

## RiverWare 6.3: Mass Balance Summary support for Salinity / Mass Units

Feature Enhancement Description / 5-17-2012 / Phil Weinstein, CADSWES -- [PDF](#)

### (0.1) Document Status

- 5-17-2012: Ready for initial review.

### (0.2) Prior Documents

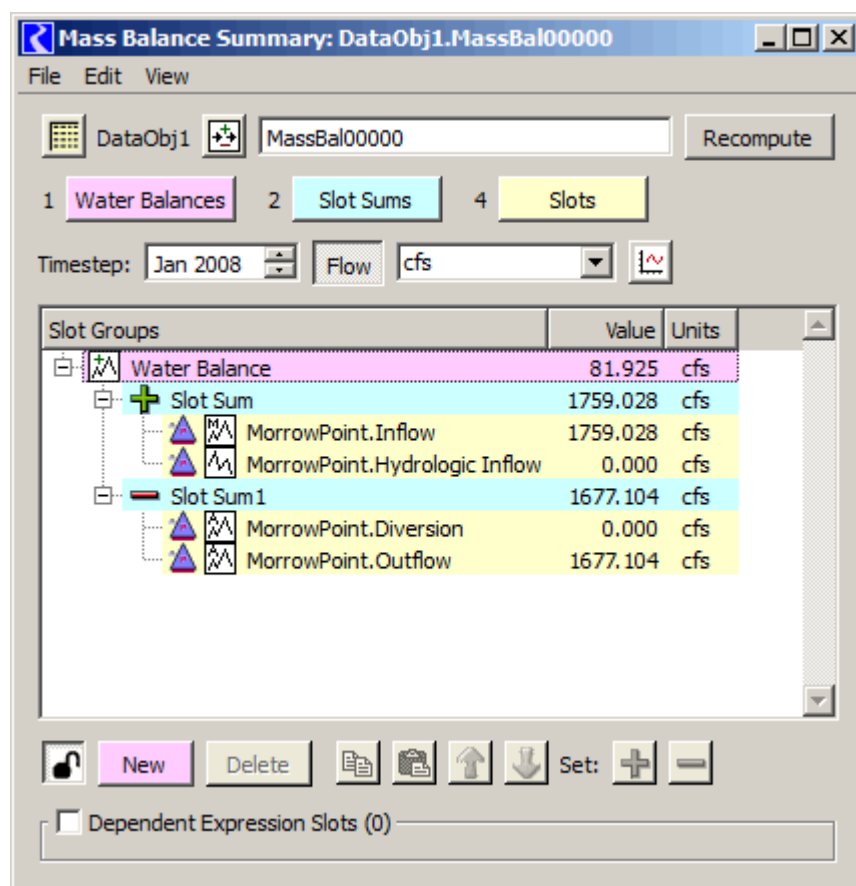
- 5-12-2012: [Proposal: Support for Salinity / Mass Units](#)
- 2-13-2012: "Version 1" [Feature Document](#) (PDF)
- 2-16-2012: [URGWOM sample data set](#)
- [Original Development Project Index](#)

### (1.0) Prior Functionality Overview

The initial version of the Mass Balance Summary Slot, introduced in RiverWare 6.2, supports summations of user defined collections of *flow* and *volume* series slots. Individual groupings of series slots can be added to, or subtracted from the computed summation series slots.

The values of all referenced flow and volume series slots, and the computed series can be displayed in any flow or volume units, set by a Flow/Volume toggle push button and a unit combo box.

As a result of a recomputation (either manually, by clicking the "Recompute" button, or automatically, at the end of a run), the unit type and display units of the computed series slots are set to those unit type and unit settings (i.e. internally, not just in for the purpose of *display* in this dialog).



Three levels of computed summation series slots are provided: "Slot Sum" collections (of referenced series slots), "Water Balance" collections (of Slot Sums), and the overall Mass Balance Summary Slot. Any of these can be used within RiverWare where references to series slots are supported.

