

UK WORK

Cotswold groundwater project

Paul Holmes has been advising an estate in the Cotswolds near Stroud about investigating and proposing solutions to manage and control groundwater springs in the Birdlip Limestone. The project will now progress with the drilling of a horizontal aquifer drain and diversion of a stream which affects recharge of the springs.



Cavities in the Birdlip Limestone



Groundwater springs at the base of a wall

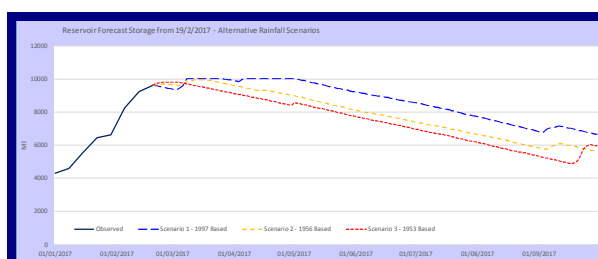
Cotswold and Wiltshire SuDS projects

Dr Robin Hall has recently completed various projects in the area of Blockley and Moreton-in-Marsh, aimed at providing developers with flood risk assessments and the design of new drainage schemes incorporating SuDS [Sustainable drainage systems]. This work included the implementation of infiltration tests using excavated pits as prescribed in the BRE Digest 365 Soakaway design, to the satisfaction of Cotswold District Council. The final design included attenuation tanks and retention basins.

Frank Farquharson has been undertaking a similar SuDS study for a development of 10 houses in Warminster, Wiltshire. The study involved infiltration tests into both trial pits and also into a 4m deep trial borehole drilled into the underlying Shaftsbury sandstone series, a Cretaceous sandstone that forms the upper member of the Upper Greensand.

Drought Contingency Planning

As a result of the recent dry winter, which led to below-average river flows and groundwater levels in many parts of south-east England, the Environment Agency prompted water companies into delivering forecasts of their reservoir stocks through the coming spring and summer months based on different plausible rainfall scenarios. WRA used hydrological models to provide the required simulations and report.



Reservoir Simulation of Spring-Summer 2017 for different rainfall-PET scenarios

Periodic Review 2019

WRA has been supporting water companies in southern England currently in the process of preparing water resource management plans for the 2019 periodic review. WRA's scope has covered both screening of engineering options at strategic review level as well as improving and updating the Aquator and Hysim model components which underpin the deployable output assessments.



Ardingly Reservoir

Assignments for PR19 have been carried out for South East Water, SES Water, Affinity Water and Anglian Water. Some of the river-groundwater systems involved are the Ardingly Reservoir and Sussex Ouse,

Arlington Reservoir and River Cuckmere, and the Bough Beech Reservoir and River Eden system in the Medway catchment. In addition to modelling, Hysim training was provided, and the need to run hundreds of climate change scenarios through the hydrological models in England and Wales led to development of Hysim-Multi, which was released by WRA in October 2016.

OVERSEAS WORK

West Bengal irrigation and flood mitigation project (WBMIFMP)

Frank Farquharson has recently been part of a World Bank mission preparing a major \$400million project on the Damodar River in West Bengal, India. Frank is providing advice on water resource availability but primarily considering how flood damage might be reduced through the project.

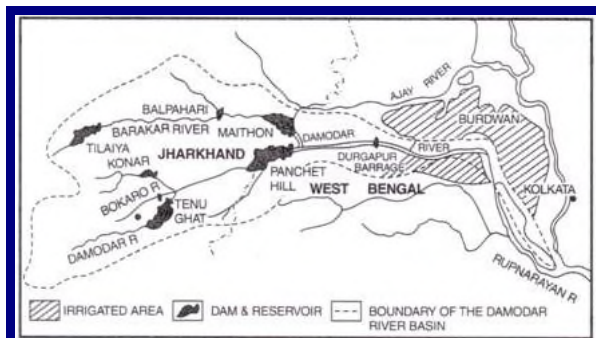


FIG. 18.3. The Damodar Valley Project

Map of the Damodar River basin in West Bengal and Jharkhand states, showing location of main reservoirs and irrigated areas.

The Lower Damodar Sub-basin area is historically flood prone. On average, about 33,500 hectares of cropped area and 460,000 people are affected every year. Although there are five large dams within the upper basin in Jharkhand state, initial thoughts are that these dams are not being managed as effectively as they could be and Frank is attempting to scope out how dam operation might be improved by the project, both to increase post-monsoon irrigation water availability and also to provide more effective flood mitigation.



View of the upper Damodar river in Jharkhand state



Outflow from the Maithon Dam on the major Barakar River tributary, during peak monsoon in August 2015

WRA Partner/Associate News

Frank Farquharson, Harvey Rodda, Nick Mandeville, Julian Smith and Marcus Francis were among the delegates attending the BHS National Meeting entitled *UK Flood Hydrology 40 Years after the Flood Studies Report*, held at CEH Wallingford on 22 Nov 2016. So WRA was well represented by Partners and Associates! Nick Mandeville presented a poster on *Identifying the quickflow storm runoff in event-based models: some advances since 1975*.

Next WRA Board Meeting

21st April 2017, 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 Nick Mandeville: nick@watres.com

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