matter of urgency. There is a global mismatch between the distribution of resources such as water, food and energy and the distribution and needs of populations (eg in Africa, China, Spain and some southern states of America). We must move either resources to people or people to resources. Relocating people is difficult in a democracy; to take a local example, successive British Governments have fought shy of enforced relocation of industry and people from the overcrowded and resource-limited South-East. Economic migrants are another powerful example. World-wide trade thus becomes an essential part of global sustainability. It makes little sense in Britain to use energy to grow 'sunshine crops', but we can export water in the form of grain or dairy products to countries short of water. Already the import of 'virtual water' in the form of grain into Egypt is equivalent to a second Nile river. And grain is an easy way to store water as Joseph demonstrated to the Pharaoh. Underpinning global trade is the need for sound money and reliable credit facilities, and thus a need for secure banks and credit agencies.

Most of all we need the spread of skills and ingenuity. We are fortunate in having available in the future the potential intellectual capabilities of large numbers of so-far under educated and under utilised people in many highly populated countries. That brainpower is probably

the finest untapped resource still available to our species. Finally we shall need space; space on which to construct houses, schools, hospitals, power sources and so on. And it is in this area of available habitable space that we face some of the most challenging aspects of global warming. For if sea-levels rise, if flooding and inundation become the norm, if temperature regimes alter and new deserts appear, then many people (perhaps 150 million people according to Sir John Houghton, Co-Chairman of the UN Global Warming Panel), will be displaced, along with their schools, factories, farms, etc. And those displaced people, although mainly in the East, cannot be ignored by the West. They will need social integration into the new world we have envisaged. The present world is finding increasing difficulty in dealing with refugees, even in hundreds and thousands. In future, we may be contemplating the relocation of a number equal to half the population of the United States. I suggest that such a challenge will be a test for global democracy - since governments must heed the voices of their electorates if they are to stay in power. Human prejudices as well as human needs and wants will exert their influences through the democratic processes and will determine government policies. Commerce and industry will supply the skills and probably the considerable capital needed to construct the future, since governments find it difficult to both tax and stay in power.

Where will those democratic decisions leave species and habitats? I said earlier that they have no intrinsic rights. How could they? 'Rights' are a product of the human mind. Whatever rights are conferred, are conferred by humans. Once again I have been influenced by the thoughts of one person - Christopher Stone, an American lawyer who explored whether natural objects should have legal rights (Stone 1972). His ideas, inspired by the work of John Muir, may need revisiting as globalisation and global warming exert their pincer power on the earth's future.

Finally, to the subject of our conference - for it is on the coastlines of the world that I see the greatest pressures being exerted. It is there that we shall measure the rises in sea level and inundation. They will be the sites for windfarms, wave and tidal power generators, container ports, sewerage terminals, new cities and new airports. The offshore (shelf) zone is considered less visually sensitive and therefore more easily developed than onshore. To deny coastal development may appear to

be denying humanitarian needs and desirable material advances. Thus the two global forces of warming and well-being will in future drive large parts of the world economy. The World Trade Organisation (with China and Taiwan joining) now represents 142 nations, 97% of the world's people and 90% of world trade. We, ie conservationists must face with realism the implications of globalisation and consumerism. We must not be merely 'the dogs that bark' as that mighty caravan passes.

Where can conservationists find their place and contribute to the sort of future I have outlined? We must be neither Canutes nor Luddites, we must develop and re-examine our philosophies and arguments. Human evolution has produced a powerful industrial and commercial species that is transforming the earth, but it has also produced the ideas and values of men like Christopher Stone and John Muir. We must find more of that vision and dedication, in quantity and quality to match the changing expectations and rising living standards of the world, and argued with conviction enough to influence the democratic processes of government. For while commerce and industry will provide the motive power, it is governments which provide the laws and the Regulators that determine the direction of social evolution.

We should also recognise that, while science has an important contribution to make, it is a limited one. Science and scientists can take sides; science can be used selectively. What is most important in decision taking is 'ideological persuasion'; that is, the belief that individuals have of what is right and what is wrong. And those beliefs are usually driven by self-interest as much as by altruism. It is regrettable that many western countries seem to have concluded that global warming is unlikely to be too detrimental to their own interests when expressed in terms of gains and losses of GNP. World-wide the sums look very different (ten times so).

Sir Crispin Tickell once famously said - „We know what to do, what we lack is the will to do it“, and I was recently at a debate on these issues when John Houghton reminded us of the words of Edmund Burke - „No man made a greater mistake than he who did nothing because he could only do a little“. But at that same debate a former Astronomer Royal (Sir Arnold Wolfendale) asked „Does it matter, in the context of geological and evolutionary time, that this generation warms the globe“?

Certainly, events of the past tell us that the earth is almost certain to experience further gross climatic change in future, regardless of what we do. Perhaps another ice-age which, as in the past, will 'cap' much of the northern hemisphere with ice. And looking back, do we feel sorrow or guilt at past cataclysmic events and extinctions? Is it only the vanity of Homo sapiens that is at stake?

The great palaeontologist/theologian Teilhard de Chardin (1959) said „With man, evolution became conscious of itself“. Perhaps it is that evolving consciousness that requires and drives us to action.



Wherries – the Broads' traditional sailing boats.

Sir Frederick Holliday, Vorsitzender Northumbrian Water Ltd, England

Man kann den Zustand unserer gegenwärtigen Welt leicht beschreiben, und wir können mit einigen Unsicherheiten eine ideale Zukunft konstruieren. Die Herausforderung für uns ist es, zu dieser erwählten Zukunft zu gelangen. Ich wurde stark beeinflusst durch die Arbeit von Lord Blake mit seiner Analyse „Die Tyrannei der Demokratie“ und Professor John Roberts, der den „Triumph des Westens“ beschrieben hat. Obwohl Demokratie vielleicht den besten politischen Rahmen bietet, birgt sie dennoch einige Schwächen. Minderheiten haben es schwer in einer Welt, in der Mehrhei-

ten regieren, aber daraus entstanden die Menschenrechte. Aber welche Rechte haben Bäume, Vögel oder Küsten?

Wenn Demokratie und „westliche Lebensweise“ kombiniert werden, dann wird das in Zukunft einen hohen Aufwand an Energie erfordern. Es existiert ein globales Ungleichgewicht zwischen Ressourcenverteilung und Bedürfnissen der Menschen. Wir müssen entweder die Ressourcen zu den Menschen bringen oder andersherum. Welthandel wird daher zu einem wichtigen Instrument zur globalen Nachhaltigkeit.

Vor allem brauchen wir die Verbreitung von Einfallsreichtum und Fachwissen. Glücklicherweise gibt es in dicht besiedelten Ländern ein großes Potential an intellektuellem Leistungsvermögen. Weiterhin brauchen wir Platz, um Häuser, Schulen oder Krankenhäuser zu bauen. Und diese werden auch an Standorten stehen, die vom Klimawandel betroffen sein könnten. Es wird also in Zukunft eine Menge an Flüchtlingen geben, die irgendwo leben müssen. All das wird ein Test sein für die globale Demokratie.

Küsten werden in Zukunft dem größten Druck durch Klimawandel ausgesetzt sein, denn dort werden die Auswirkungen des steigenden Meeresspiegels durch Überschwemmungen zu spüren sein. Dort werden aber auch Windkraftanlagen, Wellen- und Gezeitenkraftwerke, neue Städte und neue Flughäfen stehen. Küstenentwicklung zu verneinen, bedeutet auch menschliche Bedürfnisse zu verleugnen. Wir Naturschützer müssen mit Realismus den Folgen von Globalisierung und Konsum entgegenreten.

Naturschützer müssen ihre Philosophien und Argumente überdenken und weiterentwickeln, sie müssen mit neuen Visionen und Hingabe den sich ändernden Erwartungen und steigenden Lebensstandards der Welt gewachsen sein.

Ereignisse der Vergangenheit deuten an, dass es in Zukunft zu dramatischen Klimaänderungen kommen wird. Andererseits konnte sich Homo sapiens erst durch Katastrophenereignisse und Artensterben so weit entwickeln. Der Paläontologe und Theologe Teilhard de Chardin sagte: „Mit dem Menschen wurde die Evolution sich ihrer selbst bewusst“. Vielleicht treibt uns dieses sich entwickelnde Bewusstsein zu weiteren Handlungen an!

Dr Klaus Rick

Director Environmental Department,
T-Mobile, Germany



Dr Klaus Rick, Director Environmental Department, T-Mobile, Germany. Sustainable corporate management is a clear spur to increase efficiency and reduce costs.

Our Responsibility in Shaping the Future

As one of the world's leading mobile communications operators, T-Mobile provides innovative services which have become an indispensable part of the central nervous system of business and society. As one of the divisions of the Deutsche Telekom Group, we are conscious of the fact that an integrated balance between the aspects of economy, ecology and society plays a key role in maintaining the long-term prosperity and increasing the profitability of our company. Consequently, management decisions aimed at ensuring the healthy economic growth of T-Mobile also bear an equal responsibility for people and the environment.

Sustainable corporate management is a clear spur to increase efficiency and reduce costs. And this leads to a competitive advantage through organisational and process innovation and is documented in the form of increased customer satisfaction and employee motivation. T-Mobile has generated a considerable impact with sustained business methods and projects in the areas of education and nature conservation, developed from environmental management and corporate communication. This reinforces T-Mobile in its efforts to intensify and integrate these activities throughout the group.

Mobile Telecommunication Networks and their Influence on Climate Change - On the right Track

Viable economic development can only succeed if the value growth is achieved while respecting social and ecological interests. The conservation of resources and high levels of customer satisfaction therefore hand in hand at T-Mobile: On the technical side, for example, the mobile communications network systems are constantly being optimized as regards their energy efficiency and their emissions.

And this is the link to this conference. It is not known by everyone how much energy consumption is induced by digitalized telecommunication systems - wired or wireless. In 2002 Deutsche Telekom needed overall about 4.3 Tera Watt Hours (4,300 000 000 000 Wh) in Germany to keep our networks running. All telecommunication operators in the European Union need 1,5 % of the energy production in the EU. It is a part of my business to reduce this consumption - and it leads to less Carbon dioxide.

So, we are progressing prudently and in collaboration with international partners in the roll-out of range of new, 3 G third-generation mobile communications services for our customers (UMTS, W-LAN, WCDMA etc).

Operating ten thousands of base stations T-Mobile already uses more and more ecologically and energy efficient cooling systems for its equipment, increasingly employs recyclable, environmentally sound materials and, in coordination with manufacturers at the planning stage, takes into consideration the end of the lifecycle of the equipment used, always based on the certified corporate environmental management system, in place since 1998, in line with ISO 14001 and the European Union's Eco-Management and Audit Scheme EMAS.

Regarding the power consumption and in addition the air-conditioning of our technology, we are directly at the border of a new stage. With 3 G only some months ago, regrettably, we still were expecting a rise of about factor four in energy consumption for the new parallel mounted mobile network technology of 3 G aside to GSM. Most of the hardware is manufactured focused on reduced production costs and not on efficient operating. But there is a change now: The new and joyful fact we can pronounce today - and you are the first to hear this - is that we just have received new and advanced hardware that will need - this show our newest

measures and researches - much less than the expected energy consumption. So as it seems today we can significantly reduce our energy prognosis and replan our infrastructure concept for 3 G at T-Mobile. Others will follow.

This is a success of cooperation. We were insisting on energy efficient hardware for years and had intensive cooperation with our suppliers. This development was not caused by cost reduction plans as some may think. In comparison to our aggregated infrastructure costs the price for electrical energy is too low for a business case here. It is a proof of our approach and should document the responsibility of our branch that we work together towards sustainability.

Hand-held Systems, Services and Products

The intelligent use of resources in mobile phones allows the ecological burden, i.e. the environmental impact of production, normal use, misuse through charger stand by losses and disposal, to be further reduced. As T-Mobile does not produce these devices itself, it exerts its influence in this area, too. Working together and passing on customer feedback to the manufacturers generates even better concepts: modern mobile phone charges, for example, need only a fraction of the electric energy of earlier models, ecologically unsound heavy metal components, battery or display components will soon be a thing of the past. Nationwide disposal and recycling systems via the T-Punkt shops have been in place for years. Since 2003 we sponsor each hand-held taken back with 5 Euros for the Deutsche Umwelthilfe at Lake Constance.

With an annual purchasing volume of billions of Euros, T-Mobile exerts its influence on its suppliers at various levels: in addition to the ecological compatibility as described, T-Mobile also demands evidence of compliance with international social and ethical standards in the manufacture of the products and systems it purchases. In line with the „Global Compact“ of the United Nations, we reinforce principles such as the upholding of human rights and the avoidance of child labor.

T-Mobile's comprehensive sustainability standards on procurement and processes for networks, equipment and services are brought together in a manual, the „3 G Greenbook“. This is the basis for future cooperation

with leading manufacturers of mobile communications systems, with the focus on future-oriented sustainable systems and products.

In many areas, the mobile transmission of information already generates dematerialization effects, i.e. the lack of physical transport and the reduction of consumption. Examples include e-mail, mobile Internet, short and instant messaging or wireless sensor systems. These services help avoid unloaded journeys and incorrect loading with the help of telemetric data transmission. Advanced radio-based traffic routing systems reduce traffic jams and display alternative routes. As reduction in the amount of traveling using the convenient capabilities of wireless telecommunications and new forms of remote diagnosis promote improved utilization of resources. T-Mobile will continue to expand these sustainable product solutions and the opportunities they offer.

It can be seen that there are already many elements of T-Mobile's product portfolio and its internal processes which either are sustainable or which support sustainability. Overall, this leads to a considerable improvement in the utilization and allocation of resources, not only from the original business-oriented point of view, but also from a macroeconomic perspective. T-Mobile and its competitors can be proud to point to the contribution of mobile communications technology to the overall, macroeconomic increase in economic and ecological efficiency.

As the generation of profits is no longer seen as an adequate justification of business operations by many interest groups and opinion formers (customers, neighbours, investors, politicians), they are demanding additional aspects in the composition of corporate culture which, as part of sustainable corporate management, are brought together within corporate citizenship. T-Mobile meets these demands. In the educational and cultural sector, for example, measures have been taken to increase the budget for promoting school and university projects. The field of cultural and sport sponsoring will continue to enjoy broad scope. Apart from eco-sponsoring, activities are also being intensified for the protection of minors (unsuitable content material, children's protection) and in the field of debtor counseling - these are all different aspects of our overall responsibility to society. New motivational concepts are also being implemented for the employees

of T-Mobile to help them reconcile professional and family demands (work-life balance) and to increase levels of satisfaction.

Finally, customers, partners and investors will only value our products and services in the long term if they are of an excellent quality and, at the same time, do not entail negative social and ecological side effects. T-Mobile promises to act accordingly.

Dr. Klaus Rick, Geschäftsführer Umweltabteilung, T-Mobile, Deutschland

Nachhaltiges Unternehmensmanagement ist ein klarer Ansporn zur Erhöhung der Produktivität und Kostensenkung. Dies führt zu einem Wettbewerbsvorteil durch Innovationen im Bereich Organisation und Verarbeitung, bestätigt durch Kundenzufriedenheit und Motivation der Arbeitnehmerschaft. Prosperierende ökonomische Entwicklung kann nur dann erfolgreich bleiben, wenn Wachstum mit sozialem und ökologischem Interessenausgleich geschieht.

Ein Beispiel: 2002 verbrauchte die Deutsche Telekom über 4 Tera Wattstunden an Energie. Alle Telekommunikationsbetreiber in der EU verbrauchen mehr als 1,5% der gesamten Energieproduktion in der EU. Es ist eine meiner Aufgaben, diesen Verbrauch zu senken - und damit auch die CO₂-Produktion. In unseren mehreren zehntausend Basisstationen setzt T-Mobile mit Nachdruck auf ökologisch unbedenkliche Komponenten, energiesparende Kühlungssysteme und recycelbare Materialien und berücksichtigt in enger Koordination mit den Herstellern in der Planungsphase die Lebensdauer der Anlagen., Aufbauend auf unsere seit 1998 zertifizierten Umweltmanagementsysteme nach ISO 14001 und EMAS - wir waren in Europa innerhalb der Branche die Ersten-betrachten wir den gesamten Standort mit seinen Auswirkungen. Durch intelligenten Gebrauch von Ressourcen kann man auch die Umweltbelastung der Endgeräte, die z.B. bei deren Produktion, Nutzung, beim Ladevorgang oder deren nicht fachgerechten Entsorgung entstehen, weiter reduzieren. Zusammen mit den Herstellern erarbeiten wir bessere Konzepte: die modernen Mobiltelefone brauchen nur noch einen Bruchteil der elektrischen Energie älterer Modelle, ökologisch unverträgliche Schwermetallkomponenten in Batterien oder Display-Bausteinen werden bald ganz der Vergangenheit angehören. Deutschlandweit gibt es seit Jahren funktionstüchtige und kundennahe Entsor-

gungs- und Recyclingsysteme über den T-Punkt. Seit diesem Jahr zahlen wir für jedes abgegebene Handy 5 Euro an die Deutsche Umwelthilfe e.V. am Bodensee.

T-Mobile verlangt außerdem Belege für die Einhaltung internationaler sozialer und ethischer Standards bei der Fertigung der Produkte und Systeme, die es erwirbt. Ausgerichtet am „Global Compact“ („Globalvertrag“) der UN unterstützen wir Prinzipien wie die Einhaltung der Menschenrechte und die Vermeidung von Kinderarbeit.

Die umfassenden Nachhaltigkeitsstandards bei der Beschaffung und der Verarbeitung von Netzwerken, Bauteilen und Dienstleistungen, werden in unserem „3 G Greenbook“ zusammengefasst, welches die Basis darstellt für die zukünftige Zusammenarbeit mit führenden Herstellern von mobilen Kommunikationssystemen und zukunftsorientierte nachhaltige Systeme, Produkte und Dienste anstrebt.

Für viele Interessengruppen ist Gewinn allein keine Rechtfertigung mehr für Geschäftstätigkeit. Es werden zusätzliche Aspekte im Aufbau der Unternehmenskultur verlangt, die kombiniert werden mit gesellschaftlichem Engagement des Unternehmens. Im Sektor Bildung und Kultur wurde deshalb unser Budget für Schul- und Universitätsprojekte angehoben und auch der Bereich Sport- und Kultursponsoring wird in großem Umfang weitergeführt. Zusätzlich zum Ökosponsoring und zum Jugendschutz werden unsere Aktivitäten bei der Schuldnerberatung verstärkt. Neue verfeinerte Konzepte für unsere Mitarbeiter sollen zur besseren Abstimmung von Beruf und Familie und damit zu mehr Zufriedenheit führen - für ein verantwortungsvolles Unternehmen selbstverständlich.



Volunteers working in the Broads National Park.

7 Governance of Lakes and Wetlands

Overview of Governance of Each Living Lake

Andrew Moore

Environmental Consultant

Summary

Governance of protected areas is a topic of frequent discussion today. Governance may be understood as the way people decide to lead organisations, places or natural resources, and communities. A review of governance models and structures at Living Lakes reveals a complex governance picture involving all levels of government and international bodies, as well as emerging innovative approaches involving NGOs, corporations, partnerships, and collaborations. The results of an opinion survey of Living Lakes members suggest the need for further attention to the pursuit, adoption, and spreading of good governance practices. Conference workshops and discussions offer the first opportunity for a thorough treatment of these issues and practices. The Living Lakes network could adopt ongoing means of proclaiming and promoting good practices, and assisting individual members with governance challenges and opportunities.

Background

Governance of protected areas, including vital resources such as the Living Lakes, is a current „hot topic“ of discussion among environment, development, and funding agencies worldwide. The emphasis in the discussion often falls on topics such as decentralisation and participation. And there is a widespread recognition that discussions of governance affect or relate to other topics - as in this conference, with climate change. For instance, the ways decisions get made about climate change, and who makes the decisions, are relevant topics tomorrow.

The term „governance“ itself needs explaining. In general, governance has to do with the ways people decide to lead and manage organisations, places or

natural resources, and communities of any size. Often, discussions of governance hone in on the makeup, operations, responsiveness, and effectiveness of NGO boards, public commissions, and similar governing bodies. Another ongoing topic is the quality and degree of representation provided by elected and appointed bodies. A frequent viewpoint in current discussions is the notion that the group of stakeholders for a given organization, place, or community has been defined too narrowly in the past. Still another view has it that discussing governance leads to clarifying who sets the end purposes for an organisation, and who implements the means of pursuing those ends.

At least two of the Rio Treaty principles set a context for discussions of natural resource governance. As summarized by the World Resources Institute, these include principles of:

- * making decisions at appropriate level given scale of resource + Providing access to information, participation, and redress (Principle 10), and
- * integrating the environment into all decisions - „In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it“ (Principle 4).

The World Resource Institute's most recent semiannual guide to world resources goes on to provide a lesson - if not a definition - regarding governance: „How we decide and who gets to decide often determines what we decide.“

The Ends-Means Distinction in Governance

This paper and the survey that informs it draw upon an important distinction that has led many NGOs (including BTCV, one of the partners involved with Living Lakes member The Broads) to re-consider their structures and processes for governance. That is the distinction between means and ends in governance. John Carver (www.carvergovernance.com) has explored this topic in depth.

Determining, debating, and reshaping ends, also known as vision, goals, or objectives, are a critical function of governance. For instance, with Living Lakes and other protected areas, ends might have to do with nature conservation, science, visitor opportunities, local and indigenous needs, or even with practical economic uses

such as fisheries and drinking water. Shaping the ends would be the work of the board, partnership, or other multi-sided group constituted to think strategically about a Lake. Means, by contrast, have to do with how the ends or vision gets pursued, and could fall under the heading of „management“ rather than governance. Means may take the form of powers at a Living Lake, as in powers to plan, regulate, spend, generate revenue, and enter into agreements. Decisions about means might be left to professional leaders and staff of the various organisations involved.

