# SCT 2.0: System Control Table

Next Page

**Previous Page** 

Table of

**Contents** 

Main Menu

# 1.0 Introduction

The RiverWare SCT ("System Control Table") is a customizable, editable "spreadsheet" view of series data (Series Slots) in a RiverWare model. The SCT presents series data in a scrollable grid of numeric values. Background colors are used to indicate each Slot timestep's "Flag" value -- generally an indication of how the numeric value was created.

The actual data displayed in an SCT is associated with the loaded RiverWare model -- not with the SCT. So, editing series data displayed in an SCT does not effect the SCT -- it effects only the RiverWare model.

The information associated with an SCT -- i.e. that which can be saved and re-loaded as an SCT -- consists essentially of:

- 1. A list of RiverWare Slots,
- 2. A few configurable display properties for each of those Slots,
- 3. A set of general configurable display properties for the overall SCT,
- 4. An aggregation definition for aggregating multiple timesteps within each Slot.

The **time range** displayed by the SCT matches the RiverWare model's <u>Run Control</u> configuration - plus a configurable number of pre- and post-simulation timesteps.

Many SCTs may be used simultaneously within a single RiverWare session (i.e. showing distinct views into the same RiverWare Model). A given SCT may be used with distinct, but similar RiverWare models.

The SCT supports series data Slots (RiverWare Series Slots including Agg Series Slot columns, and Table Series Slot columns) on physical simulation objects and in the RiverWare accounting system.

# 2.0 SCT Tour

### 2.1 Opening an SCT



A **new SCT** can be created from the RiverWare Workspace menu: "Utilities >> SCT >> New (2.0) ...". The SCT will initially have the user-defined default configuration.

After creating a new SCT, the user will want to add Slots and Slot Dividers.

An **existing SCT** can be loaded from the RiverWare workspace by either clicking the "Open SCT" toolbar button (see picture, above), or from the menu:

"Utilities >> SCT >> Edit ..." (opens the SCT in Un-Locked mode). "Utilities >> SCT >> Load ..." (opens the SCT in Locked mode).

The "Open SCT" toolbar button and the SCT "Edit …" and "Load …" menu operations cause an Open File dialog to be shown. If the user selects an SCT file created from the **Old SCT** (version 1.0), then another dialog is shown with this notification:

This is an SCT 1.0 file. Would you like to migrate to the SCT 2.0 dialog or open this with the SCT 1.0 dialog?

Button: SCT 2.0 Button: SCT 1.0 Button: Cancel

Also, within the SCT (2.0) Dialog, an existing SCT can be loaded into that Dialog (replacing the current SCT configuration) through the "<u>File >> Load SCT ...</u>" menu operation.

# 2.2 The SCT Dialog

#### 2.2.1 Vertical Timestep Axis Orientation

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	•	5/19 24:00	Sun		125.19	2832.53	137.90	1.80	9802.89	186	
		5/13 24:00	Mon		19.30	2836.68	137.90	1.84	965.70	177	
		5/14 24:00	Tue		19.30	2835.76	137.90	1.80	1370.36	181	
		5/15 24:00	Wed		19.30	2834.84	137.90	1.61	1964.66	186	
		5/16 24:00	Thu		19.29	2833.92	137.90	1.42	1373.55	186	
		5/17 24:00	Fri		19.29	2833.00	137.90	1.68	1376.91	186	
		5/18 24:00	Sat		14.35	2832.53	137.90	1.81	1376.61	186	
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Next Page

**Previous Page** 

Table of Contents

#### 2.2.2 Horizontal Timestep Axis Orientation

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#### Selection Info Area :

LakeMeadHooverDam.Energy [Column 0] [@ 5/14 24:00] 1 value [1000 MWH] -- Value 19.30

# 2.4 Configuration Dialog

Most of the properties associated with an SCT are controlled through the SCT Configuration Dialog which is shown by selecting the SCT menu operation: "<u>View >> SCT Configuration ...</u>"

The various properties supported by this dialog are described in sections corresponding to each of the tabbed pages:

General ... Horizontal Time ... Vertical Time ... Toolbar ... Summary ... Flags ... Color

SCT Configuration						
General Horz Time Vert Time Toolbar Summary Flags Co	llor					
General Settings	Previous Page					
Pre-simulation Timesteps: 5 Post-simulation Timesteps: 0	<u>Table of</u> <u>Contents</u>					
Show Slots not present in model						
☑ Display "NaN"						
Show Grid						
Target Operations: Full Ornamentation (Slow)						
Crosshatch Pre- and Post-Simulation Timesteps						
Crosshatch Read Only Cells						
Double Click Data Cell Toggles Detail Rows						
OK Apply Reset Cancel						

# 2.5 Timestep Aggregation Dialog

When an "Aggregated View" is selected, <u>aggregations of timesteps</u> within each Slot can be displayed (in Summary cells).

The number of timesteps displayed as a single value (e.g. as the Sum or Average of the aggregated timesteps) for aggregations is determined using the SCT Timestep Aggregation Dialog.

The SCT Timestep Aggregation Dialog is shown through the SCT menu operation: "<u>TimeSteps >></u> <u>Aggregation Config ...</u>"

The user can choose a **Fixed Timestep interval.** This uses a specified constant number of timesteps for each aggregation. Aggregations start with the first timestep displayed in the SCT which is the number of configured "Pre-Simulation" timesteps before the Run Control's start date/ time.

An alternative to a Fixed Timestep Interval is a specified **Regular Interval** (amount of time), with a start offset. The user selects the aggregation interval size -- which should be larger than the timestep interval size -- and "Start At" (offset) settings. The accompanying picture shows a *weekly aggregation starting on Monday morning* (at midnight).

SCT Timestep Aggregation Conf	i
Model Timestep: 1 Day	
Fixed Timesteps per Summary	
4 <u>*</u>	Next Page
Summarize Timesteps for Regular Interval	
1 Week ⊻ Start At:	Previous Page
Hour: 0:00 🚔	Table of
Week Day: Mon 🗵	<u>Contents</u>
Month Day: 1	
Month: Jan 🗵	
OK Cancel	

With Regular Interval aggregation, the number of timesteps per aggregation can vary for the following reasons:

- 1. Monthly aggregations will have different numbers of timesteps. Other irregular relationships between aggregation and timestep intervals are also possible.
- 2. The first aggregation will have fewer timesteps if the first timestep displayed in the SCT isn't at the beginning of a regular interval aggregation (with respect to the selected offset).
- 3. The last aggregation will have fewer timesteps if the last timestep displayed in the SCT doesn't fall at the end of a regular interval aggregation (with respect to the selected offset).

# 3.0 SCT concepts

#### 3.1 Numeric Values

Numeric Slot (time series) values are internally stored as double-precision floating point numbers. But values are presented in the SCT (and elsewhere in the RiverWare user interface) with a "**display precision**" set on each Slot. Display precision is a non-negative integer which specifies the number of fractional decimal digits (to which the internal value is rounded). The SCT uses a Slot's display precision for all data cells. Currently, the SCT does not provide the capability of altering a Slot's display precision value. (A Slot's display precision can be changed in the Slot's "Open Slot" dialog).

A Slot's values are displayed in its configured "**user units**". The SCT does not provide the capability of changing a Slot's user units. (They can be changed in the Slot's "Open Slot" dialog).

If a single value is selected, it is redundantly displayed with "**model precision**" in the <u>Toolbar Value Edit</u> field, where it can also be edited. Model precision isn't necessarily the full precision of the internal value (which may be represented in units which differ from the user units). Model precision is defined as having six (6) fractional decimal digits (and expressed in user units).

Slot values can be in an "**undefined**" state. Undefined values can be displayed as "**NaN**" (which stands for "Not a Number") or as blanks, depending on an SCT Configuration (<u>General Tab</u>).

#### 3.2 Slots and Slot Dividers

Either rows or columns (depending on the current <u>axis orientation</u>) correspond to RiverWare Slots and Slot Dividers.

