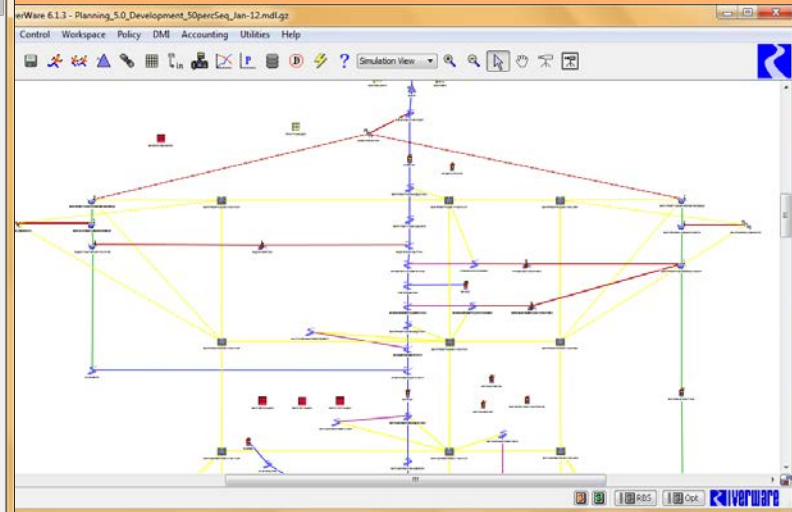
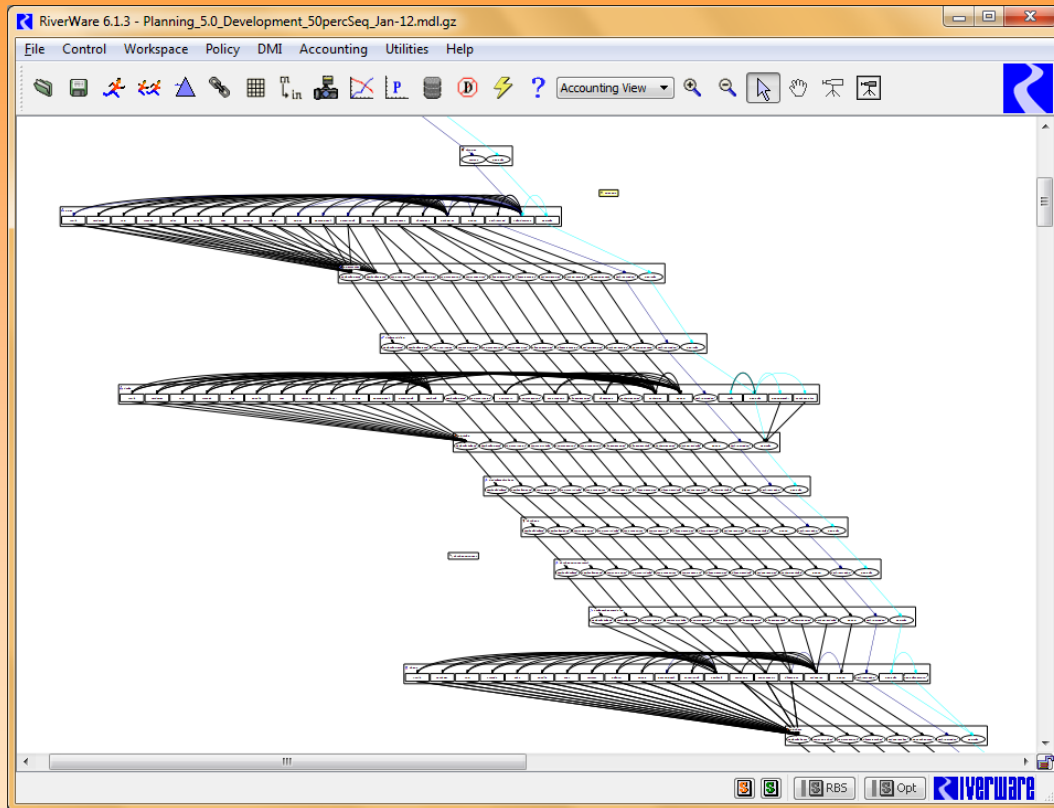


URGWOM 5.0



Craig Boroughs, **URGWOM Technical Team**

2012 RiverWare User Group Meeting

February 1, 2012

Model Area

- Rio Chama and Rio Grande from the Colorado-New Mexico State-line to the New Mexico-Texas State-line
 - includes Heron, El Vado, and Abiquiu Reservoirs on the Rio Chama and
 - Cochiti, Elephant Butte, and Caballo Reservoirs on the Rio Grande.

