

ADCP-Measurements and Evaluation of Hydrodynamics for potential River Sites at the River Nile to install an Instream River Turbine

Client: GIZ GmbH

Location: River Nile between Jinja and Kyoga Lake

Scope of Work: 3D current measurements and echo sounding upstream „Haven Falls“

Method: ADCP measurements

INTRODUCTION

According to the „developPPP“ program, GIZ GmbH planned the installation of an instream river turbine in cooperation with KSB AG at the upper Nile River between Jinja and Kyoga Lake (Fig. 1).



Fig. 1: Upper Nile River between Lake Victoria (Jinja) and Lake Kyoga

The upper Nile River downstream Jinja has 8 rapids with currents of 2-4 m/s, giving a good resource to implement an instream river turbine ($P_{elec.,eff}=10-40$ KW).

METHODOLOGY

A short trip was performed to pre-select a potential site upstream „Haven Falls“ (Fig. 2).



Abb. 2: Potential Site upstream „Haven Falls“

3D flow measurements were done using an ADCP (Workhorse Rio Grande, RDI Teledyne), which was installed on a pontoon (Fig. 3 and 4).



Fig. 3: Pontoon with ADCP and Communication Unit

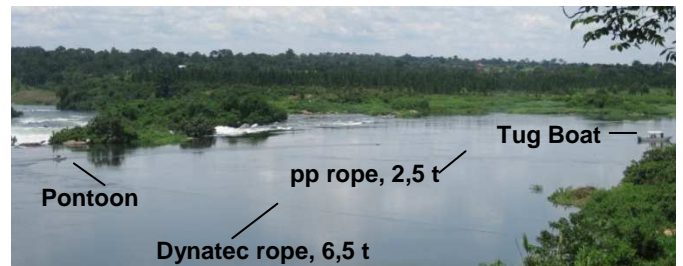


Fig. 4: Installation of the Pontoon

RESULTS AND CONCLUSION

Current velocities and water depth were measured in several sections upstream „Haven Falls“ (Fig. 5).

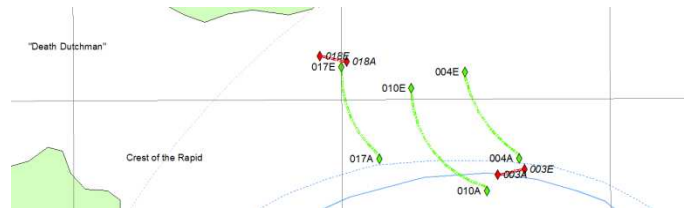


Fig. 5: ADCP-Cross Sections

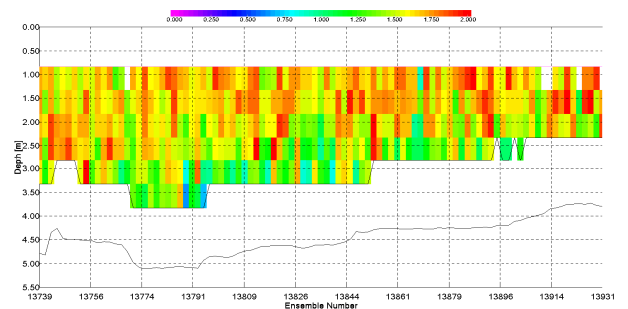


Fig. 6: ADCP-Cross Section with Current Velocities of more than 2 m/s

Measurements have shown that the area with higher velocities is restricted.