Rainfall runoff models

A rainfall runoff model is used to derive runoff for a particular area from inputs of rainfall and potential evapotranspiration (or areal potential evapotranspiration). All rainfall runoff models in Source are conceptual models that represent catchment hydrological response to rainfall as a series of mathematical relationships. They provide runoff output from each functional unit as total discharge, which is split into quick flow (surface flow) and slow flow (baseflow) components. Refer to the Source Scientific Reference Guide for more detail.

Choosing the right model

Choosing and calibrating your rainfall runoff model is essential. The quality of your rainfall runoff calibration can interact with, and affect output from other models. For example, where constituent load is calculated as the product of flow and concentration, any errors in flow estimates will be propagated through to load estimates.

Consider the following when choosing a rainfall runoff model:

- What models do you and other people in your organisation have experience with;
- Have any rainfall runoff models worked well for your catchment in the past;
- What type of catchment are you modelling? (urban, forested, mixed land use);
- What data do you have available? You need to parameterise any models you choose; and
- Do you have any information on previous rainfall runoff model calibrations? If calibrated models already exist, you can re-use the models and parameter sets.

These might also be useful:

- Run a range of different models and determine which ones work best; and
- Consider using different models or parameters, in different sub-catchments or functional units. What works best in one functional unit may not work well in another. For example, different models may be useful where sub-catchments/FUs have different soil types (different soil water holding capacity) or different proportions of urban areas (large differences in impervious runoff).

Refer to the Source Scientific Reference Guide for details on the types of rainfall runoff models.

Working with rainfall runoff models

Once a catchments scenario has been created using the Geographic Wizard for catchments, and functional unit areas have been assigned, rainfall runoff models can be configured using the Rainfall Runoff Model Configuration dialog (Figure 1). Choose **Edit » Rainfall Runoff Models...** to open this dialog and configure rainfall runoff models as follows:

1. Assign a rainfall runoff model - The total discharge generated from rainfall runoff depends on which model is specified for the sub-catchment/FU combination. In the **Model** column, first double-clicking on the cell. Then, click on the drop-down arrow that appears and choose the required model from the drop-down menu. If runoff is not of interest, or not applicable (eg. you may have FUs that represent water bodies), choose **Nil runoff**;
2. Adding input data - In the **PET** and **Rainfall** columns, click on the links in the respective cells to open the **Select Source** dialog where you can assign a single value, a time series, or a function as data inputs. Refer to Loading data; and
3. Parameterise data - A parameter set consists of a set of variables that you can assign values to. The number of parameters that appear depends on the model that is chosen in Step 1. You can accept the defaults or change these values by double-clicking in the cell and updating it.

> **Note**: You can also use functions-based model types, where you can specify functions and variables as input. Refer to Context variables for more details.

Attributes of this dialog are similar to those listed in Feature Table.

Figure 1. Rainfall Runoff Model Configuration

> **Note:** Using filters in the Rainfall Runoff Model configuration dialog is similar to using them in the Feature Table (see Working with filters in the Feature Table). However, there is also a subcatchment filter to help you find subcatchments either by name or by using the subcatchment map, see Subcatchment filter.