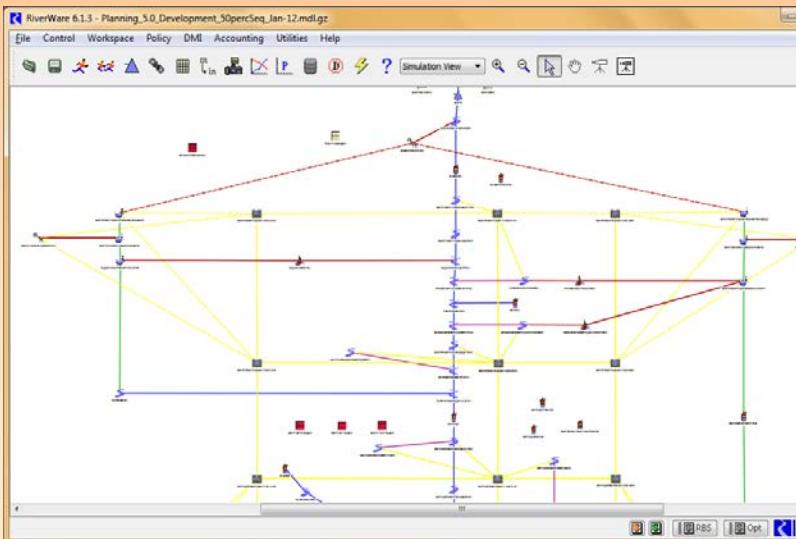


URGWOM

- The Upper Rio Grande Water Operations Model (URGWOM) has been under development since 1996.

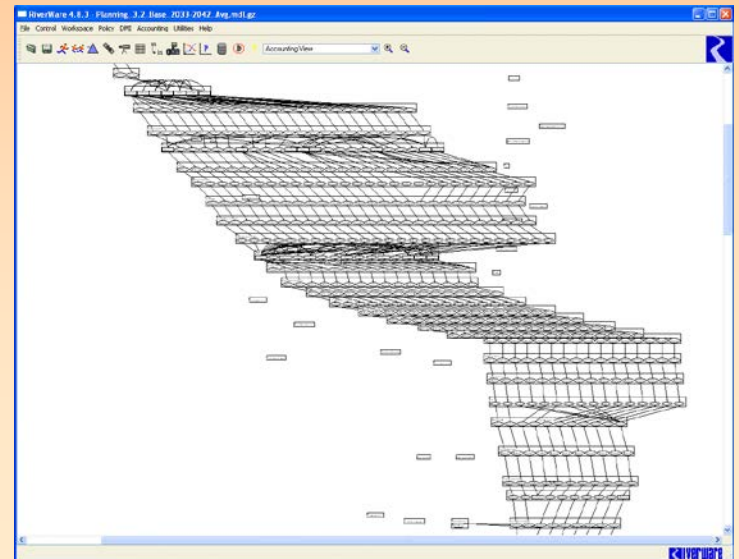
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 - methods for all the key physical processes,



