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Towards a shared vision for the Sava River



The Sava River Basin has the potential to provide not only security and protection to the livelihoods of the people living along its banks but also to be a model of transboundary integrated river basin management. This vision was created during the international conference 'Towards a Shared Vision for the Sava River' that took place on 4-5 November in Zagreb, Croatia.

One of the key challenges in managing the Sava River is the reconciliation of economic development with the protection and sustainable use of biological and landscape diversity. This along with other critical issues was discussed by the 100 participants who represented policy makers, scientists, nature conservationists and water managers from the Sava River countries along with international organisations. The importance of strengthened transboundary cooperation between the Sava countries (Slovenia, Croatia, Bosnia and Herzegovina, Serbia), along with the need for improved integration and coordination of relevant sectors for the benefits of nature and local communities was stressed.

Apart from sharing experiences between different sectors and discussing future steps in the management of the Sava River Basin, the conference built upon the result of the LIFE 3rd countries project 'Protection of Biodiversity of the Sava River Basin Floodplains', which identified 51 sites as core areas for the future ecological network along the River, and in compliance with the EU Birds and Habitats Directives. The Sava basin comprises exceptionally important habitats which shelter many globally rare and threatened animal and plant species, as well as valuable cultural landscapes formed by traditional land-use patterns.

The participants at the conference proposed a number of concrete actions including aspects of management and research priorities. Integrated management planning and the use of local knowledge, development of sustainable tourism, assessment of management structures, investigating relation between climate change and discharge patterns of the River, capacity building regarding the EU Directives, are only some of the conclusions developed and agreed at this important gathering.

The conference was organized by IUCN with the support of its partners Wageningen International, Orbicon, the State Institute for Nature Protection (Croatia), the Centre for Ecology and Natural Resources of the Faculty of Science (Bosnia and Herzegovina), the Agricultural Institute of the Republic of Srpska (Bosnia and Herzegovina), the Institute for Nature Conservation (Serbia), and the Institute of the Republic of Slovenia for Nature Conservation. The conference was supported through the EU LIFE III financial instrument.

For further information: <http://www.savariver.com/conference/>

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Flood Pulse Symposium coming up 1st – 5th February in the Okavango Delta, Botswana



The Flood Pulse Symposium will address the important effects of pulsing hydrologic cycles on the functioning of wetlands. Focusing on inland wetlands, it will have an emphasis on the importance of flood pulses for wetland flooding and linked responses in biodiversity, ecosystem functioning and human society.

The importance of flood pulses to the functioning of wetlands was first formulated by **Junk and his co-workers in 1989**.

The concept has since been growing in importance: it is now time to make an update of the past 20 years of research. The flood pulse concept makes decisive causal links among climate events and the geological and vegetative features of a river catchment. The extent and duration of flooding in a downstream wetland is determined by climate and geomorphology. The relatively abrupt shift from terrestrial conditions to flooded wetland conditions has dramatic impacts on environmental chemistry, biological productivity and biodiversity, and many life forms have evolved specific adaptations to this dynamic environment. Not least, human beings have over centuries learnt to live and use these dry and wet phases to their benefit, reflected in their livelihood strategies and cultural expressions.

The flood pulse can easily be altered; it can be flattened out or removed completely or changed in periodicity by building of dams. It can be reduced in intensity by water diversions. In addition, the likelihood of rapid climate change has serious implications for larger variation in pulse magnitude and frequency than those to which ecological and economic systems are currently adapted. Such changes can have serious repercussions for flood pulse dependent wetlands. Understanding links between hydrological pulse and ecosystem and socio-economic processes is, therefore, of critical importance to sound and long-term management of such wetlands. This multidisciplinary symposium will provide an opportunity to collect, summarize and synthesize the considerable multi-disciplinary knowledge on flood pulse that has been generated during the past 20 years, to give guidance to future research and to help incorporate this concept into policy and management.

The **Flood Pulsed Wetlands Symposium** will be held in Maun, Botswana, at the edge of the Okavango Delta, one of the world's largest flood pulsed wetlands. All inflow to the Delta emanates from the Angola highlands, passes through northern Namibia, arriving in Botswana as a distinct flood pulse where it covers many thousand square kilometres of grasslands with water. This process creates a dynamic, interlinked aquatic-terrestrial system with high biological productivity and biodiversity -- drivers of a flourishing tourism industry and the base for the development of local populations who have developed specific agricultural and livelihood strategies in response to the flood pulse.

