

OVERSEAS WORK

Incomati-Maputo Agreement

The rivers Incomati and Maputo are shared by Swaziland, Mozambique and South Africa. An Interim IncoMaputo Agreement (IIMA) was signed by the three governments in 2002 and it was agreed that a Comprehensive Agreement would follow, which would enable the countries to more effectively utilise, develop and protect the shared waters of the Incomati and Maputo River Basins. An Implementation Activity and Action Plan (IAAP) identified 12 projects, which would be implemented under the Progressive Realization of the Inco-Maputo Agreement (PRIMA), financed by the Government of Netherlands. Ron Manley is Team Leader for one of these projects which is dealing with “System Operating Rules for the Incomati and Maputo Watercourses”.



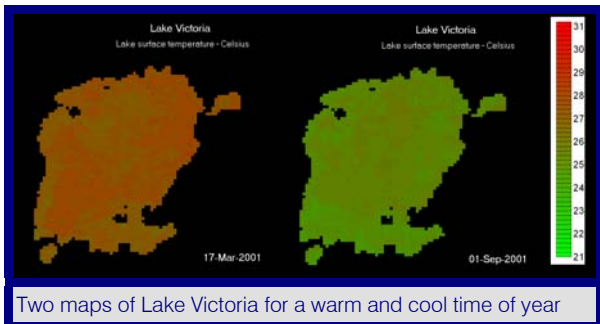
The water resources of the two basins are well-used but development is uneven. In particular flow is diverted to South Africa out of the Incomati basin and there are dams in the headwaters of the rivers in both South Africa and Swaziland. The main objective of the project is to optimise the operational management of these international river basins in terms of water allocation, flood and drought mitigation, environmental water requirements, hydropower generation and various other user demands. The early stages of the job focused on scoping each of the twelve projects so that they complement each other, reviewing current operating rules, developing an information management system, identifying any shortcomings in

the hydrometric data collection and dissemination system and deciding on which models should be used. Parts of the study-area have already been modelled using different resource allocation systems, so it was decided that a combination of Mike-Basin and the WRYM [Water Resources Yield Model] would best suit the needs of the project. The project is currently assembling data and calibrating the models.

FAO African Lakes Project

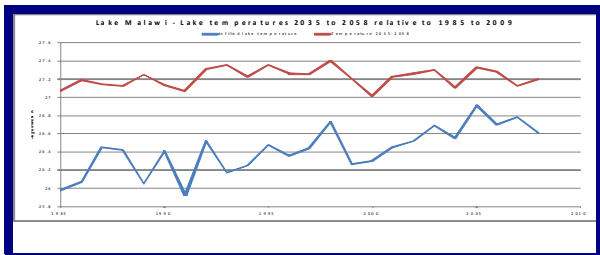
Ron Manley and Pat Reynolds have been working with the UN Food and Agriculture Organisation to improve the understanding of temperature in the African Great Lakes: Lakes Victoria, Tanganyika and Malawi. The lakes are an important source of fish protein and the objective was to use an improved understanding of temperature variation and the impact of climate change to maintain and, if possible, improve the fisheries potential.

Data on lake temperatures derived from satellite images, available since 1986 on an eight-day time step, were used to produce a set of maps and films showing the varying temperature for each lake.



Two maps of Lake Victoria for a warm and cool time of year

The next stage was to produce an indication of the impact of climate change. This involved relating lake temperature to land temperatures around each lake and using this relationship and projected changes in land temperatures to calculate the impact. In the absence of suitable temperature records, use was made of data from the Microwave Sounding Unit (AMSU/MSU), as calculated by Remote Sensing Systems.



Projected change in lake temperatures for Lake Malawi.

UK WORK

Land Drainage System for Port of Mostyn

Siemens Energy pre-assemble wind turbines at Port of Mostyn on the south bank of the Dee estuary in North Wales, before the turbines are shipped to wind farms in the Irish Sea. The port was built on a flat area of made-ground comprising a layer of crushed limestone overlying sand, pumped from sand bars in the estuary. As a result of vehicle rutting and the impermeable surface, the site suffered from ponding of surface water, which Siemens commissioned WRA to solve.

WRA worked with GWP on this project, Robin Hall carrying out the drainage design and infiltration testing, and Jeremy Baldock [GWP] the geotechnical design, with support from Alan Cobb. A solution was required which would cater for 600-tonne Demag cranes used for lifting, and 88-tonne reach stacker trucks used for moving the turbine components.



Frozen standing water and 600-tonne crane

At an initial meeting in December, drainage options were discussed with the client and a draft scheme was considered.

Trial pits were excavated in March to determine the soil horizons, groundwater depth, and to perform infiltration tests to determine the suitability of the underlying material for disposing of the surface water. The trial pits revealed that the underlying subgrade had uniform physical properties consisting of fine light brown sand. In the buildings area, soils varied between silt and sandy clay to sandy silts. Aggregate was used to prevent pit collapse, and perforated plastic standpipes were installed to measure water level. The infiltration coefficient was found to be remarkably consistent.

Plate bearing tests were carried out by Celtech. The trial pits and the plate bearing test excavations showed that the existing crushed limestone surface layer varied in thickness across the site from 100-650mm. The plate bearing tests showed that the strength of the subgrade varied significantly across the site and in places was extremely low as evidenced by vehicle-induced differential settlement.



Filling test pit with water for infiltration test

The proposed solution uses a three large infiltration trenches and a stronger more permeable aggregate surface layer placed over the original crushed limestone. This together with the use of geo-grids will stabilise the platform and improve the resistance to surface rutting created by mobile plant. Rain falling on the surface aggregate will infiltrate rapidly down to the more impermeable limestone aggregate, and then move towards the infiltration trenches. Each trench discharges via a French drain into the Dee estuary. The site will only be used for up to two years, so the system was designed to cater for a 10-year storm, with a 5% climate change enhancement. Storage in the surface aggregate layer provides a backup for larger storms. [www.gwp.uk.com.]

WRA SOFTWARE



Pat Reynolds has developed a new website, focusing on Low Carbon Options: <http://www.lowcarbonoptions.net>

The site has the following sections:

1. Policies and measures for over 70 countries
2. Strategies - agriculture, carbon management, green construction, energy, environmental, household, resource efficiency and transport
3. Business/Commerce section
4. Innovations - all sectors
5. News feeds from popular blogs
6. Explanatory videos - for all sectors

The website is complemented by a blog site <http://www.lowcarbonoptions.org>

Let Pat know if you have any problems opening pages or downloading documents...or indeed any constructive comments. Pat has just started a joint LTS-WRA project in Malawi for the Millenium Challenge Corporation.

WRA Board Meeting

4 October 2010, Marlow.

The WRA Bulletin is a quarterly publication, and relies on contributions submitted by Directors, Associates and Consultants. The document is circulated by email, and published on the WRA web-site, aiming to keep the WRA network, up-to-date with respect to current activities. Please email contributions for future issues to pach@watres.com

Water Resource Associates Ltd, PO Box 838, Wallingford, Oxon OX10 9XA. Tel: +44[0] 1491 838 190, www.watres.com