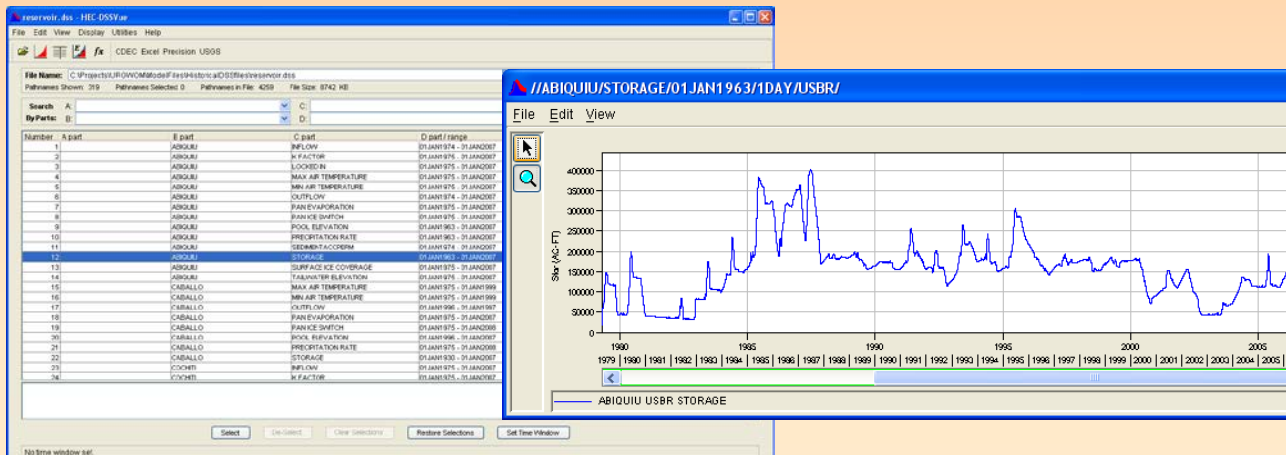
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 - a database and DMIs, and



Ordnate	Date / Time	ABOQUI POOL ELEVATION USBR
	Units	FT
	Type	INST-VAL
1	05 Feb 63 24:00	6066.4
2	06 Feb 63 24:00	6066.2
3	07 Feb 63 24:00	6065.7
4	08 Feb 63 24:00	6064.0
5	09 Feb 63 24:00	6064.1
6	10 Feb 63 24:00	6064.3
7	11 Feb 63 24:00	6064.5
8	12 Feb 63 24:00	6064.6
9	13 Feb 63 24:00	6064.0
10	14 Feb 63 24:00	6063.0
11	15 Feb 63 24:00	6063.6
12	16 Feb 63 24:00	6063.6
13	17 Feb 63 24:00	6063.4
14	18 Feb 63 24:00	6063.3

URGWOM

- The Upper Rio Grande Water Operations Model (URGWOM) has been under development since 1996
- Daily timestep model set up with
 - methods for all the key physical processes,
 - water accounting for tracking water for contractors for San Juan-Chama Project water along with other specific uses,
 - a database and DMIs, and
 - rules for all aspects of operations:
 - flood control, irrigation, transmountain diversions, the Rio Grande Compact, M&I demands, Native American water rights, Endangered Species Act compliance, and recreational uses.

Need for Model Updates

- Effort initiated to revamp the
 - accounting,
 - rules,
 - database and DMIs, and
 - documentation.

for better meeting all the growing modeling needs including

- Longer term simulations (e.g. 50 to 100 years) for
 - climate changes studies and
 - to provide inputs to biology models for endangered species analyses.
- Real-time water operations modeling