Employing the ends-means distinction could be useful for Living Lakes, as it may clarify the need for each Lake to have a vision developed by a vision-setting body in consultation with stakeholders - and to have a management structure for making and carrying out day-to-day decisions. Putting the distinction into practice for a Lake is a complex task due to the multiple overlapping jurisdictions and interests involved. Putting the distinction into practice for a Living Lakes member organisation would also require some work but would pay benefits in effectiveness.

- * Performance efficiency, capacity
- * Accountability
- * Fairness

In addition to principles or elements, it is worthwhile to consider the overlapping levels at which governance may occur. Governance can be global, national, community-level, or organization-level (the last level is the immediate concern of the many NGOs taking a closer look at the way they govern themselves). We also must not forget, especially with reference to magnificent natural bodies such as the Living Lakes, that governance can occur at the level of a specific natural resource - with input nearly certain from the four other levels.

The Living Lakes Governance Survey 2003

With the importance of governance in mind - and a sense that governance makes a difference in progress toward protecting lakes - most members of the Living Lakes network responded to a survey in August 2003. The survey contained a number of questions seeking descriptions of the governance structures and processes at a Lake, as well as some questions seeking opinions about how well Lake governance is working.

I received a total of 20 survey responses representing 18 of 23 Living Lakes members or candidates. Most survey respondents worked for NGOs; one each represented a national government body, a university, a partnership, and a corporation. Five of the responses had to do with transboundary lakes, 15 with lakes contained within one country. As with many surveys, not all respondents answered every question - and in two cases, I received more than one survey per Lake. And I learned that the situation at some Lakes did not lend itself to description by the clear-cut answers I provided.

For instance, more than one governance model may be in use at a Living Lake. Lastly, because English was a second language for many respondents, and because use of language is debatable, different people may have meant differently by their answers. For instance, some considered designation as a Ramsar site to constitute full protection for the lake, others did not.

The survey helped identify the variety of governance models in use at Living Lakes. For example:

Elements and Levels of Governance

Recent publications on governance of areas of environmental value offer two lists of the „elements“ of governance - the relevant systems, structures, and considerations. The World Resources Institute describes seven elements :

- * Institutions, laws
- * Participation rights, representation
- * Authority level
- * Accountability, transparency
- * Property rights, tenure
- * Markets, financing
- * Science and risk

Also building in a sense of what is important in governance, Canada's Institute on Governance identifies five „good governance principles“:

- * Legitimacy and voice - participation, decentralisation
- * Direction plans, consistent with international conventions

- * At The Broads, legal governing authority is vested in national government, local authorities, and international designations. Other structures are also important, such as:
 - 1 Collaborative management of the Trinity Broads between the Broads Authority, English Nature, and the Essex & Suffolk WaterCompany;
 - 2 Management by community liaison groups developing site-specific plans; and
 - 3 Delegated management by NGO Wildlife Trusts of Sites of Special Scientific Interest in agreement with English Nature.
- * At Lake Constance, at least four transnational commissions help govern aspects of the lake.
- * At Lake Uluabat and Millic Ponds, models such as collaborative management and management by local communities are in use.



Lake Uluabat, Turkey, is an example for collaborative management with the involvement of local communities.

Lake Protection Status

On the issue of lake protection status, the survey was revealing. Six respondents consider their lake fully protected via national, provincial, or international designations. Eleven consider their lake partly protected, either because only certain geographic features or areas are included in protected zones or only certain resource aspects receive protection. Three lakes, Võrtsjärv in Estonia, Chapala in Mexico, and Victoria in Kenya/Uganda/Tanzania, described themselves as „not protected.“ The needs suggested by partial or non-protection lead directly to some of the recommendations that appear below.

Involvement in Governance, and Trends toward new Governance Structures

National governments are involved in most aspects of governance (holding regulatory, planning, spending, revenue-generating powers) at most Living Lakes. Regional or provincial governments are involved in some way in about half the responding lakes, as are local authorities. Other bodies involved in some aspect of governance include national or regional commissions, transnational commissions, or special authorities.

As expected, Living Lakes report that new participatory governance structures are taking shape. Collaborative management of some sort is in effect at most responding lakes. Members of local communities or indigenous people have input into governance in some cases. At a few lakes, management functions have been delegated to NGOs. In at least one case, management has been delegated to a private sector company.

The types of collaborative management in use at Living Lakes most usually involve a partnership of some sort between a public agency and an NGO (the Living Lakes network member). At several lakes, a multi-sided public/private/NGO partnership collaborates on management. At still other lakes, multiple public agencies collaborate. In a smaller number of cases, partnerships exist between NGOs, or between public agencies and private companies.

Vision, direction, ends - and means - at the Living Lakes

At most responding Living Lakes, some sort of vision, direction, or ends statement has been created, often through a formal process. Development of such a statement is reported in process at four of the responding lakes. At least one lake's respondent noted that whereas a vision has been established, this has not led to the creation of concrete goals. One lake lacks a vision altogether.

As noted above, determining who is responsible for establishing the ends - and for implementing the means to reach those ends - is an important exercise in understanding how governance really works in an organisation or in this case with respect to a lake. Respondents to the survey tell us that in most cases, government agencies hold principal responsibility for setting ends or vision for a Living Lake, often with for-

mal or informal input from Living Lakes member organizations. Responsibility for means or programmes, by contrast, is split just about evenly between two categories: government, and partnerships.

In most cases, Living Lakes members report receiving some funding for establishing ends and pursuing means. The most frequent source of these funds is the respective national government. Funds also come from individual donations, foundation grants, and international donors. Unilever helps support a number of the Living Lakes members, and other corporate sponsors provide support elsewhere. At least four lakes, though, report receiving no funding whatsoever for their involvement in governance.

Opinions regarding Living Lake Governance

The opinion-seeking portion of the survey asked respondents to rate governance of their lake Strong, Average, or Weak against the Institute on Governance's „good governance principles.“ Ratings on most principles tended toward Average or Weak, with the exception of Direction. This appears to be consistent with other survey answers showing that direction has been established for most Living Lakes. Ratings on the other good governance criteria also appear consistent with other survey answers, and suggest areas for improvement or discussion regarding how Living Lakes are governed.

When asked about their degree of satisfaction with their current role in lake governance, five respondents responded they were satisfied, five responded they were not satisfied, and ten responded that they were partly satisfied. Those who were not satisfied made telling explanatory remarks, such as „We do most of the work but have little power“ and „[Our involvement] could be more strategic“ as well as „We have not achieved having the input to the whole process that we consider important for the lake's survival.“

Respondents also provided constructive input regarding which groups they consider under-represented in governance. Groups cited by many as currently under-represented included the general public/local residents, visitors, and conservation volunteers. Groups mentioned by several respondents included indigenous peoples, nontraditional users from minority or ethnic communities, and NGOs. A few more respondents

described communication between groups seeking involvement in governance as sufficient, than did those who said it was not sufficient.

Potential next Steps

By launching the survey and devoting time at its 8th Conference to the subject of governance, Living Lakes has taken a bold step to engage with an important set of issues which it has in common with other areas currently protected or seeking protection around the world. At workshops during the conference, Living Lakes members would do well to continue clarifying and noting:

- * which governance practices are working well, and which need improvement - with regard to governing structures, engaging with broader groups of stakeholders, and partnership in particular;
- * areas in which sharing of best practices would be most helpful to other Living Lakes members;
- * critical gaps in information or knowledge; and
- * groundbreaking efforts to involve previously under-represented groups in lake governance.

To the degree the network of lakes wishes to remain closely engaged in governance issues, it may want to consider taking the following steps (and seeking funding to support them):

- * Elaborate a set of „good governance“ principles specific to the circumstances of Living Lakes, and provide members a continuous means to rate governance at their lake with respect to those principles;
- * Publicize best practices in governance, where certain or innovative modes of partnership or collaboration are working for the benefit of one or more values;
- * Launch a targeted effort to develop and spread good practices for involving under-represented groups in governance;
- * Continue research efforts to understand the variety and nuances of different approaches to governance.

As a matter of priority, the Living Lakes network will also likely want to explore and pursue ways of assisting member lakes lacking sufficient strategic vision or

direction, those with inadequate means or powers of implementing a vision, and those in need of means to gauge performance against concrete objectives. Similarly important would be providing assistance so that currently unprotected Lakes achieve some degree of protection. Furthermore, the network may wish to carve out a niche for itself as a specialist in developing and using more inclusive means of setting and implementing strategic vision, and in making goals more concrete.

cooperative, involving actors from the public, private and civic sectors working together in partnerships of mutual trust. Governance is becoming the norm for managing complex socio-ecological systems such as living lakes. This is because the causes of the ecological deterioration of almost all living lakes lies in human-caused practices and inappropriate regulatory arrangements. To re-create sustainable living lakes will require an applied coordination of managers and social

The complete study **Overview of Governance of Each Living Lake** by Andrew Moore can be downloaded as PDF-file at www.globalnature.org.

Die vollständige Studie „**Overview of Governance of Each Living Lake**“ von Andrew Moore kann als PDF-Datei von www.globalnature.org heruntergeladen werden.

Andrew Moore, Umweltberater, Kanada

Unter Governance kann die Art und Weise verstanden werden, wie man Organisationen, Orte oder Ressourcen und Gesellschaften führt. Ein Überblick über die Modelle und Strukturen der „Lebendigen Seen“ lässt ein komplexes Bild von Governance erkennen, das sowohl alle Regierungsebenen und internationalen Institutionen als auch alle innovativen Ansätze von NGOs, Korporationen, Partnerschaften und Kollaborationen einschließt. Eine Umfrage bei LL-Mitgliedern hat ergeben, dass Bedarf an weiterer Annahme und Ausbreitung von guten Governance-Praktiken besteht. Konferenzen, Workshops und Diskussionen bieten eine erste Gelegenheit für eine ausführliche Behandlung dieser Themen. Das Living Lakes Netzwerk könnte dazu dienen, gute Beispiele für Governance aufzuzeigen und den einzelnen Mitgliedern bei der Umsetzung in die Praxis zu helfen.

Conserving Lakes and Wetlands: The Art and Practice of Good Governance

Tim O' Riordan

University of East Anglia, UK

Governance is a popular term for styles of governing that are participatory, adaptable, networked and

groups working cooperatively over long time periods to design the restoration of such living lakes via combination of reliable science and cooperative trust.

The Hickling living lake in the Norfolk and Suffolk Broads is part of the Upper Thurne catchment of a National Park. Its restoration is being made possible through a combination of coordinated scientific monitoring and modelling, and by the operation of a stakeholder partnership known as the Upper Thurne Working Group. This participatory body has built a sense of mutual trust in its working arrangements. Because of this trust, there is a unique opportunity to create a sustainable future for this important living lake.

The Hickling Setting

Hickling Broad is the remnant of a man-made lake dating back to the mid 14th century. Its 130 ha of surface water make it a key element in the Upper Thurne catchment of four lakes and extensive reed fen. The whole area is of international importance due to its inclusion of water plants such as holly leaved naiad the *Chara* species of stonewort (notably *C. intermedia*, *C. asperens*, and *C. conniva*). It is also a wintering ground for many species of migratory waterfowl, notably gadwill, pochard, widgeon, shoveller, pink-footed geese and mute swan. The marginal reed fen is home to many fen species of flowering plants, grasses and fen plants, dragonfly and associated birds.

The whole catchment is subject to saltwater intrusion,



The Broads are of international importance. The variety of habitats gives home to many plant and animal species like the swallowtail butterfly.

40

and the dykes and broads are slightly brackish from time to time. Agricultural intensification in the area during the 1970s has added nitrates and phosphates to the drainage. New pumps have also introduced ochre (a bright orange sediment containing iron hydroxide) to the lakes.

In summary, the nutrient enrichment of the system is due to the following sources:

- * phosphate rich effluent from surrounding grazing marshes seeping through via the drainage system
- * nitrates from agricultural fertilisation and incoming rainfall
- * phosphates and nitrates from bird populations, notably roosting gulls
- * release of phosphates from the sediment, now consisting of the remains of algae, and *Chara*.

In addition, the lakes are affected by variable water quality caused by changes in rainfall, runoff and drainage pumping. This alters the depth and temperature of the water, affecting plant growth and algal formation.

The lakes are in poor ecological condition, but contain sufficient diverse and internationally significant biomass as to be worthy of international conservation status. Hence the whole area is designated as an international

wildlife reserve under the European Union Habitats Directive (via candidate status for a Special Area of Conservation - cSAC).

The Conflict

In 1999 the water of Hickling, normally closely because of algal growth, cleared. As a consequence, dense lawns of *Chara intermedia* grew to surface level (1.4 metres). The outcome of this massive and unexpected proliferation of biomass was that the customary passage of sailing boats, propeller-driven boats and wind surfers was stopped, virtually for the whole summer. This was an unprecedented circumstance and led to a huge row between all the navigation and boating interests and the two principal conservation bodies, English Nature (the regulatory body) and the Norfolk Wildlife Trust (the owner and manager of Hickling Broad).

The cause of the dispute was the initial refusal by English Nature and the NWT to allow any cutting of the *Chara*. This is because the site is subject to British interpretation of EU Habitat Directive rules. These rules state that no alteration of biodiversity should occur unless it is proved that there will be no detriment to the „favourable ecological status“ of the cSAC.

Despite the establishment of a scientific Review Panel, convened by the Broads Authority, neither the boating nor the conservation interests could agree on a common position. The Review Panel recommended some experimental cutting of the *Chara*. But this was very late in the season and only covered an area of 14.5 hectares - less than 10 percent of the possible sailing area.

The Building of Confidence

John Packman, the Chief Executive of the Broads Authority, notes in his companion chapter, that the Authority was weakened in its governing style by a decision between navigation and conservation interests. Both claimed a legal mandate for their advocacy. The navigation interests argued for the national park purpose of a right of navigation, while the conservationists used the EU regulations. The net result was an impasse.

This was resolved by a series of four, trust-building, „Hickling Conventions“ held in the winter of 2000-2001. These conversations were preceded by a series of personal interviews held with all key interests in the

Upper Thurne boaters, conservationists, anglers, wildfowlers, parishes and local tradespeople. Each was asked what was their vision for the Upper Thurne, what was their nightmare, who they trusted and who they distrusted, and why, and how they felt a series of procedures could be established to build a confidence-boosting dialogue for common understanding.

The result was the four conventions on the culture of boating, the culture of wildlife, local use of the area for economy and social wellbeing, and the character of various legal arrangements for future sustainable management.

These dialogues were based on a common vision, the building of trust, the attendance of all key people at each session, and completely independent facilitation of each event. The consequence was the establishment of the Upper Thurne Working Group with terms of reference to build up the science, to ensure full sharing of knowledge and feelings and to derive a coordinated plan of action for managed cutting of the Chara should clear water return.

The Hickling Vision

Now the basis of a full management plan for the Upper Thurne is in place. This has evolved via four half-year

meetings for the „parliament“, each built on the best scientific research and a platform for mutual trust. Because all of the main implementation agencies are also involved in the „parliament“, the management plan is a direct outcome of consensual dialogue. It is argued that this is the basis of the approach to a living lake, at least in the mould of western democratic practices.

Converting the vision for the future management of the whole catchment could be put into practice as follows:

- 1 Scientific modelling of water quantity, water quality and saline incursion for the whole catchment. This will be based on four complementary doctoral research tasks, one for quantity, one for nutrients, one for ochre and one for saline movement. All of these doctorates are co-funded by the implementation partners, and all are designed to evolve on a collaborative basis. This modelling will form the basis of a comprehensive scientific audit of how to manage water flows, water depth, temperature, nutrient limitation and possible dredging of sediment to establish the best conditions for a range of freshwater plants, including lower growing *C. aspera* and *C. connivens*. In this way, it may be possible to increase biodiversity yet create more navigable „headroom“ above the plant tips.

20-year vision for the Upper Thurne

The Upper Thurne comprises a healthy, ecologically sound functioning landscape of grazing marshes, fens and open water that is maintained by adequate supplies of nutrient-poor freshwater and suitably buffered from diffuse pollutants arising from surrounding arable land. The open waters are crystal clear and beneath their surface are diverse assemblages of aquatic plants, which cover the bed and provide food and refuge for a wealth of aquatic invertebrates, fishes and birds. The littoral margins are healthy and fringed with reed swamp.

This landscape provides the basis of vibrant local communities and economies. Its superb and unique open waters provide for waterborne recreation of all types and in all the kinds of vessels historically and currently enjoyed on these waters. Craft in the Upper Thurne waters reflect in their design, dimensions, standards and state of maintenance the very high quality of the landscape and natural environment in which they operate, particularly embracing quiet non-polluting propulsion systems and low-wash hull design.

[Generated from the UTWG workshop on 14 November 2002]

- 2 Redesign of the associated catchment by raising the water table, re-establishing low intensity grazing, and creating more reedfen and grasses production in the fen restoration of the drainage regime. This will involve an adjustment to the agri-environment package which is now in offering, and incentives for landowners to cooperate across property boundaries to establish a single viable ecosystem. This exciting proposal has the full backing of the responsible regulatory agencies.
- 3 The basis of an agreement from cutting *C. intermedia* should re-establish itself in the coming years.
- * A good, reliable monitoring regime to ensure that changing growth and water quality measures are brought into a single measure. This should provide reasonable warning of proliferation. An improved regime of cutting with some cutting at an early period of growth, close to navigation areas. This will help to invigorate the plant, and maintain sailing depths at a crucial early stage in the growing and sailing season.
 - * Detailed monitoring of the cut species to check for impairment or betterment of growth, plus a programme of investigation for species transplanting to ensure restoration of Chara in open sediment areas where boating is possible with lower growth regimes.
 - * A dredging experiment to discover how best to remove the phosphorus rich surface sediment, ready for new planting or the resurgence of plant spores in the lower sediment.

42

It is worthy of note that these arrangements are in the process of being agreed. The Upper Thurne Working Group has accepted the principles of this plan and cutting regime. This is a huge improvement on the circumstances of 1999, and a testament to trust building for inclusionary governance for living lakes.

Wider Lessons for the Hickling Experience

The world of the Upper Thurne is far distant from major living lakes in other countries. The processes discussed here are appropriate to a western democracy with a respect for law and regulation, and with a history of dialogue leading to compromise and consensus. A scheme such as this has to be built on trust, it must be

ready for the unexpected, and it cannot in itself act as a template for elsewhere.

For other countries and traditions, much depends on the vibrancy of non-governmental groups, tolerance by ruling political parties, the rule of law, and the significance of scientific monitoring and modelling. Some of the latter may be possible through local interests being part of the scientific recording. Some may be possible via incentive schemes for proactive cooperation. And some may require the injection of grant aid by international organisations who recognise their responsibilities for the global stewardship of living lakes.

Whatever the mix, there is much to be gained from a slow period of face to face confidence building, the creation of a shared vision and shared trust, and the establishment of a non-threatening dialogue that is inclusive and meets regularly with a joint purpose to create a viable management plan. The plan should be constantly adjusted to new ideas from the monitoring and the science, and to fresh ways in which the various communities come to understand one another.

Tim O' Riordan, East Anglia Universität, England

Governance wird zur Regel beim Management komplexer sozio-ökologischer Systeme wie den Living Lakes, weil anthropogene Störungen und ungeeignete Regierungsvereinbarungen die Ursachen für die ökologische Schädigung von beinahe allen „Lebendigen Seen“ sind. Um nachhaltige Seen zu erschaffen braucht man eine Übereinkunft von Entscheidungsträgern und sozialen Gruppen, die über lange Zeiträume hinweg kooperativ zusammenarbeiten, um die Restaurierung dieser Seen durch die Kombination aus zuverlässiger Wissenschaft und Vertrauen zu gestalten.

Der Hickling See in den Norfolk und Suffolk Broads ist Teil des Upper Thurne Einzugsgebietes des Nationalparks. Seine Renaturierung wird ermöglicht durch die Kombination aus abgestimmtem wissenschaftlichen Monitoring und Modelling sowie durch die Arbeit der Upper Thurne Working Group, einer Partnerschaft der Interessenvertreter.



The conference participants learn more about the methods of practical fen management during the field trips.

Inspiring People, Improving Places - Engaging Stakeholders across Society

Tom Flood

BTCV Chief Executive, UK

As a UK Environmental NGO, BTCV sets out to encourage people and the communities in which they live to improve their Environment. As one of the UK's largest NGOs, BTCV is currently changing its Governance model, and in preparation for its next Strategic Plan, is seeing how best it engages with its stakeholders in Society.

Many people have a traditional view of BTCV, transit vans full of volunteers going to the countryside to do environmental work. The countryside is still important to BTCV. But today 80% of our work is in the towns and cities of the UK where people live. The UK is also a multicultural country where the Environment means different things. Consequently BTCV is having to adjust its products and services to ensure relevance in people's lives.

The change in Board Governance has altered the work of the Board and the relationship with the Chief Executive. The Board's key responsibility is to define the end goal of BTCV and set executive limitations on the Chief Executive who is responsible for the delivery of the 'ends' reporting back to the Board on achievements.

BTCV has defined its vision as 'A better Environment where people feel valued, included and involved', and will offer its products in four identified areas:

- * Healthy Communities
- * Life Skills
- * Green Spaces Management
- * Commercial Activities

In the preparation of its Strategic Plan, BTCV will need to define 'whose voices', does it take into account in the allocation of resources and ask of itself these questions:

- * What is the end goal?
- * For whom?
- * And at what cost?