**RiverWare Slots** are identified with a <u>fully qualified name</u> (including the name of the Simulation Object or Account or other entity the Slot is on) and an optional column number which the SCT attempts to match up with an actual Slot in the currently loaded RiverWare model. SCT Slot items for which a match cannot be found are indicated as disabled -- no data is shown, and no data can be provided by the user for such Slots. Properties associated with Slot items (within the SCT configuration) include:

- 1. Single-line Slot Text Label (used when Slots are shown as rows).
- 2. Multiple-line Slot Text Label (used when Slots are shown as columns).
- 3. Slot Column Width (in pixels) (used when Slots are shown as columns).
- 4. <u>Summary Function</u> for computing the value shown for Aggregates of timesteps within the particular Slot.

**Slot Dividers** are rows or columns (depending on the current <u>axis orientation</u>) which the user can place between (or above the first or after the last) Slot row or column. The user can <u>choose one particular background fill color</u> for all Slot Dividers.

- When Slot Dividers are shown as rows, they are tall enough for a line of text. In this orientation, the user can place text in the Slot Label field of the Slot Divider (row). When the SCT is unlocked, Slot Divider row text can be edited in-line by double-clicking in that field.
- When Slot Dividers are shown as columns, they are drawn as thick lines. In this orientation, text cannot be placed within the Slot Divider (columns).

In these two pictures, Slot Dividers are colored bright blue. Each picture shows two Slot Dividers:

- Picture: Vertical Timestep Axis Orientation (Slots and Slot Dividers are Columns)
- <u>Picture: Horizontal Timestep Axis Orientation</u> (Slots and Slot Dividers are Rows)

How To:

- Add or Remove Slots and Slot Dividers
- Move Slots and Slot Dividers

Previous Page

**Next Page** 

#### 3.3 Slot Names and Slot Labels

**Slot Names** are what RiverWare uses to symbolically refer to a particular Slot. Generally, the Slot Name includes the Simulation Object or Account which the Slot is on. The user cannot change a Slot's name within the SCT. (And Slots are not renamable in general. One exception is Slots defined on a Data Object, which can be renamed). In the SCT, the user doesn't enter a Slot Name (text) to refer to a Slot. Instead, Slots are picked using one of two different Slot Selectors. <u>Read more about Adding Slots and Slot Dividers to the SCT</u>.

**Slot Labels** are arbitrary text strings which the user can use to label a Slot within the particular SCT. There are actually two Slot Labels text strings associated with a Slot item: (1) a single-line text string for use when Slots are shown as rows, and (2) a (potentially) multiple-line text string for use when Slots are shown as columns. In the Horizontal Timestep Axis Orientation (where Slots are rows), a Slot Label can be edited in-line (if the SCT is unlocked). In either orientation, a Slot Label can be edited by Selecting the Slot (e.g. by selecting a data cell within the Slot), and choosing the SCT menu operation: "<u>Slots >> Set Label / Function ...</u>" (Again, the SCT must be unlocked).

Slot Labels are always visible within the SCT (as either row or column headers). The Slot Name for a Slot is shown in the Selection Info area (at the bottom of the SCT) if the current SCT selection includes only a single Slot.

In these two examples, one Slot is selected (by virtue of one of its timesteps being selected).

- Its Slot Label is "Hoover Energy"
- Its Slot Name is "LakeMeadHooverDam.Energy" (see bottom of SCT).

#### 3.4 Timesteps

The SCT supports Series Slots (including Agg Series Slots and Table Series Slots). These represent time series data -- an array of values representing measurements of one particular quantity at (roughly) equally spaced time intervals. [Technically "monthly" timesteps are not *equally spaced* -- those are supported too].

Only Slots with a **timestep interval** matching the RiverWare Model's <u>Run Control</u> timestep interval can be displayed in the SCT -- this applies to most Series Slots in a model.

However, the **timestep** *range* of Slots in an SCT (i.e. the contiguous range of timesteps for which values are defined on a particular Slot defined by the Slot's **begin time** and **end time**) do not have to match Run Control: SCT cells corresponding to a timestep on a Slot which is out of that Slot's defined range are just displayed as blank. A Slot's timestep range is automatically extended when the user enters a numeric value in a data cell which is out of that Slot's timestep range.

Conversely, the displayed timestep range of the SCT -- which is the model's current Run Control timestep range plus the indicated number of pre-simulation and post-simulation timesteps -- may not cover the complete timestep range of Slots displayed in the SCT. When this occurs, a special ornamentation (an upper-left or lower-right corner triangle) on the Slot's first and/or last cells indicate the presence of obscured (hidden) timestep values for that Slot. Read about How to Show Obscured Pre- and Post-Simulation Timesteps.

Within the SCT, timesteps are generally laid out in the opposite axis as Slots. The one exception to this is the <u>Aggregated View</u> (see next section) in <u>Horizontal Timestep Axis Orientation</u>, where timesteps within a single aggregation are laid out vertically, but the overall arrangement of timesteps is horizontal.

#### 3.5 Timestep Aggregation

For display (and certain data export) purposes only, groups of <u>timesteps</u> within each Slot can be aggregated and summarized as single numeric values within an SCT. Probably the most useful configuration for timestep aggregation is choosing an aggregation interval size larger than the timestep interval size, for example, a *weekly aggregation* of a *daily timestep* model. It's also possible to select a constant number of timesteps for each

Table of Contents

Next Page

aggregation. An SCT can support only one aggregation definition (interval our timestep count) at any given time. Read more about the <u>Timestep Aggregation Dialog</u>.

The SCT supports both non-aggregated and aggregated "views". In **non-aggregated views**, every data cell displays the value of exactly one timestep (of one Slot). **Aggregated views**, have two types of data cells: Detail Cells and (Aggregation) Summary cells. See the next section.

## 3.6 Detail Cells and (Aggregation) Summary Cells

Aggregated SCT views (see <u>Timestep Aggregation</u>) have two different types of data cells:

Detail Cells display the value of exactly one timestep (of one Slot), as do all cells in non-aggregated views.
 Summary Cells display the result of a particular <u>Summary Function</u> on the timesteps which make up a single timestep aggregation (on one Slot).
 In both <u>axis orientations</u>, Summary and Detail cells have the same relative arrangement: an aggregation's Detail Cells (showing each of the individual timesteps within the aggregation) are laid out immediately below the aggregation's single Summary cell. Also, the two types of cells are laid out in rows, i.e. Summary Rows and Detail Rows -- though the correspondence of those rows to the same Slots vs. the same timesteps differs in the two axis orientations.

In the aggregated views, Summaries are always shown and Details can be shown or hidden. (The non-aggregated views show only Details, without Summaries).

#### 3.7 Summary Functions

A distinct Summary Function can be selected for each Slot in an SCT. This selection is part of the SCT Configuration (i.e. not stored with the Slot in the RiverWare model). The function is applied to the set of timesteps within each <u>timestep aggregation</u> on the Slot. The result of the function, as applied to a particular timestep aggregation, is displayed in a <u>Summary cell</u>.

The following Summary Functions are supported.

- First value
- Nth value (particular 'n', e.g. 5th)
- Last value
- Sum
- Average
- Median
- Minimum
- Maximum

For the arithmetic functions, undefined values ("NaNs") are ignored.

Note that Median requires a sorting of values, so this can slow down the speed of SCT refreshes. If there is an even number of non-NaN values, the Median is defined as the average of the "middle two" values.

How To:

Change a Slot's Summary Function

# 3.8 Axis Orientation



Aggregated Horizontal Timestep Axis Orientation is the "classic view" supported by the old SC1. This is also the most complicated view: Overall, timesteps increase to the right (horizontally). But within a single timestep aggregation (for a set of rows of <u>detail cells</u> corresponding to a single slot), timesteps increase downward (vertically).

#### 3.9 Slot Selection

There are two distinct, unrelated senses of the idea of Slot Selection relative to the SCT.

When the user is trying to <u>add Slots</u> which exist in the currently loaded RiverWare model to the SCT, the user chooses (selects) such Slots via one of the Slot Selector dialog boxes. <u>Read more about Adding Slots and Slot</u> <u>Dividers to the SCT</u>.

Apart from that, once a Slot is represented within the SCT, the user will select certain data cells within the Slot, or the whole Slot row or column, to perform operations on the Slot, such as setting values or Flags. This is the more common sense of "selecting" a Slot in the SCT. For the user's purpose of referring to a Slot in the context of some operation, the selection of any number of cells within the Slot is sufficient. <u>Read more about Slot operations in the SCT Slots menu</u>.

