

River Basin Management

Course Outline

Following the recent enactment in Europe of the Water Framework Directive, the Landfill Directive and the Groundwater Regulations, and the international imperatives of the Millennium Development Goals, there is a high demand for trained, experienced scientists and engineers with specialist knowledge of river basin management and an understanding of the broader principles of integrated water resources planning. The WRA course in River Basin Management is designed to give practicing professionals the required knowledge and exposure to a range of skills used in the sustainable and integrated management of the water resources in a large drainage basin.

Course Content

The course will be taught through four main modules, tackling the key components of river basin management, and integrated water resources planning.

Management Framework and Institutions

- Basic principles of River Basin Management
- Environmental economics
- Water Resources policy and institutional framework
- Water Resource systems and assessment
- GIS applications for river basin management
- Water Framework Directive in Europe

Hydrological Science

- Catchment Scale and the River Basin Management Plan [RBMP]
- Water Quality, River and Aquifer Conservation
- Diffuse and Point pollution
- Impact of land management on water quality
- Biodiversity and ecology at river basin scale
- Renewable energy focussing on hydro-power and windfarms
- Climate change and hydrological modelling
- Remote sensing tools

Monitoring

- River Basin Processes
- Natural River Systems and restoration
- Field techniques and Monitoring requirements of RBMPs

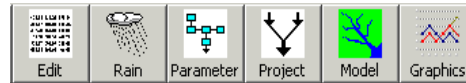
Case Studies

The course will draw on the wealth of WRA experience and project examples, to exemplify key aspects of river basin management, and case studies will be used in hands-on work.

Course lecturers are regularly involved in teaching and research activities at the Universities of Oxford, Reading, and Newcastle-upon-Tyne and University College London.

Courses can be tailored to the specific requirements of clients, and delivered as a closed course at any location.

WRA Software



HYSIM: Hydrological catchment model with database engine for resource assessment and flow naturalisation.

AQUATOR: Conjunctive use water resource system model.

HYDRO: Multi-purpose reservoir operation and analysis.

CDIG: Digitising software for hydrological data.

LASER: Liming control model.

HERMES: River water quality model.

INCA-N: Integrated catchment model for water quality [nitrates]

INCA-P: Integrated catchment model for water quality [nutrients, sediment, macrophyte dynamics]

DISPRIN: General purpose program for simulation of water quality dispersion along river systems.

PTFIT: Interpretation and analysis of pumping test data.

WDT: Well design toolkit for Water wells

Training

Project design: Designing projects with logical frameworks and team-up tools.

Well analysis: Provision and use of software for simulation and analysis of pumping, and observation well behaviour, including analytical prediction of well losses.

Rainfall/runoff modelling: Use of rainfall/runoff models for a variety of applications.

Water quality modelling: Use of river, catchment and lake models.

River Basin Management: Use of river, catchment and lake models.

To Find Out More

For more information please visit our web site at:
<http://www.watres.com>

If you require further details about the company or the principals write, telephone or e-mail us at this address:

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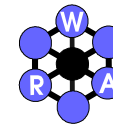
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Water Resource Associates



Kalandula Falls in Central Angola

Groundwater Development

Flood, Urban & Low Flow Hydrology

Water Resource Management & Modelling

Database & Software Development

Water Quality Modelling

Hydrometry & Telemetry

RIVER BASIN MANAGEMENT COURSE



Specialist Training



Water Resource Associates Ltd was founded in 1994 and provides specialist consultancy services, world-wide. The Directors have previously worked for a range of organisations including the Institute of Hydrology, British Geological Survey, firms of consulting engineers, the British water industry and International agencies. They have experience of working on problems in the water environment in over 120 countries across the full spectrum of arid to humid climates.

Project Portfolio



Canada: Lake Simcoe Nutrient Modelling [Trent University and Ontario Ministry of the Environment].

Norway: SEALINK project, examining changes in nutrient fluxes to the sea from air and land sources in the Vansjø-Hobøl Basin

Scotland & Northern Ireland: HYSIM-AQUATOR software for surface water yield assessment [SNIFFER]

British Waterways: Development of hydrological models for reservoir and canal feeders throughout England and Scotland.

Belgium: Flood Study of Meuse tributary [Namur City Council].

Romania: Modelling metals in the Aries and Mures Rivers [Rosia Montana Gold Corporation]

Turkey: Yeşilirmak River Basin assessment of impact of climate change on irrigation and hydropower [Solventa].