It needs to learn how to measure outcomes alongside the collection of outputs. It has defined its values as people, the communities in which they live, and the quality of their Environments and it has listed the core values by which it will measure its business performance:

- * Inclusiveness and Choice
- * Support and Empowerment
- * Improving the Environment
- * Understand the impact of its work
- * Having demonstrable Corporate Responsibility

The way in which BTCV will deliver its future goals will be more inclusive than the traditional white volunteer audience of the past decade. We have decided to revamp our members' magazine 'The Conserver', so that it is no longer funded by members' subscriptions, but by advertising. We will revamp the BTCV website, currently visited by 10,000 people monthly, so it is more in keeping with the values of BTCV. We will seek funding to develop an inner website area for Community Groups to acquire access to information and be able to 'talk' to other Community Groups. An online Shop will be launched at the end of 2004.

Next year BTCV celebrates its work on Diversity at a European Conference in Birmingham on March 25th and the launch of its Strategic Plan in the autumn of 2004.

Tom Flood, Geschäftsführer BTCV, England

Die britische Umweltorganisation BTCV will Menschen und Gemeinden dazu ermutigen sich für ihre Umwelt einzusetzen. Die traditionelle Arbeit von BTCV bestand darin, mit Freiwilligen auf dem Land Umweltarbeit zu verrichten. Heute wird die Arbeit zu 80% in Städten erledigt und an die unterschiedlichen Bedürfnisse unserer multikulturellen Gesellschaft angepasst. Diese Veränderung der „Governance“ führt auch zu einer Veränderung der Beziehung zwischen Vorstand und Geschäftsführung. Der Vorstand muss die Endziele definieren, die Geschäftsführung muss sie verfolgen. Unsere Vision lautet: „Eine bessere Umwelt, in der Menschen sich wertvoll, berücksichtigt und einbezogen fühlen“. Die Methoden, mit der die Zukunftsziele erreicht werden sollen, werden umfassender sein als in der Vergangenheit.

Im März 2004 wird BTCV auf der Europäischen Konferenz in Birmingham seine Arbeit im Bereich Diversität und den Start des neuen Strategieplans im Herbst feiern.

Managing the Broads: Developing Structures and Processes to Engage with its Stakeholders

Dr John Packman

Broads Authority, Executive Director, UK



Dr John Packmann, Chief Executive of the Broads Authority. Governance, in the context of the management of protected areas, is concerned with the structures and processes by which the agenda is set, decisions made and stakeholders involved.

Summary

This paper considers the common elements between notions of governance in environmental decision-making and concepts derived from business management. It concludes that they have much in common and in the context of managing protected areas such as the Norfolk and Suffolk Broads suggests that fostering an organisational culture that is open and inclusive is central. At the heart of the successful management of an area such as the Broads is the culture of the organisation and its relationship to its stakeholders. The paper looks at a number of changes to structures and processes undertaken by the Authority and evaluates their success in shifting cultural barriers.

Introduction

I hope from the field trips at the beginning of the week you have not only seen some of the beauty of the Broads

but we have also gained an insight into the management challenges associated with this important wetland. I have been reflecting on the last year's wonderful conference in South Africa and common issues to Living Lakes partners.

What strikes me very strongly after talking to Andrew Venter about St Lucia in South Africa, or Hans Jerrentrup about Nestos Lakes in Greece or hearing from Anne Levesque and Ellen Zimmerman about the Columbian Wetlands in Canada, is that the management challenges faced by Living Lakes partners are very complex, much more so than in the commercial world.

The issues we deal with are technically complex, for example understanding the water chemistry of shallow lakes such as Hickling, or evaluating the impact of diffuse pollution from farmland or understanding the behaviour of bird or mammal species.

We have a huge web of stakeholders with different interests, sometimes conflicting, at different levels. In a European context from Directives issues by the European Union which may have a direct impact on the management of our wetlands down to local users who have a strong emotional attachment to their traditional activities.

Funding is usually a challenge for us. There is not enough and our stakeholders have high expectations as to what can be achieved. Our ability to influence and change this environment in which is operated is very limited and there are many other agencies who have a role. In the context of the Broads English Nature and the Environment Agency, national agents of Government, have important roles in relation to biodiversity, water quality and flood protection.

And on a day-to-day basis we have dedicated staff who are a challenge to manage because of their strong convictions and commitment which may leave them open to stress.

Decisions we need to make have many dimensions and colleagues at this university have suggested that not only do we have to be concerned with questions of efficiency, equity, legitimacy and effectiveness, but we must also take account of the impact of institutions, context and scale.

Given the challenging environment in which we work what are the lessons we can take from the literature on governance and recent management theory?

Governance

Governance, in the context of the management of protected areas, is concerned with the structures and processes by which the agenda is set, decisions made and stakeholders involved. Thinking on the subject of governance and its role in environmental decision making suggests that the traditional structures and processes for making these decisions are no longer adequate. We need new structures and processes built on the principles of trust and engagement with stakeholders.

The literature talks about open decision making processes, building trust encouraging participation. It is suggested that public management should be through networks and partnerships rather than traditional structures and that this will require significant shifts in our thinking and the development of new structures and processes.

Why do we need this? Because the issues in public policy are extremely complex and the traditional mechanisms of command and control are no longer acceptable. Stakeholders expect to be involved.

Reference is therefore made to a paradigm shift - a fundamental change to the way in which an organisation works and interfaces with its stakeholders.

Organisational Development

Turning to recent organisational theory, what ideas does this offer us in terms of the management of a protected area. Key ideas advocate an organisation that can develop a set of unique capabilities and be responsive to its external environment. A focus on its customers and their needs, there is also an emphasis on networks and new forms of organisational structure by writers such as Charles Handy.

The Common Agenda

So perhaps not surprisingly there is a great deal of similarity in the writings on good modern governance and good modern management. Both suggest that the traditional methods of command and control are not appropriate in the modern world and that a paradigm shift is required - a fundamental change in the way we relate to our customers and stakeholders.

Experience from the Broads Authority

The Norfolk and Suffolk Broads is a unique and internationally important wetland landscape that has been shaped and nurtured by its inhabitants since at least Roman times. Broads are shallow, reed-fringed lakes that originated as great pits dug for peat to provide fuel during medieval times.

The boundary of the Broads Executive Area is tightly drawn around the flood plains and lower reaches of the three main rivers, the Bure, Yare and Waveney. It encompasses an area of 303 sq.km - a mainly open, undeveloped landscape of water, fens, marshes and woodland, but including some built-up areas, notably waterside villages. There is a short coastal strip at Winter-ton, which overlaps with the North Norfolk Coast Area of Outstanding Natural Beauty, and an estuary at Breydon Water. The extensive inland waterway system, comprising 190 km of navigable and lock-free rivers and over 40 broads, is a major attraction.

The Broads Authority, a unique institution set up by its own act of parliament in 1988, manages the area. The Authority has three duties:

It shall be the general duty of the Authority to manage the Broads for the purposes of

- * conserving and enhancing the natural beauty of the Broads;
- * promoting the enjoyment of the Broads by the public; and
- * protecting the interests of navigation.

The first two duties are the same as were given to the national parks in England and Wales under the 1949 Act, but what makes the Broads Authority different is its role as the third largest inland navigation authority in England.

The Authority comprises 35 members appointed by Government, local authorities, various statutory bodies and local interests. It employs about 100 full-time staff and has a turnover of approximately £ 4.5 million. Its income comes from two principal sources: two-thirds by way of grant from national government and one-third from navigation tolls, a local tax on boats using the Broads.

The Management Challenge

The challenge for the Broads Authority is considerable. It faces:

A complex physical environment

- * We still do not fully understand the science of these shallow freshwater lakes and for example the role that diffuse pollution plays in the boom and bust of particular plant species such as *Chara intermedia*.
- * Climate change will have a huge impact on the Broads but how and when is unknown.

A complex human environment

- * There are a large number of stakeholders often with conflicting vested interests.
- * It operates in an arena with multi-level governance: from a direct relationship to government to need to involve local users.
- * There are established rights, particularly navigation, which are defended avidly by local users.

Limited resources and influence

- * Although by comparison with some of our Living Lakes partners the budget may look generous, in terms of the restoration and management of the Broads it is small, probably a third of what is required.
- * The Authority has only limited room for manoeuvre and its ability to change the parameters within which it operates are constrained by for example the difficulty of amending the Norfolk and Suffolk Broads Act that established it.

The Broads Authority has been outside the modernisation agenda that has swept through local government in England and Wales. It has therefore had to modernise itself, taking on the principles of modern governance and organisational development.

In terms of modern governance the Authority has focused on:

- * Building trust with its stakeholders
- * Developing networks for stakeholder involvement in the work of the Authority
- * Looking at its decision making such that it is open and participative

The Authority has developed its own capacity through:

- * The empowerment of staff
- * A focus on the needs of our stakeholders/customers
- * Aiming for outstanding performance built on our unique capabilities
- * Continually adapting to changes in the external environment
- * Developing a clear vision
- * Strengthening our partnerships and networks

Both have required the implementation of a paradigm shift, a fundamental change in the way we operate, with new structures and processes for the management of the Authority. The environment within which we operate is continually changing and through a series of incremental changes we can match that external change. But from time to time organisations go through a period of 'flux' which means that a gap opens up between where they are and where they need to be - this requires a transformational change or the demise of the organisation.

Over the last two years the Broads Authority has changed structures and processes with the specific aim of promoting an integrated approach to the management of the Broads. This has been carried out as part of the Broads Authority Development Programme. The Programme has three interrelated objectives: the development of a long-term strategy to guide the work of the Authority and gain the necessary resources from Government, the modernisation of the Authority's operations, particularly its decision making and developing mechanisms to encourage all parts of the Authority and its stakeholders to work together for the good of the Broads.

Developing a Long-Term Strategy

Critical to the modernisation of the Authority has been the development of a new Broads Plan to set the vision for the future of the Broads for the next 20 years and guide the work of the Authority over the next five years. The document is short - about 30 pages with SMART (Specific, Measurable, Achievable, Realistic and Timely) targets. It has been prepared in an open way involving stakeholders throughout the process so that a common vision for the Broads is set for not just the Broads Authority but also other agencies and stakeholders.



The Broads National Plan is a SMART (Specific, Measurable, Achievable, Realistic and Timely) vision for the future of Britain's largest protected wetland.

Modernising the Authority

The decision-making structure has been simplified by combining the former separate Navigation and Environment Committees into one new Broads Management Committee so that an integrated approach is taken. The Authority has also decided to reduce its membership from 35 to 21. This will require secondary legislation, an order made by the Government Minister.

The management structure has also been changed moving from five departments based on the responsibilities of the Authority to four integrated directorates. Thus in the new structure all the field activities are in one department whilst a new Research and Strategy Directorate looks across all the work of the Authority in terms of developing new policy.

Working Together

The involvement of stakeholders has been a key part of the Development Programme and central to this has been the establishment of the new Broads Forum. 50 organisations are represented by 20 members of the Forum who have the opportunity to debate key issues before the Authority makes a decision. This has, so far, assisted the Authority in making difficult decisions and been part of a more open approach to decision making.

Raising the profile of the Authority with stakeholders, visitors and decision makers is critical and the present name - Broads Authority - does not help. The status of the area as a national park is not obvious and the role of the Authority is not clear. The Authority has therefore decided to change its name to The Broads National Park. The implementation of this will require an amendment to the Norfolk and Suffolk Broads Act 1988.

Changing the Culture

Changing structures and processes is important and can be difficult but what is far more important and far more difficult is changing the culture of an organisation and the culture associated with its stakeholders.

What is culture? The diagram by Johnson 'The Cultural Web' helps us understand the complexity of culture. It can be summarised as 'an organisation's view of itself and its environment'.

We rarely start with a clean sheet where culture is concerned and there is usually baggage from the past that inhibits the bold changes that are necessary to move an organisation forward. In the case of the Broads, when Aitken Clarke set up the new Broads Authority in the late 1980s he inherited responsibilities and staff from the Yarmouth Port and Haven Commissioners who brought a set of assumptions and ways of thinking that have helped to shape the organisation.

But what has become clear over the last couple of years is that we not only need to change the culture of the Broads Authority but also the culture of the organisations with whom we work if we are to get the best solutions for the Broads.

Lessons and Next Steps

In the case of the Broads we face three major barriers in taking the organisation forward and making the shifts that writers on governance and management suggest are needed. These barriers to change are: legislative, funding and the attitude of stakeholders and staff.

Firstly, the need for legislative change. The reduction in the number of members of the Authority from 35 to 21 requires legislation which is difficult to achieve.

Secondly, whilst the Broads Authority is well funded by comparison with some of our overseas partners, its £4.5 million turnover is about a third of what we have estimated we require. Sensible changes like the streamlining of our planning service require funding and more office accommodation.

Thirdly, we need to continue to develop a culture within and without the organisation that embraces the principles of:

- * The involvement of stakeholders and the wider community in our work,
- * continuous adaptation to our external environment and
- * The building and strengthening of trust and partnership.

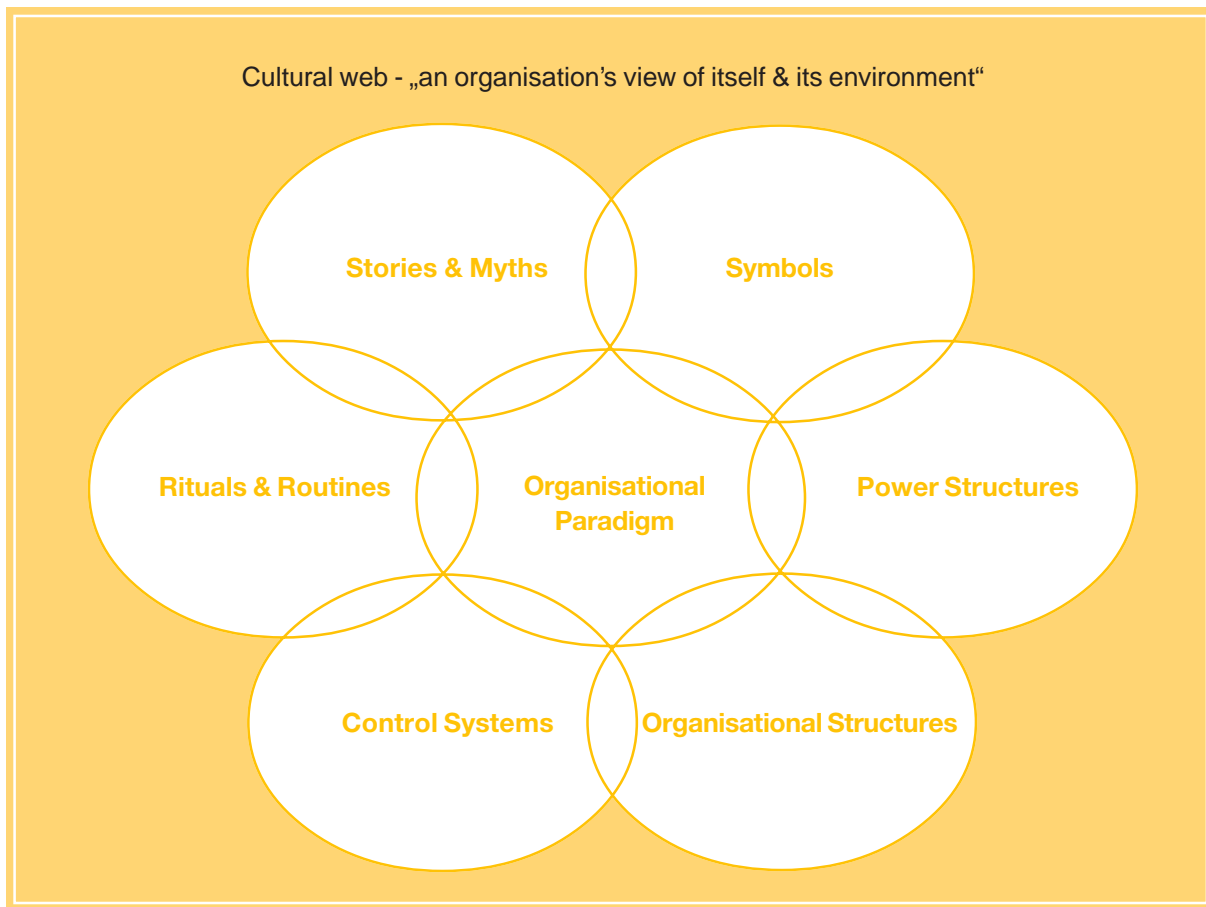
Dr. John Packman, Geschäftsführer Broads Authority, England

Die Methoden von Governance im Rahmen umwelt-relevanter Entscheidungsfindungen lassen sich gut mit dem Management von Unternehmen vergleichen. Beim Schutz von Gebieten wie dem Broads Nationalpark ist es wichtig, eine offene und einschließende Organisationsstrategie zu verfolgen. Im Mittelpunkt eines erfolgreichen Managements steht dabei die Beziehung der Organisation zu den verschiedenen Interessensvertretern, die zum Teil unterschiedliche, wenn nicht gar konträre Ziele als Schwerpunkte sehen.

Seit 1988 wird der Broads Nationalpark von der Broads Authority (BA) geleitet. Es handelt sich hierbei auch um die drittgrößte Schifffahrtsbehörde in England, bestehend aus 35 Mitgliedern und 100 Vollzeitbeschäftigten. Die besondere Herausforderungen der BA besteht darin, auf eine komplexe physikalische Umwelt im Rahmen einer komplexen menschlichen Gesellschaft mit limitierten Mitteln und Einfluss einzugehen.

Um den Veränderungen in Gesellschaft und Politik gerecht zu werden, müssen die Organisationsstrukturen der BA modernisiert werden. Dazu wurde in den letzten 2 Jahren ein Entwicklungsprogramm aufgestellt mit den Zielen einer Langzeitstrategie für die Arbeit der BA, der Modernisierung aller von der BA durchgeführten Maßnahmen sowie der Entwicklung von Mechanismen, die alle Beteiligten der Behörde und Interessensvertreter dazu ermutigt sich gemeinsam für die Broads einzusetzen.

Erschwert werden diese Veränderungen vor allem durch bestehende Gesetze, ungenügende Finanzierung und durch die Einstellung vieler Interessensvertreter und Mitarbeiter.



Johnson (1992)

8 Panel Presentations on Governance

Letting The Dead Sea Live - Challenges in Governance

David Katz

Friends of the Earth Middle East (FoEME)

The Dead Sea, the lowest point on earth and home to numerous cultural and ecological treasures, is under severe threat due to water diversions, unchecked industry, and uncoordinated development. The result is a rapidly dropping sea level, the drying up of coastal springs and habitats, and land subsidence causing destruction of infrastructure. Several unique circumstances combine to pose challenges to governance of the basin, including:

- * A shared basin between three political entities: Israel, Jordan and Palestine, with disputed sovereignty claims, very tense relationships, and little official communication between governments.
- * Upstream water diversion out of the basin, means that governance structures based on a watershed approach alone, will be insufficient.
- * The focus of much lake management - managing the surrounding uplands to protect the lake ecosystem - is inappropriate in the case of the Dead Sea, for which primary concern is for harm to surrounding upland environment because of mismanagement of the lake.

Traditionally, the governments have worked independently and either ignored the problems or sought large scale engineering solutions, such as massive canals to import water from the Red Sea. FoEME, working in all three countries, has promoted a coordinated planning process and has served as a conduit for information and ideas between governments and stakeholders. One focus of FoEME's work has been promotion of registration of the Dead Sea basin as a UNESCO Biosphere Reserve and/or World Heritage Site, which would require all governments to work jointly to develop and implement a sustainable development plan with designated areas for conservation. To date, all

countries have responded positively to this idea in principle and are investigating what form it might take.

Policymakers have also traditionally ignored the possibility of restoring the natural flow into the Dead Sea because, among other reasons, they disregarded potential economic gains from conservation. To counter this, FoEME also undertook an economic study of costs and benefits of conservation value in the basin. This has strengthened the rationale for sustainable management. While governance structures in the Dead Sea region are still extremely weak and underdeveloped, FoEME's experience demonstrates the possibility for a nongovernmental organisation to take the lead in promoting coordinated governance structures, when governments lack the initiative or ability to do so themselves.



The Dead Sea, bordering Jordan, Israel, Palestine, is extremely threatened due to excessive water withdrawal.

David Katz, Friends of the Earth Mittlerer Osten (FoEME)

Das Tote Meer ist ernsthaft bedroht durch Wasserentnahme, Zuführung ungeklärter Industrieabwässer und unkoordinierte Entwicklung. Daraus folgt zum einen ein rapide sinkender Wasserspiegel, die Austrocknung von Küstenquellen und Küstenhabitaten sowie eine Bodenabsenkung, die zur Zerstörung der Infrastruktur führen. Besondere Herausforderungen für Governance des Gebietes sind die angespannten Beziehungen zwischen den drei Anrainern Israel, Jordanien und Palästina, Wasserentnahme aus den Zuflüssen und Missmanagement der Seenregion, das zu einer Zerstörung des Umlandes führt.

Die Regierungen haben bisher unabhängig gearbeitet und entweder die Probleme ignoriert oder an großangelegte technische Lösungen gedacht wie gewaltige

Kanäle, die Wasser aus dem Roten Meer einbringen sollen. Die in allen drei Gebieten aktiven FoEME haben für einen gemeinsam abgestimmten Planungsprozess geworben und dienen als Vermittler von Informationen und Ideen zwischen Regierungen und Interessenvertretern. Ein Arbeitsschwerpunkt ist der Einsatz für die Ausweisung des Toten Meeres als Biosphärenreservat und/oder Welterbegebiet. Das erfordert jedoch ein Zusammenarbeiten der drei Regierungen, um einen nachhaltigen Entwicklungsplan mit Ausweisungen von Naturschutzgebieten zu erstellen und durchzuführen. Die Länder haben darauf positiv reagiert.

