

Mara River Flows

Integrated Water Resource Management

... for people and for nature

May 2010

Greetings from the Mara River Basin! The long rains have continued through May, and we continued to see high flows in the river, even flooding over the North (Old) Mara Bridge. May also brought a number of exciting research and governance activities, including another workshop on implementing a payment for ecosystem services (PES) scheme in the basin; a planning meeting between the Lake Victoria Basin Commission, WWF and USAID regarding the next stages of project implementation; and the Ecological Society for Eastern Africa Annual Meeting. We also spent some time in the lab this month, analyzing our water quality samples from the Mara, and we'll be bringing some of our findings to you in this and upcoming newsletters.

State of the River

Now into our seventh month of regular rainfall, the river is really flowing consistently at healthy levels. Water quality indices have stabilized and turbidity levels are back down to fairly normal levels. In recent macroinvertebrate sampling, we noticed that the high flow levels have swept away most of the aquatic insects. However, this is one of the important roles of high flows and floods—to reset community composition by flushing away dominant species, allowing new species to drift in from upstream, and increasing overall biodiversity. As these flow levels continue, or even slowly decline, species will become re-established in the river, and numbers of individuals will begin to rise again.



New Mara Bridge – April 3rd, 2010



New Mara Bridge – May 16th, 2010

Water quality parameters for the Mara River

Date	Time	Temp	pH	DO%	Salinity	Turbidity
M/D/Y	hh:mm:ss	C		%	ppt	NTU
04/03/2010	12:28:25	20.06	7.34	81.3	0.05	3463
05/10/2010	13:41:45	22.44	7.72	82.6	0.05	163

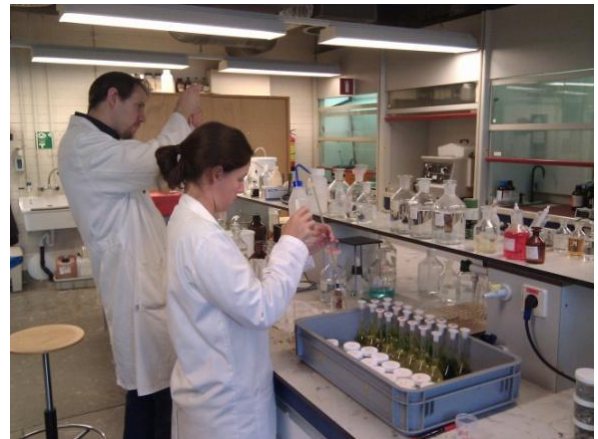
Research



Picture 1: MaraFlows workshop at UNESCO-IHE Institute for Water Education

Last month we told you about the new team of researchers working in the Mara under the MaraFlows program, funded by [UNESCO-IHE Institute for Water Education](#). This month, we traveled to UNESCO-IHE in Delft, The Netherlands, to participate in a workshop to officially launch the program. We met with the Principal Investigator, Dr. Michael McClain, the 4 East African PhD students, and a team of the UNESCO-IHE and East African professors advising the students. We presented our work in the Mara Basin over the last two years and each student presented on the proposals they are developing for their projects. We also developed a list of topics for incoming MSc students to work on. This was a great opportunity to assess where our understanding of hydrological and ecological processes in the basin stands, and what questions we must address to improve this understanding.

Our visit to UNESCO-IHE also provided an excellent opportunity for Chris and me to participate in the analysis of the 300+ water quality samples we have collected in the Mara River Basin over the last two years. When we first arrived in Kenya, in May 2008, our primary goal was to build on the Environmental Flow Assessment that had been undertaken in the basin. We aimed to do this by conducting monitoring in the river basin that would address data gaps in the EFA and monitoring critical minimum flows in particular to determine if our environmental flow recommendations



Picture 2: Amanda and Ferdi in the lab at UNESCO-IHE analyzing water quality samples from the Mara

were sustainable. We monitored water quality at 11 sites throughout the upper and middle basin every two weeks, studying relationships between water quality and flow level, and we monitored aquatic insects

monthly at a subset of the sites as an indicator of ecosystem health. We completed this intensive sampling in September, but we have continued with monthly monitoring of water quality and seasonal monitoring of aquatic insects. Although we are still completing the extensive analyses of these water samples, we can present a few of our initial findings here. We will continue to bring more of our results to you in the upcoming newsletters.



Picture 3: Dissolved organic carbon analyzer at UNESCO-IHE

Some of our most interesting results came from the Talek River, which is the last major tributary of the Mara

River before it enters Tanzania. Despite flowing into the Mara inside the protected areas, the Talek's banks are host to many lodges and campsites, which rely on the Talek for water abstraction and which often lack appropriate methods for sewage disposal. We monitored two sites on the Talek River for one and half years—one site was above most of the lodges, camps and settlements, and one was below them. We found striking differences in water quality between the two sites, with the upstream site having consistently better quality than the downstream site, and these differences between sites were exacerbated during the dry season. For example, conductivity readings, which are a sign of contamination, were consistently higher at the downstream site by 10% during the wet season; however, during the dry season, they jumped to being 300-400% higher. The same pattern was apparent with dissolved organic carbon, jumping from a 10% increase from upstream to downstream in the wet season to a 300-400% increase in the dry season. Total phosphorous and nitrogen levels were also consistently higher by 4-6 times in downstream sites. The remarkable difference in carbon and nutrient levels between these two sites is likely due to human sewage inputs into the river; however, we cannot say that with certainty. Chris aims to address this very question during his MSc research, studying anthropogenic impacts on rivers in the protected areas of the Mara Basin, and how the river assimilates those inputs.