However, newly formulated upstream interests are different, with ambitions for water developments such as irrigation and construction of dams for hydro-electrical production. To manage these changes in use and demand, the three riparian countries sharing the basin have established the Permanent **Okavango Basin River Commission (OKACOM)** with its secretariat in Maun. The Government of Botswana has developed the **Okavango Delta Management Plan for the Ramsar Site** and the **University of Botswana's Harry Oppenheimer Okavango Research Centre (HOORC)**, was established to specifically address natural resource management issues. A current UNDP-GEF funded project, **BIOKAVANGO**, aims to raise awareness and to involve local populations in the management of the Delta and its biodiversity.

For further information please visit:

www.orc.ub.bw/floodpulse/index.html

WWF and partners kick off regional programme on environmental flows for the Zambezi



A successful kick-off meeting was held in October 2009 in Lusaka between WWF Country Offices for Zambia, Mozambique, and South Africa and partners (TNC, UNESCO-IHE, International Crane Foundation, GPZ – Zambezi Development Planning Office, and academic institutions of Zambia, Mozambique and Zimbabwe) when an inception phase of 18 months was planned for the Zambezi regional environmental flow programme.

The **Zambezi** is one of Africa's most majestic rivers. It is a lifeline for many people and provides a unique habitat for numerous significant species. To meet human development needs the river has been heavily modified, as evidenced by the construction of huge dams in the main stem and some of the tributaries of the Zambezi basin to meet the energy demand of Southern Africa.

These changes have severely distorted the Zambezi River's natural flood regime and as a consequence, biodiversity values have greatly declined with a knock on effect for local communities dependent on natural resources. WWF proposes the use of environmental flows to set out water requirements in the Zambezi River Basin.

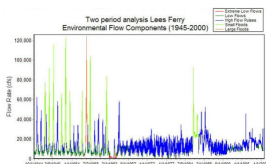
In line with the objective to restore environmental flow in the Zambezi river system, increasing both human and ecosystems' health without jeopardising hydropower production is in the long-term vision of the programme. This includes a wide variety of wildlife, many endemic and endangered, to flourish in protected wetlands and floodplains, provision of subsistence needs (nutritional, medicinal, housing and cultural) for the poor and, more generally, enabling conditions for socio-economic development.

For this ambition to be realized, three major changes are expected to take place in common practice in the Zambezi River Basin. The operating rules of hydropower dams will incorporate environmental flow releases. Essential freshwater

resources areas will be well protected and properly managed. Tributaries or river stretches with high ecological importance will be kept dam-free, thus ensuring environmental flows.

The results achieved so far in this respect include incorporation of environmental flows in the **SADC** IWRM strategy of 2008, increased collaboration between agencies in the Zambezi River Basin to take lead in IWRM implementation with the support of a USD 1-Million programme proposal. In addition, the experiences gathered from the **Kafue flats** have now been upscaled to the entire river system.

Announcing the launch of the most advanced version of Indicators of Hydrologic Alteration



The Nature Conservancy's Indicators of Hydrologic Alteration (IHA) program for calculating ecologically relevant statistics from daily streamflow data can now generate flow-duration curves and has an improved algorithm for comparing data from two time periods.

The Indicators of Hydrologic Alteration (IHA) is a software program that provides useful information for those trying to understand the hydrologic impacts of human activities or trying to develop environmental flow recommendations for water managers. Nearly 2,000 water resource managers, hydrologists, ecologists, researchers and policy makers from around the world have used this program to assess how rivers, lakes, and groundwater basins have been affected by human activities over time, or to evaluate future water management scenarios.

This program was developed by scientists at **The Nature Conservancy** to facilitate hydrologic analysis in an ecologically-meaningful manner. This software program assesses 67 ecologically-relevant statistics derived from daily hydrologic data. For instance, the IHA software can calculate the timing and maximum flow of each year's largest flood or lowest flows, then calculates the mean and variance of these values over some period of time. Comparative analysis can then help statistically describe how these patterns have changed for a particular river or lake, due to abrupt impacts such as dam construction, or more gradual trends associated with land- and water-use changes. The IHA software is described in a number of scientific papers, including "**A Method for Assessing Hydrologic Alteration Within Ecosystems**", and "**How Much Water Does A River Need?**"

Among the new enhancements of Version 7.1 are:

1. Users now have the ability to compare two different flow datasets, including data from two different stream gauges or from two different model runs or scenarios covering a similar time frame. The computations are identical to a comparison of two different periods in a single flow dataset.
2. The Environmental Flow Components algorithm has been improved to simplify the default version, and also to provide greater flexibility in calibration.
3. Flow duration curves (FDCs) have been added. IHA will compute FDCs using the same periods, years, and days used for the 33 IHA statistics. FDC results are displayed in a new tab on the results spreadsheet, and are computed annually and for each month. It is possible to view any number of FDCs on the same graph.