Politiker haben es bisher versäumt, den natürlichen Zufluss ins Tote Meer wiederherzustellen, weil u.a. mögliche Einkünfte durch Naturschutz nicht berücksichtigt wurden. Um dem entgegenzuwirken, haben FoEME eine Studie über Kosten und Nutzen des Naturschutzwertes durchgeführt, die das Prinzip Nachhaltiges Management gestärkt hat. Obwohl die Governancestrukturen immer noch schwach und unterentwickelt sind, zeigt die Erfahrung FoEMEs, dass NGOs die Führung beim Vorantreiben von Governancestrukturen übernehmen können, wenn es Regierungen an Initiative und Fähigkeiten dazu mangelt.

Governance of Poyang Lake

Dai Xingzhao

MRLSD, Jiangxi, China

General Information about Poyang Lake

Poyang Lake, located in China's Jiangxi Province in Southeast of China, is the largest freshwater lake and the largest natural resource in China. Five rivers (Ganjiang, Xiushui, Xinjiang, Fuhe and Raohe) from the south, east and west feed the lake and in turn empty into the Yangtze River. The average rate of flow is 152,500 million m³, which is 1.5 times of Dongting Lake's (the second largest fresh water lake in China) and exceeds the total flow of Yellow River, Hai River and Huai River.

The area of the lake is subject to dramatic changes in water levels, shrinking to a tenth of this size in winter,

when a complex of shallow lakes, mudflats and wet grasslands form around the periphery, which make Poyang Lake one of the most important areas for biodiversity protection in China and even in the world. It accommodates 332 kinds of birds, subordinate to 17 orders, 55 families. There are 124 species of waterfowls ducks (Anatidae): 32 species, snipes (Scolopacidae): 25 species. 10 of them are 1st class species in China's list of protected species („red list“), amongst them the famous Siberian white crane (*Grus leucogeranus*), who is the symbol of Poyang Lake. The others such as Hoodeel crane (*Grus monacha*), Greet Bustard (*Otis tarda*), White stork (*Ciconia ciconia*) Black stork (*Ciconia nigra*) etc. Each year, about 6751 white cranes spend the winter at Poyang Lake. There are 44 species in the list of the national second protected birds: e.g. White ibis (*Threskiornis aethiopicus*) Spoonbill (*Platalea leucorodia*), White-fronted goose (*Anser albifrons*) etc. Due to steadily increasing of the Lakes watersheds, the number of birds coming to Poyang Lake will raise.

The water quality in Poyang Lake is generally considered to be good with only some small parts having problems of organic pollution, heavy metals, etc. The main threats to the environment of the lake mainly come from bad governance.

The Role of the Government in the Protection of Poyang Lake

The Chinese government pays high attention to the protection of Poyang Lake. Poyang Lake has been approved by the government as one of the 40 national A-class nature reserves with the total reserve area of 22,400 ha. In 2002, Poyang Lake was further approved by the national government as one of the 19 National Special Ecological Function Protection Zones.

The governance of Poyang Lake is mainly in the responsibility of local county governments (it directly involves 12 counties). Meanwhile, three provincial government agencies join the governance, they are:

- * Forest department: responsible for the natural conservation (land, wetland resources, wildlife protection, migratory birds).
- * Agricultural department: responsible for the fishery resource management (aquatic production).
- * Transportation department: responsible for the water transportation.

Challenges for Better Governance of Poyang Lake

Coordinate between different stakeholders

The lake was divided by 11 counties, and there are another 14 counties nearby the lake, and more than 40 million people live within the Poyang Lake watershed. It is very difficult to meet their interests, and to manage the lake in an ecologically sustainable way at the same time.

Poverty

Poyang Lake area is one of the poorest areas of China. How to demonstrate a new livelihood for the poor people is a priority task.

Watershed Management Strategy - a Way towards better Governance

Better governance of Lake Poyang needs joint responsibility of many players. The provincial government has implemented the MRL program through integrated watershed planning. The strategy plan was adopted in 1983 and is based on the recognition that all parts of the watershed are interdependent. The MRL Program is one of the priority projects of China's Agenda 21. A master plan concerning the sustainability of the Poyang Lake watershed has been worked out and approved by the People's Congress of the Jiangxi Province, which is supported by many local and international experts, initiatives and activists.

MRL Commission consists of the relevant provincial departments and is headed by the responsible vice provincial governor. Its mandate is to coordinate the actions of the departments in the Poyang lake watershed.

MRLSD's Role in the Governance of Poyang Lake

MRLSD is the leading support NGO in the region.

Based on the slogan „The only earth we share“, MRLSDs activities are based on four principles:

- * Integrated development: Seeking sound measures to well integrate ecological, economic and social benefits and combine poverty alleviation with restoration and protection of natural resources.
- * Participatory approach: Paying special attention to the poor groups and women's participation in the

planning, decision making and implementation of sustainable utilization of natural resources.

- * Capacity building: Supporting the development of farmers' self-help organisations, keeping good dialogue and cooperation with them.
- * Sharing and common progress: Participating extensively in the national and international dialogue and exchange of skills and expertise, foster cooperation in the areas of sustainable development to share practical experiences, information and research results.



Lake Poyang in China accomodates over 300 bird species.

Dai Xingzhao, MRLSD, Jiangxi, China

Der Poyang-See ist Chinas größter Süßwassersee und wird von 5 Flüssen gespeist. Im Winter unterliegt der See großen Wasserschwankungen, die zur Ausbildung von Flachwasserseen, Wattbereichen und Feuchtgebieten führen. Der See wird so zu einem der wichtigsten Gebiete für den Schutz der Artenvielfalt. U.a. ist er Heimat für über 300 Vogelarten, darunter den Schneekranich, Symbolvogel des Poyang-Sees.

Ein Hauptproblem am Poyang-See ist die ungenügende Governance. Die chinesische Regierung hat den See als „A-Klasse“-Naturreiservat sowie als „Special Ecological Function Protection“-Zone ausgewiesen. Insgesamt gibt es 12 involvierte Bezirke und drei Regierungsbehörden, die für die Governance des Sees verantwortlich sind: das Forstamt (Naturschutz), Landwirtschaftsamt (Fischerei und Ressourcenmanagement) und Verkehrsamt (Wassertransport). Die Provinzen in der Seenregion gehören zu den ärmsten in China. Es ist schwierig, die Interessen aller Beteiligten zu vereinbaren. Zum Schutz und nachhaltigen Ma-

agement des Wassereinzuggebietes wurde das MRL-Programm und ein Masterplan aufgestellt.

MRLSD ist die führende NGO in der Region. Ihre Arbeit basiert auf den Prinzipien von integrierter Entwicklung, sozialem Ansatz, Aufbau von Kapazitäten und gemeinsamen Fortschritt.

Lake Peipsi

Margit Säre

CTC, Estonia and Russia

Lake Peipsi/Chudskoe is a shallow lake situated in Northern Europe and part of the Baltic Sea basin. It is the fourth largest lake in Europe (3,555 sq.km) and the largest international lake in Europe. Lake Peipsi is shared between the Estonian Republic (44% of the surface area) and the Russian Federation (56%).



Lake Peipsi is shared between Estonia and Russia.

Lake Peipsi is located in the future EU external border area and that is why the water management issues in this region are of major importance also at European level.

Governance issues, sustainable use of resources in international basins is very important and is quite complicated when two or more transition countries share water basins. Communities in transition countries are especially dependent on the local natural resources as they often rely on agricultural production, fishing as their main income. There are also many competing users (tourism, urban development, fisheries) of lake resources

and many interest groups whose opinions should be taken into account in managing the lake resources.

Main problems related to the water management in Lake Peipsi basin:

- * the absence of joint complex management programs (Estonia/Russia)
- * inefficient interrelations among stakeholders
- * weak interstate co-ordination in the lake basin
- * NGO's potential is not used in full force
- * complicated border issues

Legal basis for the transboundary water management in Lake Peipsi basin started to develop after 1991 or after Estonia's re-independence. There are four main laws relating to the water management and fishery issues of Lake Peipsi.

The Estonian-Russian Transboundary Water Commission was established in 1997 after signing of an intergovernmental agreement on the protection and sustainable use of transboundary water bodies between the Republic of Estonia and the Russian Federation.

Besides the agreement signed in 1997, Estonia and Russia have also set an agreement on fisheries of Lake Peipsi, Lämmi and Pskov (1994), an agreement on mutual fishing relationships (1994) and an agreement on environmental protection (1996).

The Estonian-Russian intergovernmental Transboundary Water Commission organises the exchange of monitoring data between countries; defines priority of scientific studies on sustainable use of transboundary waters; agrees on common methods for analyses and indicators of quality for transboundary waters; facilitates cooperation between different agencies and ensures publicity of discussions of questions related to the use and protection of the transboundary waters.

The Transboundary Water Commission is an important formal mechanism for the organisation of the cooperation across the borders as well as between local stakeholders on one hand and the two governments on the other hand. The Commission is working also actively with civil society organisations; the head of one of its working groups „Cooperation with local authorities, NGOs and international organisation“ is lead by Estonian NGO: Peipsi Center for Transboundary Cooperation.

Peipsi CTC is implementing several international projects in the field of water management, community development and border research. In our water management program we have conducted several seminars and training sessions for local authorities, NGOs and schools; environmental campaigns, sociological studies, publications, information dissemination via e-mail lists, websites etc.

Peipsi CTC research shows that in transition countries, where there has been lack of intergovernmental cooperation and where cooperation is not formalized yet, the role of NGOs becomes very important as non governmental organisations can play the role of a mediator in helping to build trust between partners, in bringing together different stakeholder groups across the border.

Margit Säre, CTC, Estland und Russland

Der in Estland und Russland gelegene Peipsi-See ist der viertgrößte See Europas. Die Hauptprobleme beim Wassermanagement des Sees liegen im Fehlen eines

gemeinsamen Managementplans, ineffektiven Beziehungen zwischen Interessenvertretern, schwacher zwischenstaatlicher Koordination und komplizierten Grenzangelegenheiten.

1997 wurde die Estnisch-Russische grenzüberschreitende Wasserkommission eingerichtet. Diese organisiert den Austausch von Monitoring Daten, bestimmt die Priorität von wissenschaftlichen Studien, erleichtert die Kooperation zwischen Behörden und kümmert sich um Veröffentlichungen zum Thema Gebrauch und Schutz von grenzüberschreitenden Gewässern. Sie ist ein wichtiges Instrument zur Zusammenarbeit zwischen Interessensvertretern und den zwei Regierungen und arbeitet außerdem zusammen mit bürgerlichen Organisationen.

Die NGO Peipsi Center for Transboundary Cooperation (CTC) führt internationale Projekte im Bereich Wassermanagement, Gemeindeentwicklung und Grenz-forschung durch. CTC Untersuchungen haben ergeben, dass NGOs als Vermittler in Übergangsländern mit Mangel an zwischenstaatlicher Zusammenarbeit eine wichtige Rolle spielen.

9 Climate Change and Lakes

Overview of Climate Change and its Impacts on Living Lakes

Prof Mike Hulme

Tyndall Centre, University of East Anglia (UEA), UK

The climate of the Earth has never been stable, least of all during the history and evolution of life on Earth. Glacial periods, for example, have been (globally) 4°-5°C cooler than now, and some interglacials have been (perhaps) 1°-2°C warmer. These prehistoric changes in climate were clearly natural in origin and occurred on a planet inhabited by primitive societies with far smaller populations than at present. Ecosystems and species have moved, often freely, in response to such past changes and have evolved within this climatic history. Lake systems have risen and fallen many times during the Earth's climatic history.

The causes of contemporary and future changes in climate, the rate and potential significance of these changes for ecosystems and hydrological systems and for the human species, however, are all notably different from anything that has occurred previously in history or pre-history. The causes are now dominated by human perturbation of the atmosphere, the rate of warming already exceeds anything experienced in the last 10,000 years and, given the ecological imprint made by our current and growing population of 6 billion and more, the significance of this prospect for the natural world and for human society is qualitatively different from previously experienced changes in climate.

The atmosphere delivers both resources (e.g. rain, sun, wind) and hazards (e.g. hurricanes, blizzards, droughts) to ecosystems and societies. Ecosystems, hydrological systems and our human cultures and economies are 'tuned' to the climate in which they evolve. All societies have therefore evolved strategies to cope with some intrinsic level of climatic variability - for example, nomadic pastoralism, flood prevention, building design, weather forecasting, early warning systems and the weather-hedging industry are all forms of human response to the variability of climate or the extremes of weather.

Consequently, there exists some level of variation in climate or some frequency or severity of weather extremes that can be 'accommodated' using existing strategies or behaviour. Exactly what can be accommodated, however, varies greatly within and between societies and between ecosystems, so that vulnerability to weather and climate change is strongly differentiated around the world.

So the central concern is not that humans are altering climate, but whether these changes in climate can be accommodated using our existing capacity to adapt, drawing upon our intellectual, regulatory, social or financial capital, and whether hydrological systems are resilient enough to survive these climatic perturbations given the other pressures they are subjected to by human development? Additional questions that flow from this perspective are: to what extent can we (need we?) predict future climates to assist this process of adaptation, and to what extent do we need (and desire) to reduce the size of the changes in climate facing us to allow our adaptive potential to sustain an acceptable dynamic equilibrium between climate, ecosystems and society?

We face certainly continuing, probably accelerating and possibly unprecedented changes in the Earth's climate over the coming years and decades. These changes in such a fundamental resource for society will introduce new challenges for the way we live with and influence climate. Some of these challenges may be broadly foreseeable, many of them may not. Some of the risks associated with a rapidly changing climate may be quantifiable, many of them may not. What should be our response? As evidence is emerging that some hydrological and biological systems are already reacting to this human-induced change in climate, and as we know that at least for some regions and for some communities and ecosystems climate variability already imposes huge costs, doing nothing is unlikely to be the best option. Societies, including managers of valuable lake systems, need to develop and implement appropriate strategies to reduce the risks associated with a changing climate - to ensure that these changing climatic resources are appropriately exploited and that the adverse impacts of changing climatic hazards are minimised. Mitigation measures are required to reduce global greenhouse gas emissions with the intention of eventually stabilising atmospheric concentrations at

some level at which an acceptable dynamic equilibrium could be sustained between climate, ecosystems and human society. On the other hand, due to the inertia of both the climate system and our energy structures, greenhouse gases accumulated and accumulating in the atmosphere since the pre-industrial era will continue to affect global climate long into the future. Together with the existing exposure of many communities and water resources to extremes of weather, adaptive measures become essential in order to enhance the coping abilities of valued lake systems, vulnerable communities and exposed infrastructures.

These crucial perspectives about climate change need to be integrated fundamentally into the full range of policy measures that are demanded by our drive towards sustainable development, an argument equally valid for the nations of the South as for the nations of the North, and for managers of lake systems as for other managed assets. We all need to come to terms with climate change.

Generic Impacts of Climate Change on Lakes

56

Climate change directly affects important characteristics of lake systems such as: lake levels; water temperature; thermal stratification; water quality; productivity; biodiversity. Indirect effects of climate



Livestock farming in the Broads region.

change also affects lake systems through for example: changes in the characteristics of lake catchment (watershed) areas; climatic influence on socio-economic activity in and around lakes. In some cases current lack of understanding and limited availability of empirical case studies of lake processes and their interactions limits our ability to determine with confidence the impacts of climate change on lake hydrology and ecology. Nevertheless there are certain generic relationships between climate and lacustrine systems that will be common to most, if not all, the Living Lakes. The following section outlines some of these generic links between climate and lacustrine systems.

Climate variables likely to directly affect Lakes

Rising average temperatures and changes in extremes

- * Rising air temperatures will increase surface water temperature and influence thermal stratification in lakes. Warmer winters may affect mixing and nutrient recycling rates in temperate lakes as reduced seasonal cooling, which causes breakdown in the thermal density contrast, may be reduced.
- * Higher frequency of extreme temperatures in summer (with possible exceedence of critical thresholds) and reduced winter freezing in certain lakes are likely to affect thermal stratification and species composition.
- * Higher surface air and water temperatures will increase open water evaporation rates and lead to a fall in lake levels unless offset by increases in precipitation or changes in other factors that affect evaporation rates (see below).

Changes in the temporal and spatial characteristics of precipitation

- * The impacts will vary according to the direction and magnitude of precipitation change and the hydrological characteristics of the lacustrine and any associated fluvial system.
- * Endorheic (closed) and exorheic (open) lakes are very dependent on the balance of inflows and evaporation and may be very sensitive to change in either.
- * Increases in precipitation, unless offset by higher evaporation, will increase lake inflows and lake

levels, if extreme precipitation events increase in frequency this will lead to greater frequency of riparian flooding.

- * The extent to which lake level fluctuations and change affect lake productivity and biodiversity varies according to local conditions of the lake and its catchment.
- * Drier conditions, exacerbated by greater evaporation, will reduce lake inflows and lake levels. Water quality, productivity and biodiversity are likely to be reduced.
- * Seasonal regimes may be reduced or enhanced, depending upon the nature and interaction of precipitation and evaporation change, with potentially significant effects on lake hydrology, ecology and management.
- * Lakes fed by snowmelt rivers in spring are likely to see earlier and faster spring thaws leading to higher river flows and lake levels in this season.
- * Changes in variability over longer timescales, e.g. decades, possibly associated with changes in behaviour of the El Niño - Southern Oscillation (ENSO) will also affect lake characteristics and management.

Changes in other climate variables, including radiation or cloud cover, relative humidity and wind speed

- * Data on factors affecting lake evaporation and catchment evapotranspiration other than temperature, namely relative humidity, cloud cover and wind speed over the lake and land cover in the contributing areas, were not available for this study.
- * In some instances changes in these variables may cause marked changes in lake systems. Increased evaporation due to warmer temperatures may either be enhanced, for example by increases in wind speed and radiation, or offset (and sometimes even reduced) by increases in humidity and cloud cover.
- * Changes in wind speed and prevailing wind direction will also influence mixing processes and thermal stratification in lakes. In tropical lakes mixing is more dependent upon evaporative cooling during the windy season.

Rise in sea-level

- * For low-lying lakes and those with tidal influences rising mean sea-level and increasing magnitude and possibly frequency of extremes will be important.
- * By the 2080s, global-mean sea level rise is ~0.35 m with emissions scenario A2 (the full range of possible sea-level rise by the 2080s as published by the IPCC is from ~0.08 m to ~0.80 m). The increase in mean sea-level combined with possible changes in storminess will have wide ranging impacts upon lacustrine and associated fluvial systems.
- * Flooding, saltwater incursion, rivers backing up and increases in lake levels will dramatically alter lake hydrology, ecology and management.

Interaction with non-climate Factors

It is important to note that climate change will not occur in isolation - many other driving forces will operate on lake systems during this century and it may be the case that for many of the Living Lakes, particularly those with high population densities, climate change may play a relatively minor role in affecting future lake conditions. Lake hydrology, water quality and productivity are heavily dependent upon direct and indirect human activities. The way in which these activities evolve in the future will be influenced by climate change and will determine the extent and importance of climate impacts on lakes and society. Combining changes in climate and society into fully integrated assessments of the future state of lakes is beyond this analysis.

Improving our ability to make such integrated assessments for lakes, and for ecosystems and society as a whole, is a major challenge for research during the next few decades.

Overview of Results for the Living Lakes

It is difficult to summarise the implications of climate change for the Living Lakes for three reasons which are discussed below: their diversity of characteristics; the range of possible future climate conditions projected for the Lakes; and the interaction between climate change and human activities.

Diversity of characteristics

The Living Lakes include lakes of very different sizes, from relatively small (Mono Lake) to extremely large (Lake Victoria); very different depths, from shallow (Milicz Ponds) to extremely deep (Lake Baikal); some with coastal influences (Lake St Lucia); diverse climate regimes, tropical (Laguna de Bay), temperate (the Broads), continental (Lake Tengiz) and Mediterranean (Nestos Lakes); whether closed, endorheic (Mono Lake) or open, exorheic (the Pantanal); nutrient status, eutrophic (the Broads) and oligotrophic (Lake Baikal); and their physical characteristics, open water lakes (Lake Constance), river valley wetlands (Columbia River wetlands), coastal marshes (Lake St Lucia), and so on.

The Range of possible future Climate Conditions projected for the Living Lakes

- * By the 2080s, all the Living Lakes are projected to be considerably warmer (>2°C) in „winter“ (DJF) and „summer“ (JJA) than the present day.
- * In most of the Living Lakes, „summer“ temperatures (JJA) increase at a faster rate than the rise in global mean temperature.
- * The rise in „winter“ (DJF) temperatures is less homogeneous, with roughly equal numbers of lakes warming slightly faster or at a similar rate to the rise in global mean temperature, and a couple of lakes warming slightly more slowly.
- * Three lakes, Lake St Lucia, Laguna de Bay and the Mahakam Lakes, have projected warming rates slightly lower than the rise in global mean temperature in both „winter“ and „summer“.
- * Only Lake Larache has precipitation projected to decrease in both seasons and only Lake Baikal has precipitation projected to increase in both seasons (a combination of small and large changes in both instances).
- * Four lakes (Lake St Lucia, the Broads, Lake Constance and the Columbia River wetlands) have contrasting precipitation changes in „winter“ and „summer“.
- * None of the Living Lakes is projected to have large increases in precipitation in both „winter“ and „summer“, nor large decreases in precipitation in both seasons.