Need for Model Updates

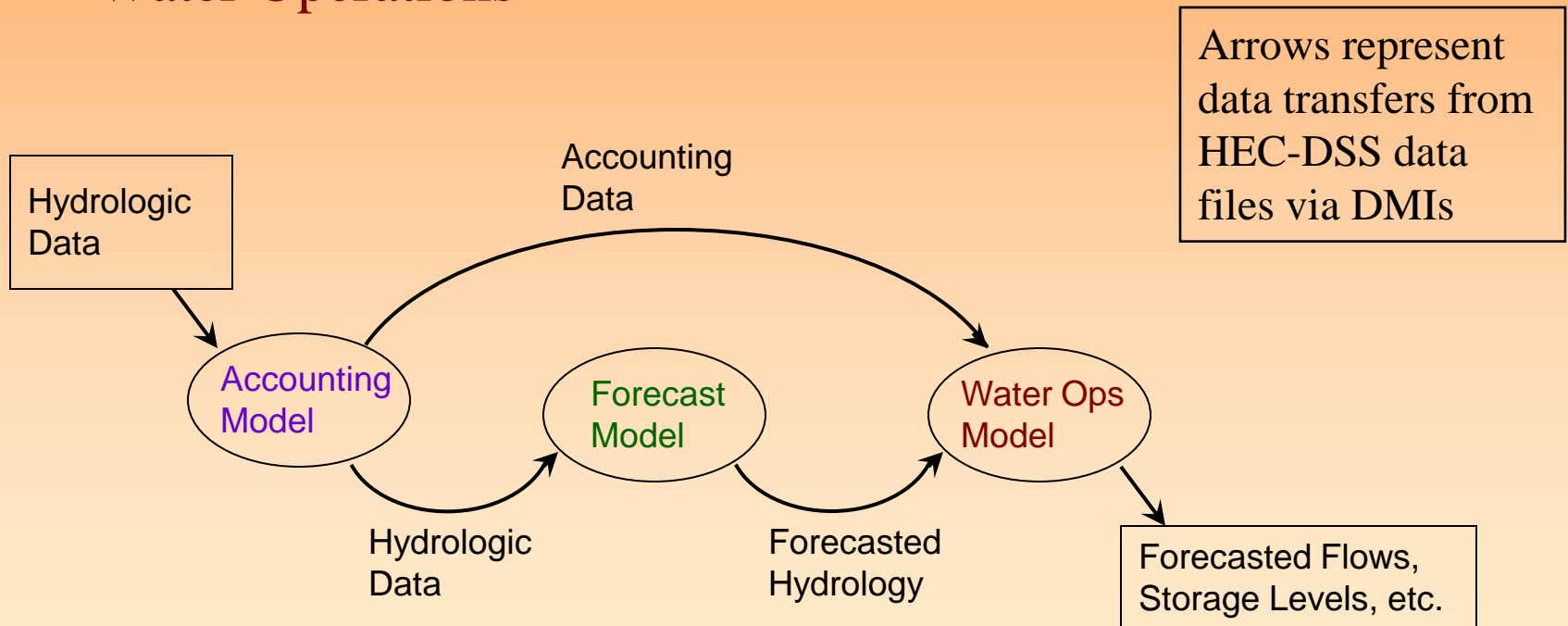
- Changes being implemented to
 - simplify model administration and the set up for applications,
 - consolidating modules.

Previous URGWOM Modules

- *Accounting module* used for simulations with actual data to track the status of accounts.
- *Water Operations module* used with the *Forecast module* to complete runs through a calendar year to prepare Annual Operating Plans.
- *Planning module* used to evaluate long-term impacts of proposed actions (e.g. for NEPA processes or Biological Assessments) on various indicators in the basin:
 - deliveries to water users, river flows, interstate Compact deliveries, and the overall water budget.

