



# Mara River Flows

## Integrated Water Resource Management ... for people and for nature

Welcome to the first monthly Mara newsletter! It is our hope that this venue will be an opportunity to keep everyone updated on activities in the Mara River Basin, including the state of the river, ongoing and upcoming research, politics and any other interesting happenings. By creating a central forum for dialogue and updates, we hope to foster the exciting spirit of collaboration we feel every time we are able to meet in person.

### State of the River



*New Mara Bridge – May 15<sup>th</sup>, 2009*



*New Mara Bridge – June 1st, 2009*

We returned from our month-long leave at the end of April to find that the river had not yet recovered from the very low flows it experienced in March. February and March are historically the time of the lowest flows in the Mara River Basin, and the failure of both the long rains in March-May, 2008, and the short rains in Oct.-Dec., 2008, exacerbated this state such that some of the lowest flows ever documented in the Mara River occurred in March, 2009. We had planned to conduct an additional Environmental Flow Assessment (EFA) sampling event to refine the Reserve estimates for the Mara River by adding data from critical low flow levels, and we were fortunate to be able to schedule this event for the last week of February, allowing us to capture data at these very low levels. You can see in the table below that the discharge levels at two of the three EFA sites were lower than the recommended flows for even dry season minimum flows in drought years.

Site	Mean Discharge m <sup>3</sup> /sec (February 2009)	% Time Equaled or Exceeded on Monthly Flow Duration Curve (FDC)	Reserve (Minimum Dry Season Drought Year)
Kapkimolwa (EFA 1)	0.177	98%	0.30
Mara Safari Club (EFA 2)	1.035	97%	1.00
New Mara Bridge (EFA 3)	1.056	93%	2.00



Dead fish along the bank of the Mara at the New Mara Bridge

The week following the EFA sampling trip, the river levels fell a bit lower, and a widespread fish die-off occurred, with healthy-looking individuals of a number of species appearing on the banks of the river. It was reported to us by folks from the Mara Conservancy that this was observed from the group ranches into the Masai Mara. We documented it at EFA 3 during our sampling event in the second week of March. Dissolved oxygen levels at this site had dropped to 40%, and we found 8 individuals of 5 different species within a 20 m stretch. This is the first strong evidence we have that Reserve recommendations provide a fairly robust estimate of minimum sustainable levels. Interestingly, incidental interviews indicated a typhoid outbreak occurred in Bomet District during these low flows, with several children dying in March-April.

The long rains this season were delayed in their arrival and did not begin in earnest until early May; however, the river has now recovered to fairly high levels, along with fairly high levels of sediment loading. You can see our latest readings from the Mara and major tributaries here.

Date M/D/Y	Time hh:mm:ss	Site	Temp C	DO %	pH	Conductivity mS/cm	Salinity ppt	TDS g/L
5/29/2009	13:56:03	Amala River	18.46	82.1	7.5	0.078	0.04	0.058
5/29/2009	13:55:31	Nyangores River	18.48	81.8	7.53	0.074	0.04	0.055
6/1/2009	14:03:50	Talek River	24.82	65	7.6	0.163	0.08	0.106
6/2/2009	14:31:12	Mara River	22.55	71.2	6.78	0.094	0.05	0.064

However, the total rainfall is still far below normal levels, and with the general failure of rains in the two previous seasons, it will be interesting to see how river levels fare during July-August. This is our first true wet season working in the Mara, and it certainly increases the challenges. We spent several days during our last two sampling efforts stuck in the mud, jacking up the truck and shoving all the firewood under the tires over and over, sometimes in the middle of a buffalo herd. However, it also afforded us the opportunity to meet some very nice folks with some very big trucks!



## Research

We are continuing our twice monthly sampling protocol, and we are looking forward to getting back all the data from the very low flows of March. After conversations with a UNESCO-IHE student named Aleksander Pavlov, we are looking forward to adding diatom sampling to our protocol to add more data to our water quality assessment, and to begin to develop our understanding of the basal food resource dynamics in the river. We were also excited to document our first live mussel in the Mara River, an *Elliptio* sp., as it made its way back towards the water during subsiding peak flows. A mussel specialist at the museum is going to identify this specimen for us, and we hope to begin learning more about the mussel populations of the river.



Assefa and Mengistu scouting out potential soil erosion plots.

Two graduate students arrived at the end of May-beginning of June from Dr. Assefa Melesse's lab at Florida International University. Mengistu Defersha is studying soil erosion and runoff patterns in the MRB. He has constructed several experimental runoff plots, and he is planning to use the results in conjunction with GIS layers and soil data to construct a runoff-erosion model for the entire Basin. Shimelis is collecting information on the economic trends and demographics of different sectors in the Basin, and he is planning to create a water resource allocation

optimization model that will be user-friendly and hopefully applied in future planning efforts by WRMA.



Two of Mengistu's Soil Erosion Plots.