- * Ten lakes show an inconsistent pattern of precipitation change in „winter“ and seven in „summer“. Three lakes, all located in the Americas, have inconsistent precipitation signals in both „winter“ and „summer“.
- * Ten lakes are projected to have either small or large increases in „winter“ (DJF) precipitation, only five lakes are projected to have small increases in „summer“ (JJA) precipitation and no lakes are projected to have large increases in „summer“ precipitation.
- * No change in „winter“ or „summer“ precipitation is projected to occur in only three instances.
- * A considerable number of the Living Lakes are fed by tributaries draining mountainous regions and/or areas experiencing very cold winters which are likely to be affected by earlier and faster spring snowmelt due to warmer temperatures.
- * A considerable number of the Living Lakes are located in coastal areas and to some degree are affected by tidal processes. These lakes are at risk from the effects of sea level rise, whereby increases in mean and flood water levels and increases in saltwater incursion are likely to have significant impacts on habitat conditions and water quality.

Lake	Location	DJF Temperature change	JJA Temperature change	DJF Precipitation change	JJA Precipitation change
The Broads	Norfolk/Suffolk, UK	3.3	3.6	22 Large increase	-20 Large decrease
Lake Constance	Germany, Austria, Switzerland	4.0	4.6	17 Small increase	-16 Small decrease
Lake La Nava	Castile-León, Spain	3.0	5.2	2 Inconsistent	-32 Large decrease
Milicz Ponds	Slask, Poland	5.0	3.8	19 Small increase	-3 No change
Nestos Lakes	Hrysoupolis, Greece	3.5	5.4	5 No change	-36 Large decrease
Uluabat Lake	Northwestern, Turkey	3.2	5.2	-3 Inconsistent	-49 Large decrease
Lake Larache	Morocco	3.2	4.2	-18 Small decrease	-33 Large decrease
Lake Victoria	Uganda, Kenya, Tanzania	2.6	3.5	21 Large increase	0 Inconsistent
Lake St. Lucia	KwaZulu Natal, South Africa	2.5	2.9	10 Small increase	-10 Small decrease
The Dead Sea	Israel, Jordan, Palestine	3.2	4.2	-13 Small decrease	63 Inconsistent
Lakes Peipsi/Võrtsjärv	Baltic Sea, Estonia, Russia	6.7	3.8	23 Large increase	5 Inconsistent
Lake Tengiz	Kazakhstan	5.7	5.6	24 Large increase	-7 Inconsistent
Lake Baikal	Siberia, Russia	5.6	5.3	36 Large increase	8 Small increase
Poyang Lake	Yangtze River, China	4.4	3.3	-2 Inconsistent	13 Small increase
Lake Biwa	Shinga Prefecture, Japan	3.3	3.2	-4 Small increase	14 No change
Mahakam Lakes	East Kalimantan, Indonesia	2.4	2.5	2 Inconsistent	7 Small increase
Laguna de Bay	The Philippines	2.2	2.4	-4 Inconsistent	9 Small increase
Columbia River Wetlands	British Columbia, Canada	4.4	4.9	12 Small increase	-7 Small decrease

Lake	Location	DJF Temperature change	JJA Temperature change	DJF Precipitation change	JJA Precipitation change
Mono Lake	California, USA	3.6	4.7	16 Inconsistent	-19 Inconsistent
Laguna de Chapala	Mexico	3.0	3.2	-18 Inconsistent	-8 Small decrease
Laguna Fuquene	Andes Mountains, Columbia	3.0	3.2	12 Inconsistent	-3 Inconsistent
Pantanal Wetland	Brazil, Bolivia, Paraguay	3.0	3.8	3 Inconsistent	-8 Inconsistent
Laguna Mar Chiquita	Argentina	3.2	2.4	5 Inconsistent	10 Small increase

Table: A summary of future temperature (°C) and precipitation (%) change for the Living Lakes case studies caused by greenhouse gas emissions assumed by the SRES A2 scenario. Results are summarised from nine climate model experiments. DJF = Winter, JJA = Summer

The Interaction of human Activities in the Future

Some of the most important direct and indirect human activities that have significance for the future state of lakes include;

- * Diversions/Abstractions
- * Eutrophication
- * Other water quality problems
- * Navigation
- * Inflows; quality, quantity, variability
- * Productivity (livelihoods) - overexploitation
- * Habitats and biodiversity
- * Invasive species
- * Land use change
- * Tourism

These activities already pose challenges with varying degrees of importance to the Living Lakes and many of them will affect, and be affected by, climate change. This makes it extremely difficult to make precise judgements about the impacts and importance of climate change for the Living Lakes.

Having said this, certain key issues emerge collectively from the analysis of the 23 Living Lakes;

- * There is high confidence that temperatures will rise in

all the lakes with implications for water temperature (it will increase) and water quality. Higher temperatures are also likely to increase evaporation rates. Lakes which freeze over in winter and those fed by snowmelt rivers are likely to experience considerable disruption to the present temporal characteristics of these processes. Changes in extremes are likely to be particularly important (increasing spring floods, reduced frequencies of freezing events).

- * Most of the Living Lakes are projected to experience some degree of precipitation change although there is less confidence in whether and how much change will occur for specific lakes. Changes in precipitation regime are likely to have important consequences for lakes with the precise detail depending upon the direction and magnitude of the changes. Some lakes, those with very large catchments, shallow lakes, those fed by major rivers, highly seasonal lakes and so on may exhibit quite pronounced responses to changes in precipitation regime. Some of the Living Lakes are affected by the influence of El Niño and will be exposed to the effects of changes in the frequency and intensity of El Niños that may occur as global climate changes.
- * The present use and management of lakes and how this develops in future will greatly affect the consequences of climate change. Some lakes are already experiencing major stresses in terms of

abstractions, fishing, pollution etc. It is difficult to determine precisely how these stresses will be affected by climate change for the reasons outlined above. In some cases climate change may exacerbate stresses (e.g. where precipitation declines in areas of limited water availability and high demand) and in other cases it may offer opportunities (e.g. warmer temperatures may increase productivity, increased precipitation may reduce water quality problems and increase supply). Some of the Living Lakes are at present relatively unaffected by human activities and will naturally respond to climate change as it occurs.

- * Capacity to manage lakes now and in the future will determine how much a given change in climate affects lake systems and the people they support. Some of the Living Lakes have established procedures and institutions for effective management which puts them in a good position to plan and adapt to future climate change. Other Living Lakes have very little capacity to deal with rapid expansion and exploitation of their functions and in these cases climate change represents another incentive for building capacity in lake management.

Lake Descriptions

The remainder of this report presents climate change scenarios for the 23 Living Lakes and a qualitative assessment of their implications for the future state of the lakes by the 2080s (i.e. the period 2070-2099). Unless otherwise acknowledged specific information on the Living Lakes has been obtained from the Living Lakes web site: www.livinglakes.org

Prof. Mike Hulme, Tyndall Centre, East Anglia Universität (UEA), England

Die Studie des Tyndall Centre für Klimawandelforschung beschreibt die Folgen des Klimawandels für

insgesamt 23 Seen, die alle Mitglieder des internationalen Seennetzwerkes Living Lakes sind, darunter auch der Baikalsee in Sibirien und der ostafrikanische Viktoriasee. Laut Studie werden bis zum Jahr 2080 die Temperaturen an den Seen um bis zu 5,7 Grad steigen. Grund ist der wachsende Ausstoß von Treibhausgasen wie Kohlendioxid und Methan. Eine durchschnittliche Erhöhung der Temperaturen von 4,6 Grad und weniger Regen in den Sommermonaten prognostiziert die Studie für den Bodensee, Deutschlands größten und Zentraleuropas zweitgrößten See. Diese Veränderungen werden großen Einfluss auf die Tier- und Pflanzenwelt des artenreichen Sees haben.

Der Klimawandel beeinflusst direkt wichtige Eigenschaften von Seen, wie Wasserspiegel und Wassertemperatur. Es gibt auch indirekte Auswirkungen, wie veränderte Charakteristiken des Einzugsgebietes. Klimatische Variablen, die Seen direkt beeinflussen können, sind z.B. steigende Durchschnittstemperaturen, Veränderungen der Niederschlagsverteilung, Veränderung der Sonneneinstrahlung oder Windgeschwindigkeit, Anstieg des Meeresspiegels oder Erhöhung des Salzeintrags.

Es muss betont werden, dass der Klimawandel nicht isoliert auftreten wird - viele andere Belastungen werden in diesem Jahrhundert auf die Seensysteme einwirken, vor allem auf die Seen mit hoher Besiedlungsdichte. Einige wichtige menschliche Aktivitäten haben ebenfalls direkte oder indirekte Auswirkungen auf den zukünftigen Zustand von Seen, wie z.B. Wasserumleitung, Schifffahrt, Wassereinträge, Übernutzung, Einführung fremder Arten oder Tourismus. Diese können Klimaänderungen beeinflussen und durch sie beeinflusst werden. Diese Wechselwirkungen machen es schwierig, die Folgen der Klimaänderungen für die Seen abzuschätzen.

Wir werden vor neue unvorhersagbare Herausforderungen gestellt werden und sind gezwungen, neue Strategien zu entwickeln, um die Risiken des Klimawandels zu minimieren.

The complete study **Overview of Climate Change and its impacts on Living Lakes** by Prof Mike Hulme can be downloaded as PDF-file at www.globalnature.org.

Die vollständige Studie „Overview of Climate Change and its impacts on Living Lakes“ von Prof. Mike Hulme kann als PDF-Datei von www.globalnature.org heruntergeladen werden.

10 Case Studies on Climate Change and Lakes

Lake Victoria, East Africa

Marisa Goulden

Tyndall Centre, University of East Anglia, UK

Human Adaptation to Climate Variability and Change in East African lakes and Wetlands

In order to predict society's vulnerability to future climate change and identify possible needs and options for adaptive action we need to understand more about how people cope with and adapt to impacts from current-day climate variability. The research being undertaken seeks to understand how people cope and adapt within the specific context of climatically driven fluctuations in tropical lake and wetland resources. Lakes and wetlands in sub-Saharan Africa provide diverse livelihood opportunities such as fishing, agriculture and harvesting of natural swamp products. Although flooding and drought events in the past have caused significant impacts on lake-side and wetland dwellers, these same events can also provide new opportunities for resource use, for example as more fish or additional areas of fertile land may become available.

The presentation described a PhD research project in its early stages. Field research for this project will take place in Uganda in the catchments of Lake Victoria and Lake Kyoga, in association with Makerere University in Kampala. Uganda is a country with open water or wetlands accounting for 22% of its surface area and where 80% of the population live in rural areas and are directly or indirectly dependent on natural resources.

Livelihoods, adaptation mechanisms and the social and institutional relationships that influence these will be analysed. Both quantitative and qualitative methods such as questionnaire surveys and in-depth interviewing will be used in several case study villages that have experienced differing resource fluctuations. The impacts of current climate variability will be compared with possible future impacts under different scenarios of climate change. This will be done by carrying out a physical analysis using rainfall data, satellite images and a lake water balance modelling approach which



Full sails on Lake Victoria, East Africa.

will first use historical climatic variables and then outputs from Global Climate Models.

Marisa Goulden, Tyndall Centre, East Anglia Universität, England

Die vorgestellte Dissertation wird in Zusammenarbeit mit der Makerere Universität in Kampala im Einzugsgebiet des Viktoriasees und des Kyogasees in Uganda durchgeführt. Die Untersuchung beschäftigt sich mit der Anpassung von Menschen an klimatische Veränderungen in tropischen Seen und Feuchtgebieten.

Offenland oder Feuchtgebiete stellen 22% der Landesfläche Ugandas. Dort leben 80% der Bevölkerung in ländlichen Gebieten, die mehr oder weniger direkt von den natürlichen Ressourcen abhängig sind. Im Untersuchungsgebiet bieten Fischerei, Landwirtschaft und das Ernten von natürlichen Sumpfprodukten ein vielfältiges Auskommen. Obwohl Überflutungen und Dürreperioden schon in der Vergangenheit signifikante Auswirkungen auf Ufer- und Feuchtgebietenbewohner hatten, bieten sich dadurch aber immer neue Möglichkeiten der Ressourcennutzung z.B. durch Entstehung neuer Fischgründe oder fruchtbaren Landes.

Mit quantitativen und qualitativen Methoden wie Befragungen und tiefergehenden Interviews in Dörfern mit unterschiedlichen Ressourcen-Verfügbarkeiten sollen der Nahrungserwerb, die Anpassungsmechanismen sowie die sozialen und institutionellen Beziehungen analysiert werden. Die Auswirkungen der momentanen klimatischen Verschiebungen werden verglichen mit möglichen Auswirkungen in der Zukunft mit Hilfe einer Analyse der aktuellen Niederschlagsdaten und Satellitenbildern sowie eines Modells, das auf historischen Klimavariablen und Ergebnissen der Globalen Klimamodelle basiert.

Experience across European Lakes

Dr David Viner

Climate Research Unit, University of East Anglia, UK

European lakes will respond to both changes in the climate, the environment and society. The interactions between these need to be understood if we are to determine how Europe's freshwater lakes will respond. The IPCC has produced a series of scenarios that present storylines on how society and population will change. In turn these can be used to estimate future changes in climate. The figure shows the qualitative changes for a range of key socio-economic indicators, population, environment and climate for the IPCC SRES (Special Report on Emissions Scenarios) Scenarios.

Lakes will respond to changes at the regional level, the drivers here include: societal changes; temperature and precipitation change; sea level rise and saline intrusion; policies, such as, CAP, Natura 2000 etc.; and Tourism changes (climate change will impact upon tourism flows which in turn will add or remove pressures upon lakes).

The European Union funded CLIME project is the main focus of the research that will address the interactions between lakes, the climate, the environment and society and to assess, through integrated modelling how lakes will respond during the 21st Century. The aims of CLIME are:

- * To develop a suite of quantitative water quality models

that can be used to simulate the responses of lakes to future as well as past changes in the weather and climate;

- * To quantify through sound scientific investigation the impact of local changes in the catchment and regional changes in the weather and climate on the dynamics of lakes in Northern, Western and Central Europe.

Dr. David Viner, Fachbereich Klimaforschung (Climate Research Unit), East Anglia Universität, England

Europäische Seen reagieren auf Änderungen des Klimas, der Umwelt und der Gesellschaft. Das IPCC hat eine Serie von Szenarien über Änderungen in der Gesellschaft und der Bevölkerung aufgestellt, die für eine Abschätzung der Klimaveränderungen in Zukunft herangezogen werden können. Auf regionaler Ebene können das Änderungen der Temperatur und Niederschläge, des Meeresspiegels und Salzeintrags, der politischen Maßnahmen wie CAP oder Natura 2000 und des Tourismus sein.

Das EU-finanzierte Projekt CLIME konzentriert sich auf die Untersuchung von Wechselwirkungen der verschiedenen Einflüsse und will durch Modellerstellung abschätzen, wie sich Seen innerhalb des nächsten Jahrhunderts verändern werden. Mit der Erstellung mehrerer Modelle zur Wasserqualität sollen Reaktionen der Seen auf Klima- und Wetteränderungen in der Zukunft wie auch der Vergangenheit simuliert werden. Es soll wissenschaftlich untersucht werden, wie sich

Scenario	Population	Economy	Environment	Equity	Technology	Globalisation	Climate
A1F1	↗	↗	↘	↗	↗	↗	↗
A1B	↗	↗	↗	↗	↗	↗	↗
A1T	↗	↗	↗	↗	↗	↗	↗
B1	↗	↗	↗	↗	↗	↗	↗
A2	↗	↗	↘	↘	↗	↘	↗
B2	↗	↗	↗	↗	↗	↘	↗

Figure: A qualitative summary of the IPCC SRES Scenarios (Modified after IPCC, 2001).

lokale Veränderungen im Wassereinzugsgebiet und regionale Veränderungen beim Wetter und Klima auf die Dynamik von Seen in Nord-, West- und Zentraleuropa auswirken.

Flooding and other Climate Impacts in the Broads

Steve Hayman

Environment Agency, UK



The ecological condition of the Broadland river system and wetlands depends upon an adequate influx of good quality freshwater.

The Norfolk and Suffolk Broads area (Broadland) extends across 30,000 hectares of flood plain and includes 43 broads and 190 kilometres of navigable rivers. It enjoys national park status and is recognised for its landscape and nature conservation value by a range of national and international designations.

The evolution of the Broadland environment has been greatly influenced by human activity since Roman times, and the present diversity of wetland habitats is dependent upon the maintenance of flood defences, land drainage and sympathetic land use practices. There are a whole range of natural and social pressures on the area which will be the drivers for continuing

change through the 21st century, including those associated with climate change. The challenge is to be prepared for, and to proactively manage this change in a way which will sustain and, where possible, enhance the unique character of the area.

Climate change is an overarching issue which will influence virtually every aspect of the Environment Agency's work. Scientific opinion suggests that East Anglia will see a much more marked seasonality in rainfall and river flows with an increase in the frequency of summer droughts and winter floods. Sea levels are predicted to rise by 4.5 mm/year due to global warming, which will be in addition to the current 1.5 mm/year sinking of the land brought about by geological processes (isostatic adjustment). Furthermore, climate change is likely to mean increases in storminess resulting in more frequent and severe tidal surges and wave activity at the coastline.

The ecological condition of the Broadland river system and wetlands depends upon an adequate influx of good quality freshwater. The Agency carries out extensive water quality monitoring and can exert some control through the licensing of abstractions and the consenting of discharges. Climate change, therefore, has considerable potential to impact upon the Agency's water resources and water quality activities in Broadland, in addition to its responsibilities for riverine and coastal flood defences.

As a possible foretaste of things to come, during the past 15 years Broadland has experienced a prolonged period of drought conditions, a major fish kill due to saltwater incursion far into the river system, and breaching of the tidal flood embankments. Given sufficient time, and favourable conditions, freshwater habitats recover from these events. However, under a climate scenario where such impacts will be experienced on a regular basis, there will be a progressive deterioration in ecological status.

The present system of flood defences is crucial in safeguarding the recreation, amenity, landscape and nature conservation interest of the area. These comprise 14 kilometres of front-line sea defences along the north-east Norfolk coastline, and 240 kilometres of earth embankments on the tidal river banks. The majority of these defences have not had any major improvements for nearly 50 years and are currently in poor condition due to erosion, settlement and general deterioration.

The Agency is committed to the alleviation of saltwater flooding in Broadland, and it proposes to invest nearly £ 100 million over the next 10 years on strengthening both the sea defences and tidal flood embankments. Even so, no general increase in the height of the defences is planned, other than an allowance for settlement and sea level rise.

The current approach to flood risk management in Broadland is generally one of maintaining the status quo. Whilst there remain many uncertainties about the longer term prognosis, it is very unlikely that such a strategy will be sustainable much beyond the next 20 years. Acceptance that it is not going to be realistic to safeguard all the important freshwater habitats against disruption by saline incursion, means that opportunities need to be sought to create new wetlands in order to retain the area's rich biodiversity. The Agency is very aware that changes to the current flood defence practices have implications for socio-economic interests in Broadland as well as the ecological impacts, and it will work in partnership with the Broads Authority, and other key stakeholders, to develop an adaptive strategy for proactively meeting the challenges posed by a range of possible future climate conditions.

Steve Hayman, Umweltamt, England

Der Nationalpark Norfolk und Suffolk Broads erstreckt sich über 30.000 ha Fläche. Schon seit den Römern haben Menschen die Broads gestaltet und somit ist die bestehende Vielfalt an Feuchtgebietshabitaten abhängig von der weiteren Nutzung und Instandhaltung des Gebietes. Es wird eine Reihe von natürlichen und gesellschaftlichen Belastungen geben, die durch das 21. Jahrhundert hindurch der Motor für kontinuierliche Veränderungen sein werden, Klimaänderungen eingeschlossen.

Für den Osten Englands wird durch Klimaverschiebungen eine stärkere Saisonalität bei Niederschlägen mit einer höheren Frequenz an Sommerdürren und winterlichen Überschwemmungen vorhergesagt. Die Meeresspiegel sollen bis zu 4,5 mm/Jahr ansteigen und es wird voraussichtlich mehr Stürme mit stärkerer Brandung und Wellenaktivität an den Küsten geben. Als einen Vorgeschmack haben die Broads in den letzten 15 Jahren schon eine Dürreperiode erlebt, ein großes Fischsterben und Zusammenbrüche von Dämmen. Sind die Abstände zwischen solchen Ereignissen groß

genug, kann ein Süßwasserhabitat sie überstehen. Kommen sie jedoch in regelmäßigen Abständen vor, wird sich der ökologische Status kontinuierlich verschlechtern.

Das momentane System zur Überschwemmungsabwehr ist ausschlaggebend zur Sicherstellung der Funktionen des Gebietes. Es besteht aus 14 km Küstenschutzvorrichtungen an der Küste Norfolks und 240 km Dämmen an den Flussufern. Seit fast 50 Jahren wurden diese Vorrichtungen nicht mehr repariert und befinden sich in schlechtem Zustand. Die Behörde wird deshalb in den nächsten 10 Jahren etwa £ 100 Millionen für Reparaturmaßnahmen ausgeben. Die aktuelle Vorgehensweise im Überschwemmungsrisikomanagement soll zunächst den Status quo erhalten. Obwohl man schlecht langfristige Vorhersagen machen kann, ist es unwahrscheinlich, dass diese Strategie länger als 20 Jahre erfolgreich sein wird. Wenn man annimmt, dass man die wichtigen Süßwasserhabitate so nicht geschützt werden können, muss man schon jetzt nach Möglichkeiten suchen, um neue Feuchtgebiete für den Schutz der Biodiversität zu erschaffen. Die Veränderungen der momentanen Schutzmaßnahmen werden sozioökonomische wie auch ökologische Auswirkungen haben. Es muss deshalb in Zusammenarbeit mit der Broads Authority und anderen Interessensvertretern eine adaptive Strategie entworfen werden, um den Herausforderungen frühzeitig zu begegnen.

Local Government Action Plan for Climate Change in the Columbia Wetland Region

Mark Shmigelsky

Mayor of Invermere, Canada



Columbia River Wetlands region in British Columbia, Canada.