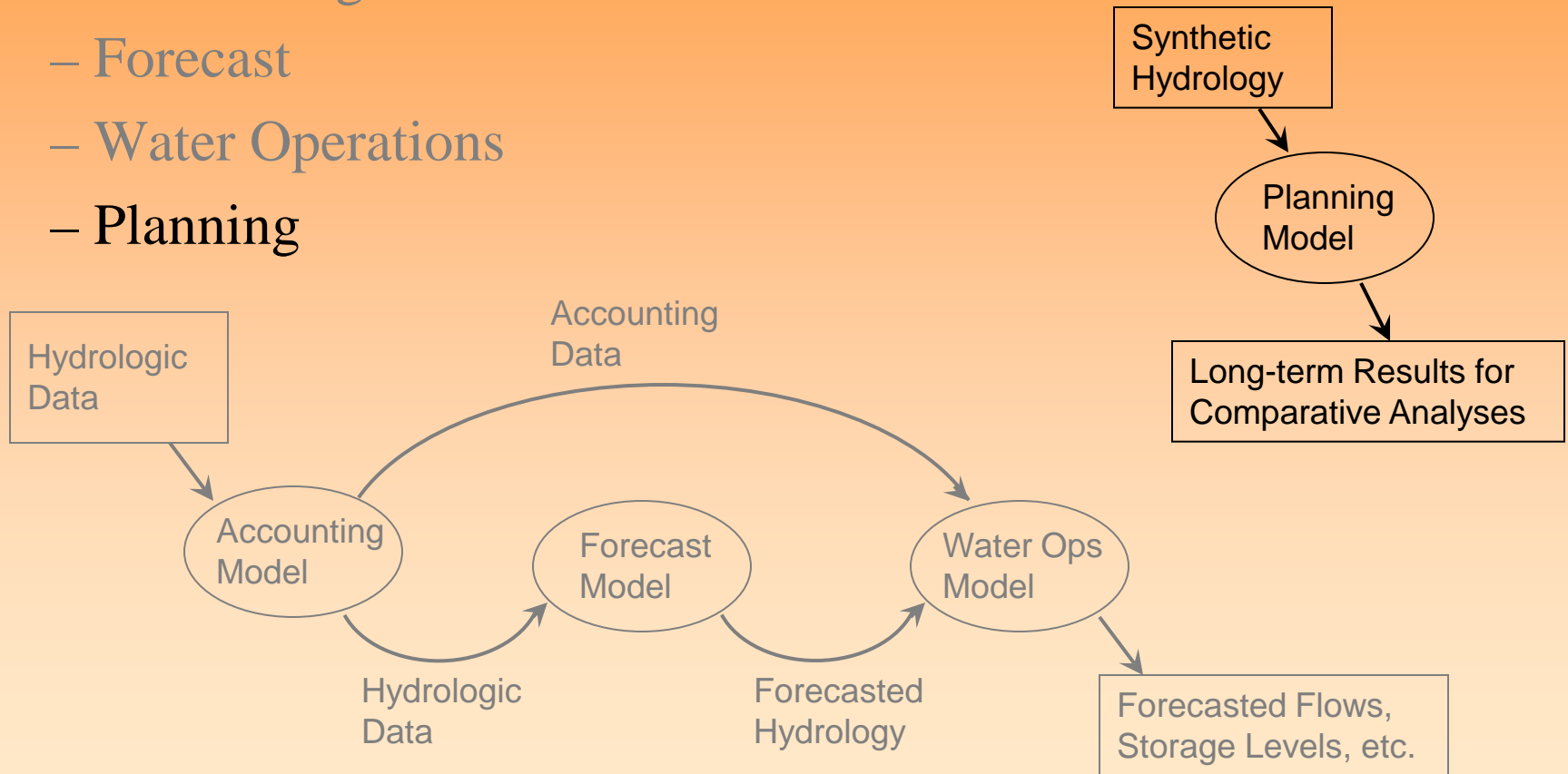
Previous System of Models

- Four separate daily timestep modules of URGWOM
 - Accounting
 - Forecast
 - Water Operations