Azerbaijan: Surface Water Studies for Sangachal terminal and Serenja hazardous waste facility [BP Exploration Shah Deniz]

Russia: Reservoir optimisation for Volga navigation study at Nizhny Novgorod [SWK for ROSRECHFLOT]

Middle East Peace Process: Development of national water data banks & Environmental early warning system [EU and GEF]

Jordan: Modelling ancient and modern hydrology for the Water, Life and Civilisation project [Leverhulme Trust]

Lebanon: Water Resource study of the Hasbani Basin to assess equitable use of the Jordan River resources [EU-Relex]

Yemen: Sayhut and Noujad Dam feasibility Studies [Conser, Abu Dhabi Fund for Development]

Botswana, Namibia: Effects of proposed pumped abstractions on Okavango Delta [Ministry of Water, CSIR, South Africa]

Malawi: Environmental and Natural Resources Management Action Plan for Upper Shire Basin [LTS-MCC]

Lake Victoria Basin Commission: Control rules for hydro-power operation and management of lake water level [with CEH]

Tanzania: Dar-es-Salaam future water supply [Norconsult]

Mozambique: Hydropower part of Energy Master Plan

Nepal: Upper Tama Koshi hydropower feasibility study

Brunei: Temburong Transfer Scheme & Batu Apoi Dam feasibility study [Montgomery Watson, for Min of Public Wks]

Indonesia: South Java flood control study [Min of Public Works; Bintan Industrial Estate Water Supply [Sembcorp Parks]

Hydrology



WRA expertise covers hydrometric network design, instrumentation, data capture and processing, flood estimation and forecasting, low flow, yield and drought studies, hydropower operation, modelling complex conjunctive use water resources systems, arid zone hydrology and wetland hydrology.

We also specialise in producing high quality hydrological software either as bespoke applications or as products for general use. Software products include catchment models, conjunctive-use water-resource simulation models, river water quality models and chart digitising software.

Water Quality and Hydro-ecology



INCA-N for Windows
Version Land Use Change (based on 1.8.1)

Water quality and hydro-ecological studies are key WRA activities, including modelling, management, and development of software for rivers, lakes and catchments.

Capability includes environmental impact assessment, integrated catchment management and investigation of land-use and climate change, assessment of nitrogen balance, movement of metals, acidification and real-time forecasting and control. Services include hydrochemistry, time series analysis, water quality sampling and analysis, liming control software for acid rivers and lakes, aquatic and river corridor surveys.

Groundwater Management



WRA provides services for groundwater development and management in most global geologies. The company has provided advice on centralised management of groundwater for large-scale irrigation and water supply projects, as well as developing frameworks for provision for Rural Water Supply & Sanitation Schemes & installing individual water supply points.

Environmental issues and sustainable water supplies are central to many water resource projects, requiring knowledge of man's influence as well as natural variation in water quality.

Support has been given to the UK water industry at many levels. Writing and use of specialised software for tackling complex problems include borehole design, pumping test analysis and deployable output assessment. WRA is supported by Groundwater Drilling & Monitoring Ltd, and can offer hydro-metry as well as soil and aquifer test services.

WRA websites

www.waterwelldesign.com
www.lowcarbonoptions.net
www.climatedata.info
www.ema.com.mk

www.oxscisoft.com
www.southernhydropower.co.uk
www.hydro-gis.co.uk

The WRA Team



Directors

Frank A K Farquharson: Flood hydrology and Real-time forecasting, water resource assessment & management.

Paul A C Holmes: Groundwater development, hydrological modelling and water resources planning

Dr A Nick Mandeville: Hydrology, strengthening capability of foreign hydrological services, author of RIS method.

Ron E Manley: Engineering Hydrology, specialising in river flow simulation and wetland hydrology, author of HYSIM.

Dr Patrick J Reynolds: Microbiology and Environmental Management.

Prof Paul G Whitehead: Water quality modelling, catchment hydrochemistry, acidification, author of INCA.

Prof Andrew J Wade: Water quality & hydro-ecological modelling, river basin management.

Dr Sean T Avery: Hydrology & Water Resources in East Africa and the Middle East, Transboundary management .

Associates

Richard B Bradford: Hydrogeology and well design.

Dr John Bromley: Hydrogeology and Water Management.

Robert P C Brown: Hydrological & resource modelling.

Dr Sean Burke: Hydro-ecology & Water quality modelling

Daniel Butterfield: Software development and GIS.

Dr David Carless: Hydropower and alternative energy.

Dr John B Chatterton: Environmental economics.

Professor Mike Edmunds: Hydrogeochemistry.

Dr Paul N Garrad: Flood hydrology.

Dr Chris S Green: Hydrologic software, author of Aquator

Dr Robin L Hall: Land-use & evaporation modelling.

Dr Robin Herbert: Hydrogeology, author of PTFIT.

Dr Bruce A Lankford: Irrigation engineering & science.

Dr Mike J Lowing: Flood hydrology & hydrometric data.

Dr Harvey J E Rodda: Hydro-GIS, DTMs & ISIS modelling.

Dr David T Plinston: Developing countries water resources

Dr Debbie Snook: Hydro-ecology & aquatic surveying

Tim Stephens: Land-use & Watershed Conservation.

Dr Kyle Thomas: Hydrologic, sediment & pollution models