For the next phase of our research in the Basin, Chris and I are interested in focusing on the dynamics between the Mara River and the wildebeest migration. This is a subject of much hypothesizing, but very little data thus far. We have found a lot of interest in this question locally, and several potential partners have expressed an interest in collaboration. Erustus Kanga, lead ecologist for the Kenya Wildlife Service and PhD student at Gronigen University, is currently studying hippo grazing patterns in the Mara.

However, he is interested in a post-doc to study the relationship between hippos and water quality in the Mara in more detail.

Samson Lenjirr, the former head warden for the Masai Mara National Reserve (MMNR), has worked in conjunction with FIU/GLOWS and WWF for many years. He is now the new head warden for the Mara Conservancy, and we met with him recently to discuss our research. He expressed his interest in doing his doctoral research on the relationship between the wildebeest and the Mara, from the wildlife perspective. As our research would focus on the river side of the equation, I think it may be exciting if we could all work together. Working with Erustus and Samson would also allow the opportunity bring the KWS and the Mara Conservancy on board, which would be great local partnerships to develop.

We also spoke to Brian Heath, Director of the [Mara Conservancy](#), about our interest in staying in the MRB to continue our research through the upcoming migration (Sept.-Dec., 2009). This would allow us to obtain detailed data from a season of focused sampling, which could be directly applied to our graduate studies. Brian is very excited about our work on the Mara, and he insisted we stay through March to cover another complete hydrological cycle. He also offered some support from the Mara Conservancy. While they can't provide funding, per se, they can allow us to stay in their secured research campsite for free, provide mechanical work from their garage, and allow us to purchase food and diesel from their stores, which are all very generous offers. This makes the option of staying to conduct research much more feasible. We are planning to approach the Frankfurt Zoological Society later this month, which funds much of the research in the Serengeti, about providing some funding to support us.

## **Politics**

This month has led to some exciting developments in the political realm of EFA implementation. Amanda, the GLOWS Research Associate in the Basin, was invited by WWF to accompany them to meet with regional and national level officials in the Ministry of Water and Irrigation (MOWI) of Tanzania. We have already presented the EFA and accompanying Biodiversity Action Plan to the Kenyan officials, so this was an opportunity to do so on the downstream side of the basin. They were very receptive and supportive of the documents, and promised to be engaged in their implementation. They also informed us that the TZ Water Act is close to being finalized, and we were given a copy. It was exciting to see that the language of Reserve protection is very prominent in the law.

The day after our meeting with the Permanent Secretary of the MOWI, TZ, he attended a Council of Ministers meeting at the Lake Victoria Basin Commission of the EAC. He spoke in strong support of the documents, and the Council voted to adopt the documents. This means the documents and their findings have mandate at the level of the EAC to be implemented in all Partner States (the 5 EAC countries), so this is quite an

exciting development. We also continued to meet with the PS of the MOWI, KE, and he has offered to assist in arranging meetings between us and various Ministries to present the EFA and BAP.

Of course, the next step is to work towards on-the-ground implementation, which will need to be done in conjunction with the regional water offices and water user's associations. On this grassroots level, we will be traveling this week with WWF to the Masai Mara to speak with the managers of the hotels and tourist lodges about the current status of the Mara River, the EFA and the BAP, and what all of this means to them. The goal of the meeting will be the establishment of a sub-catchment WRUA in the Masai Mara, which can be engaged in the implementation of a Payment for Ecosystem Services scheme. We will continue to focus on developing the local and regional components during the next two months, as WWF works towards establishing the National Stakeholder Workshops.

### **Other Interesting Happenings**

We were contacted by two interesting people this month about our work in the Mara. [Simon Trevor](#) is an environmental film maker and founder of the [African Environmental Film Foundation](#) who has made a number of documentaries on water issues, including the Great Ruaha River. He is planning a series of films about the Mara, and he was looking for some actual data on the situation, which seems to be in short supply. We were happy to provide him with the GLOWS water quality baseline assessment report and the EFA Report, as well as some information about our research. He will be returning to Kenya in August, and we look forward to spending some time in the field with him then.

[Nicholas Wadhams](#) is a freelance journalist with [CNN](#), and he is conducting pre-interviews with people in preparation for a story 60 Minutes is doing on the migration and the Mara River in August. They are interested in focusing on the health of the river and the situation in the Mau Forest. During the large wildebeest drowning in 2007, in which about 10,000 wildebeest died when they crossed the river at a bad location, CNN told the story that deforestation in the Mau had led to higher than normal peak flows, which had caused the wildebeest to drown. Hmmmm.... Got the parts right, just not the story line. Anyway, it is exciting to be working on collecting the data in which so many people are interested. It is a perfect time to be studying the Mara River!

### **See you next month!**

I hope this newsletter is an informative and helpful way to keep everyone in the loop. Please feel free to forward it on to anyone who may be interested, or let me know their address and I'll include them on the mailing list. Also, please let me know if there are any other areas you would like covered or on which you would like more information. We are happy to be your eyes and ears on the ground, in the Mara.