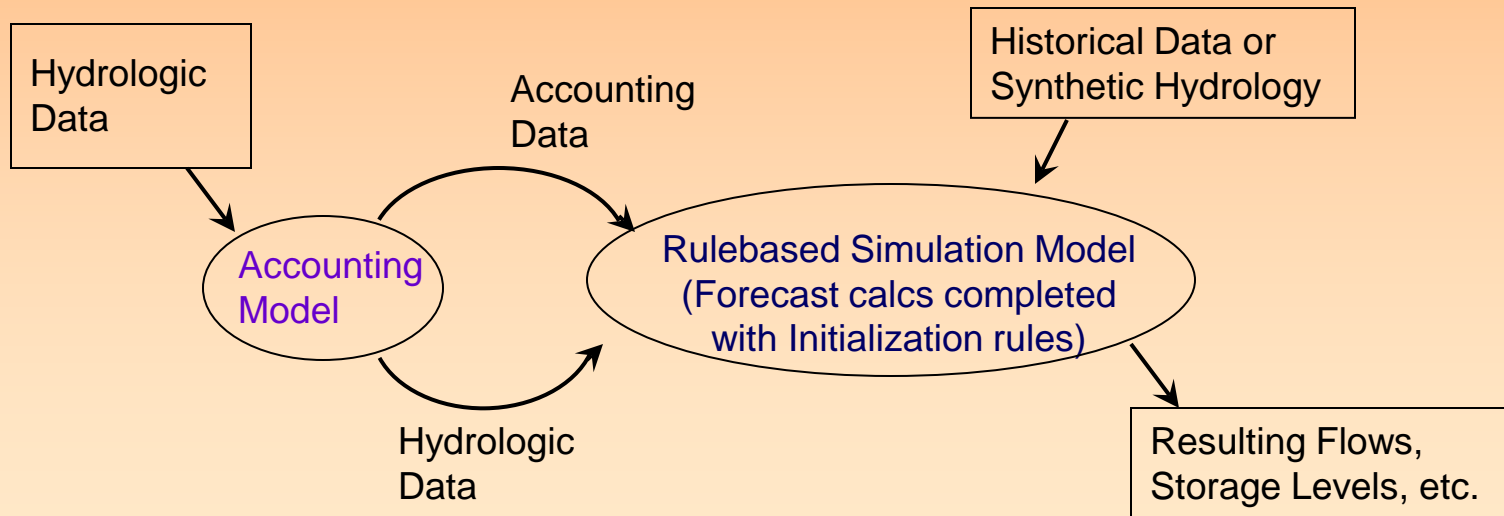
Previous System of Models

- Four separate daily timestep modules of URGWOM
 - Accounting
 - Forecast
 - Water Operations
 - Planning



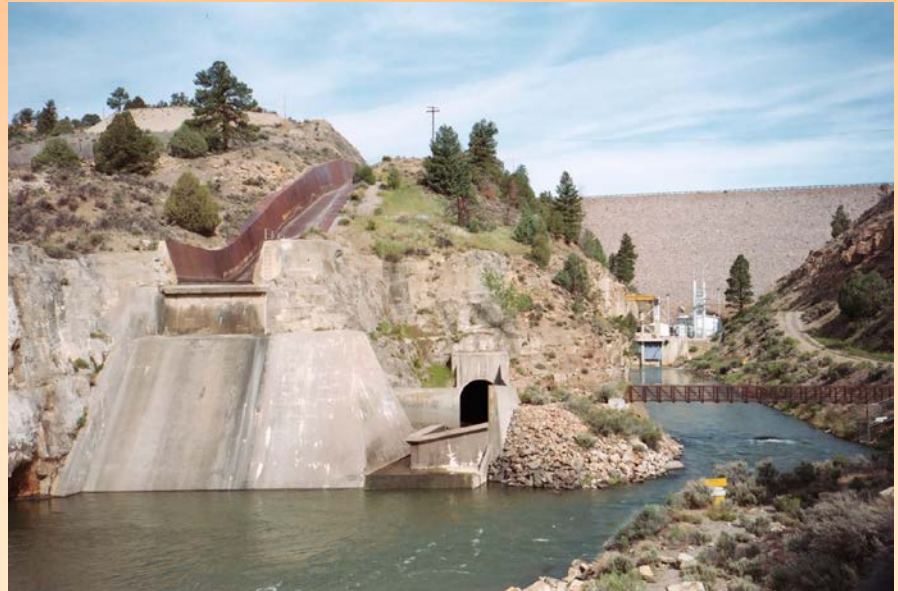
System of Models with URGWOM 5.0

- Two separate daily timestep models
 - Accounting Simulation Model
 - Rulebased Simulation Model



Need for Model Updates

- Changes being implemented to
 - enhance the representation of specific aspects of policy,
 - some older aspects of policy removed.



Need for Model Updates

- Changes being implemented to
 - improve the efficiency for meeting current modeling needs
 - by incorporating CADSWES recommended rule changes for performance enhancements and

