

**SOCIO-ECONOMIC BENEFITS OF
METEOROLOGICAL AND HYDROLOGICAL SERVICES**

INVENTORY OF DECISION SUPPORT TOOLS

Runoff and Streamflow Routing Programs

ITEM	DESCRIPTION
Sector	Engineering in General
Sub-sector	Hydrological design, hydrological modelling, flood forecasting
Tool Name	RORB – runoff routing URBS – continuous/event rainfall runoff routing model
Tool Description	RORB Version 5 is a general runoff and streamflow routing program used to calculate flood hydrographs from rainfall and other channel inputs. It subtracts losses from rainfall to produce rainfall-excess and routes this through catchment storage to produce the hydrograph. It can also be used to design retarding basins and to route floods through channel networks. URBS incorporates a Montecarlo stochastic modelling module and runs 10000 model runs in an hour.
Weather, Climate or Water inputs	Rainfall and streamflow data for a specific catchment
Specific weather, climate, water data required	Rainfall and stream discharge data
Spatial resolution	Areal rainfall for sub-catchments Stream discharge data at specific point/s
Temporal resolution	Dependent on catchment area and monitoring interval, but from minutes to hours
Delivery methodology	Dependent on application – hydrological design – historical data; flood forecasting – real-time data
Frequency of data requirement	Dependent on application and temporal resolution of the input data
Other	Can be linked with hydraulic models
Detailed Tool Description	The model can be used both for the calculation of design hydrographs and for model calibration by fitting to rainfall and runoff data of recorded events. The model is areally distributed, nonlinear, and applicable to both urban and rural catchments. It makes provision for temporal and areal variation of rainfall and losses and can model flows at any number of gauging stations. In addition to normal channel storage, specific modelling can be provided for retarding basins, storage reservoirs, lakes or large flood plain storages. Base flow and other channel inflow and outflow processes, both concentrated and distributed, can be modelled.
Spatial resolution	Flood hydrographs at specific points in the catchment.
Temporal resolution	Variable, depending on the size of the catchment (minutes to hours)
Delivery methodology	Graphical or numerical output
Frequency of provision	Variable depending on the temporal resolution adopted
Other	The model can be used as a planning tool, e.g. for design flood derivation, or for real-time flood forecasting.
Benefits of tool application	The model can be used to size hydrological structures, e.g. bridges, culverts, dams, or for flood warning and forecasting purposes. Benefits accrue from optimum design of hydrological structures – 10-20% of total construction costs and from flood warning services –

	benefit/cost ratios from 1.5 to 6.6.
Possible future advances	Possible future advances include provisions for inclusion of radar rainfall data and real-time operational usage.
Comments	
URL	RORB: http://eng.monash.edu.au/civil/research/centres/water/rorb/ ARBS: http://members.optusnet.com.au/~doncarroll/index.htm
Others	These are just two of a variety of rainfall-runoff modelling tools used for design flood estimation and flood forecasting.