## 3.10 Two Types of "Pasting"

As a "view" into a RiverWare model, an SCT isn't exactly a "spreadsheet." The primary intended uses of the SCT are:

- 1. to prepare a model with user-supplied constants (values and "Flags") for a model run.
- 2. to examine the results of a model run.

The **default paste operation** (Ctrl-V) (and the Paste Toolbar Button) pastes only "Input Semantics" values into the current selection. Values computed as a result of a model run are not pasted. Specifically:

- Input flagged values are pasted to the destination timesteps with the Input Flag
- The final timestep value of a Target Operation is copied to the destination with the Target Flag, and the Begin Target is pasted if an explicit Begin Target timestep was defined (but only if the entire Target operation was included in the copied selection).
- **Best Efficiency** ("B"), **Max Capacity** ("M") and **Drift** ("D") flagged timesteps in the copied ("source") selection are pasted as undefined ("NaN") values in the destination timesteps, but with the source flag.
- Other timesteps are cleared. That is, set to "NaN" with an Output Flag.

The "Edit >> Paste as Input" (Ctrl-N) operation pastes all defined (non-"NaN") values from the copied ("source") selection to the destination timesteps, assigning the Input Flag to those values. Undefined ("NaN") values from the copied ("source") selection are pasted as "NaN" / Output Flagged values in the destination timesteps.

How To:

- Copy a Single Value to Many Timesteps
- ▶ Copy Multiple Values
- Copy a "Timeslice" across all Slots
- Copy a Whole Slot
- Copy Data to the Clipboard (e.g. to Excel).

User Interface Technical Documentation Revised: January 13, 2004 **Previous Page** 

Next Page

# 4.0 How To -- SCT Configuration

### 4.1 Lock or Unlock the SCT Configuration

When the SCT is "locked," the following components of the SCT configuration cannot be changed:

- The list of Slots and Slot Dividers. So, Slots and Slot Dividers cannot be added, removed, or moved.
- Slot Labels and Horizontal Slot Divider Labels
- Slots' Summary Functions (for the Aggregated Views)

The SCT can be locked or unlocked by pressing the Toolbar Locked toggle button or the "<u>Edit >> SCT</u> <u>Configuration Locked</u>" menu toggle button.



#### 4.2 Add Slots and Slot Dividers

The SCT maintains a list of Slot Items (symbolic references to Slots, and Slot Dividers). These are laid out as rows or as columns, depending on the <u>axis orientation</u>.

To add Slots or Slot dividers, the SCT must be unlocked.

Only actual Slots which exist in the currently loaded RiverWare model can be added to an SCT. Slots to be added can be selected by the user through one of the two RiverWare Slot Selectors.

Slots Menu ...

Slots and Slot Dividers can be inserted into the SCT using the <u>"Slots" menu</u>:

- Before the <u>selected Slot</u>,
- After the selected Slot,
- At the end of the Slot / Slot Divider list.

For the purpose of determining the "insertion point" for an addes Slot, a "reference Slot" is regarded as "<u>selected</u>" if one or more timesteps within the slot are selected. The "Insert Before" and "Insert After"

			<u>Next Page</u>
Insert Before	⊳		
Insert After	$\triangleright$		Previous Page
<u>A</u> ppend	Þ	New <u>S</u> lots	Table of
		New <u>A</u> cct Slot	<b>Contents</b>
		New Slot <u>D</u> ivider	

operations are disabled if more than one reference Slot is selected -- unless the SCT is empty, in which case the insertion operations are unconditionally enabled.

#### 4.3 Remove Slots and Slot Dividers

To remove Slots or Slot dividers, the SCT must be unlocked.

Removing a Slot from the SCT does not remove it from the RiverWare model and does not effect the Slot's data.

Multiple Slots and Slot Dividers can be removed at any time. Those that are <u>selected</u> when the user operates the "<u>Slots >> Delete Slots / Dividers</u>" operation are removed from the SCT.

Slot Dividers are a bit more difficult to select than Slots since they don't have any associated data cells. It is necessary to select a Slot Divider in the Row or Column header.

#### 4.4 Move Slots and Slot Dividers

To move Slots or Slot dividers, the SCT must be unlocked.

Slots and Slot Dividers can be copied, cut, and pasted (inserted or appended) **within an SCT or between SCTs.** The data copy and paste operations (under the SCT Edit menu) are not related to the Slot and Slot Divider "moving" operations. Instead, the following operations under the SCT <u>"Slots" menu</u> are used:

Slots >> Copy Slots / Dividers Slots >> Cut Slots / Dividers Slots >> Insert Copied Slots / Divs Slots >> Append Copied Slots / Divs At least one Slot Item must be selected. At least one Slot Item must be selected. Exactly one Slot Item must be selected. No particular selection is required. The "**Cut Slots / Dividers**" operation immediately deletes the selected Slots. If there is not a subsequent "Insert Copied Slots / Divs" or "Append Copied Slots / Divs" operation, the Slot Items which were "Cut" are gone from the SCT.

The "Insert Copied Slots / Divs" operation inserts the previously "Copied" or "Cut" Slot Items immediately *before* the single selected Slot item.

The "**Append Copied Slots** / **Divs**" operation appends the previously "Copied" or "Cut" Slot Items to the end of the SCT's Slot Item list (after the last Slot row or after the last Slot column, depending on the <u>axis orientation</u>).

The cell ornamentation (crosshatch) displayed on the "copy data cell set" does not apply to the "Copy Slots / Dividers" operation. **No special ornamentation** is shown for the Slot items being copied.

There is no problem with having a **Slot represented redundantly** within an SCT (e.g. as a result of Inserting or Appending a Slot reference into the same SCT from which it was Copied). One reason the user may want to do this is needing to see two or more distinct <u>Summary Functions</u> (e.g. Sum and Average) for aggregates of a particular Slot.

**Previous Page** 

### 4.5 Change a Slot's Summary Function

Read about Summary Functions.

To change a Slot's Summary Function, <u>the SCT must be unlocked</u>. When the SCT is unlocked, there are **two ways** of changing a Slot's Summary Function.

(a) In the <u>Aggregated Horizontal Timestep Axis View</u>, if the Summary Function column in the Row Header Table is shown (see the <u>SCT Configuration Horizontal Time Tab</u>), the user can **double click the Slot's Summary Function field** to show an option menu with the available Summary Function choices.

To read more about **showing the Summary Function column** in the Aggregated Horizontal Timestep Axis View, see also: <u>How to Configure Row and Column Headers</u>

Next Page

(b) A Slot's Summary Function can also be changed by <u>selecting a</u> <u>single slot</u> and choosing the "<u>Slots >> Set Label</u> /<u>Function ...</u>" menu operation. This shows the dialog box shown here. The user can select a different choice from the Summary Function option menu.

- SCT Slot	Label / Function Configuration	Previous Page
LakeHavasuPa	rkerDam.Evaporation	Table of Contents
Row Label:	Parker Evaporation	
Column Label:	Parker .Evaporation	
Summary Fund	tion: Sum 🗵	
	OK Cancel	

#### 4.6 Show or Hide (Aggregation) Summaries

Read about Timestep Aggregation or about Detail Cells and (Aggregation) Summary Cells.

Summaries (Summary Cells) are always shown in the Aggregated Views, and not shown in the Non-Aggregated Views. To show or hide Summaries, just switch to the appropriate view in either of these ways:

I(a) Select one of the **detail modes** from the SCT <u>"TimeSteps" menu</u>:

- [] Show/Hide Details (Shows Summaries)
- [] Hide All Details (Shows Summaries)
- [] Show All Details (Shows Summaries)
- [] No Aggregation (Hides Summaries)

If the detail mode **Toolbar buttons** are shown (see the <u>Toolbar Button Configurations</u> on the Toolbar tab of the <u>SCT Configuration Dialog</u>), Summaries can be shown or hidden by selecting a detail mode using those buttons.

#### 4.7 Show or Hide Details

Read about <u>Timestep Aggregation</u> or about <u>Detail</u> <u>Cells and (Aggregation) Summary Cells</u>.

All Details (Detail Cells) and only Details are shown in the Non-Aggregated views. So **all Details** 



can be shown by selecting the "No Aggregation" detail mode either through the <u>"TimeSteps" menu</u> or with the detail mode Toolbar buttons, if they are shown (see above).