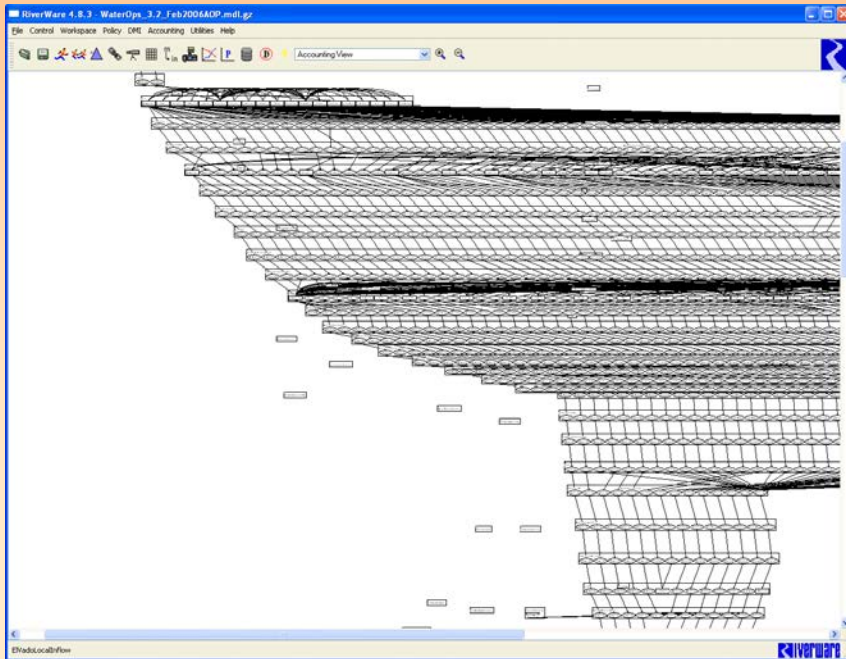
Need for Model Updates

- Changes being implemented to
 - improve the efficiency for meeting current modeling needs
 - by incorporating CADSWES recommended rule changes for performance enhancements and
 - consolidating the number of accounts and revamping the ruleset.

