# Powersim Constructor Mini Model, version 07

02-21-2002

Powersim Constructor Run-Time - [Native Inflow]

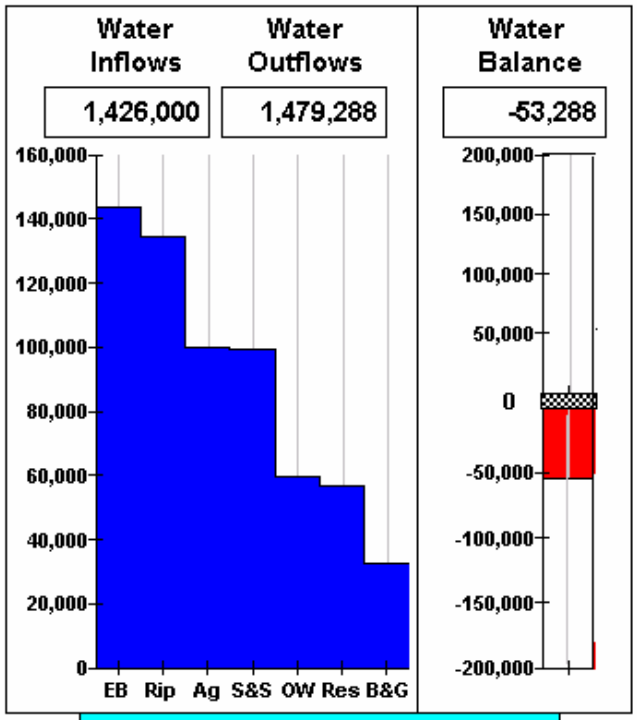
File Edit View Simulate Window Help

# Rio Grande Native Inflow (measured at Otowi)

Some Explanation:

Some Considerations:

| The Budgeting: | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| S&S Delivery | 100,000 | 100,000 | 100,000 | 100,000 | 100% |




Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 13/30 NUM

Powersim Constructor Run-Time - [Tribs & GW]

File Edit View Simulate Window Help

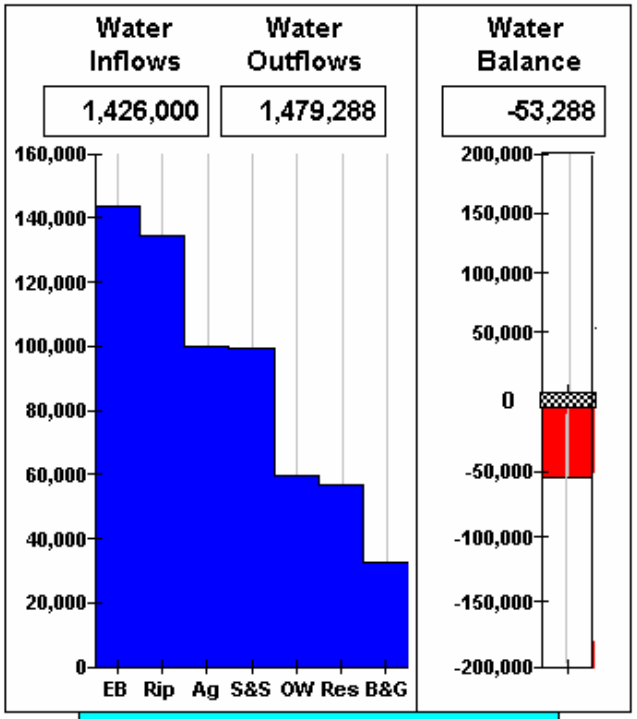
# Tributaries and Groundwater

Some Explanation:

Some Considerations:

The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| S&S Delivery | 100,000 | 100,000 | 100,000 | 100,000 | 100% |




Soccoro & Sierra

80,000 90,000 100,000 110,000 120,000

Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 14/30 NUM

Powersim Constructor Run-Time - [SJ/Chama Inflows]