Where is Invermere?

- * Located between the Rocky and Purcell Mountains in the Southeastern part of British Columbia Canada.
- * Gateway to the Columbia Valley Wetlands.
- * Population of 2900 (permanent), Seasonal up to 8000. Valley permanent pop. 8000, Seasonal up to 40,000.
- * Economy is dependent on tourism, forestry and mining.

Impacts of Climate Change?

- * The region will see less snowfall, with an earlier melt.
- * Water for irrigation.
- * Domestic water supply.
- * Fish habitat.
- * More forest fires.
- * Infestation from pine beetle.
- * Change of habitat.

What is Invermere doing?

- * Adopted policy to lead the community in adapting to climate change.
- * Supported the ratification of Kyoto Protocol.
- * 106th Climate change partner with Federation of

Canadian Municipalities.

- * Implementing a climate change plan.

Invermere's Action Plan

Step 1

- * Lead by example.
- * Recognition of impacts and need to adapt.
- * Attempt to mitigate the impacts.

Step 2

- * Main policy document of local government.
- * Identify goals.
- * Protect water resource.

Step 3

- * Organized workshop with seven other agencies focused on impacts in the Basin.
- * Directed information to elected officials.

Step 4

- * Endorse FCM climate change program.
- * Reduce local government emissions.

Step 5

- * Manage water resources.
- * Water metering.
- * Lake management strategy.

Step 6

- * Cleaner air program.
- * New purchasing policy.
- * Retrofit municipal buildings.
- * Spread the word!

Conclusion

- * Local Governments must be proactive.
- * Recognize the impacts of climate change on our communities.
- * Must think of long-term planning.

Mark Shmigelsky, Bürgermeister von Invermere, Kanada

Invermere liegt zwischen den Rocky und den Purcell Mountains im südöstlichen Teil Britisch Kolumbien und ist das Tor zu den Kolumbien Feuchtgebieten. Die Bevölkerung liegt bei 2.900 permanenten und 8.000 saisonalen Bewohnern, im Tal steigt die Bevölkerungszahl auf bis zu 40.000 in der Saison an. Die Gemeinde lebt vom Tourismus, der Waldwirtschaft und dem Bergbau.

Für die Region werden als Auswirkungen des Klimawandels u.a. sinkende Schneemengen im Winter so-

wie Wassermangel im Sommer vorhergesagt. Damit zusammenhängend werden z.B. die Fischhabitats kleiner werden und es werden mehr Waldbrände auftreten.

Invermere will die Gemeinde auf diese Klimaveränderungen vorbereiten. Als Unterstützer der Ratifizierung des Kyoto-Protokolls und als ein Partner der „Federation of Canadian Municipalities“, wird ein aus sechs Schritten bestehender Aktionsplan durchgesetzt. Als Fazit wird festgestellt, dass die Auswirkungen des Klimawandels auf die Gemeinden anerkannt werden müssen. Regierungen sollen deshalb frühzeitig aktiv werden sowie langfristige Aktionspläne erstellen.

11 Solar Lakes

The future supply of energy is crucial for the economic, social and ecological development world wide. The international foundation Global Nature Fund (GNF) aims to implement concrete projects to reduce greenhouse gas emissions. To achieve this, the solar campaign „Solar Lakes“ was initiated. There are already examples of successful use of promising new solar technologies in lake regions.

Emission-free Shipping in Harmony with Nature

For some years now, quiet, emission-free solar power boats have been operating at Lake Constance. Solar power boats work by harnessing electric energy gained from photovoltaic (PV) cells. There are almost unlimited possibilities for the use of solar energy: as solar taxis, boating for pleasure or nature excursions and as research vessels. The solar passenger ferry HELIO is operating between the Swiss border and the German border of Lake Constance. In the Broads, our British Living Lakes partner, a solar catamaran is in use. Within the scope of the Solar Lakes Campaign, GNF will promote this environmentally friendly technology worldwide.

=> www.kopf-solaradesign.com

=> www.solarboats.net

ECOCAMPING - Tourism and Solar Energy

14 camping sites in the Lake Constance region and six at Lago Maggiore in Italy are taking part in this initiative launched by the Lake Constance Foundation - a Living Lakes partner. This project demonstrates that the use of environmentally friendly technologies in the tourism sector may considerably reduce the consumption of fossil fuels. Camping sites equipped with solar panels generate energy for hot water in showers and heating systems. Photovoltaic technology is used for electricity generation.

=> www.ecocamping.net

Species Conservation by Introducing Renewables

With the financial support of GNF, a solar power station was constructed at Lake Tengiz, Kazakhstan. The energy won from the sun supplies a ranger station with power at the 1500 km² large steppe lake. Non-isolated power lines which caused the death of a large number of birds including very rare birds such as steppe eagle and spotted eagle in the past have now been removed. Before, 800 birds were killed on a stretch of 11 km in the space of only a few days. The renewable power generation at the station will be complemented with a wind mill that will be set up in 2003. Donations for this project are welcomed by the GNF.

=> www.globalnature.org

68



Emission-free solar power boats such as the solar ferry „Helio“ at Lake Constance are operating at the Broads and several other lakes and rivers in the world.



Removal of the deadly power lines at Lake Tengiz in Kazakhstan.

Solar Lakes

Der GNF hat die Kampagne „Solar Lakes“ gestartet, um Maßnahmen zum Klimaschutz in Seenregionen zu fördern. Schon heute existieren an den Living Lakes-Partnerseen etliche Beispiele für den erfolgreichen Einsatz zukunftsweisender Solartechnologien.

Emissionsfreie Schifffahrt im Einklang mit der Natur

Seit einigen Jahren bereits fahren geräuschlose und emissionsfreie Solarboote auf dem Bodensee. Ihre Einsatzmöglichkeiten sind beinahe unbegrenzt. Die Solarfähre Helio am Bodensee verbindet die schweizerische mit der deutschen Uferseite und wird von Pendlern wie Touristen gern genutzt. Der Living Lakes-Partner Bodensee-Stiftung ist am Betrieb der Helio ebenso beteiligt wie die Allianz Umweltstiftung, die finanzielle Unterstützung leistet. Beim britischen Living Lakes-Partner Broads ist seit 2000 ein Solarkatamaran als Ausflugs- und Beobachtungsboot in Großbritanniens größ-

tem Feuchtgebiet im Einsatz. Der Partner des GNF, die mittelständische Kopf AG, baut diese solarbetriebenen Boote mit Kapazitäten von 12 bis 120 Personen.

ECOCAMPING - Tourismus mit Solarenergie

14 Campingplätze am Bodensee und sechs am Lago Maggiore in Italien beteiligen sich am Projekt ECOCAMPING des Living Lakes-Partners Bodensee-Stiftung. ECOCAMPING zeigt die großen Einsparpotentiale auf, die sich im Tourismus durch die Nutzung erneuerbarer Energien ergeben. Auf den Campingplätzen erzeugen Solarkollektoren Warmwasser für Duschen und Heizungen. Photovoltaikanlagen dienen zur Stromerzeugung.

Solaranlage am Tengis-See

Im September 2000 fanden deutsche Naturschützer an einer 11 km langen Stromleitung am Tengis-See in Kasachstan 800 tote Vögel, die durch Anflug an die Stromleitungen oder beim Ansitzen auf den Masten durch Stromschlag getötet wurden. Dieses Massensterben seltener Vögel wie Mönchsgeier und Schneeeule beendeten die kasachischen Living Lakes-Partner von der hiesigen Nationalparkverwaltung in Kooperation mit dem NABU und GNF, indem eine kleine Siedlung am Ende der Stromleitung mit einer Solaranlage zur Versorgung mit Strom ausgestattet wurde. Um auch im Winter diesen störungsfreien Betrieb sicherzustellen, wird ein zweiter von der Sonnenstrahlung unabhängiger Stromerzeuger installiert. Eine Nachrüstung mit einem kleinen Windbatterielader wird mit Unterstützung des GNF umgesetzt. Durch den Einsatz erneuerbarer Energien wird nicht nur ein Beitrag zum Klimaschutz, sondern auch zum Erhalt seltener Vogelarten geleistet.

12 EU LIFE Workshop Session „Planning and Implementation of Wetland Management“



The Project „Living Lakes: Sustainable Management of Wetlands and Shallow Lakes“ is supported by the EU Life Environment Programme.

Introduction

In the framework of the Living Lakes Conference a workshop „Planning and Implementation of Wetland Management“ was offered to wetlands managers and experts. This workshop took place in the context of the GNF-coordinated project „Living Lakes: Sustainable Management of Wetlands and Shallow Lakes“ for which GNF secured a grant under the EU LIFE III programme.

Project areas are the lagoons La Nava and Boada in Spain and the Nestos Lakes in north-eastern Greece. The main goal of the project is to develop and implement a management plan with the local communities focusing on the development of the wetlands while benefiting the social and economic needs of the local population.

This project focuses on the protection of water and biodiversity through the conservation of lakes and wetlands. The experiences gained are transferable to other action fields. The two selected demonstration areas are typical for a great number of wetlands and shallow lakes in Europe.

Expertise comes from project partners in the Lake Constance region and at the Norfolk and Suffolk Broads who have gained rich experience in finding solutions for water management problems. In particular, the Lake Constance Foundation provides know-how in the fields of extensive agriculture and organic farming, sustainable tourism and visitor management in protected areas and environmental education. The Broads Authority has considerable experience and expertise in shallow lake restoration, particularly with respect to combating eutrophication by mud pumping, bio-manipulation and other techniques. It has also extensive experience in fen management, using grazing animals and specialised harvesting machinery.



The project areas of the EU LIFE Project „Living Lakes: Sustainable Management of Wetlands and Shallow Lakes“ are the Lakes La Nava and Boada in Spain, and the Nestos Lakes in north-eastern Greece.

The workshop session „Planning and Implementation of Wetland Management“ in the framework of the EU Life project is a tool to make the experience and expertise accessible.

From vision to action

Cath Johnson

Conservation Officer Trinity Broads Project Manager,
Broads Authority



Cath Johnson, Conservation Officer Trinity Broads Project Manager, Broads Authority. The Broads Plan comprises a concrete action plan and a strategic plan that sets out a vision and long term as well as short term aims.



What is the Broads Plan?

Under the terms of the Norfolk and Suffolk Broads Act the Broads Authority (BA) are required to produce a management plan for the Broads area, and renew it every 5 years. The Broads Plan is for everyone with a stake or interest in the Broads area, including Government, organisations, business, trusts, charities and visitors. The plan sets out the BA's policy with respect to the exercise of its functions. Consultees include: appointing authorities, Internal Drainage Boards and bodies with an interest in the Broads.

The Broads Plan is a concise 25-page document and issues, objectives and targets are clearly identified.

It provides a framework that includes:

- * 20 year strategic plan
- * 5 year action plan

Its objectives are Specific, Measurable, Achievable, Relevant & Timely (SMART). It provides a vision for the Broads area and a mission for the BA.

The Process

In 2002 an open, transparent and accountable process of engaging stakeholders began to review the 1997 Broads Plan. Over 80 key organisations and interest groups attended workshops. Many more attended community held events. The whole process involved the guidance of independent consultants and was overseen by the BA's Strategy and Resources Committee. An expert and advisory group of nationally expert and influential officers will be able to assist with the implementation of the Plan.

Types of Engagement

Phase 1 involved Bounded dialogue where stakeholders were able to influence decisions.

Phase 2 involved Consultation where stakeholders reviewed the Draft Broads Plan.

Strategic Plan

The Plan is in 2 parts:

- * The Strategic Plan sets out a vision and long term 20 year aims for the future (beyond the life of the Plan). It outlines short-term 5-year objectives. It identifies a

set of guiding principles of sustainable development, which direct the decisions and actions of the BA in the implementation of the Plan.

- * The final section outlines how the Plan will be implemented and identifies a set of indicators that will be used to monitor and evaluate its progress e.g. for the „Maintenance of the Broads landscape“ - a potential indicator would be to monitor the percentage of flood plain maintained as grazing marsh.

Action Plan

The second part of the plan is the action plan. It was compiled with lead organisations and lead partners, year of action; financial resources and links to other strategies are clearly identified. The Action Plan addresses the issues concerned with these. It provides achievable and measurable actions. The 16 aims and 151 policies contained in the 1997 Broads Plan have mainly been amalgamated into the new Broads Plan as principles, objectives and actions. Those not included have either been addressed or are no longer applicable.

Key Challenges

Topics for stakeholder discussion at the workshops were initially derived from workshop sessions with BA members and staff. These were:

- * Water quality/quantity: hydrology, abstraction and climate change.
- * Waterways: water space, dredging, bank erosion and ancillary facilities.
- * Recreation and Tourism: marketing quality, infrastructure, access, hire boat industry.
- * Landscape: ESA, fens, Broads Flood Alleviation Project and renewable energy.
- * Built and Local Heritage: development control, archaeology, local tradition and skills.
- * Promote Understanding: information and education, design quality and physical and social access.

The workshop identified some key challenges and opportunities for the BA.

Guiding Principles

The long-term management and development of the Broads area will be based on the key principles of sustainable development: „To ensure that human use and development does not destroy the natural or cultural resource.“

This requires meeting four key objectives:

- * Social progress - to recognise the needs of everyone.
- * Effective environmental protection.
- * Wise use of natural and cultural resources.
- * Maintenance of economically and socially viable communities.

Action Plan - Some key objectives

To illustrate how a vision becomes an action would be to take an example from the Broads Plan:

Objective: To develop and implement a strategy for monitoring, restoration and management of rivers and broads;

Action: Implement the Trinity Broads Management Plan.

72

Trinity Broads

The Trinity Broads are isolated from the main river system by the Muckfleet drainage channel. The location of a sluice, constructed in 1850, has meant that the broads have maintained relatively good water quality, free from the effects of eutrophication and tourist development. The Trinity Broads were designated as a cSAC in 2000.

Restoration of Ormesby Broad

In 1995 Essex & Suffolk Water (landowner), BA and Environment Agency embarked on an EU Life Project to: „Create clear water conditions to produce a self-sustaining aquatic macrophyte community.“ Lack of consultation led to outrage from the local community and a deterioration of public support for the project. In 1997 a Project Manager was employed by the BA to „win back“ community support through consensus building.

Partnership Approach

A partnership was formed with BA, EA, ESW and English Nature (EN) and formalised through a Memorandum of Agreement in November 2001.

Several local consultation groups now exist:

Trinity Broads Consultation Group - Parish Councils, anglers, shooting and sailing.

- * Trinity Broads Volunteer Wardens
- * Trinity Broads Fisheries Conservation Group - anglers have direct involvement.

Management Infrastructure

Communication can occur at any level. Mechanism routes exist so that community can feed information back both formally and informally.

Management Framework

The Management Plan 2000-2005 will be reviewed in 2004. Bounded dialogue was used to compile the document through consultation with community.

It provides a framework to ensure that:

- * Wildlife and habitats are protected and enhanced.
- * Recreation activities are managed at an appropriate level.

Community Involvement

Community involvement at a site specific, local level has been key to the production of an effective, achievable management plan. Local communities are fundamentally the future of the Broads area. Their involvement is key to the successful future management of the Broads.

Cath Johnson, Projektleiterin Trinity Broads, Broads Authority, England

Die Broads Authority ist gesetzlich dazu verpflichtet alle fünf Jahre einen neu überarbeiteten Managementplan für die Norfolk und Suffolk Broads zu erstellen. Dieser sogenannte Broads-Plan schließt alle Interessengruppen mit ein, wie Regierung, Organisationen, Wirtschaft und Besucher. Der Broads-Plan enthält eine Langzeit-Vision für die nächsten 20 Jahre sowie einen 5-Jahres-

Aktionsplan. Die Ziele, die im Broads-Plan aufgeführt werden, sind präzise, messbar und realisierbar.

Im Jahr 2002 wurden Vertreter aller Interessengruppen in zahlreichen Veranstaltungen und Workshops dazu eingeladen, den Broads-Plan von 1997 gemeinsam zu überarbeiten. Die Kernherausforderungen für die Interessenvertreter waren Wasserqualität, Wasserwege, Erholung und Tourismus, Landschaften, Kultur- und Naturerbe sowie Umweltbildung.

Die langzeitlichen Ziele des Broads-Plans berücksichtigen sozialen Fortschritt, effektiven Umwelt- und Naturschutz, weise Nutzung von natürlichen und kulturellen Ressourcen sowie die ökonomischen und sozialen Bedingungen der Gemeinden.

Im Rahmen des Broads-Plans soll sicher gestellt werden, dass Tier- und Pflanzenwelt geschützt und dass Freizeitaktivitäten in einem angemessenen Maß angeboten werden. Die Einbindung der Bevölkerung spielt eine herausragende Rolle zur Entwicklung eines erfolgreichen Managementplans.

Managing the steppe lakes: La Nava and Boada

Eduardo de Miguel

Fundación Global Nature, Palencia, Spain



Eduardo de Miguel, Fundación Global Nature, Palencia, Spain. In 1990 the Fundación Global Nature initiated an ambitious and innovative recovery project of the La Nava wetland.

73

The former La Nava Lake

Lake La Nava was one of the biggest steppe lakes of the Iberian Peninsula. This endorreical lake was 6.8 km long and 4.6 km wide. The flooded area depended on the rainfalls. Its surface was estimated at 2,000 to 5,000 hectares. Due to the Cambo Law, La Nava was drained in the 40s and 50s, and its basin was dedicated to new agricultural farming lands.

La Nava had a very important role in the local economy. More than 20.000 horses and other domestic animals grazed there, and its waters gave shelter to a great variety of fauna and flora.

The Recovery Project - Restoration Works

In 1990, Fundación Global Nature began the restoration works of La Nava, and in 1992 the Regional Administration assumed the management of the wetland. In 1998, Fundación Global Nature began the recovery of Boada wetland and now it is responsible for its

management. In the case of La Nava, the use of an important part of the land is shared with local shepherds.

In La Nava, several kilometres of dykes avoid the flooding of nearby fields. It was necessary to readapt the former drainage channels to facilitate the water capture. At present, the water that enters into both wetlands comes from the Channel of Castilla and not from the overflow water.

Now, the Regional Ministry of Environment is the direct responsible for La Nava. The Boada wetland is managed by Fundación Global Nature (NGO). Both Municipal Councils (Fuentes de Nava and Boada de Campos) participate in some management aspects, but not regularly. Other stakeholders are not implicated in the management of the wetlands.

Nowadays, 307 hectares of La Nava and 70 hectares of Boada have been restored representing only 10% of the former wetland.

At present, La Nava and Boada have following legal statuses:

International level:

- * International Important Wetlands (Ramsar Convention)
- * Important Bird Areas

Regional level:

- * Natural Park
- * Regional Catalogue of Wetlands

In many cases, there is no coordination among the different protective legal status.

Biological importance of the Wetlands

La Nava and Boada are a stopover for 10,000 to 15,000 Greylag Geese and thousands of ducks every year. During the fall season, hundreds of shorebirds, herons and passerines rest and feed in the waters of these shallow wetlands. Black-winged Stilt, Whiskered Terns and Coots, are some of the breeding species found in these wetlands.

In spring, these wetlands are covered with helophytic vegetation and subaquatic flora. Some of these plants are crucial to maintain the water quality.

Problems of the Wetlands

These steppe lakes still present a great variety of problems, such as:

* Sewage

La Nava and Boada receive from time to time urban and industrial sewage (from small local leather factories). Low water levels and high temperatures in summer can accelerate the harmful effects of sewage.

* Agricultural intensification

Farmland landscape has changed dramatically within few years. Removal of edges and boundaries, and concentration of land in big plots, contribute to increase sediment deposition and the loss of important natural habitats. Intensive agriculture uses a great variety of products such as fertilizers, biocides, many of which come through the overflow waters.

* Eutrophication

Sewage water and the accumulation of organic material are responsible for wetlands eutrophication. In La Nava, the existence of great areas of brushes (Carex or Eleocharis) provides every year an estimated biomass of 7,000-10,000 tons per hectare.

* Few monitoring works

Monitoring is essential to guarantee a high water quality, such as:

- Water analysis
- Botanical studies
- Limnological studies

* No Management Plan

* Introduction of allochthonous species

LIFE-project: „Sustainable Management of Wetlands and shallow Lakes“

Global Nature Fund is the beneficiary of the project „Sustainable Management of Wetlands and Shallow Lakes“, in which Fundación Global Nature and the Councils of Fuentes de Nava and Boada de Campos are partners. Fundación Global Nature is also partner of the project „Aquatic Warbler conservation in the IBA Nava-Campos“, in which Consejería de Medio Ambiente (Regional Administration) is the beneficiary. These



The steppe lake La Nava, Spain, is a key wintering and migration site for thousands of birds.

two projects are an essential part of the management works carried out in both wetlands.

The LIFE programme „Conservation of Aquatic Warbler in the IBA Nava-Campos“, is carrying out vegetation management works based on grazing, mechanical removal, mowing and controlled burning.

Goals of the LIFE Environment Project

Management Plan

Management Plans are the main tool for the correct administration of any protected area. Fundación Global Nature, collaborating with local stakeholders, has designed a Management Plan for the protected area. This Plan should be implemented in 2004.

Agri-environmental Plan

To reduce agriculture's impact, Fundación Global Nature is developing some measures in the LIFE project „Sustainable Management of Wetlands and Shallow Lakes“. An agro-environmental scheme is being designed, implementing good farming methods and an extensification plan.

This new Spanish agro-environmental scheme was issued on January 12, 2001. It is based on 9 different measures, applicable throughout the country.