## (2.0) Functional Enhancement Overview

In RiverWare 6.3, the Mass Balance Summary Slot has been enhanced to also support series slots with *mass* units (e.g. for salinity slot entities).

Mass-based operation occurs when all of the referenced series slots have *mass* units.

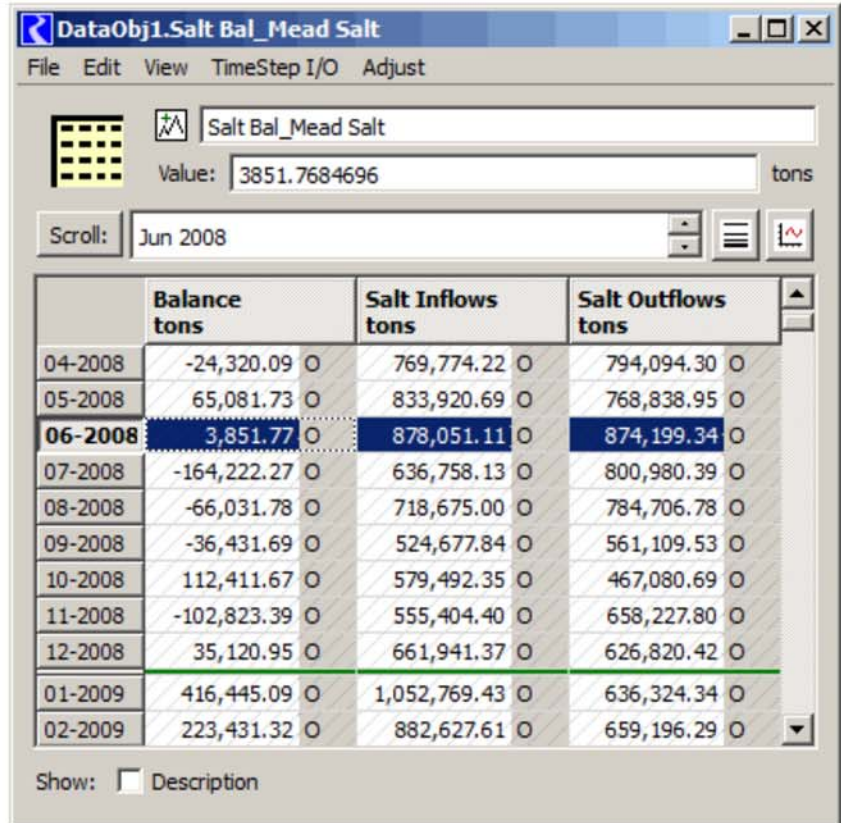
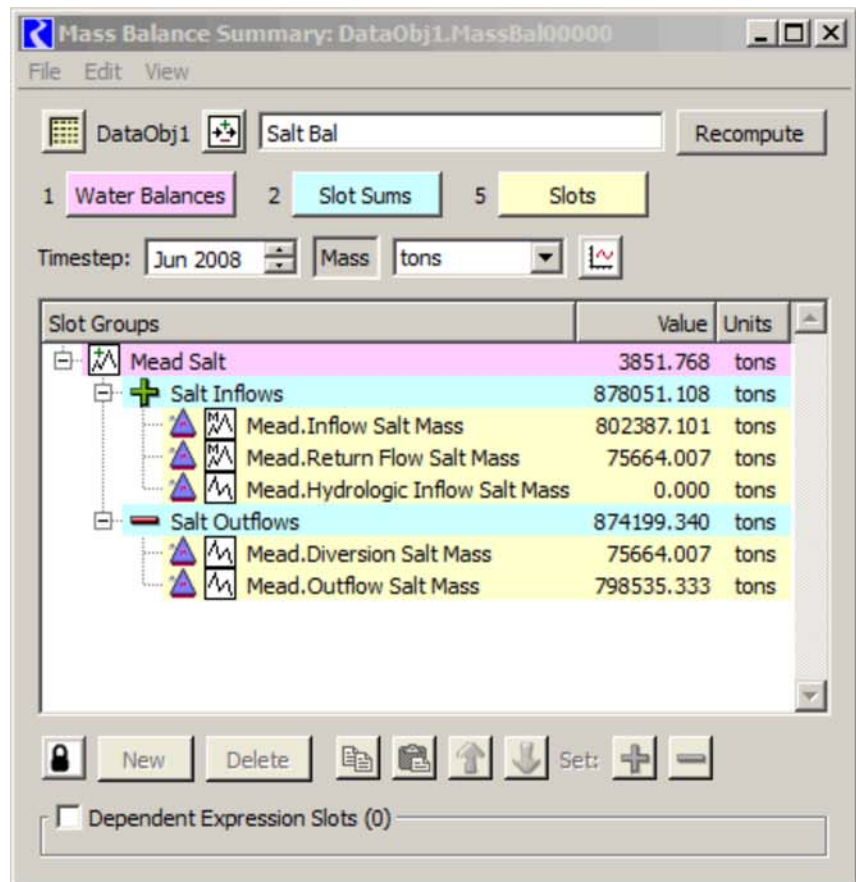
In "**mass mode**", the "Flow/Volume" toggle push button is replaced by an inset "Mass" unit label, and the unit combo box is populated with the configured mass units (currently defined in the external "units" file). The standard units file defines these mass units:

- g
- kg
- mg
- metric\_tons
- tons

Correctly defined Mass Balance Summary Slots will have references to either:

1. Flow or Volume series slots
2. Mass series slots

An error is reported if the set of series slot references don't conform to this criteria.  
*See below.*



## (2.1) Status Message Line

A line of information will conditionally be shown below the slot tree. Messages will be displayed in the following two circumstances:

1. Before any slot references have been added. The message indicates the supported unit types (currently Flow and Volume, or Mass).
2. When there is a problem with the set of unit types represented within the set of referenced series slots. (Also, an error would be reported to diagnostics output the next time the mass balance summary slot is recomputed).

When appropriate, a "[?]" (question mark) button will also be presented for showing additional information in a popup dialog.

Supported: Flow/Volume slots or Mass slots.

Set:

**Mass Balance Summary: Bal Obj.Blue Mesa**

File Edit View

Bal Obj Blue Mesa

1 2 3

Timestep: Mar 2008 acre-ft

Slot Groups	Value	Units
<b>Flows</b>		
<b>Inflows</b>		
BlueMesa.Inflow	38460.000	acre-ft
BlueMesa.Return Flow	0.000	acre-ft
<b>Outflows</b>		
BlueMesa.Outflow Salt Mass	304.954	tons

Problem: Slots having mutually incompatible unit types are included:

Set:

☐ Dependent Expression Slots (0)

**Mass Balance Summary Unit Type Problem**

Problem: Slots having mutually incompatible unit types are included.

Slots having the following unit types are included in this mass balance summary:

- Flow
- Mass

Either Flow and Volume slots OR Mass slots can be included in a mass balance summary.

### (3.0) Implementation Note

The support for "mass mode" was internally implemented as support for all slot references having *any single unit type*. For example, "Power" series slots could also be supported. As discussed in the brief proposal document, for this to make sense, it would probably be necessary to reframe this feature in the user interface and documentation, e.g. as just "Balance Summary" (or something) instead of "Mass Balance Summary". Also, references to "Water" in "Water Balance" could be dynamically changed to the active unit type mode, e.g. "Power Balance".

Basic support for enabling an arbitrary subset of unit types was briefly tested, including informational messages shown on the status message line and auxiliary popup dialog (*described above*). The set of supported unit types is configured in the following C++ method, shown with only "Mass" enabled. (The related three lines are commented out).

```
// static
const QList& MassBalSumConfig::supportedSingleUnitTypesRef()
{
    if (_supportedSingleUnitTypes.isEmpty())
    {
        _supportedSingleUnitTypes << MASS;

        // _supportedSingleUnitTypes << POWER;
        // _supportedSingleUnitTypes << ENERGY;
        // _supportedSingleUnitTypes << NOUNITS;
    }

    return _supportedSingleUnitTypes;
}
```

--- (end) ---