File Edit View Simulate Window Help

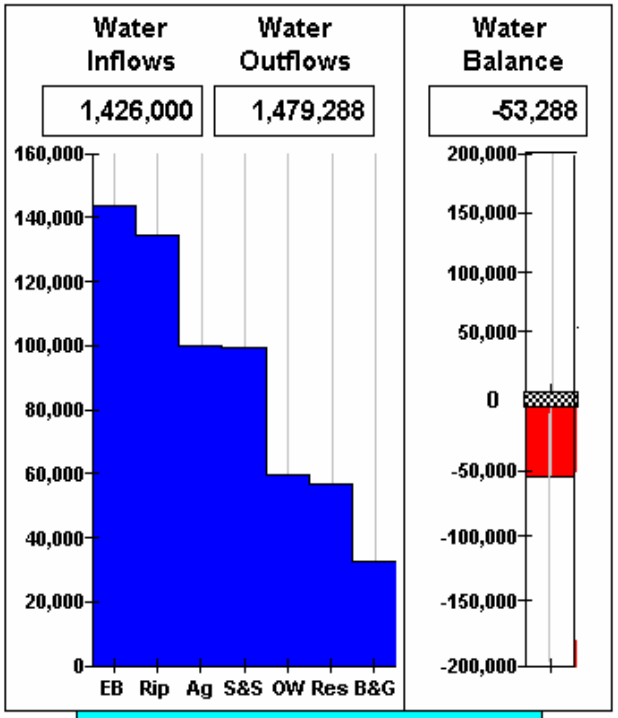
# San Juan/Chama Inflows

Some Explanation:

Some Considerations:

The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| S&S Delivery | 100,000 | 100,000 | 100,000 | 100,000 | 100% |




Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 16/30 NUM

Powersim Constructor Run-Time - [Imports From Other Regions]

File Edit View Simulate Window Help

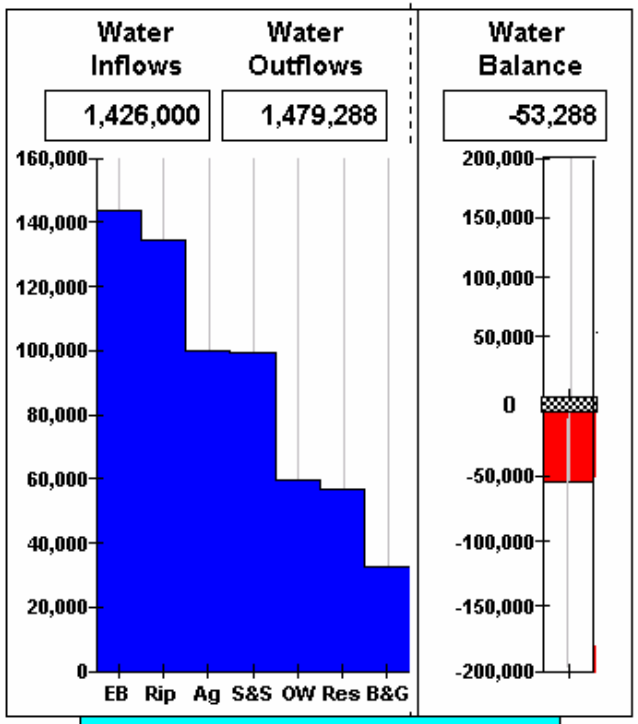
# Imports from Other Regions

Some Explanation:

Some Considerations:

The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| S&S Delivery | 100,000 | 100,000 | 100,000 | 100,000 | 100% |




Soccoro & Sierra

80,000 90,000 100,000 110,000 120,000

Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 18/30 NUM

Powersim Constructor Run-Time - [Urban Storm Drain Inflow]

File Edit View Simulate Window Help

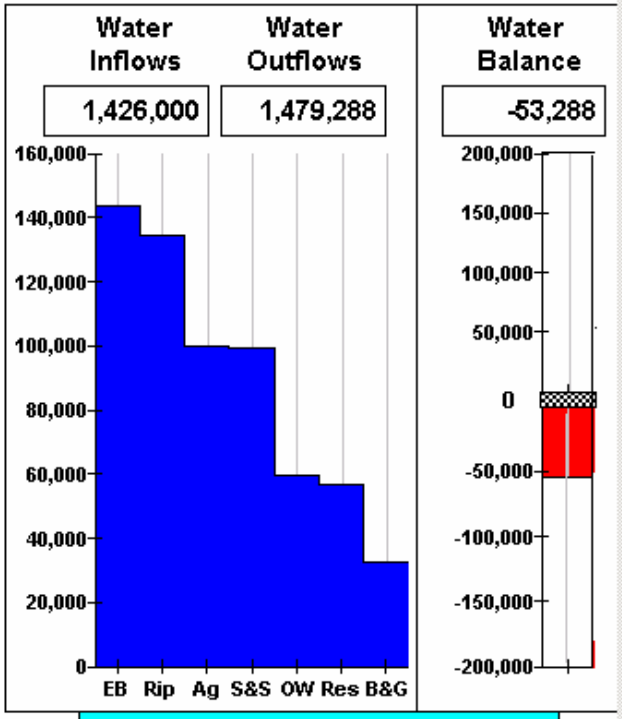
# Urban Storm Drain Inflow

Some Explanation:

Some Considerations:

The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| S&S Delivery | 100,000 | 100,000 | 100,000 | 100,000 | 100% |




Soccoro & Sierra

80,000 90,000 100,000 110,000 120,000

Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 23/30 NUM

Powersim Constructor Run-Time - [Inflows]

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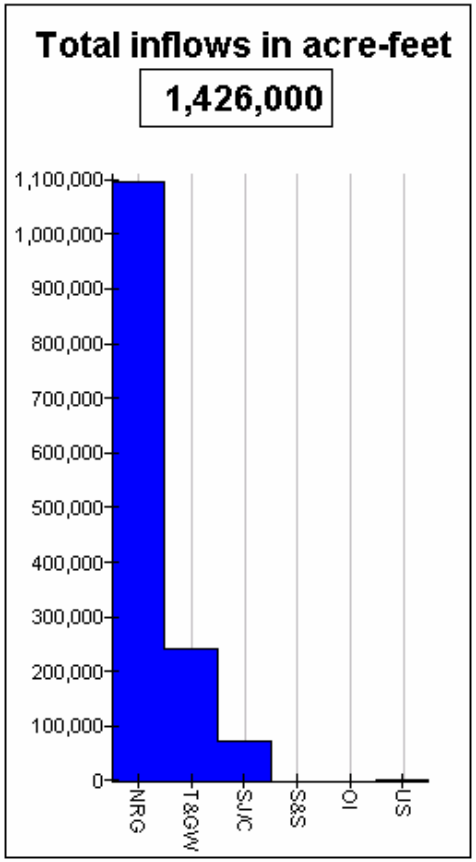
# Total Water Inflows (25-year averages; 1972-1997)

| | |
|---|---|
| Native Rio Grande (NRG) | 1,100,000 acre-feet |
| Tributaries and Ground Water (T&GW) | 245,000 acre-feet |
| San Juan/Chama (SJ/C) | 55,000 acre-feet |
| Imports from Socorro & Sierra Region (S&S) | 0 acre-feet |
| Imports from Other Sources (OI) | 0 acre-feet |
| Urban Storm Drains (US) | 5,000 acre-feet |
| Total inflows | 1,426,000 acre-feet |




Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

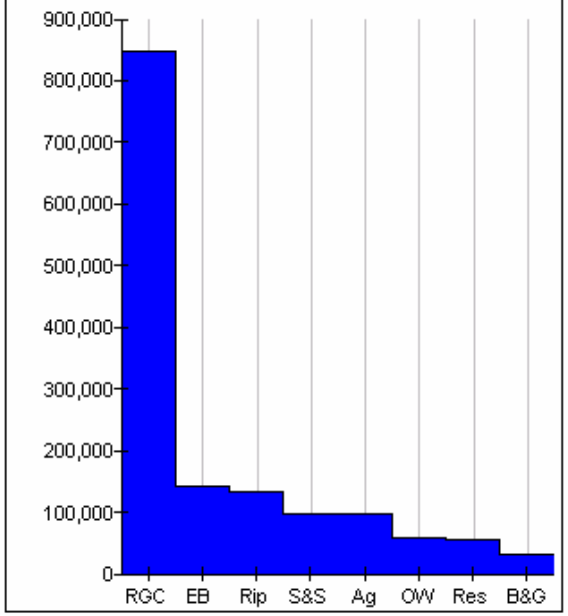
Zoom 100% Page 3/30 NUM

Powersim Constructor Run-Time - [RGC]

File Edit View Simulate Window Help

# Rio Grande Compact Deliveries (RGC)

| Water Inflows | Water Outflows | Water Balance |
|---|---|---|
| 1,426,000 | 1,479,288 | -53,288 |




All water measured in acre-feet, unless otherwise indicated.

## Some Explanation:

-- Established in 1930s
-- Divides available water among CO, NM, TX
-- Enforced by U.S. Supreme Court
-- NM-ISC responsible to ensure NM deliveries

## Some Considerations:

-- NM obligation depends on inflow at Otowi gage
-- Delivery is measured at EB dam
-- Storage requirement at EB is also specified
-- Mechanism exists for short-term credits/deficits

## The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection |
|---|---|---|---|
| RGC Obligation | 845,000 | 845,000 | 845,000 |

Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 4/30 NUM

Powersim Constructor Run-Time - [EB]

File Edit View Simulate Window Help

# Elephant Butte Reservoir Evaporation (EB)

Some Explanation:

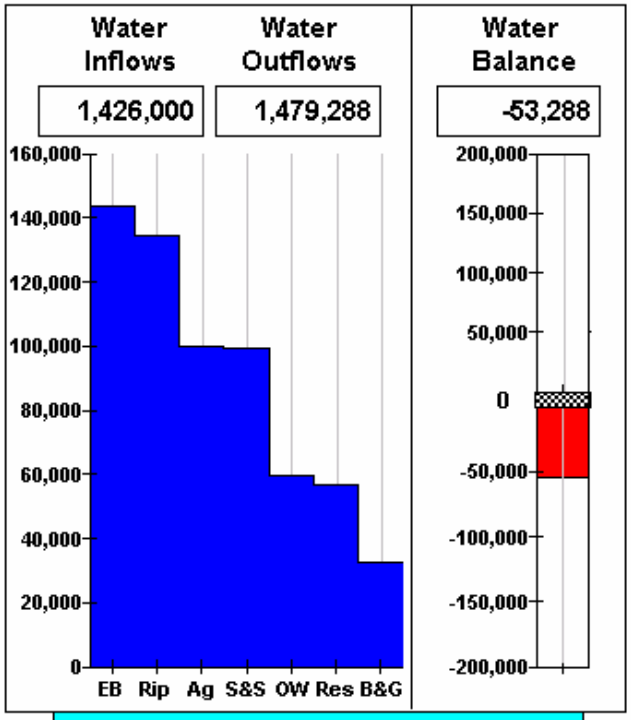
Under the RG Compact, water is stored at EB Reservoir for delivery downstream. Evaporation from the reservoir's surface is charged to the Middle Rio Grande region.

Some Considerations:

-- EB Reservoir is heavily used for recreation.
-- Location is low altitude, hot, and dry, with high evaporation rates.
-- Water storage at EB is required under RG Compact.

The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| Surface Acres | 16,000 | 16,000 | 16,000 | 16,000 | 100% |
| Evaporation/Acre | 9 | 9 | 9 | 9 | 100% |
| Total Use | 140,000 | 140,000 | 140,000 | 144,000 | 100% |




EB surface area

0 10,000 20,000 30,000 40,000

Evap, acre-feet/year/acre

7 8 9 10 11

Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 6/30 NUM

Powersim Constructor Run-Time - [Rip]

File Edit View Simulate Window Help

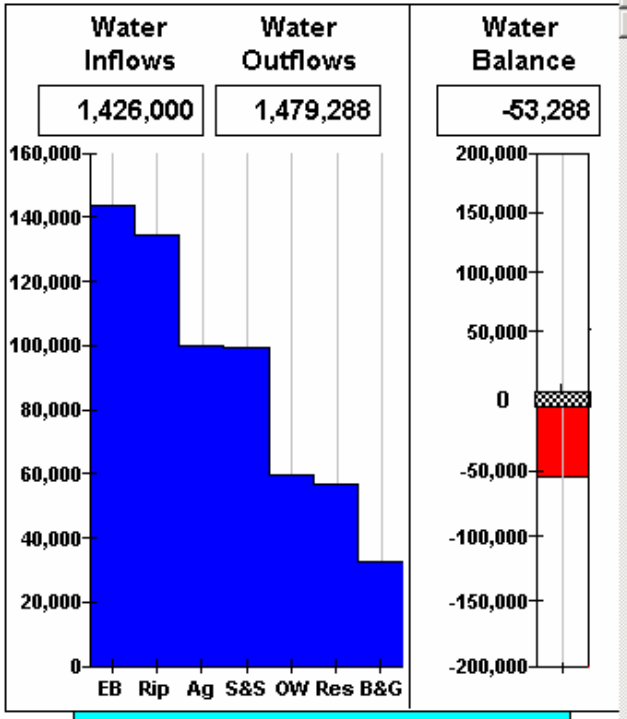
# Riparian Evapotranspiration (Rip)

Some Explanation:

Riparian evapotranspiration is consumption of water by plants in and along rivers and streams. It includes evaporation and transpiration of water through plants. It includes the bosque as well as growth along streams and ditchbanks.

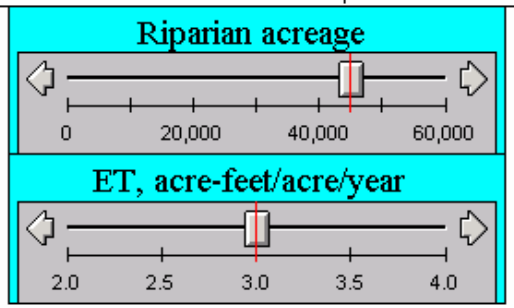
Some Considerations:

-- Plant species consume various amounts of water.
-- Some endangered species need riparian habitat.
-- Riparian use continues during droughts.
-- Removing high-water-use plants can reduce consumption.