- 1 Extensification
- 2 Preservation of endangered varieties of cultivated plants
- 3 Reduction of agrochemical use
- 4 Erosion control

- 5 Protection of wetland flora and fauna
- 6 Traditional farm systems in the Canary Islands
- 7 Irrigation water saving
- 8 Landscape protection and fire control
- 9 Integrated management of livestock production

We have concluded that the following measures are more practical and applicable, but they are still under discussion with local farmers:

- * Agricultural extensification: improvement of traditional fallow land.
- * Agricultural extensification: protection of fauna and flora and improvement of steppe bird habitats.
- * Land set-aside: recovery of wild flora and biodiversity.
- * Fight against erosion in herbaceous crops.
- * Integrated management of livestock production: actions in pasture and stubble fields.
- * Integrated management of livestock production: actions in pasture and stubble fields.

Green Filter

Fundación Global Nature will install a green filter in the entry channel of waters of the Boada wetland. The floating macrophytes filters are easy to have low maintenance costs and permit the primary, secondary and tertiary water depuration.

Control of Water Quality

Water quality in the Boada wetland, in collaboration with La Coruña University, is being monitored. The Royal Botanical Garden of Madrid is also developing studies of aquatic flora. These researches permit to foresee contamination problems, which can affect fauna and flora communities.

Buffer Zones

To prevent diffused pollution and erosion, Fundación Global Nature is creating buffer zones in the La Nava and Boada wetlands, through the plantation of vegetation stripes with species capable of absorbing these nutrients. Some plots remain as fallow land, and other have been sown with thistle, a perennial crop able to pump high nutrient quantities.

Afforestation

In 2003, Fundación Global Nature has planted 10,560 trees and bushes of 12 different species. Many of these bushes and trees have been planted in buffer zones.

Public Use

La Nava and Boada possess a basic infrastructure for public use. Both lakes offer trails, paths and bird hides for visitors.

The Regional Administration (Junta de Castilla y León) has a Visitors Centre, used by more than 10,000 people a year, and in 1992, Fundación Global Nature opened the „Centro de Estudios Ambientales y Albergue de Tierra de Campos“, where environmental education, research and restoration works are being developed.

Environmental Education and Work Camps

Fundación Global Nature holds work camps every year where young people of different nationalities collaborate in the restoration of wetlands and learn to value their importance. Environmental issues are also explained in local schools.

Dissemination (e.g. internet, exhibition, brochures, video, manual)

During the past years, several brochures, reports and publications about wetlands have been published. Fundación Global Nature is also working on a management manual, where works and experiences of wetlands restoration will be explained.

Eduardo de Miguel, Fundación Global Nature, Palencia, Spanien

Der La Nava See war der größte Steppensee der Iberischen Halbinsel, bis er in den 40er und 50er Jahren trockengelegt wurde, um neue landwirtschaftlichen Flächen zu schaffen. 1990 begann die Fundación Global Nature mit den Renaturierungsarbeiten von La Nava. Mit der Renaturierung der Lagune Boada wurde 1998 begonnen. Bisher wurden nur etwa 10% der ursprünglichen Seefläche wiederhergestellt.

La Nava und Boada sind gesetzlich geschützt nach Ramsar und als Important Bird Areas sowie auf regionaler Ebene als Naturpark und im Katalog für Feuchtgebiete. Dennoch sind sie einer Vielzahl von Bedrohungen ausgesetzt, wie z.B. industriellen Abwässern, Intensivierung der Landwirtschaft und damit Eutrophierung und der Einführung von nicht heimischen Tier- und Pflanzenarten.

Das EU-LIFE Projekt „Nachhaltiges Management von Feuchtgebieten und Flachwasserseen“ wird von der Fundación Global Nature in Zusammenarbeit mit dem GNF durchgeführt. Unter anderem soll bis 2004 ein Managementplan unter Einbeziehung lokaler Interessenvertreter aufgestellt werden. Die wichtigsten Inhalte des Managementplans sind:

ein Aktionsplan für den Bereich Landwirtschaft (z.B. zur Extensivierung, Reduktion der Pestizideinträge), Installation von Grünfiltern, Monitoring der Wasserqualität, Erschaffung von Pufferzonen, Wiederaufforstung, Einrichtung von Infrastrukturen für Besucher, Umweltbildung und Veröffentlichungen.



Sustainable Wetland Management and Restoration Measures at Nestos Lakes and Lagoons, Greece

Hans Jerrentrup

Society for Protection of Nature and Ecodevelopment (EPO)



Hans Jerrentrup, Society for Protection of Nature and Ecodevelopment (EPO), Greece.

The Nestos Wetlands

The Nestos Delta in North-eastern Greece expands over 500 km² and has a coastline of about 50 km with the Aegean Sea. The river Nestos itself inside the delta is about 30 km long. Four main ecosystems characterise the delta:

- * The riverbed with large riparian forests, sandy islets, branches of running and still waters, oxbows, meadows, reed beds, tamarix scrubs, inland sand dunes of ca 4,000 ha,
- * a coastal strip of 50 km with beautiful white sand dunes, that are the largest in Northern Greece,
- * eight shallow lagoons (about 2,700 ha) with extended salt marshes, wet meadows and tamarix scrubs,
- * and 18 small freshwater lakes (near Hrysoupolis) with reed beds, floating vegetation of water-lilies and

other rare water plants, dry and wet meadows, small bushy forest patches and traditional agriculture.

Large parts of the delta plain have been drained in the 20th century and are intensively used by agriculture, irrigated with water from the Nestos river.

The flora and fauna of the Nestos Delta is extraordinarily rich due to the variety of biotopes and the geographical location at the eastern edge of the Mediterranean Basin, where three bio-geographical regions overlap: the Mediterranean, the East-central European and Asia Minor. The area holds the strongholds of the Greek population of Golden Jackal and Otter. More than 320 bird species have been observed, of which about 110 are breeding, 180 are migrant visitors and about 120 species winter in the area. The breeding populations include Lesser-spotted Eagles, White-tailed Eagles, Spur-winged Plovers, colonies of Grey and Purple herons, Little Egrets, Little Bittern, Little and Common Terns, Pratincoles, Stone Curlews, 90 pairs of White Storks, Masked Shrike, Hoopoe, and Bee-Eaters. Nestos is a very important stop-over place for Palaearctic bird migration for raptors, waders, terns, storks, herons, pelicans, Glossy Ibis, Spoonbills and many songbirds. The wintering species reach up to 50,000 aquatic birds: ducks, geese, swans, divers, Pygmy cormorants and numbers of large raptors like Imperial, Spotted and White-tailed Eagles.

77

Established Protection Orders

The Nestos Delta with its wetlands is protected by a number of international and national laws and treaties, such as:

- * Ramsar Convention for Wetlands of International Importance,
- * European Wild Birds Directive, (EEC/79/409/1979) as „Special Protected Area“,
- * European Flora-Fauna Habitats Directive (EU 92/43) as a „Natura 2000“ Site
- * Area of „Special Interest“ for European Ornitho-fauna (IBA),

There are two large zones where hunting is prohibited and there are two totally protected, fenced riparian forest areas of about 1,000 ha, especially for wildlife.

In 1996, the Nestos Delta was declared a National Park by ministerial decree for 2+1 years (854/B/5796/Sept.1996),

but unfortunately no presidential law followed, leaving the area without the National Park status.

Problems of the Nestos Wetlands

Generally the main problem is the lack of protection measures, a coordinating administration and management authority, clear zones for land use and the missing determination of boundaries of protected areas with indications of allowed and prohibited human activities. In consequence, the following activities often cause serious threats and deterioration of natural areas:

- * Intensive agricultural practices with continuously growing need of fertilizers, pesticides and irrigation water cause eutrophication, pollution and lack of freshwater in lagoons and lakes.
- * Drainage and land reclamation schemes still devastate natural biotopes.
- * Illegal hunting causes serious losses of rare and protected fauna species and disturbs wintering aquatic birds, forcing them to continuous movements during winter.
- * Intensive stock grazing in the riparian forest and on dunes causes problems to soils and vegetation.
- * Illegal woodcutting inside the riparian forest is still a common habit of local people.
- * Arbitrary building-up areas (without permissions) at the Nestos mouth and along the coast devastate biotopes, as well as the expansion of the building zones of coastal villages.
- * The construction and operation of two hydroelectric dams on the main course of Nestos in the mountains result in reduction of water supplies in the delta and in the loss of sediments, necessary to render the delta's coast line.
- * Over-fishing of stocks in the sea and the lagoons.
- * Illegal uncontrolled garbage and sewage dumps near every village and generally widespread garbage in landscape and nature.

The EU LIFE Environment Programme

The main goal of the project is to demonstrate how wetlands in the Nestos Area can be restored and managed wisely in ways that are compatible with sustainable development. Management plans for the conservation of the wetlands, a plan for agricultural extensification and sustainable tourism development in cooperation with the local communities have been elaborated. The plans include buffer zones around the lakes to reduce nutrient influx, guidelines for the treatment of sewage effluent and visitor management. Work camps for youth, as well as training courses for wetland managers will help to spread the expertise developed. Partner to EPO in Greece is AENAK - the Development Agency of the Prefecture of Kavala that plays an important role in the local implementation of the project measures, like the organisation of stakeholder meetings for the management plans and the permissions to use public land for the installation of buffer zones.

Measures and Results in the Nestos Wetlands

A. Management Plans

Management plans for representative parts of the delta were elaborate with the option of being implemented later on a larger scale. Three management plans were developed by EPO with the support of GNF and other experts and discussed with various stakeholders in a number of team meetings of two working groups: conservation/wetland management versus agricultural extensification and sustainable tourism development. The plans include the following areas (see Table 1) and activities:

- * An integrated management plan for the conservation of two representative wetlands areas of the Nestos Delta was developed and will be applied on about 500 ha of wetland zones at four lakes and one lagoon.
- * A concept for the extensification of 4.000 ha agriculturally used land around the wetlands is integrated into the management plan and concrete measures are being proposed as agri-environmental extensification scheme. The area around the lakes is under an ongoing land reorganisation scheme, where areas of low agricultural value will be set aside for conservation,



offering the unique opportunity to create natural biotope - bridges between the different small lakes. At the lagoons intensively farmed land is proposed to be involved in extensivisation measures with financial incentives for farmers.

- * For the development of sustainable tourism in the Nestos area first an inquiry was carried out to describe the existing infrastructure and find out problems of tourists and tourism businesses as well as to get first ideas for development measures. Then a sustainable tourism management plan was drawn and discussed with local stakeholders. The proposals will be the basis for further programs and measures.

effluents of drainage canals. In this newly installed zone, more than 50,000 water plants (*Typha angustifolia*, *Typha latifolia* and *Phragmites* sp.) were planted in three adjacent basins. In the phase of the landscape modelling it was necessary to construct a field path to get access to the area with heavy machinery. More than 770 m of old drainage canals were filled in to guarantee controlled water flow in the three constructed successive basins. Between the last basins and the lagoon an overflow with an additional earth-gravel filter was constructed. The filter strip was flooded and drained with fresh water three times to wash out surface salt. Afterwards it has been flooded permanently.

Purpose	Surfaces at the Lakes	Surfaces at the Lagoons	Total Surfaces
Areas for Nature Conservation (Management Plan - Part I)	252.3 ha	246.2 ha	498.5 ha
Areas for Agricultural Extensivisation (Management Plan - Part II)	1,321.8 ha	2654.6 ha	3,976.4 ha
Areas for planting Buffer Strips	3.5 ha	6 ha	ca 10 ha

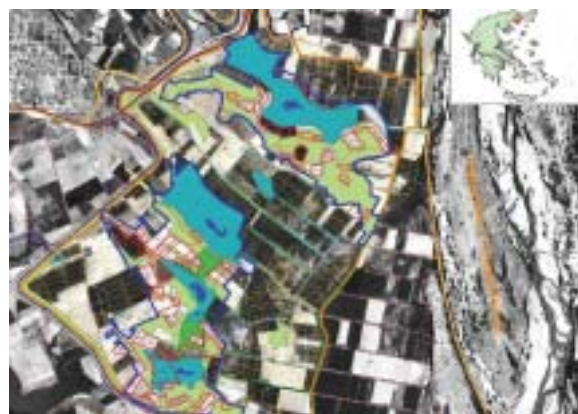
Table: Overview of Project Action Areas at Nestos Lakes & Lagoons.

B. Buffer Zones

In rural areas agriculture is the main source of nitrate and phosphate loads to lakes and lagoons. Therefore practical demonstration measures of management were part of the programme including the creation and plantation of buffer zones between agricultural fields and the wetlands.

- * At the lakes several hectares of buffer zones close to the shores were densely planted with different tree species for erosion control and non/point agro effluents. The buffer zones had to be fenced to prevent damage by grazing stock. At the same time these zones function as „biotope bridges“ for wildlife species reconnecting the different lakes with natural habitats.
- * At the lagoons a vegetated buffer filter strip of about 6 ha was created and planted to remove nitrogen and phosphorus loads from more concentrated

All measures described above were mapped in detail and a series of bilingual GIS Maps were produced for the management plans, presentations and publications (see Map).



A series of bilingual GIS Maps was produced for the management plans, presentations and publications.

C. Interpretation trail

A nature trail at the Nestos Lakes showing the different biotopes and activities was drafted and discussed with representatives of the local authorities, as the town intends to create recreation facilities close to some of the lakes. An intensive coordination of all measures is crucial to avoid conflicts and overlapping.

D. Monitoring and Water Analysis

Water quality measurements are carried out regularly in the lake and lagoon areas to verify the situation of water quality before and after the management measures are taken. At two of the lakes access through the reeds was opened with an 80 m long newly constructed floating footbridge. This construction allowed measurements at these lakes for the first time in their history!

E. Dissemination

- * In autumn 2003 a regional wetlands management workshop was organized with more than 130 participants including speakers from six countries with Living Lakes partner lakes. In the course of the workshop two field trips to the wetlands and the action sites were organized.
- * A mobile exhibition with currently 16 boards was produced, describing in detail and bilingually the Nestos and La Nava wetlands, functions and values of wetlands, the LIFE programme and furthermore the main activities and measures of this LIFE project with an emphasis on wetland management, the management plans, water quality and monitoring. The inauguration of the exhibition took place at the Nestos workshop.
- * A bilingual project brochure was elaborated, describing the project, its objectives, the measures such as management plans, filter strips and buffer zones, monitoring, environmental education and stakeholder involvement etc., and the achievements as well as problems encountered and lessons learned. The brochure will be widely disseminated to pupils, tourists and local people to guarantee high transferability of the project results.
- * Also a video/DVD documentation of the project with all important events and meetings will be produced for wide distribution.

F. Environmental Education

Environmental education with school classes from the bordering towns and villages is a very important activity to „spread the message“ and get more people involved into the concerns of nature conservation and management. Educational packages for basic schools, including presentations (talk, slides, maps, games) inside the schools and a full day excursion to the wetlands of the Nestos Delta were organized, involving about 680 pupils and teachers in the presentations and field trips. Also local teachers were supported in their environmental education activities with „teacher information folders“, printed materials, direct advice, slide shows etc. Four different leaflets/flyers were produced and used for the environmental education activities: a brief sheet about the LIFE project, an information leaflet about the Nestos Lakes, Lagoons and the Delta, a list of the Fauna species of the Lakes/Lagoons and a slide series about the Nestos Lakes and Lagoons.

G. Other Benefits of the LIFE Programme

The following long-term outputs of the programme are expected:

- * Improving the ground and surface water quality,
- * reducing the over-abstraction of water by the promotion of extensive agriculture and organic farming in the catchment area around the lakes and lagoons,
- * integrating sustainable wetland use into the land use plans of the communities and the regional authorities,
- * public motivation and positive awareness of the importance of proper preservation of the wetlands,
- * establishment of a continuous, fruitful and lasting debate with all parties involved in the management of the wetland,
- * the actual function of an environmentally friendly method of purification of the water of the wetland, through the accumulated expertise and experience of all project partners.

The construction of the buffer zone and vegetation filter strip at the lagoon showed quickly very positive results and generated a positive feedback from the local people, e.g. local fishermen of the cooperatives,



Recently implemented measure: Planted filter strip. Before water from channels enters the lagoon it is filtered inside the vegetation buffer zone.

responsible for the management of five large lagoons, showed great interest in the buffer zone installation. They asked for an intensive collaboration to identify further programmes for the installation of similar filter strips at other lagoons in the delta with similar problems. Positive comments came also from the local water management board - they suggested to discuss ideas to include irrigation water flow into the construction of future filter strips at the other Nestos lagoons. This gives some evidence for the great demonstration effect of this LIFE project.

H. Practical Lessons Learned

- * For managing wetlands you need: Patience, Patience, Patience!
- * If you cannot avoid it, do what you have to do at least three months before the scheduled time!
- * Dialogue and round table procedures are means of vital effectiveness (don't forget the coffee!)
- * Don't mess with the Public Sector (even if you are coming from inside!).
- * Environmental NGOs have often excellent on-site knowledge, great scientific experience and connections - integrate them!!

Hans Jerrentrup, Society for Protection of Nature and Ecodevelopment (EPO), Griechenland

Das Nestos Delta im Nordosten Griechenlands erstreckt sich über 500 km². Vier Ökosysteme charakterisieren das Gebiet: der Nestos Fluss mit seiner angren-

zenden Habitaten, ein 50 km langer Küstenstreifen, 8 Flachwasserlagunen mit ausgedehnten Salzmarschen und 18 kleine Süßwasserseen. Ein großer Teil der Deltaebene wurde im 20. Jahrhundert trockengelegt und wird intensiv landwirtschaftlich genutzt, bewässert mit Wasser aus dem Nestos Fluss.

Flora und Fauna des Deltas weisen eine außergewöhnliche Diversität auf, was auf die Vielfalt unterschiedlicher Biotope und die geografische Lage am östlichen Rand des mediterranen Beckens zurückzuführen ist, wo drei bio-geografische Regionen überlappen. Das Gebiet ist die Hochburg der griechischen Population von Goldschakal und Otter und es wurden über 320 Vogelarten beobachtet.

Das Nestos Delta steht unter dem Schutz verschiedener internationaler und nationaler Gesetze und Abkommen. Es ist ausgewiesen als Ramsar-Schutzgebiet, „Special Protected Area“ der EU-Vogelschutzrichtlinie, Natura 2000-Gebiet im Rahmen der FFH-Richtlinie. Die Ausweisung als Nationalpark wurde schon 1996 begonnen, bisher aber nicht vollendet.

Die Hauptprobleme des Gebietes sind der Mangel an Schutzmaßnahmen, einer koordinierenden Verwaltung und einer Management-Autorität. Dadurch werden die natürlichen Flächen bedroht durch Trockenlegung, intensive Landwirtschaft, illegale Jagd, illegaler Holzeinschlag, nicht genehmigte Bebauungsmaßnahmen u.a.

Das EU LIFE Projekt wird zusammen mit dem griechischen Partner AENAK durchgeführt, der eine wichtige Rolle bei der Verwirklichung von Projektmaßnahmen spielt. Zu den Maßnahmen und Ergebnissen, die bisher erreicht wurden, zählen: a) Die Entwicklung von Managementplänen für die Bereiche Schutzmaßnahmen ausgewählter Feuchtgebietszonen, Extensivierung der Landwirtschaft und Nachhaltiger Tourismus. Da das Nestos Gebiet sehr groß ist, wurden die Managementpläne zunächst nur für repräsentative Bereiche erstellt. b) Die Einrichtung von Pufferzonen in landwirtschaftlich intensiv genutzten Bereichen. c) Die Planung eines Naturlehrpfades. d) Wasseranalysen und Monitoring. e) Weitergabe der erlangten Erfahrungen durch Workshops, Ausstellungen, Erstellung von Broschüren und Lehrfilmen. f) Umweltbildungsprojekte mit Schulen.

13 Outlook

Ibero American Living Lakes Conference in Mexico

In March 2004, an Ibero-American Living Lakes Congress will be held at Lake Chapala to discuss ways to preserve the lake ecosystem and to raise awareness within Mexico and throughout the world about this severely endangered lake. The congress is organised by the Mexican Living Lakes partners and the Fundación Humedales, Living Lakes partner in Colombia. During the congress, a comparative study between Laguna de Fúquene and Lago de Chapala will be presented.

Im März 2004 wird ein ibero-amerikanischer Kongress am Chapala See stattfinden. Es soll darüber diskutiert werden, wie das Seenökosystem gerettet und das Bewusstsein innerhalb Mexikos und in der ganzen Welt für diesen stark bedrohten See erhöht werden kann. Der Kongress wird vom mexikanischen Living Lakes-Partner und der Fundación Humedales, dem kolumbianischen Seenpartner, organisiert. Während der Tagung wird eine Vergleichsstudie zwischen Laguna de Fúquene und Lago de Chapala vorgestellt werden.

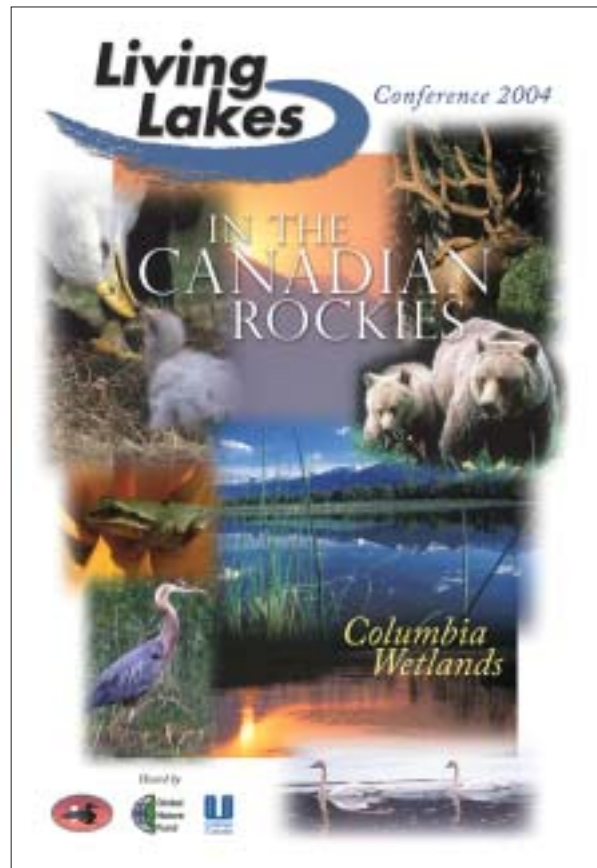
82



Sunset on Lake Chapala, Mexico's largest lake.