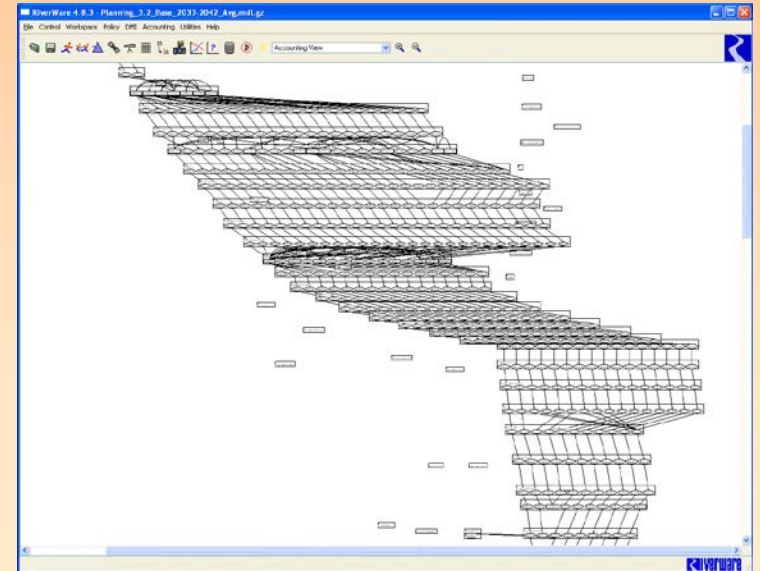
Consolidating Accounts

- Accounts being consolidated

Previous Water Operations module accounts



Previous Planning module accounts



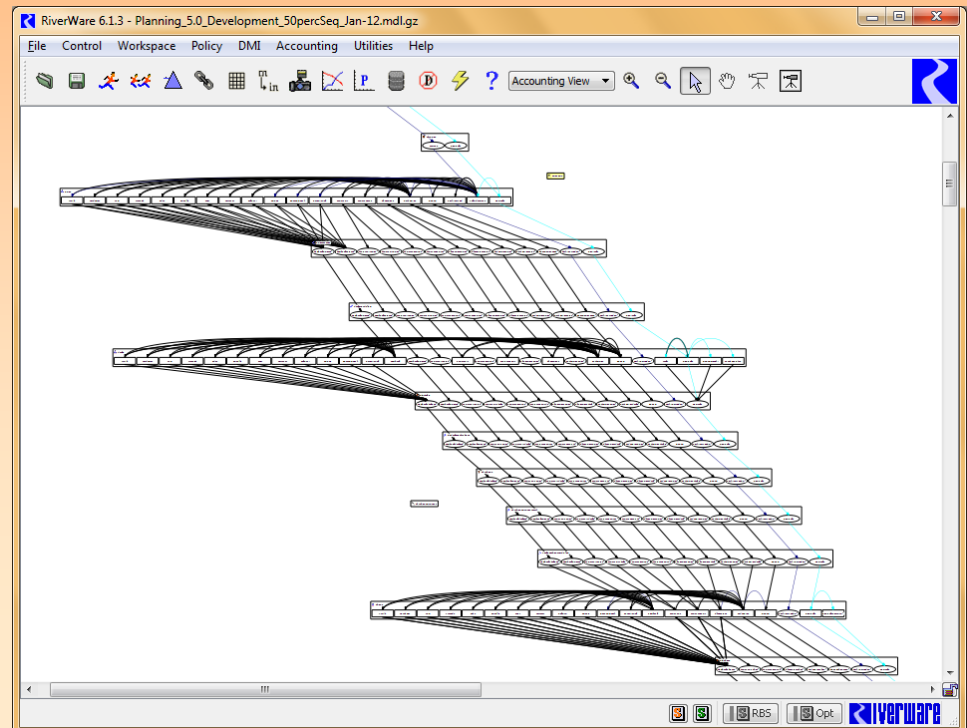
Consolidating Accounts

- Accounts being consolidated to
 - improve simulation efficiency,
 - have one model for all rulebased simulations, and
 - potentially meet the needs for daily accounting model runs.

Consolidating Accounts

- Accounts being consolidated to
 - improve simulation efficiency,
 - have one model for all rulebased simulations, and
 - potentially meet the needs for daily accounting model runs.

New model accounts



Need for Model Updates

- Changes being implemented to
 - simplify database updates and data administration
 - removing method parameters from the database, and
 - setting up default inputs for when values are not directly input
 - (e.g. default synthetic diversion and demand schedules will be used);

Need for Model Updates

- Changes being implemented to
 - simplify database updates and data administration
 - removing method parameters from the database, and
 - setting up default inputs for when values are not directly input
 - (e.g. default synthetic diversion and demand schedules will be used);
 - update the Middle Rio Grande calibration
 - consolidating inputs for crop consumption calculations.

The screenshot displays two overlapping windows from a software application. The top window, titled 'CochitiWestSideAgDepletions:Area1.Irrigated Area by Crop', shows a table with columns for various crops and their irrigated area in acres. The bottom window, titled 'CochitiWestSideAgDepletions:Area1.Evapotranspiration Rate by Crop', shows a table with columns for various crops and their evapotranspiration rate in inches per day. Both windows have a 'Scroll:' field set to 'Jan 30, 2012'.

	Cotton acre	Silage acre	Melons acre	Vegetables acre	FamGarden acre	Alfalfa acre	Pasture acre	Grapes acre	Peppers acre	Apples acre	Nursery acre	Oats acre	Mis: acre
10-12-2013 Sat	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I
10-13-2013 Sun	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I
10-14-2013 Mon	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I
10-15-2013 Tue	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I
10-16-2013 Wed	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I
10-17-2013 Thu	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I
10-18-2013 Fri	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I

	Corn in/day	Sorghum in/day	Wheat in/day	Barley in/day	Cotton in/day	Silage in/day	Melons in/day	Vegetables in/day	FamGarden in/day	Alfalfa in/day	Pasture in/day	Grapes in/day
01-27-2012 Fri	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.04 I	0.00 I	0.05 I
01-28-2012 Sat	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.05 I	0.00 I	0.05 I
01-29-2012 Sun	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.05 I	0.00 I	0.05 I
01-30-2012 Mon	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.05 I	0.00 I	0.05 I
01-31-2012 Tue	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.06 I	0.00 I	0.08 I
02-01-2012 Wed	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.00 I	0.04 I	0.00 I	0.05 I

Need for Model Updates

- Changes being implemented to
 - significantly improve the transparency of the model.

Goals with URGWOM 5.0

- Applications

- URGWOM 5.0 will allow for applications

- for preparing AOPs and
 - completing planning studies

- to be simplified and model runs to be completed more efficiently and

- URGWOM 5.0 will allow for continuous longer simulations (e.g. 50 or 100 years) to be completed

- ...on RiverWare for 64-bit.

Goals with URGWOM 5.0

- Documentation
 - Documentation and user manuals will be simplified
 - Rules documentation will include a flowchart for overall policy as represented by the URGWOM ruleset.

Goals with URGWOM 5.0

- Database
 - Database updates and data administration will be simplified.
 - DSS files will be reconfigured to allow for new DMIs to be created with a reduced amount of datasets and name maps.