In the Aggregated Horizontal Timestep Axis Orientation View, each Summary Row corresponds to one Slot. So showing or hiding the details for a single Summary Row shows or hides the details for one Slot.

In the **Aggregated Vertical Timestep Axis Orientation View**, each **Summary Row** corresponds to **one Timestep Aggregation**. The Detail Rows under a Summary Row represent the individual timesteps within each timestep aggregation. Showing or hiding the details for a single Summary Row shows or hides the details for one Timestep Aggregation across all Slots (where each Slot is in a separate column).

In the **Aggregated Views in "Show/Hide Details" (Optional Details) detail mode,** Details (Detail Cells), are showable and hideable independently for each Summary Row the three ways:

(a) by using a treeview control (rightward or downward pointing triangle) on the left side of a Summary Row.

(b) by entering Ctrl-D when one or more cells are selected. This sets the detail open/closed state to the opposite of the first Slot or timestep aggregation represented in the cell selection.

Note: In this detail mode, ALL Details can be shown or hidden by selecting a whole column and entering Ctrl-D.

(c) If the following toggle on the <u>General Tab</u> of the <u>Configuration Dialog</u> is on, then double clicking in a cell toggles the detail open/closed state corresponding to the cell. (If this toggle is off, then double clicking in a data cell starts an in-cell modify-edit operation for the value in that data cell).

[x] Double Click Data Cell Toggles Detail Rows

The user can show or hide **ALL Details** (Detail Cells) by selecting the "Show All Details" or "Hide All Details" **detail modes** from the SCT <u>"TimeSteps" menu</u> or the corresponding Toolbar Buttons if they are shown. Selecting

these modes does not effect the individual Summary Row detail open/closed states in the "Show/Hide Details" detail mode.

# 4.8 Configure Row and Column Headers

Since the correspondence between Slots and Times with Rows and Columns depends on the <u>axis orientation</u>, the types of information which can be shown in Row and Column headers depends primarily on the selected axis orientation.

The **visibility** of certain **row header columns** and **types of information in data column headers** is controlled separately for the two axis orientations through the use of two corresponding tabbed panes in the <u>Configuration</u> <u>Dialog</u>.

- Horizontal Time Tab
- Vertical Time Tab

In the **Horizontal Timestep Axis Orientation** only (where rows correspond to Slots), the following two in-cell edit operations are supported when the <u>SCT is unlocked</u>:

- Editing a Slot Row Label (by double-clicking).
- Changing a Slot's Summary Function (by double-clicking on the Slot's Summary Function -- if the Summary Function column is shown -- read more). This is available only in the Aggregated (Horizontal) view since Summary Functions are relevant only for the Aggregated views.

# 4.9 Adjust Column Widths

Columns can be manually resized by dragging the dividers between the **column headers.** The following four operations are also available in the SCT <u>"View" menu</u>, Each is described below.

View >> Set Data Column Widths View >> Fit Data Columns to Headers View >> Fit Data Columns to Data View >> Fit Row Header Column

"View >> Set Data Column Widths" is used to set all Data Columns to the width of the single selected column. The best way to use this is to follow these steps:

- 1. Resize one of the data columns manually to the desired width by dragging the column header divider on the right side of the column.
- 2. Select the column by clicking in the middle of its column header
- **3.** Select "View >> Set Data Column Widths." This resized all of the data columns to the width of the selected column.

"View >> Fit Data Columns to Headers" resizes all of the data columns to fit the text in the corresponding column headers.

"View >> Fit Data Columns to Data" resizes all of the data columns to fit the widest numeric value displayed in the corresponding columns.

"View >> Fit Row Header Column" resizes the columns in the Row Header Table to fit the widest content in the corresponding columns. This operation also adjusts the "splitter" between the Row Header Table and the SCT Data Table to exactly fit the Row Header Table.

Previous Page

Next Page

Many, but not all of the column width adjustments are preserved when an SCT is saved and reloaded.

# 4.10 Change Colors

Colors can be modified from the Flags Tab or the Color Tab of the SCT Configuration Dialog:

- 1. From the SCT Menu, press "<u>View >> SCT Configuration ...</u>"
- Press the Flags Tab to modify Flag Colors or the Color Tab to modify other colors ... 2.

Pressing one of the Color buttons brings up a Qt Color Chooser. Only one Color can be changed at a time. To see **Next Page** the effect of the new chosen colors in the SCT, press Apply in the SCT Configuration Dialog. To accept the changes, press OK. To cancel all changes since the bringing up the SCT Configuration Dialog, press Cancel.

Read about saving the new settings as default, or restoring the default color settings.

**Previous Page** 

#### 4.11 Change Ornamentations

Various graphical ornamentations can be configured through settings in the <u>SCT Configuration Dialog</u>. These settings are represented on different tabbed panes in that dialog ...

- <u>General Tab</u> Toggle: **Display "NaN."** If this is disabled, undefined numeric values are shown as blanks (empty cells).
- General Tab Toggle: Show Grid
- <u>General Tab</u> Toggle: **Target Operations: Full Ornamentation.** This should generally be enabled. If it is turned off, only the final timestep of Target Operations are shaded (solid with the configured <u>Target color</u>). This was introduced for very large models where screen refreshes are seen to be very slow.
- <u>General Tab</u> Toggle: **Crosshatch Read Only Cells** (e.g. Expression Slots and certain Accounting System Slots). Non-editable values are shaded with a crosshatch of a <u>configurable color</u>.
- <u>Horizontal Time Tab</u> Toggle: **Draw Weekend Divider Columns.** This enables the drawing of thick lines between pairs of timesteps which straddle a Friday-to-Saturday or Sunday-to-Monday boundary in the Horizontal Timestep Axis Orientation Views. If enabled, Weekend Divider columns are drawn with the configurable Weekend Divider color.
- <u>Horizontal Time Tab</u> Toggle: **Draw Month Divider Columns.** This enables the drawing of thick lines between pairs of timesteps which straddle the first and last timesteps of calendar months in the Horizontal Timestep Axis Orientation Views. If enabled, Month Divider columns are drawn with the <u>configurable Month Divider color</u>.
- ▶ Vertical Time Tab Toggle: Draw Weekend Divider Rows. This enables the drawing of thick lines between pairs of rows which straddle a Friday-to-Saturday or Sunday-to-Monday boundary in the Vertical Timestep Axis Orientation Views. In the *Aggregated* Vertical Time View, if the weekend boundary falls between Detail Rows which are hidden, then the divider is drawn as a **dotted** line immediately below the corresponding Summary Row. If enabled, Weekend Divider rows are drawn with the <u>configurable Weekend Divider color</u>.
- Vertical Time Tab Toggle: Draw Month Divider Rows. This enables the drawing of thick lines between pairs of timesteps which straddle the first and last timesteps of calendar months in the Vertical Timestep Axis Orientation Views. In the Aggregated Vertical Time View, if the month boundary falls between Detail Rows which are hidden, then the divider is drawn as a dotted line immediately below the corresponding Summary Row. If enabled, Month Divider rows are drawn with the configurable Month Divider color.
- Summary Tab: Show Timestep Flag Colors exclusive toggle buttons. This selects the conditions under which Flag values are indicated with background shaded regions in Summary Cells. Generally, "Always" is a good choice. This was introduced for two reasons: (1) to experiment with ways of distinguishing Summary Rows from Detail Rows, and (2) to support quicker screen refreshing with large aggregations -- to the extent that turning off this ornamentation accomplishes that.
- Flags Tab: Custom colors to indicate Slot timestep Flag values with background color shading. All Flag colors should be chosen to contrast with the Foreground Text color.
- <u>Color Tab</u>: Other custom ornamentation colors.

19

Previous Page

Next Page

#### 4.12 Change the Aggregation Interval

The Aggregation Interval can be changed using the SCT<u>Timestep Aggregation Dialog</u>. This dialog is shown through the SCT menu operation: "<u>TimeSteps >> Aggregation Config</u>..."