The 9th Living Lakes Conference in Canada

The 9th Living Lakes Conference will take place from Sept. 26 to Oct. 2, 2004 in the Columbia River Wetlands in Canada. The conference will be hosted by the Living Lakes partner organisation East Kootenay Environmental Society (EKES) and the Global Nature Fund (GNF).



Poster: The 9th Living Lakes Conference will take place in the Columbia River Wetlands, Canada.

The conference addresses the following issues by focusing on two key themes:

- * Land and Water Use in Recreational Development
Managing development and growth to ensure wetlands and lakes are healthy and enjoyable for generations to come.
- * Business and Corporate Social Responsibility
Recognising that healthy lakes and wetlands are a part of a vibrant economic future, and that accountability for environmentally responsible economic activity rests with business, along with communities and government.

The Living Lakes Conference 2004 sets out to

- * generate a greater global appreciation for the internationally relevant ecological attributes of the Columbia Wetlands.
- * Create a platform to exchange knowledge and share ideas between international, national and regional delegates on the trends, challenges and best practices of recreational development in lake and wetland regions around the world.
- * Create an opportunity for international, national and regional delegates to discuss the role of business in the ecologically and socially responsible use of water ecosystems.
- * Create an opportunity for Canadian corporations and governments - regional to national - to demonstrate their commitment to protect the ecological integrity of critical waterways, such as the Columbia Wetlands.

Conference Location

In November 2000, the Columbia Wetlands were designated as Canada's Living Lake. As the backdrop for this important global gathering, the Columbia Wetlands, in the heart of the Canadian Rockies, are one of the longest intact wetlands in North America and are home to thousands of species of animals, birds and plants, some of which are now endangered.

9. Living Lakes Konferenz in Kanada

Die 9. Living Lakes Konferenz findet vom 26. September bis 2. Oktober 2004 in den Columbia River Wetlands in Kanada statt. Die Veranstaltung wird von der Living Lakes Partnerorganisation East Kootenay Environmental Society (EKES) in Kooperation mit dem GNF organisiert.

Die beiden Schwerpunktthemen der Veranstaltung sind:

- * *Flächen- / Wasserverbrauch bei der Entwicklung des Fremdenverkehrs:
Entwicklung und Wachstum so gestalten, dass auch zukünftige Generationen sich noch an Feucht- und Seengebieten erfreuen können.*
- * *Wirtschaft und gesellschaftliche Verantwortung von Unternehmen:
Erkennen, dass intakte Seen und Feuchtgebiete ein Teil dynamischer wirtschaftlicher Zukunft sind und dass die Verantwortung für nachhaltige Entwicklung bei Wirtschaft, Gemeinden und Regierungen liegen.*

Die Living Lakes Konferenz 2004 soll dazu beitragen die internationale Wertschätzung der ökologischen Bedeutung der Columbia River Wetlands zu erhöhen. Zudem bietet sie Gelegenheit

- * *für einen Austausch mit internationalen, nationalen und regionalen Delegierten über Trends, Herausforderungen und positiven Beispielen zur Tourismusentwicklung in Seengebieten,*
- * *für eine Diskussion mit den Delegierten über die Rolle der Wirtschaft im ökologisch und gesellschaftlich verantwortlichem Umgang mit Wasser-Ökosystemen und*
- * *für kanadische Unternehmen und Verwaltungsbehörden - regional wie national -, ihr Engagement zum Schutz von gefährdeten Feuchtgebieten wie den Columbia River Wetlands zu bekunden.*

Veranstaltungsort

Die Columbia River Feuchtgebiete liegen im Zentrum der Kanadischen Rocky Mountains. Sie sind eines der größten intakten Feuchtgebiete Nordamerikas und bieten Lebensraum für Tausende verschiedener Tier- und Pflanzenarten. Die Columbia River Wetlands sind seit dem Jahr 2000 Mitglied im Living Lakes Netzwerk.

Living Lakes Partner Lakes, Candidates and Associates

Coordination and Organisation



Global Nature Fund (GNF)

International Foundation for Environment and Nature
Contact Persons: Udo Gattenlöhner, Stefan Hörmann, Bettina Jahn, Jörg Dürr-Pucher, Marion Hammerl
Fritz-Reichle-Ring 4
D-78315 Radolfzell, Germany
Tel. +49 7732 99 95-0
Fax +49 7732 99 95-88
e-mail: info@globalnature.org
Websites: www.livinglakes.org;
www.globalnature.org;
www.livingwetlands.org



Wildlands Trust

Contact person: Dr. Andrew Venter
P.O. Box 57, Hilton
KwaZulu-Natal, 3245, South Africa (RSA)
Tel. +27-33-343 1975
Mobile: +27-83-324 7484
Fax +27-33-343 1976
e-mail: ecopart@iafrica.com

Victoria Lake; Kenya, Tanzania and Uganda



OSIENALA (Friends of Lake Victoria)

Contact Person: Dr. Obiero Ong'ang'a
Re-Insurance Plaza, 2nd floor
P.O. BOX 4580, 40103 Kisumu, Kenya
Tel. and Fax: +254-035-23487
Mobile: 0733-717124
e-mail: osienala@swiftkisumu.com or
osienala@osienala.org, oonganga@swiftkisumu.com
Website: www.osienala.org

84

Partner Organisations and Candidates (*C)

AFRICA

St. Lucia Lake; South Africa

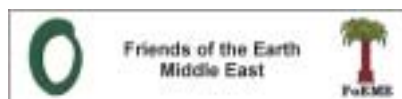


The Wilderness Foundation

Contact Person: Rosanne Clark
P.O. Box 122
Himeville 3256, South-Africa (RSA)
Tel. +27 33 7021980 (home office),
+27 33 7021061 (home), 082 3596736
e-mail: rosanne@futurenet.co.za
Website: www.wild.org/southern_africa/wf.html

ASIA

Dead Sea; Israel, Jordan, Palestine



FoEME - Friends of the Earth Middle East, Israel

Contact person: Mr Gidon Bromberg
85 Nehalat Benyamin St.
Tel-Aviv, Israel
Tel. +972-3-560-5383
Fax +972-3-560-4693
e-mail: info@foeme.org;
Website: www.foeme.org

Addresses and Contacts

FoEME - Friends of the Earth Middle East, Jordan
PO Box 9341
Amman 11191, Jordan
Tel. +962-6-5866602/3
Fax +962-6-5866604
e-mail: foeme@go.com.jo
Website: www.foeme.org

Laguna de Bay; Philippines



CLEAR-Conservation of Laguna de Bay's Environment and Resources

Tripartite Partnership of:

Society for the Conservation of Philippine Wetlands

Contact person: Amy Lecciones
5/F ALSOCO Bldg. Herrer St. Legazpi Village Unit 1006
Jollibee Centre
San Miguel Avenue
Makati City, Philippines
Tel. + 632 750-6357
Fax + 632 750-6357
e-mail: amym1@psdn.org.ph
Website: www.psdn.org.ph/wetlands/ or
www.psdn.org.ph/clear/



Laguna Lake Development Authority

Chief, Research and Development Division
Contact person: Lennie C. Santos-Borja
2nd Floor, Annex Building, EPD Complex
Capitol Compound, Pasig City 1600, Philippines
Tel. and Fax +63-2-637-7581
e-mail: lennieborja@yahoo.com, acsb@skynet.net
Website: www.llda.gov.ph



Unilever Philippines

Contact persons: Jika Mendoza-Dalupan;
Chito Macapagal
1351 United Nations Avenue, 1007, Paco, Manila,
Philippines
Tel. +63-2-562-3951
Fax +63-2-562-3951
e-mail: jika.mendoza-dalupan@unilever.com
chito.macapagal@unilever.com

Lake Baikal; Siberia (Russia)



Club „Firn“ (NGO)

Contact person: Larisa Batotsyrenova
Kommunisticheskaya Street, 16; 670000 Ulan-Ude,
Buryatia, Russia
Mail: PO Box 4204, 670017, Ulan-Ude, Russia
Tel. +7-3012-21 67 23
Fax +7-3012-21 62 50
e-mail: office@firnclub.ru; larisa@firnclub.ru
Website: www.firnclub.ru



Baikal Information Center GRAN

Contact person: Dr. Nina Dagbaeva
Office 1, 9 Borsoeva St.
Ulan-Ude, Buryatia, Russia, 670000
Tel. and Fax +7 (3012) 217073
e-mail: ecoinfo@ulan-ude.ru
Website: gran.baikal.net/

Lake Biwa; Japan



International Lake Environment Committee Foundation (ILEC) and Kosho-Net

Contact persons: Dr Shinji Ide, Dr Masahisha Nakamura
1091 Oroshimo-cho, Kusatsu-city
Shiga 525-0001, Japan
Tel. +81-77-568-45 67
Fax +81-77-568-45 68
e-mail: nakamura@lbri.go.jp; ide@ses.usp.ac.jp
Website: www.ilec.or.jp

Mahakam Lakes; Indonesia



Wetlands International -Indonesia Programme

Contact person: Nyoman N. Suryadiputra
Jl. A. Yani No 53 Bogor
P.O. Box 254/Boo,
Bogor, 16002, Jawa Barat, Indonesia
Tel. +62-251-312189
Fax +62-251-325755
e-mail: nyoman@wetlands.or.id

Poyang-hu; P.R. China

MRLSD - Promotion Association for Mountain-River

Lake Regional Sustainable Development
Contact persons: Xiaohong Wang, Xingzhao Dai
MRL Office Building, Provincial Governmental
Complex
South One Road 007
Nanchang City, 330046, China
Tel. +86-791-6288-748
Fax +86-791-6288-747
e-mail: xingzhaod@vip.sina.com

Tengiz and Korgaljinski Lakes; Kazakhstan



Korgaljinski Goszapovednik Kazakhstan (Korgaljinski State Nature Reserve)

Contact persons: Murat Aitzhanov, Amina Kaukeyeva, Maxim Koshkin
474210 Republik of Kazakstan
Akmolinskaya oblast, Korgaljin
Tel. +7-31-73 72 16-50
Fax +7-31-73 72 10-43
e-mail: korgalshin@nursat.kz



NABU Deutschland, Tengis Project

Contact persons: Michael Brombacher, Till Dieterich, Martin Lenk
Invalidenstr. 112, 10115 Berlin, Germany
Tel.: +49-30-28 49 84-44
Fax +49-30-28 49 84-84
e-mail: Michael.Brombacher@nabu.de;
til.dieterich@nabu.de; lenk@mail.uni-greifswald.de

EUROPA

Laguna La Nava; Spain



Fundación (2001) Global Nature España

Contact persons: Fernando Jubete
Corro del Postigo ,1
E-34337 Fuentes de Nava, Palencia, Spain
Tel. +34-979-84 23 98
Fax +34-979 84 23 99
e-mail: fjubete@fundacionglobalnature.org
Website: www.fundacionglobalnature.org

Addresses and Contacts

Fundación Global Nature España, Madrid Office
c/ Capitán Haya, 23, esc 2, 9º
E-28020 Madrid, Spain
Tel. +34-91-556 93 90
Fax +34-91-556 98 95
e-mail: madrid@fundacionglobalnature.org

Lake Balaton; Hungary (*C)

Association of Civil Organisations of Lake Balaton

Contact person: Tivadar Szabó
Fonyód Béke u. 3, Hungary-8640
Tel. +36-85-560-320
Fax +36-85-560-321
e-mail: sz.tivadar@axelero.hu
Website: www.balatonregion.hu/

Lake Balaton Development Coordination Agency

(consulting role)
Contact person: Dr. Gábor Molnár
Siófok Batthyány u. 1, Hungary-8600
Tel. +36-84-317-002
Fax +36-84-317-002
e-mail: molnarg@balatonregion.hu
Website: www.balatonregion.hu/

Lake Constance; Germany, Switzerland, Austria



Lake Constance Foundation (Bodensee-Stiftung)

Contact persons: Patrick Trötschler,
Marion Hammerl-Resch
Paradiesstrasse 13
D-78462 Konstanz, Germany
Tel. +49 7531 90 98-0
Fax +49 7531 90 98-77
e-mail: office@bodensee-stiftung.org
Website: www.bodensee-stiftung.org

Milicz Ponds; Poland



Polish Society of Wildlife Friends „pro Natura“

Contact person: Roman Guziak
Podwale 75
PL-50449 Wroclaw, Poland
Tel. and Fax +48-71-343 47 49 - 326 (or 333)
Mobile: +48-71-600 87 80 06
Tel. and Fax +48-71-343 41 77
e-mail: pronatura@eko.wroc.pl
Websites: www.eko.wroc.pl/pronatura
www.eko.wroc.pl/bocian www.bociany.pl (in Polish only)

Nestos Lakes; Greece



EPO - Society for Protection of Nature and Eco-development

Contact person: Hans Jerrentrup
PO Box 124
GR-64200 Hrysoupolis, Greece
Tel. +30-2-591-023144
Fax +30-2-591-047009
e-mail: Ecoconsult-epo@kav.forthnet.gr

Norfolk & Suffolk Broads; United Kingdom



The Broads Authority

Contact persons: Dr. Michael Green, Dr. John Packman
18 Colegate, Norwich
Norfolk, NR3 1BQ, Great Britain
Tel. +44-1603-6107-34
Fax +44-1603-7657-10
e-mail: Michael.Green@broads-authority.gov.uk;
broads@broads-authority.gov.uk
Website: www.broads-authority.gov.uk



British Trust for Conservation Volunteers (BTCV)

Contact person: Kate Mackenzie
BTCV Dragon Cottage, St Ann Lane
Norwich, NR1 IQG, Great Britain
Tel. +44-1603-767400
Fax +44-1603-767373

e-mail: K.Mackenzie@btcv.org.uk

Contact person: Anita Prosser (BTCV, Howbery Park,
Wallingford, Oxfordshire, OX10 8BA, UK)

Tel: + 44 (0) 1491 821622

Fax +44-(0)-1491 839 646

e-mail: A.Prosser@btcv.org.uk

Website: www.btcv.org

Uluabat Lake; Turkey



WWF

WWF Turkey

Contact persons: Mrs. Hatice Dinç, Mr. Ahmet Birsel
Bahçekapi - Sirkeci Istanbul, Turkey (Türkiye)

Tel. +90-212-528 20 30

Fax +90-212-528 20 40

e-mail: hdinc@wwf.org.tr

Website: www.wwf.org.tr

Võrtsjärv, Estonia and Peipsi; Estonia and Russia



Estonian Fund for Nature (ELF)

Contact person: Robert Oetjen

Address: P.O. Box 245, Tartu 50002, Estonia

Tel. +372-7-428 443

Fax +372-7-428 166

e-mail: elf@elfond.ee



Website: www.elfond.ee

CTC Peipsi Center for Transboundary Cooperation

Contact persons: Margit Säre, Gulnara Roll

Aleksandri Str. 9, 51004 Tartu, Estonia

Tel. +372 7 302 302

Fax +372 7 302 301

e-mail: margit@ctc.ee

Website: www.ctc.ee

CENTRAL and SOUTH AMERICA

Lago Chapala, Mexico



Fundación Cuenca Lerma Lago Chapala Santiago A. C.

Contact persons: Manuel Villagomez Rodriguez

Tel. +52-33 38 12 99 21

Fax: +52-33 3810 38 17

e-mail: lily_sg@hotmail.com

Mtro. Salvador Peniche Camps

Integrated Basin Management Project

Centro Universitario de Ciencias Económico

Administrativas

Universidad de Guadalajara

Tel. 33-37703394

Private and fax +1-36735881,

Mobile: +44-333 7227518

e-mail: salvadorpc@prodigy.net.mx,

speniche@cucea.udg.mx

Addresses and Contacts



Sociedad Amigos del Lago de Chapala A. C.

Contact persons: Luis Aguirre, Justus Hauser
Apdo. postal 353, Madero 202
45900 Chapala, Jalisco
Mexico
Phone: +52-376-76-55755
Fax: +52-376-76-55754
e-mail: info@amigosdelago.org
luis_aguirre@amigosdelago.org
justus_hauser@amigosdelago.org
Website: www.amigosdelago.org

Laguna Fuquene; Colombia



Fundación Humedales

Contact persons: Mauricio Valderrama Barco,
German
I. Andrade Calle 97 N° 21-42 Bogotá, Colombia
Tel. +57-1-6164777
Fax +57-1-6164777
e-mail: humedales@humedales.com;
mvalde@humedales.com; giandradep@yahoo.com

Mar Chiquita; Argentina

Centro de Zoología Aplicada Argentina

Universidad Nacional de Córdoba
Contact person: Dr. Enrique H. Bucher
Casilla de Correos 122
5000 Córdoba, Argentina
Tel. +54-351-433 20 55
Fax +54-351-424 11 91
e-mail: buchereh@uolsinectis.com.ar
Website: www.efn.uncor.edu/dep/cza/

Pantanal Wetlands; Brazil, Bolivia, Paraguay



ECOTROPICA Brazil

Rua 03, nº 391
Boa Esperança - 78.068-370
Cuiabá, MT Brazil
Tel. +55 65 627-6619
Fax +55 65 627-66 15
e-mail: operacional@ecotropica.org.br
Website: www.ecotropica.org.br

Titicaca Lake; Peru, Bolivia (*C)



TRÓPICO- Asociación Boliviana para la Conservación

Contact person: Jorge Cárdenas and Patricia Ergueta
c. Alfredo Ascarrunz 2620
La Paz - Bolivia
Tel. +591-2-242 34 95
Fax +591-2-242 35 26
e-mail: tropico@acelerate.com
Websites: www.tropico.org and
www.magri-amexpress.com.bo

NORTH-AMERICA

Columbia River Wetlands; BC, Canada



East Kootenay Environmental Society

Contact person: Yossi Cadan, Executive Director
495 Wallinger

Kimberley, British Columbia, Canada VIA 2Y5

Tel.: +1+250-427-9325

Fax +1+250427-3535

e-mail: ekes@ekes.org; yossi@ekes.org

Website: www.ekes.org

Contact person: Mrs. Ellen Zimmerman

PO Box 1496

Golden, BC, V0A 1H0

Canada

Tel. +1-250-348-2225

Fax +1-250-344-5225

e-mail: ellenzim@rockies.net

Contact person: Anne Levesque

Box 74

Invermere, BC, V0A 1K0

Canada

Tel.: +1- 250-342-2487

Fax: +1-250-342-2497

e-mail: anne_levesque@telus.net

Mono Lake; California (USA)



Mono Lake Committee

Contact persons: Geoff McQuilkin, Arya Degenhardt,
Greg Reis

PO Box 29, Lee Vining, California 93541, USA

Tel. +1-760-647-65 95

Fax +1-760-647-63 77

e-mail: geoff@monolake.org; arya@monolake.org,
greg@monolake.org

Website: www.monolake.org

(For request regarding the website

www.livinglakes.org

please contact Greg Reis: greg@monolake.org)

Associated Partner Organisations

Kolindsund Wetlands, Denmark

Kolindsunds Venner - Friends of Kolindsund

Contact person: Jesper Nielsen, Chairman

Laerkevej 2; Ryomgaard, Denmark

Tel. +458639-4318

E-mail: helboe@post9.tele.dk

Website: www.kolindsund.dk/

Lake Sapanga, Turkey

ADASU Water & Sewage Administration

Contact person: Dr. Suleyman Kocbas, Project
Consultant

Adapazari Metropolitan Municipality

Adpazari - TURKEY

e-mail: skocbas@superonline.com

Lago Enriquillo and Lac Azurei, Haiti Dominikanische Republic

Programa Medioambiental Transfronterizo

Contact person: Mr. Andreas Schubert

Calle Restauración 15, Jimaní, Provincia

Independencia

República Dominicana

Tel. +809-248-3220

Fax +809-248-3165

e-mail: pet@codetel.net.do

Coordination:



***International Foundation
for Environment and Nature***

Fritz-Reichle-Ring 4
78315 Radolfzell, Germany
ph. : +49 (0)7732 9995-0
fax : +49 (0)7732 9995-88
e-mail: info@globalnature.org
www.globalnature.org
www.livinglakes.org

Local Organisers of the 8th Living Lakes Conference:



**Norfolk & Suffolk Broads; United Kingdom
The Broads Authority**

Contact persons: Dr. Michael Green,
Dr. John Packman
18 Colegate, Norwich
Norfolk, NR3 1BQ, Great Britain
ph. : +44-1603-6107-34
fax : +44-1603-7657-10
e-mail: Michael.Green@broads-authority.gov.uk;
broads@broads-authority.gov.uk
Website: www.broads-authority.gov.uk

British Trust for Conservation Volunteers (BTCV)

Contact person: Kate Mackenzie
BTCV Dragon Cottage, St Ann Lane
Norwich, NR1 1QG, Great Britain
ph. : +44-1603-767400
fax : +44-1603-767373
e-mail: K.Mackenzie@btcv.org.uk
Contact person: Anita Prosser (BTCV, Howbery Park,
Wallingford, Oxfordshire, OX10 8BA, UK)
ph. : + 44 (0) 1491 821622
fax : +44-(0)-1491 839 646
e-mail: A.Prosser@btcv.org.uk
Website: www.btcv.org

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