We were fortunate to be able to discuss our observations of the health of the Talek River with [Dr. Kay Holekamp](#). Kay has been studying hyenas from a research camp on the bank of the Talek River since 1988, and she has witnessed noticeable declines in the quantity and quality of water in the Talek in that time. Kay graciously hosted us at her camp, and she and several hyena researchers participated in some sampling we did in the Talek. It would be amazing to have the kind of long-term knowledge and understanding of the water resources in this region that Kay does of the hyena clans and their behavior. In fact, her group has started documenting significant behavioral changes in hyenas that appear to be linked to land management practices, something one can only document with long-term, painstaking dedication. You can read more about this in [her latest publication](#), and you can follow along with their research on their [blog](#).

This month we also attended the [Ecological Society for Eastern Africa](#) Annual Meeting, at the Multimedia University in Nairobi. The theme of the conference was "Climate Change and Resource Use in East Africa," and there were nearly 100 scientific presentations on climate change impacts, adaptations and mitigation. Many presenters recognized that Africa not only will be the continent hardest hit by climate change, but also the most vulnerable. Freshwater resources are likely to be highly impacted by climate change, which can be seen in the increasing unpredictability in rainfall quantity and seasonality in the Mara Basin, which ultimately impacts river flows directly, through runoff, and indirectly, through human consumptive needs. This meeting was a great opportunity to learn about other natural resource projects in the region and to meet some exciting young scientists. We look forward to participating again next year!



Picture 2: The Ecological Society for Eastern Africa Annual Meeting in Nairobi

Governance

In May we continued to work towards implementation of a Payment for Ecosystem Services (PES) scheme in the Mara Basin. We have already established and held meetings with working groups studying the Hydrology and Legal-Institutional Arrangements in the basin within a PES context. Working groups are comprised of local and regional government authorities and experts in the topic. In May, we convened the Livelihoods Assessment and Cost-Benefit Analysis Working Groups. The primary aim of the Livelihoods Assessment working group is to determine who the potential service providers are, what their current livelihood strategies are, and what would be the opportunity cost of implementing best management practices. The Cost-Benefit Analysis working group should determine 1) if land use changes are the most effective way of solving the core problem faced by service buyers, and 2) if payments for ecosystem services are adequate compensation for service providers to change current land use. We are now working on hiring consultants to develop technical reports in all four areas, under the guidance of the working groups, which together will form our implementation plan for PES in the Mara.

Partners on the Ground

In May, the regional coordinating agency in the basin, the Lake Victoria Basin Commission (LVBC) of the East African Community (EAC), held a planning meeting with USAID-East Africa and WWF-Eastern and Southern Africa Regional Programme Office (WWF-ESARPO). LVBC was granted \$3 million USD over the next three years by USAID-EA to implement the recommendations of the Environmental Flows Assessment (EFA) and Biodiversity Strategy and Action Plan (BSAP) reports. These reports were developed for the Mara River Basin under the [GLOWS consortium](#) with funding from USAID. LVBC has now developed their work plan to undertake this project and is in the process of hiring a coordinator to manage it, so we are very excited to see the next steps taking place.

Other Interesting Happenings

During the Masai Mara wildebeest migration, there are typically large mortality events that occur in which hundreds or even thousands of wildebeest die in the river during a crossing gone awry. However, in 2007 there was a huge mortality event in which 10,000 wildebeest died. Opinions vary about where to place blame for this atypical event – flash floods caused by destruction of the Mau Forest, aggressive tourists forcing the crossing and blocking the exit route, or simply an act of Mother Nature. National Geographic has decided to cover this story in a new TV series called “Wild Case Files,” in which they cover wildlife mysteries from around the world. We were contacted by the production company contracted to produce the show to learn more about our work in the Mara, and to get some technical guidance in interpreting the rainfall and flow data for the river during that event. We were happy to assist with the information, although we weren’t in Kenya during their filming. We’ll be sure to keep you posted when the episode airs.

We were also excited to learn USAID was expecting a visit from the Administrator for the U.S. Environmental Protection Agency (EPA), Lisa Jackson, and she was planning to visit the Mara during her travels. We were honored to be invited to participate in her visit by informing her about GLOWS’ work protecting water resources for both people and nature in the Mara River Basin. Unfortunately, Ms. Jackson had to cancel her visit due to the major oil spill in the Gulf of Mexico. The Gulf is a body of

water in the US where we have spent plenty of time fishing, canoeing, swimming and enjoying the bounty of nature, and it has been heartbreaking to watch this environmental disaster unfold. We hope it will be brought to a close soon and the effects somehow mitigated.

See you next month!

Our travels to UNESCO-IHE in Delft took us into the beginning of June. However, our partners were busy in the basin with important work, including training on the EFA and BSAP recommendations in Tanzania. We now have returned to the Mara and are preparing for our final tour through the basin, during which we will introduce several new students to institutions and sites on the ground, visit with all of our partners and meet with the Serengeti Lead Ecologist to discuss ongoing water monitoring in the basin. We look forward to updating you next month!

Who are we?

Christopher Dutton is the Coordinator of the Trans-boundary Water for Biodiversity and Human Health in the Mara River Basin (TWB-MRB) Project. Amanda Subalusky is the Research Coordinator – East Africa for Florida International University. We both work within the GLOWS consortium. Read more about us at <http://maraadventure.blogspot.com>

What is GLOWS?

GLOWS is a consortium financed by the United States Agency for International Development (USAID) working to increase social, economic, and environmental benefits to people of the developing world through clean water, healthy aquatic ecosystems and sustainable water resources management. Read more about it at www.globalwaters.net