

## HEC-ResSim 3.0 Release Notes

Version 3.0 (April 2007) of the Reservoir System Simulation program (HEC-ResSim) is now available. This version supersedes Version 2.0 which was released to the general public in September 2003. Many new features, as well as enhancements to existing features, have been added to the program since that time. The new features to look for are:

- New & Improved Outlets
  - Pumps
  - Power Plants
- New & Improved Operation Options
  - Pump-back Storage Operation
  - System Hydropower Operation
  - Enhanced “At-Site” Hydropower Rules
  - If-Then-Else Logic for Rule Application
  - User-Scripted State Variables
  - User-Scripted Rules
  - Release Allocation / Outlet Prioritization
  - Scheduled Outlet Outages
  - Outlet Capacity Overrides
  - Period-Average Release Requirements
  - Improved Tandem and Parallel System Operation
- New & Improved Data-Management & Analysis Features
  - Network Importer
  - User-Report Builder
  - Enhancements for Period of Record (long term) simulation

Several of these new features you may want to implement right away, while others will take a while to understand and implement.



*We strongly recommend that before you begin to utilize some of the new features you:*

- 1) [make backup copies](#) of your existing watersheds
- 2) check the data in all elements of your model, being especially vigilant in reviewing your operations rules
- 3) *verify the operation of your current models with ResSim 3.0, and*
- 4) *once satisfied with the results produced by the new version for each of your current models, make another set of backup copies. This second backup copy is suggested because when you open a watershed in ResSim 3.0, the format of key model files is changed, thus making the watershed unable to be opened with older versions of ResSim.*

The first new feature to consider using is the **Release Allocation** option. This option allows you to specify the priority of use of the outlets in your reservoir. Prior versions of ResSim treated the outlets of a reservoir in a very 'democratic' fashion -- releases were allocated to the outlets evenly, up to their capacity. In the Release Allocation feature, this method of allocation is called balanced with the balance being "even" or 50-50. Although the even balance is the default, you can specify an uneven balance such as 60-40, 70-30, or whatever is appropriate for your set of outlets.

Two other allocations methods are also available; they are sequential and stepped. The sequential method allows you to order the outlets in a list, the first in the list getting all the release up to its capacity. When the release exceeds the capacity of the first outlet, the first outlet releases its capacity and the rest of the release is allocated to the second outlet, up to its capacity, and so on. The stepped method is a combination of balanced and sequential. The Release Allocation option and its methods are described in detail in the ResSim User's Manual.

The next feature you will want to familiarize yourself with is the **Report Builder** or User Reports Editor. Although "a picture is worth a thousand words", you will find that this new feature is one of the most useful analysis tools in ResSim. With the Report Builder you can design your own tables of output with optional column summaries or statistics. You can also define additional columns (or variables) in your table by utilizing simple math calculations on other columns (e.g., you can add column one to column two to create column three). ResSim 3.0 also stores many additional model variables to the output DSS file; thus, allowing you to design tables for program analysis as well as for inclusion in study reports. Details of the Report Builder can be found in the ResSim User's Manual.

The **If-Then-Else** structure added to the operations editor is probably the most powerful (and complex) new feature. This feature allows you to define a conditional ("if") block within the rule stack of an operation zone and insert one or more rules into the block. If the condition evaluates to true, the rules enclosed in the block become active in the current zone's rule stack. Conditional expressions can include constants, program variables, external variables, and user-defined state variables. Optional "else if" and "else" blocks can be attached to an "if" block to set off one or more rules associated with their conditions. This complex feature is described in detail in the ResSim User's Manual.

**Pumps** and **Pumpback-Storage Operation** have been added to HEC-ResSim. To incorporate pumping in your model, you first add a Pump as an "outlet" to a reservoir and define its physical properties. Then you add a Pumping Schedule rule to the appropriate zones of the Reservoir's operation set. The pumping rule includes a target pool elevation and the hours of the day during which the pump is allowed to operate. If the reservoir pool elevation drops below the target, the pump rule will become active and pumping will occur in an effort to refill the reservoir. The Pump outlet type and the Pumping Schedule rule are described in detailed in the ResSim User's Manual.

The new **System Hydropower** Operation feature in HEC-ResSim allows you to operate a group of reservoirs to meet a shared power generation requirement while at the same time maintaining a user-defined storage balance between the reservoirs.

As these and other new features were developed, they often led to improvements to existing features. This is especially true with the operational rules and editors. Thus, it is strongly recommend that as you move your watersheds that were developed in prior versions into ResSim 3.0, you should *first back up your existing models*, then review each model carefully once you have opened it in the new version. Check the data in all elements of your model, being especially vigilant in reviewing your operations rules.

Please refer to the HEC-ResSim User's Manual for details regarding the new features. The Table of Contents includes  markers to help you quickly identify and find descriptions for the new features.