For a free download of Version 7.1, including manuals and tutorial in English and Spanish, go to

<http://conserveonline.org/workspaces/iha>

Integrated Basin Flow Management for the sustainable development of the Mekong River Basin



Vithet Srinetr, Environment Programme Coordinator in the Environment Division of the Mekong River Commission Secretariat based in Vientiane (Lao PDR), discusses past experiences and the current activities that the Mekong River Commission has initiated towards environmental flows.

An Integrated Basin Flow Management (IBFM) has been undertaken by the Mekong River Commission (MRC) Secretariat since 2004. The objective of the IBFM has been to provide information to the Member Countries of the predicted costs and benefits of land and water development of the basin. This information was intended to aid discussions between the countries on the *trade-offs* that may be necessary (1) between basin development and the related social and environmental impacts enabling agreement on a mutually *acceptable* framework for sustainable basin development, and (2) between the member-States - to ensure *reasonable and equitable* transboundary sharing of *beneficial uses*.

IBFM is defined by the MRC Strategic Plan 2006-2010 as “a set of multidisciplinary activities providing information and knowledge to decision makers on cost and economic benefits of water resource development in the LMB including environmental and social impacts of development as related to changes in the flow regime”.

IBFM activities have been carried out in three phases, over the period 2004 to 2008. Phase 1, completed in 2004, was mainly an assessment of the available hydrological and meteorological data of the Basin. Phase 2, carried out in 2005, was to introduce a holistic, multi-disciplinary approach to assess river flows from the perspective of *beneficial uses* (economic, social and environmental) enabling discussion between the member-States on *trade-offs* and finally agreement on an *acceptable* flow framework for basin development and flow monitoring. Phase 3, carried out during 2006-08, was designed for research and development of predictive tool.

Initial biophysical, economic, and social assessments and predictions were made by a multi-disciplinary team for 5 hydro-geographical zones of the Mekong mainstream for 3 demonstration scenarios. The biophysical assessments included predictions of change to hydrology, hydraulics, sedimentation, water quality, and the abundance of fish, invertebrates, water birds and amphibians and reptiles. Economic assessments valued the *beneficial uses* associated with the Lower Mekong River and assessed the benefits and costs related to changes in flow regimes by use and region. The social assessment was intended to describe the social impacts of flow regime changes on the people living near the river. The assessments were made for the purposes of stimulating discussions within and among the Member Countries on *trade-offs* and what could constitute *acceptable flows* for the Lower Mekong River, as well as identifying valuable assets and acceptable change.

The flow assessments and impact predictions were made using the available data. Due to data and methodological limitations assessment results have been considered a first approximation, indicating the direction and type of changes as well as some indication of the order of magnitude of potential impacts. These assessments across the six zones suggest that many of the flow response relationships are currently imperfectly known due to a lack of data. Also, the IBFM tools developed cannot be used directly if scenarios change as compared to the schematic scenarios based on which the methodology was developed. Modification of prediction is therefore difficult without expert inputs.

The IBFM produced a number of specialist, main reports, and booklets. Three booklets are currently being published by the MRC Secretariat. These include MRC Management Information Booklet Series No. 2 - The Flow of the Mekong, No.3 - The Modeling the Flow of the Mekong, and No. 4 – Integrated Basin Flow Management.

As a continuation of the IBFM for 2009 and 2010, the MRC Secretariat is planning to undertake an IBFM pilot study, which can illustrate the IBFM concept and approach, enhance the ownership and understanding of the Member Countries, is simple to implement and can be completed within short timeframe. While the broader objectives of the IBFM as originally stated are retained, it has been suggested that the management oriented goal for this IBFM pilot is food security. The overall objective of the IBFM pilot is, therefore, to assess how the current development activities in the pilot area impact food security either directly or through impacts on ecological and socioeconomic conditions. Other objectives include (1) investigating how the IBFM concept becomes a useful (and user friendly) water resources management tool, (2) proposing methodologies and means for up-scaling of the IBFM application to wider areas, (3) serving as demonstration sites for capacity building and awareness raising. The MRC is currently seeking qualified consultants to help in the design of the pilot study.

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Mexican government announcing publication of a national standard



On 9 November 2009, during the World Wilderness Congress in Mérida (Mexico), the Director General of National Water Commission (CONAGUA) publicly announced his agency's commitment to promulgate a standard on environmental flows in Mexico by 2010. The technical standard is likely to prescribe a hierarchy of methods for determining environmental flows, including an Ecological Limits of Hydrologic Alteration (ELOHA)-like framework for regional assessment.