### 4.13 Show Obscured Pre- and Post-Simulation Timesteps

The time range of the SCT is dependent on:

- 1. The time range of the loaded RiverWare model's Run Control
- 2. The number of pre-simulation and post-simulation timesteps configured for the SCT.
   Next Page

   It is very possible that the time range of any particular Slot starts before the first timestep shown in the SCT or ends after the last timestep shown in the SCT. When this occurs, a small corner triangle is displayed in the first or last Summary cell and the first or last Detail cell in that Slot. If such a Detail Cell is selected, the number of "obscured timesteps" is shown in the Selection Info Area at the bottom of the SCT.
   Previous Page

   The only way to show a Slot's obscured timesteps is to extend the time range of the SCT to cover the Slot's full
   Table of Contents

time range. This is done in the <u>General Tab</u> of the <u>SCT Configuration Dialog</u>. Observe the number of obscured timesteps (as described above), and increase either the "Pre-simulation Timesteps" count or "Post-simulation Timestep" count by the required amount.

A Series Slot's full range can also be displayed in that Slot's **"Open Slot" dialog** (i.e. *instead of* viewing the full Slot in the SCT). Unfortunately, the initial version of the new SCT doesn't support directly showing that dialog for a Slot. The user would have to start at the RiverWare workspace, open the Slot's Object's "Open Object" dialog, and "drill down" to the Slot's "Open Slot" dialog (possibly via the Object's Account Tab if the Slot is on an Account).

#### 4.14 Use the Default Configuration

A single SCT Configuration -- without a Slot Item list -- can be saved as a "default" SCT configuration. The default configuration is supported with these menu operations (from the SCT <u>"View" menu</u>) ...

#### View Menu ...

Defaults >	Apply Default Settings	
	Save Current Settings as Default	Next Page
	Clear Default Settings	
"Apply Default Settings" applies the saved Default Settings to	o the current SCT. The SCT's Slot Item list (Slot	Previous Page
references and Slot Dividers) is not effected. "Save Current Settings as Default" saves the SCT configurat	ion (without the Slot Item list) as the Default	Table of Contents

"Clear Default Settings" restores the Default Settings to the factory defaults. The current SCT is not effected.

The Default Configuration is used:

configuration.

- when creating a new SCT (see <u>Opening an SCT</u>);
- when migrating an Old (Version 1.0) SCT to the new SCT;
- when explicitly applying the Default Settings to the current SCT (via the "<u>View >> Defaults >> Apply Default Settings</u>" menu operation described <u>above</u>).

# 5.0 How To -- Model Data Operations

### 5.1 Set a Single Value

Generally, data cells are directly editable -- just start typing. The first typed digit keys replace the original value in the cell.

If the user wants to *modify* the value (e.g. correct a digit in the middle of a number), there are two options:

- 1. Click in the cell, and then click in the Toolbar Value Entry field (at the top of the SCT) and edit the number there, or
- 2. If the "Double Click Data Cell Toggles Detail Rows" option is turned **off** (<u>see the Configuration Dialog</u>, <u>General Tab</u>), then double clicking in the cell starts an in-cell modification edit.

Entering "n" or "nan" in either upper or lower case causes the value and Flag to be cleared (i.e. set to the Output Flag).

To abort an edit, press the Escape ("Esc") key.

As soon as **"keyboard focus" leaves the cell** (e.g. by pressing the "Enter" key or the "Tab" key, or by clicking another cell), and if the entered text represents a valid number (or is "N" or "NaN") the entered value is assigned to the Slot timestep. If the text is not valid then the cell is restored to its original value.

If a valid, defined (non-"NaN") value is entered, in addition to the numeric value being assigned to the Slot timestep, generally the **Input Flag** is set. The exception to this is that cells which initially have the **Target Flag** set will retain that Flag.

The full precision typed in by the user -- within the limits of a "double precision floating point number (about 13 decimal digits) -- is assigned to the underlying Slot timestep, even though the displayed precision is generally limited.

There are a few types of Slots which are **not editable.** This is true of Expression Slots and certain Accounting System Slots. Pressing a digit key when a read-only data cell has keyboard focus has no effect. If the Read-Only ornamentation is enabled (see the Configuration Dialog, General Tab), read only data cells will be "cross-hatched" with a user configurable "Read-Only" color.

The SCT Lock does not prevent modifications to Slot data.

<u>Next Page</u>

**Previous Page** 

#### 5.2 Set Multiple Values

When multiple data cells are selected (e.g. by dragging with the left mouse button, or by shift- or control-clicking data cells with the right mouse button), the most recently selected cell is ornamented as the "active cell" (with normal background shading and a heavy cell border) rather than as "selected" (with reverse-color background shading). Initiating and completing an edit of the active cell results in setting the entered value on each cell of the entire selection. In all other ways, editing the active cell within a multiple-cell selection behaves similarly to the setting of a single value.

The multiple cell selection can include timesteps from Slots having different unit types (e.g. Flow and Area) -- it's up to the user to insure that the multiple-value setting operation makes sense.

Selecting a <u>Summary Cell</u> is equivalent to selecting all of the corresponding Detail Cells, so an edit of a Summary <u>Next Page</u> Cell is implicitly a multiple-value edit operation.

A special operation which also sets multiple values is "<u>Edit >> Interpolate</u>." This operation is active only if:

#### **Previous Page**

Table of

**Contents** 

- 1. all selected cells are within a single Slot, and
- 2. both the chronologically first and last timesteps have defined (non-"NaN") values.

**"Edit >> Interpolate"** sets all timesteps between the first and last timesteps to linearly interpolated values between the first and last timestep values in the **standard units** for the Slot, and assigns the Input Flag to those values. Note that the standard units for "per time" values (e.g. flow values) are never "per month," so the potential undesired effect on the interpolation function due to the different amounts of time represented by different months is avoided.

#### 5.3 Clear Values

All editable values can be cleared by selecting them and pressing the **"Del" (delete) key**. This operation is also available as a menu operation: "Edit >> Clear Values".

When a value is cleared:

- 1. Its value is set to "NaN"
- 2. Its Flag is set to the Output Flag

Two variants of a related function also result in the clearing of values:

Edit >> Clear Outputs >> within Selection >> whole SCT



"Clear Outputs" clears values which would generally be computed during a model run. Timesteps with the following Flags are set to "NaN":

#### Output ("O"), Best Efficiency ("B"), Max Capacity ("M") and Drift ("D")

The SCT Lock does not prevent the clearing of Slot data.

#### 5.4 Set a Flag

Flags are properties associated with individual Slot timesteps which are generally depicted in the SCT using background color shading.

The user can set the Input ("I") and Output ("O") Flags on all editable Slot timesteps, with the provision that the Input Flag can be set only on timesteps with a defined (non-"NaN") value. Other Flags can be set only on certain Slots. The <u>Target Operation</u> -- which sometimes involves coordinating *pairs of* internal Flags on different timesteps -- is discussed more in the next section.

The Flag Set operations are available in the <u>Edit menu</u>, and as Toolbar Buttons which can be optionally shown or hidden, depending on settings in the <u>Configuration Dialog</u>, <u>Flags Tab</u>. These operations are also available as keyboard accelerators:

("I")	Input	Ctrl+I	
("O")	Output	Ctrl+O	
("T")	Target	Ctrl+T	Previous Page
("B")	Best Efficiency	Ctrl+B	
("M")	Max Capacity	Ctrl+M	<b>T</b> .1.1
("D")	Drift	Ctrl+Shift+~	lable of
("S")	Surcharge Release	Ctrl+S	Contents
("G")	Regulation Discharge	Ctrl+G	

If the current cell selection includes any Slot on which a particular Flag is **not supported**, the Flag Set operation for that Flag is disabled. The disabled menu operations are indicated as "grayed-out". The Flag Set Toolbar Buttons are indicated as being active with a black border. (Those buttons lacking a black border are disabled).

The SCT Lock does not prevent the setting of Flag values on Slot timesteps.

#### 5.5 Set a Target Operation

A Target Operation can be applied to a single timestep, or to a contiguous range of timesteps on the following types of Slots:

- 1. Reservoir, Storage
- 2. Reservoir, Pool Elevation

If the Target Operation is applied to a single timestep (by <u>setting the Target Flag</u> on a single selected timestep), then that timestep is regarded as the final Timestep of the Target Operation -- and the **first timestep is implied** by the Flag values in the preceding timesteps. (This implicit Target Begin timestep is determined during the model run). The Set Target Flag operation is enabled only if the value for that single timestep is defined (non-"NaN").