The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| Surface Acres | 45,000 | 45,000 | 45,000 | 45,000 | 100% |
| ET/Acre | 3 | 3 | 3 | 3.00 | 100% |
| Total Use | 135,000 | 135,000 | 135,000 | 135,000 | 100% |




Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 7/30 NUM

Powersim Constructor Run-Time - [AG]

File Edit View Simulate Window Help

# Agricultural Evapotranspiration (Ag)

Some Explanation:

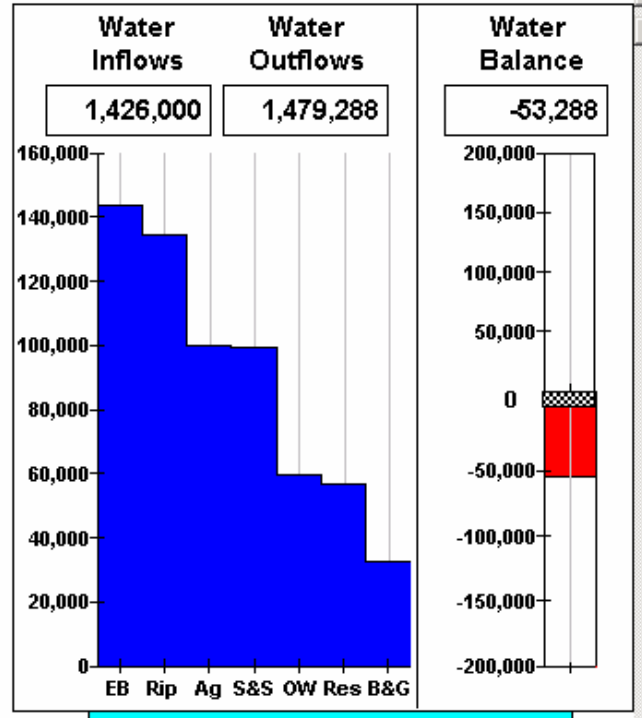
Water consumed in irrigated agriculture is that which evaporates from fields and transpires from plants.

Some Considerations:

-- Agriculture maintains rural landscapes.
-- Agricultural way of life is historic, aesthetic, and valued.
-- Local food production and consumption has advantages.
-- Difficult to restore agriculture after conversion to urban.

The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| Surface Acres | 48,000 | 42,400 | 29,000 | 48,000 | 100% |
| Evaporation/Acre | 2.1 | 2.1 | 2.5 | 2.09 | 100% |
| Total Use | 100,000 | 89,000 | 72,000 | 100,320 | 100% |




Agricultural acreage

30,000 40,000 50,000 60,000

ET, acre-feet/acre/year

0 1 2 3 4

Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-cultural | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 8/30 NUM

Powersim Constructor Run-Time - [S&S]

File Edit View Simulate Window Help

# Deliveries to Socorro & Sierra Counties (S&S)

Some Explanation:

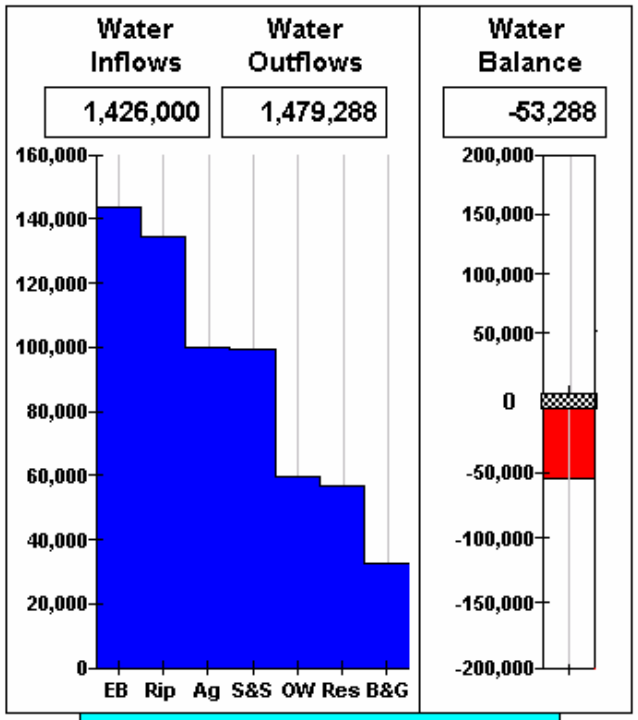
There is no formal water delivery agreement between the S&S and MRG regions. Current values are traditional average deliveries from MRG to S&S for consumption in S&S.