The government of Mexico has announced the publication of a national standard for environmental flow determination in 2010. The announcement of this standard represents an important change on water management paradigm and an outstanding contribution to biodiversity conservation in Mexico. As part of the federal government's strategy to support sustainable development in water resources management, this commitment places Mexico in a globally advanced position in recognizing nature's role as main water supplier.

“We are convinced that environmental flows are the basis to achieve sustainable development. Implementing this program will allow us to strike a balance between rational water use and ecosystem conservation” said José Luis Luege Tamargo, Director General of **CONAGUA**. After clarifying that the criteria set for the standard are being reviewed by experts, Mr.

Luege assured that this kind of actions represents a clear commitment from the government to implement activities that generate productivity instead of endangering the environment.

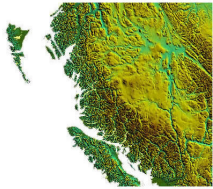
Whilst participating in a panel on forests and water, Omar Vidal, Director of WWF-Mexico, reiterated how important the role of environmental flows is in river systems and how this can serve as a means to tackle one of the main challenges that society faces in the 21st century: water scarcity in terms of both quantity and quality, as a result of over-abstractions from rivers and aquifers. "The world's rivers are running dry and this is a challenge that cannot be faced in isolation. We need water allocation mechanisms that are effective and appropriate to the magnitude of our problem".

The commitment to publish a national standard has been supported by the results of environmental flow determination and implementation strategies developed by **WWF-Mexico** and **Fundacion Gonzalo Rio Arronte** in three river basins in the last four years. These results show the technical, legal and administrative alternatives to implement environmental flows in Mexico, and therefore improve water sustainability. A first draft of the national standard synthesizing these experiences is already in place. It has been developed by a group of experts led by Rafael Sanchez Navarro from Spain and WWF staff, with the participation of Rebecca Tharme from **The Nature Conservancy**, the environmental flows group from the **Mexican Institute of Water Technology**, and experts from the **National Water Commission**.

The draft proposes a four-level approach to estimate environmental flows depending on the water availability, ecological importance and conservation condition. The first and second levels, based on desktop methods, are applied to water planning; the third and fourth levels, based on holistic methods, are focused on specific ecosystems, such as wetlands, and big water infrastructure projects. The draft will be discussed in the following months, and the final version is expected by the second half of 2010.

For more information contact Eugenio Barrios, Director of Freshwater Program, WWF-Mexico, ebarrios@wwfmex.org.

BC Hydro's Water Use Planning program



The electric utility, BC Hydro, is implementing environmental monitoring programmes, which study issues such as total gas pressure and migratory bird use of drawdown zones or survey the life history of various fish species.

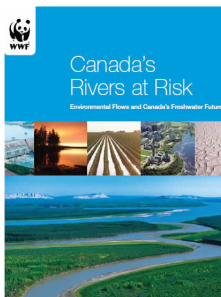
Water use planning is an example of sustainable work in practice at BC Hydro. The overall goal is to find a better balance between competing uses of water, such as domestic water supply, fish and wildlife, recreation, heritage and electrical power needs, which are environmentally, socially and economically acceptable to British Columbians.

Water use plans were developed for most of BC Hydro's hydroelectric facilities through a consultative planning process involving participants, such as government agencies, First Nations, local citizens and other interest groups.

The provincial Comptroller of Water Rights reviews the water use plans under the provisions of **British Columbia's Water Act**, and involves Fisheries and Oceans Canada, other provincial agencies, First Nations, and holders of water licences who might be affected by the plans.

Once accepted by the Comptroller, operational changes, monitoring studies and physical works outlined in the plans are implemented by the Comptroller through orders under the Water Act

Canada's Rivers at Risk: a report by WWF



"Environmental Flows and Canada's Freshwater Future" – a high level assessment of 10 Canadian Rivers based on key threats to environmental flows - triggers reactions from local stakeholders across the country.

Canada's most precious natural resource – fresh water – is in jeopardy due to the effects of climate change, withdrawals and diversions, and flow regulation and fragmentation, according to a recent **WWF-Canada** report called "**Canada's Rivers at Risk: Environmental Flows and Canada's Freshwater Future**". The report focuses on the importance of flow to assess the status and forecast of 10 Canadian rivers ranging from pristine and free flowing to highly modified and managed systems, and reveals that some are dangerously close to drying up.