If the Target Operation is applied to a range of timesteps within a Slot (by selecting a set of data cells and operating the <u>set Target Flag operation</u>), then the earliest timestep is assigned the Target Begin Flag and the latest timestep is assigned the Target (End) Flag. The latest timestep must have a defined (non-"NaN") value. In this sort of Target Operation (with an explicitly defined Target Begin timestep), the final Target timestep is indicated with a solid background fill color (of the <u>user configured Target Color</u>), and the previous timesteps have only a thick border of that color.

**Next Page** 

#### 5.6 Copy a Single Value to One or Many Timesteps

A single timestep value can be copied to one or more timestep values on a Slot having the same unit type with the following four steps. This works both within a single SCT, or between SCTs. Steps 3 and 4 (pasting) can be repeated any number of times.

- 1. Select (click in) the source cell (a detail cell, or a data cell in a non-aggregated view -- see Note-1, below).
- 2. Perform the copy operation in one of three ways:

  (a) press Ctrl+C
  (b) select the "Edit >> Copy" menu operation
  (c) press the "Copy" Toolbar Button

  The source cell will be marked with the "Copy Set Crosshatch" of a <u>user configured color</u>.
- **3.** Select (click in, and optionally drag) the **destination cell(s)**.
- 4. Perform the **paste operation** in one of these ways:
  - (a) press Ctrl+V or Ctrl+N
    (b) select the "Edit >> Paste" or "Edit >> Paste as Input" menu operation
  - (c) press the "Paste" Toolbar Button

All but the "Paste as Input" and "Ctrl+N" operations perform the **default Paste** operation which pastes only "input semantics" values and Flags -- and clears all the other destination timesteps. <u>Read more about</u> the two types of paste operations.

The paste operations will be enabled only if all of the destination cells are of the **same unit type** as the source cell, and they are all editable (i.e. not "read-only"). See note-2, below, about the handling of real values.

Note-1: If the source cell is a <u>summary cell</u> (in an aggregated view), then generally this is equivalent to selecting multiple values (multiple timesteps), which would initiate the copy of multiple values -- <u>discussed in the next</u> <u>section</u>. One exception to this is a summary cell of the first or last timestep aggregation which happened to have only a single timestep, in which case the type of copying described in this section ("Copy a Single Value") would apply.

Note-2: If the paste operation is enabled, then values which are pasted (<u>depending on the type of paste operation</u>) are assigned to the destination timesteps using **standard units**. This means that if the display units of the source and destination Slots are different (e.g. cubic feet per second vs. cubic meters per second), then the pasted values will *appear to be different* from the source value (in the source cell). The quantities which those values represent will be the same.

**Next Page** 

**Previous Page** 

Table of

**Contents** 

#### 5.7 Copy Multiple Values

A set of timesteps within a single Slot can be copied to another "time" within the same Slot, or to a different Slot having the same unit type. This works both within a single SCT, or between SCTs. Steps 3 and 4 (pasting) can be repeated any number of times.

- 1. Select (click in, and optionally drag) the **source cells**. This can include all sorts of data cells, including summary cells. The set of timesteps indicated in the selection do not have to be contiguous -- the relative offsets between them will be remembered.
- 2. Perform the **copy operation** in one of three ways: (a) press Ctrl+C

(b) select the "Edit >> Copy" menu operation (c) press the "Copy" Toolbar Button The source cells will be marked with the "Copy Set Crosshatch" with a user configured color.

Previous Page 3. Select (click in) a single cell to identify the earliest destination timestep. This can be any sort of data cell, including a summary cell. If a summary cell is selected, the implied earliest timestep is the first timestep within the timestep aggregation represented by that summary cell.

Alternate operation: Instead of selecting a single cell to identify the earliest destination timestep, if the user selects a single whole Slot, the implied destination timestep is the earliest timestep from the source timestep selection. This is accomplished differently in the two axis orientations:

In Horizontal Timestep Axis Orientation (where rows correspond to Slots), selecting a Slot is done by clicking in a **row tab** at the extreme left side of a summary row, or any data row in the nonaggregated view. Or -- if the SCT is locked -- by clicking in any Row Header field within a summary row -- or in any row in the non-aggregated view.

In Vertical Timestep Axis Orientation (where columns correspond to Slots), selecting a Slot is done by clicking is a column header.

- **4.** Perform the **paste operation** in one of these ways:
  - (a) press Ctrl+V or Ctrl+N
  - (b) select the "Edit >> Paste" or "Edit >> Paste as Input" menu operation (c) press the "Paste" Toolbar Button

All but the "Paste as Input" and "Ctrl+N" operations perform the **default Paste** operation which pastes only "input semantics" values and Flags -- and clears all the other destination timesteps. Read more about the two types of paste operations.

If there are timestep "gaps" in the source timestep selection, those gaps are honored by the paste operation. That is, the corresponding gaps in the destination will not be effected.

The paste operations will be enabled only if the selection includes cells from only one Slot. Pasting of defined values is performed using **standard units.** (Read more about that in note-2, in the "Copy a Single" Value" section).

**Next Page** 

#### 5.8 Copy a "Timeslice" across all Slots

A set of contiguous timesteps across all Slots within an SCT can be copied to other timesteps within the same SCT. Steps 3 and 4 (pasting) can be repeated any number of times.

1. Select (click in, and optionally drag) the source timesteps.

In **Horizontal Timestep Axis Orientation** (where columns are timesteps or timestep aggregations), this is done by clicking and dragging in the **column headers.** 

In **Vertical Timestep Axis Orientation** (where rows correspond to timesteps or timestep aggregations), this is done by clicking or dragging in the **row tabs** at the extreme left side of each row.

Next Page 2. Perform the **copy operation** in one of three ways: (a) press Ctrl+C (b) select the "Edit >> Copy" menu operation (c) press the "Copy" Toolbar Button **Previous Page** The source timestep data cells will be marked with the "Copy Set Crosshatch" with a <u>user configured</u> <u>color</u>. Table of 3. Select (click in) a timestep row or column (as in step 1, above) to identify the earliest destination **Contents** timestep. 4. Perform the **paste operation** in one of these ways: (a) press Ctrl+V or Ctrl+N (b) select the "Edit >> Paste" or "Edit >> Paste as Input" menu operation (c) press the "Paste" Toolbar Button

All but the "Paste as Input" and "Ctrl+N" operations perform the **default Paste** operation which pastes only "input semantics" values and Flags -- and clears all the other destination timesteps. <u>Read more about the two types of paste operations</u>.

#### 5.9 Copy a Whole Slot

The series data of a whole Slot can be copied to another Slot in the same SCT or to a different SCT. Steps 3 and 4 (pasting) can be repeated any number of times.

1. Select a source Slot.

In **Horizontal Timestep Axis Orientation** (where rows correspond to Slots), this is done by clicking in a **row tab** at the extreme left side of a summary row, or any data row in the non-aggregated view. Or -- if the SCT is locked -- by clicking in any **Row Header field** within a summary row -- or in any row in the non-aggregated view.

In Vertical Timestep Axis Orientation (where columns correspond to Slots), this is done by clicking is a column header.

- 2. Perform the copy operation in one of three ways:
  - (a) press Ctrl+C
  - (b) select the "Edit >> Copy" menu operation

(c) press the "Copy" Toolbar Button

The source timestep data cells will be marked with the "Copy Set Crosshatch" with a <u>user configured</u> <u>color</u>.

3. Select (click in) a cell to identify the destination Slot and earliest destination timestep.

*Alternate operation:* Instead of selecting a single cell to identify the earliest destination timestep, if the user selects a **single whole Slot**, the implied destination timestep is the earliest timestep defined in the source Slot (regardless of the time range shown in the SCT). This is accomplished differently in the two axis orientations, as described in step 1, above.

- 4. Perform the **paste operation** in one of these ways:
  - (a) press Ctrl+V or Ctrl+N
  - (b) select the "Edit >> Paste" or "Edit >> Paste as Input" menu operation
  - (c) press the "Paste" Toolbar Button

All but the "Paste as Input" and "Ctrl+N" operations perform the **default Paste** operation which pastes only "input semantics" values and Flags -- and clears all the other destination timesteps. <u>Read more about the two types of paste operations</u>.