Some Considerations:

-- MRG could reduce deliveries to S&S via purchase, lease, or other mechanisms.
-- S&S is developing its own regional water plan.
-- S&S also projects regional growth in demand.

The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| S&S Delivery | 100,000 | 100,000 | 100,000 | 100,000 | 100% |




Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 3/30 NUM

Powersim Constructor Run-Time - [OW]

File Edit View Simulate Window Help

# Open Water Evaporation (OW)

Some Explanation:

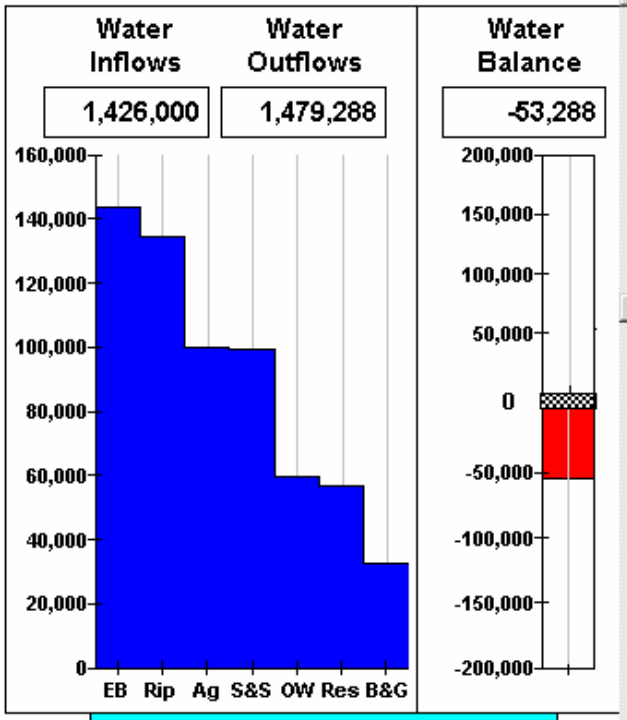
Open water includes rivers, streams, lakes, wetlands, ditches and pools. Because of its size, Elephant Butte is considered separately.

Some Considerations:

-- Open water provides recreation & habitat for endangered species.
-- Some open water can be replaced with pipes but conversion costs are high.

The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| Surface Acres | 12,000 | 12,000 | 12,000 | 12,000 | 100% |
| Evaporation/Acre | 5 | 5 | 5 | 5.00 | 100% |
| Total Use | 60,000 | 60,000 | 60,000 | 60,000 | 100% |




Open water acreage

5,000 10,000 15,000 20,000

Evap., acre-feet/acre/year

0 3 6 9

Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 4/30 NUM

Powersim Constructor Run-Time - [Res]

File Edit View Simulate Window Help

# Residential Uses (Res)

Some Explanation:

Residential consumption includes evapotranspiration from outdoor plants and trees, and indoor human uses.

Some Considerations:

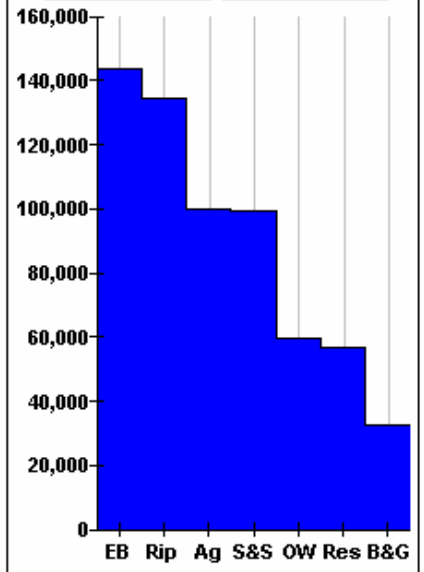
-- Use is linked to population.
-- Use is affected by population behavior.
-- At current rate, population in MRG will double by 2050

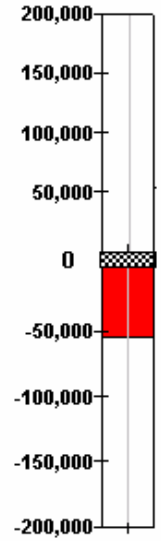
The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| Population | 713,000 | 1,016,000 | 1,470,000 | 713,000 | 100% |
| Per capita use | 0.08 | 0.09 | 0.10 | 0.08 | 100% |
| Total Use | 57,000 | 91,000 | 149,000 | 57,040 | 100% |

Note: "Per capita use" reflects residential use on a regional basis.

| Water Inflows | Water Outflows | Water Balance |
|---|---|---|
| 1,426,000 | 1,479,288 | -53,288 |




Population

600,000 1,000,000 1,400,000

Use/person/year

0.04 0.08 0.12

Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 6/30 NUM

Powersim Constructor Run-Time - [B&G]

File Edit View Simulate Window Help

# Business & Government (B&G)

Some Explanation:

B&G covers consumption from commercial, industrial, municipal, state and federal activities, including commercial and industrial production, human consumption, lawns, parks.