Evaluating the health of our rivers from the perspective of environmental flows reveals a truer, and more troubling, picture

of Canada's freshwater future than the more traditional focus on raw quantities of water within our borders. It forces us to look at the scale that matters most when it comes to fresh water – the watershed. When we do, we find that growing more food, generating more electricity, quenching the thirst of expanding cities, and fueling industry, are taking their toll on the nation's rivers. The report concludes that we must value our fresh water differently and take immediate action to protect it.

The report garnered considerable **media attention** across the country including several major television, print, and radio outlets (approximately 250 media hits altogether). For more information, please visit <http://www.wwf.ca/rivers>

Sharing the benefits around large dams in West Africa



Major dams have long been criticized by NGOs, however they need not necessarily spell disaster for the communities they displace, if benefits from the dam can be shared by stakeholders.

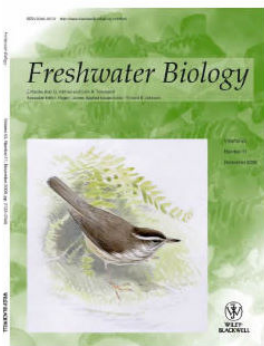
The International Institute for Environment and Development (IIED) is pleased to announce the publication of a new report on this topic. "**Sharing the benefits of large dams in West Africa**" coincides with a regional consultation about how future dams in West Africa can share benefits with local people, including river users and communities who have been displaced.

The report acknowledges that many dam programmes that have resettled and compensated people have been problematic especially after a few years, when compensation measures linked to the construction of the dam come to an end. But it points to mechanisms where direct or indirect benefits from hydropower or irrigation schemes have been shared with local people.

The challenge is to ensure that displaced people benefit through the lifetime of the dam – as much as 50 to 80 years – and not just for the first 5 to 10 years when the project's main financial backers are still engaged. The report says mechanisms that engage and support affected communities will also benefit governments, investors and dam operators by promoting good community relations, public support for infrastructure development and improved livelihoods.

The report is also available in French : "**Partage des bénéfices issus des grands barrages en Afrique de l'Ouest**". For further information contact : Jamie Skinner, Cluster Leader, Global Water Initiative - West Africa, International Institute for Environment and Development, 4 Hanover Street, Edinburgh, EH2 2EN, Scotland. Email: Jamie.skinner@iied.org, Tel : + 44 131 226 6866, Fax : + 44 131 624 7050

Freshwater Biology Special Issue "Environmental Flows: Science and Management"



Edited by Angela H. Arthington, Robert J. Naiman, Michael E. McClain, and Christer Nilsson, this special issue of Freshwater Biology is due for release in January 2010. Early views of articles in advance of print are available online at:

<http://www3.interscience.wiley.com/journal/119880174/issue>

Summary

Environmental flows - the flow regimes left in rivers, or restored to developed rivers - are a central tool helping resource managers to protect the biodiversity, resilience and ecological goods and services provided by healthy riverine ecosystems. Yet for many thousands of streams and rivers we cannot answer the question - how much water does a river need, when and how often?

This Special Issue reports new findings and provides novel insights in the science and management of environmental flows, including: synoptic reviews, methodological innovations, flow restoration experiments, modelling techniques and broader principles to support sustainable use of basin-wide freshwater resources. Based on contributions to this Special Issue, the action agenda of the **2007 Brisbane Declaration** on environmental flows and the wider literature, the Editors propose an invigorated global research programme to construct and calibrate hydro-ecological models that quantify environmental flows and thereby protect the ecological goods and services provided by healthy rivers in various hydro-climatic settings across the globe.

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Southeast Instream Flow Network website launched



The Southeast Instream Flow Network (SIFN) assists 15 southeastern states in the United States in instituting protective environmental flow policies.

In the Southern US, instream flow policies are administered at the state level, thus the Southeast Aquatic Resources Partnership (SARP) envisioned a network (the Southeast Instream Flow Network – SIFN) to leverage experience and resources among state-based partnerships in the 15 Southeastern Association of Fish and Wildlife Agencies (SEAFWA) states – Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia. The SIFN goal is to help the states institute protective instream flow policies. With funding from the Multi-State Conservation Grant Program of the US Fish and Wildlife Servicework follows these objectives:

- Bring state teams together to initiate and develop working relationships
- Educate participants on the scientific basis of instream flow policy
- Share instream flow policy-related tools & resources specific to state needs
- Communicate among states to support and build on past experiences
- Provide training for use of assessment tools to determine environmental impacts to hydrologic regimes and develop instream flow standards
- Produce guidance documents for development of effective instream flow protection policy and supporting programs.

Visit their new website at: <http://southeastaquatics.net/programs/sifn>