**Previous Page** 

Table of

**Contents** 

# 5.10 Copy Data to the Clipboard (e.g. to Excel).

It is possible to copy the numeric values displayed in an SCT to the System Clipboard -- and subsequently paste those values into another application, e.g. Microsoft Excel or other spreadsheet

This operation is more similar to the <u>Print Selection operation</u> than to the other Copy operations. Data is copied with the displayed units, and without reference to units, (but optionally with a greater precision).

To copy data to the system clipboard:

1. Make any data cell selection in the SCT. For the purposes of this operation, the minimum enclosing geometric (not chronological) rectangle around the selection is implied. In the aggregated views, summary rows are included only if all of their subordinate detail rows are included.

2. Select the menu operation "<u>Edit >> Export Copy ...</u>" The "Export to Clipboard" dialog box is shown. (See picture).

**3.** Select "Display" or "Model" Data Precision, and whether undefined values should be pasted as "NaN" (or as a blank). Then press the "Copy" button.

**4.** In the other application (e.g. Excel), perform a paste operation (from the system clipboard). (Note: the SCT does not yet support this type of paste).

**Clipboard data format:** ASCII-encoded decimal numeric values (or "NaN" for undefined values -- if selected) within a row are separated with Tab characters. Rows are separated with New Line characters.

Export to Clipboard	
6 rows, 3 columns	
Data Precision	
Display	<u>Next Page</u>
O Model	
✓ Show NaN	Previous Page
Copy Cancel	<u>Table of</u> <u>Contents</u>

# 6.0 How To -- Printing, Plotting, Exporting Data

# 6.1 Printing

The graphical depiction of the SCT, or a subset of the SCT, can be printed. From the SCT, only the Row Header Table and SCT Data Table (with column headers) are included. The printed-page header and footer contains some information about the SCT and RiverWare model.

There are three "File >> Print" menu operations:

"File >> Print >> Selection" "File >> Print >> Page" "File >> Print >> Full SCT"

The "Print Selection" operation prints the minimum enclosing rectangle around the selection. In the aggregated views, summary rows are included only if all of their subordinate detail rows are included. This is similar to the <u>Copy Data to Clipboard</u> operation.

The selection ornamentation (reverse colors) is shown only in the "Print Page" and "Print Full SCT" operations.

## 6.2 Plotting

The full defined time range of Slots indicated with the current SCT selection are shown as Plots (on the screen) when the user selects the plot operation -- even if the Slot selection is indicated with just one or a few cells (timesteps) within Slots. Plotting is enabled only if no more than two unit types are represented within the Selection.

A Plot of the selected Slots can be shown either by:

- 1. Selecting the "<u>Slots >> Plot Slots ...</u>" menu item, or
- 2. Clicking the Plot Toolbar Button

#### 6.3 Exporting Data

The initial release of the SCT (2.0) does not support exporting data to files. But see the <u>Copy Data to Clipboard</u> operation.

Next Page

**Previous Page** 

<u>File</u> <u>Edit</u> Slots	SCT bhops1.sct (bhop							
TimeSteps View Run	FileEditSlotsTimeStepsViewRunImage: State of the state o							

#### 7.1 File Menu

The SCT File menu supports the following operations.

**"Load SCT"** allows the user to load a different SCT Configuration file into the particular SCT.

If an old SCT (1.0) SCT File is selected by the user, it is automatically migrated to the new SCT format (just for this SCT session, unless the SCT is resaved). The user is not asked if this should be done, unlike <u>opening</u> an old SCT File from the RiverWare workspace where the user is given the option of opening an old SCT using the old SCT dialog.

**"Save SCT"** and **"Save SCT As ..."** save the SCT's current configuration as an SCT File. "Save SCT" is enabled only if the SCT has a name (i.e. if it was opened from an SCT File, or if it is a new SCT for which a "Save SCT As ..." operation has already been performed).

**"Save Model"** and **"Save Model As ...**" perform the same operations as the "Save" and "Save As ..." operations in the RiverWare workspace. They don't effect the SCT, nor do they cause the SCT configuration to be saved.

The **"Print"** operations are described in the "<u>How to Print</u>" section.

"Close Window" closes the SCT. This does not automatically save the SCT's configuration.

32

**Next Page** 

**Previous Page** bhop Table of **Contents** File Edit Slots Time Steps Load SCT ... Save SCT Save SCT As ... Save Model Save Model As ... Print Selection **Close Window** <u>Page</u>

Full SCT

#### 7.2 Edit Menu

The SCT Edit menu supports the following operations.

The behavior of the Copy / Paste operations depend on the nature of the current selection within the SCT. Read more in these sections:

> <u>Copy a Single Value to One or Many</u> <u>Timesteps ... Copy Multiple Values</u> ... <u>Copy a "Timeslice" across all Slots</u> ... <u>Copy a Whole Slot</u>.

The difference between the **default Paste** operation and **"Paste as Input"** is described in the "<u>Two Types of Pasting</u>" section.

"Export Copy ..." is described in the "Copy Data to the Clipboard (e.g. to Excel)" section.

"Clear Outputs" and "Clear Values" are described in the "<u>How to Clear Values</u>" section.

The various Flag setting operations are described in the "<u>Set a Flag</u>" and "<u>Set a Target Operation</u>" sections.

**"Interpolate"** is a special function described at the end of the "<u>Set Multiple</u> <u>Values</u>" section.

The **"SCT Configuration Locked"** toggle is described in the "Lock or Unlock the SCT Configuration" section.

SCT bhoj	os1.sct (bhop	
<u>E</u> dit <u>S</u> lots <u>T</u> imeSteps	<u>⊻</u> iew <u>R</u> un	
<u>С</u> ору	Ctrl+C 80	
<u>P</u> aste	Ctrl+V	
Paste as I <u>n</u> put	Ctrl+N	
Export Copy		
Clear Outputs		<u>P</u>
Set to <u>I</u> nput	Ctrl+I	
Set to <u>O</u> utput	Ctrl+O	
Clear <u>V</u> alues	Del	
Target Operation	Ctrl+T	
Clear Target Operation		
<u>B</u> est Efficiency	Ctrl+B	
<u>M</u> ax Capacity	Ctrl+M	
<u>D</u> rift	Ctrl+Shift+~	
Surcharge Release	Ctrl+S	
<b>Regulation Discharge</b>	Ctrl+G	
Interpolate		
SCT Configuration Loci	ked	

Next Page

Previous Page

#### 7.3 Slots Menu

The SCT Slots menu supports the following operations.

"Plot Slots ..." is described in the "Plotting" section.

**"Enable Dispatching"** and **"Disable Dispatching"** set the dispatching state of the Simulation Objects containing the current SCT Slot selections. Slots on a Simulation Object with dispatching disabled are indicated with a crosshatch (<u>of a configurable color</u>) on Slot Labels in the Row Header Table (in Horizontal Timestep Axis Orientation only).

**"Insert Before," "Insert After,"** and **"Append"** are described in the "<u>How to Add Slots and Slot</u> <u>Dividers</u>" section.

The other **"Copy," "Cut", "Insert,"** and **"Append"** operations are described in the "<u>Move Slots and Slot</u><u>Dividers</u>" section.

**"Delete Slots / Dividers"** is described in the "<u>Remove Slots and Slot Dividers</u>" section.

SCT bhops	s1.sct (bho	
<u>S</u> lots <u>Time Steps</u> <u>y</u>	<u>v</u> iew <u>R</u> un	
<u>P</u> lot Slots	Ctrl+P	
Enable Dispatching		
<u>D</u> isable Dispatching		
Set <u>L</u> abel / Function		
Insert Before	$\triangleright$	
Insert After	$\triangleright$	
Append	$\triangleright$	
<u>R</u> eassign Slot		
Copy Slots / Dividers	s	
Cut Slots / Dividers		
Insert Copied Slots / Divs		
Append Copied Slots / Divs		
Delete Slots / Dividers		

## 7.4 TimeSteps Menu

The SCT TimeSteps menu supports the following operations.

"Aggregation Config ..." shows the SCT Timestep Aggregation Dialog".