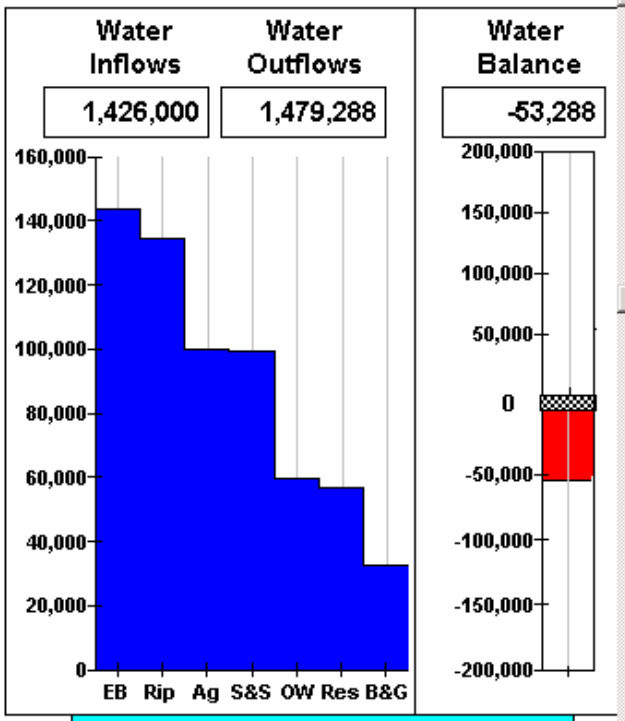
Some Considerations:

-- Jobs are needed for a healthy economy.
-- Some endeavors produce more jobs.
-- Some endeavors use more water.

The Budgeting:

| | 25-Year Average | 2020 Projection | 2050 Projection | Your Budget | % of Avg. |
|---|---|---|---|---|---|
| Jobs | 343,000 | 489,000 | 707,000 | 343,000 | 100% |
| Consumption/job | 0.096 | 0.087 | 0.073 | 0.10 | 100% |
| Total Use | 33,000 | 43,000 | 52,000 | 32,928 | 100% |

Note: "Consumption/job" reflects business & gov. use on a regional basis




Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 7/30 NUM

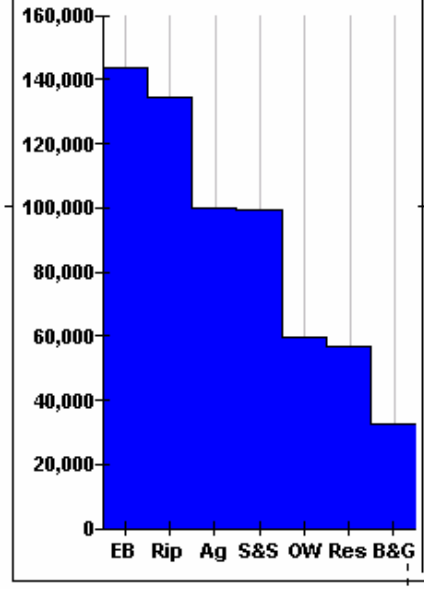
Powersim Constructor Run-Time - [Totals]

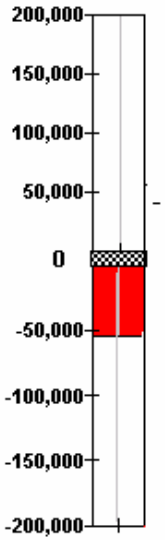
File Edit View Simulate Window Help

# Totals

| | Units | Units, % of 25-yr. avg. | Per Unit Use | Per Unit Use, % of 25-yr. avg. | Sub-total | Sub-total, % of 25-yr. avg. |
|---|---|---|---|---|---|---|
| Rio Grande Compact | | | | | 850,000 | |
| Elephant Butte Evaporation | 16,000 | 100% | 9.00 | 100% | 144,000 | 100% |
| Socorro & Sierra Deliveries | | | | | 100,000 | 100% |
| Riparian Use | 45,000 | 100% | 3.00 | 100% | 135,000 | 100% |
| Open Water Evaporation | 12,000 | 100% | 5.00 | 100% | 60,000 | 100% |
| Irrigated Agriculture | 48,000 | 100% | 2.09 | 100% | 100,320 | 100% |
| Business & Government | 343,000 | 100% | 0.10 | 100% | 32,928 | 100% |
| Residential Uses | 713,000 | 100% | 0.08 | 100% | 57,040 | 100% |