The "Show/Hide Details," "Hide All Details," "Show All Details," and "No Aggregation" exclusive toggle buttons select the SCT's Detail Mode. The first three choose the Aggregated View of the currently selected Axis Orientation (see next item), and "No Aggregation" shows the corresponding Non-Aggregated View. These selections are described in the "Show or Hide (Aggregation) Summaries" and "Show or Hide Details" sections.

The "Axis Orientation" selections choose between Horizontal Timestep Axis Orientation ("classic") and Vertical Timestep Axis Orientation (new with SCT 2.0). These are described in the "Axis Orientation" section.



Table of **Contents** 

# TimeSteps Menu ...



#### 7.5 View Menu

The SCT View menu supports the following operations.

**"SCT Configuration ..."** shows the SCT <u>Configuration Dialog</u>.

**"Toggle Row Details"** is described in the "Show or Hide Details" section.

**"Set Data Column Widths"** and the various "Fit Column" operations are described in the "<u>Adjust Column Widths</u>" section.

The **"Defaults"** operations are described in the "<u>Use the Default Configuration</u>" section.

The various **"Page"** operations scroll the SCT window in the indicated direction. These will generally be accessed via the indicated keyboard accelerators, but are included in this menu to document their implementation.

The **"Next Slot"** and **"Previous Slot"** operations move the active cell to the next or previous Slot.

**"Refresh"** shouldn't be necessary if the SCT is implemented correctly, but is included to help diagnose refresh problems, etc.

# ps1.sct (bhops.mdl.gz)

View. Run SCT Configuration ... Toggle Row Detail Ctrl+D Set Data Column Widths Fit Data Columns to Headers Fit <u>D</u>ata Columns to Data Fit Row <u>Header</u> Columns Defaults 123 Page Up PgUp Page Down PgDown Page Left Alt+PgUp Alt+PgDown Page Right Next Slot Tab Previous Slot Shift+Tab <u>R</u>efresh Ctrl+F

Next Page

Previous Page

#### 7.6 Run Menu

The SCT Run menu supports the following operations.

**"Run Control Dialog ..."** shows the RiverWare Run Control Dialog (also pictured here). The time range of the SCT is based on the time range specified in the Run Times section of this dialog. Read more in the "<u>Timesteps</u>" section.

**"Start Run ..."** initiates a model run using the Controller and Run Times indicated in the Run Control dialog.



# 8.0 Configuration Settings

General ... Horizontal Time ... Vertical Time ... Toolbar ... Summary ... Flags ... Color



#### Next Page

#### 8.1 General Tab

The SCT Configuration Dialog is shown through the use of the SCT "<u>View >> SCT</u> <u>Configuration ...</u>" menu operation.

The "Pre-" and "Post-simulation

**Timesteps''** integer spinner values are used in the determination of the SCT's time range. The indicated number of timesteps are added to the RiverWare model's <u>Run Control</u> time range. Read more in the "<u>Timesteps</u>" section.

The **various display options** in the middle area are described in the "<u>Change</u> <u>Ornamentations</u>" section. The following two settings are **not supported:** 

"Show Slots not present in model" (such Slot items are always shown, but are grayed out and do not show any data).

"Crosshatch Pre- and Post-Simulation Timesteps" - not implemented.

#### The "Double Click Data Cell Toggles

**Detail Rows**" setting determines the behavior of double clicking in the SCT Data Table. Turning this option on replaces the

SCT Configuration		
General	Horz Time   Vert Time   Toolbar   🛃 .	
General Settings		
Pre-simulation Timesteps: 4		
Post-simulation Timesteps: 0		
Show Slots not present in model		
✓ Display "NaN"		
Show Grid		
✓ Target Operations: Full Ornamentation (Slow)		
Crosshatch Pre- and Post-Simulation Timesteps		
Crosshatch Read Only Cells		
Double Click Data Cell Toggles Detail Rows		
ок	Apply Reset Cancel	

default behavior of double clicking (i.e. initiating an in-cell modification-edit) with an open/close details operation. The latter functionality is relevant only for the aggregated views, but the disabling of "edit initiation" is applied to the non-aggregated views anyway, for consistency. Read more in the "<u>Show or Hide Details</u>" and "<u>Set Single</u><u>Value</u>" sections.

# Previous Page

Table of

**Contents** 

# 8.2 Horizontal Time Tab

The SCT Configuration Dialog is shown through the use of the SCT "<u>View >> SCT</u> <u>Configuration ...</u>" menu operation.

These settings effect the appearance of only the Horizontal Timestep Axis Orientation views.

Refer to the following sections for an explanation of these settings:

- Configure Row and Column Headers
- ▶ Change Ornamentations



# 8.3 Vertical Time Tab

The SCT Configuration Dialog is shown through the use of the SCT "<u>View >> SCT</u> <u>Configuration ...</u>" menu operation.

These settings effect the appearance of only the Vertical Timestep Axis Orientation views.

Refer to the following sections for an explanation of these settings:

- Configure Row and Column Headers
- ▶ Change Ornamentations

SCT Configuration	
General Horz Time Vert Time Toolbar	
Vertical Timestep Orientation Settings	
✓ Show Column: Weekday	
Column Headers: Include Scale and Units	Next Page
Column Headers: Include Summary Function	
Draw Weekend Divider Rows	Previous Page
Draw Month Divider Rows	Table of
OK Apply Reset Cancel	Contents

### 8.4 Toolbar Tab

The SCT Configuration Dialog is shown through the use of the SCT "<u>View >> SCT</u> <u>Configuration ...</u>" menu operation.

These settings determine the presence of individual Toolbar Buttons in the <u>SCT</u><u>Toolbar</u>.

The operations associated with each of the configurable Toolbar Buttons are also represented in the <u>SCT menus</u>.

The presence of the Flag Setting buttons within the SCT Toolbar is set on the "<u>Flags</u> <u>Tab</u>" rather than on this tab.



# 8.5 Summary Tab

The SCT Configuration Dialog is shown through the use of the SCT "<u>View >> SCT</u> <u>Configuration ...</u>" menu operation.

The settings on this tabbed pane were introduced mainly to experiment with ways of speeding up screen refreshes in very large models or in SCT configurations using a large aggregation (relative to the model timestep).

With typically sized models and aggregations, the benefit of disabling full functionality doesn't seem to be significant.

The **"Show Timestep Flag Colors"** options are described in the "<u>Change</u> <u>Ornamentations</u>" section.

The **"Selection Summary"** options disable or limit the 2nd Status Line shown at the bottom of the SCT. The last three components are used for limiting the median computation, which is the only statistic which requires a set of values to be *sorted*.

- SCT Configuration	
Horz Time Vert Time Toolbar Summary	
Summary Cells Flag Ornamentation	
Show Timestep Flag Colors:	
<ul> <li>Never</li> <li>When detail rows are hidden</li> </ul>	<u>Next Page</u>
O With 7 or fewer timesteps	
Always	Previous Page
Selection Summary (Status Line)	Table of
Show selection summary status line	Contents
Show median computation (slower)	
✓ Limit median computation	
31 Timesteps	
OK Apply Reset Cancel	

## 8.6 Flags Tab

The SCT Configuration Dialog is shown through the use of the SCT "<u>View >> SCT</u> <u>Configuration ...</u>" menu operation.

The "Flags" tabbed pane is used for two distinct types of settings related to the support of Slot timestep Flags in the SCT.

The various checkbox controls are used to determine the **presence of the Flag Toolbar Buttons** in the <u>SCT Toolbar</u>. If any such Toolbar Buttons are displayed, the Input Flag and Output Flag Toolbar buttons are displayed unconditionally.

See also the <u>Toolbar Tab</u> for the configuration of the presence of other Buttons in the Toolbar.

The "copies" of the Toolbar Buttons (*i.e.* this is also how these buttons appear in the SCT Toolbar -- in their enabled state) are used to configure the colors used for background shading of the various Flag values. Read more in the "Change Colors" section.

See also the <u>Color Tab</u> for the configuration of other user-settable colors used in the SCT.



# 8.7 Colors Tab

The SCT Configuration Dialog is shown through the use of the SCT "<u>View >> SCT</u> <u>Configuration ...</u>" menu operation.

The "Color" tabbed pane is used for configuring colors used in the SCT (other than Flag colors which are set on the <u>Flags</u> <u>Tab</u>).

Refer to the following sections for an explanation of these settings:

- Change Ornamentations
- Change Colors



--- (end) ---