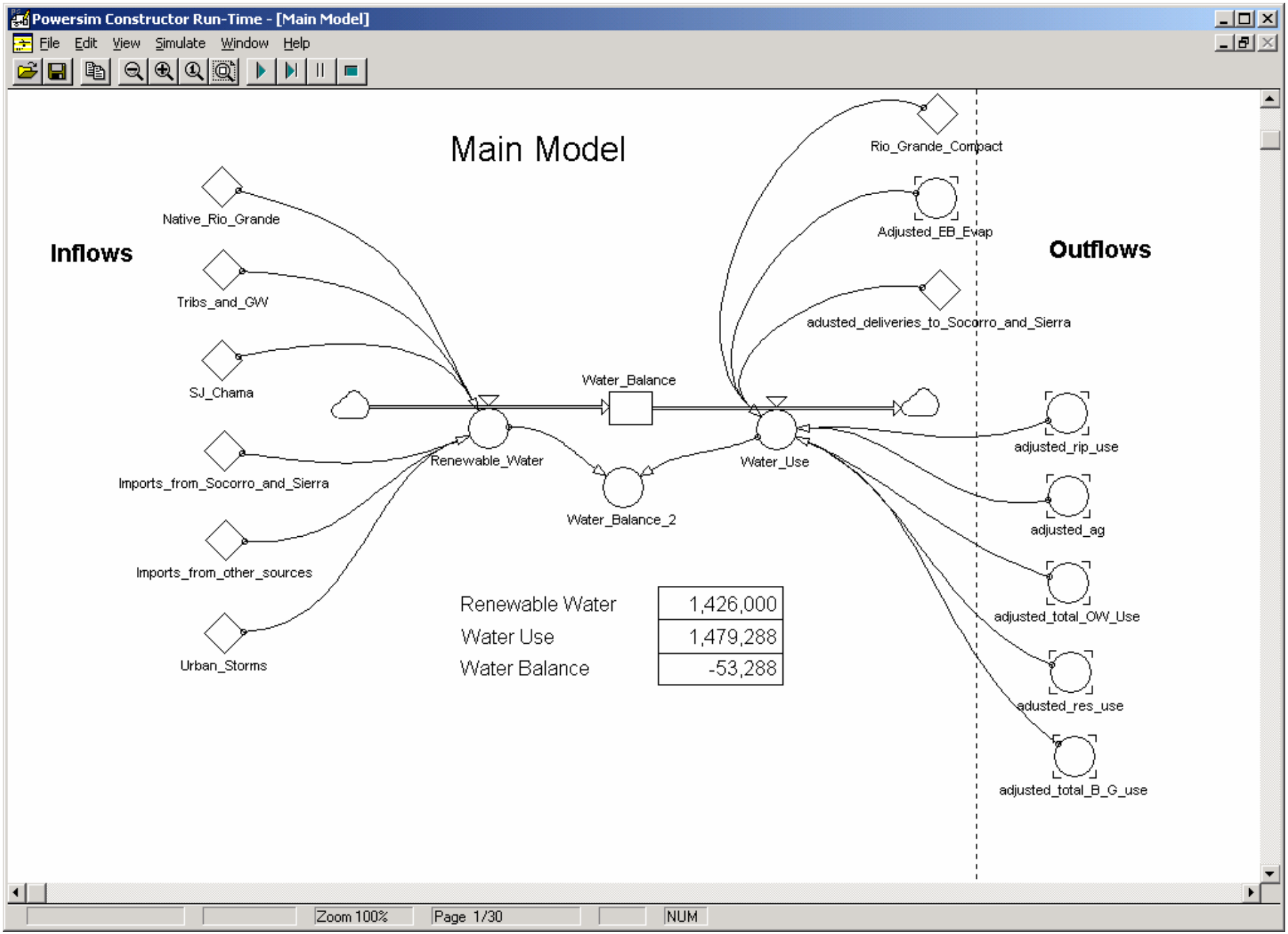
| Water Inflows | Water Outflows | Water Balance |
|---|---|---|
| 1,426,000 | 1,479,288 | -53,288 |

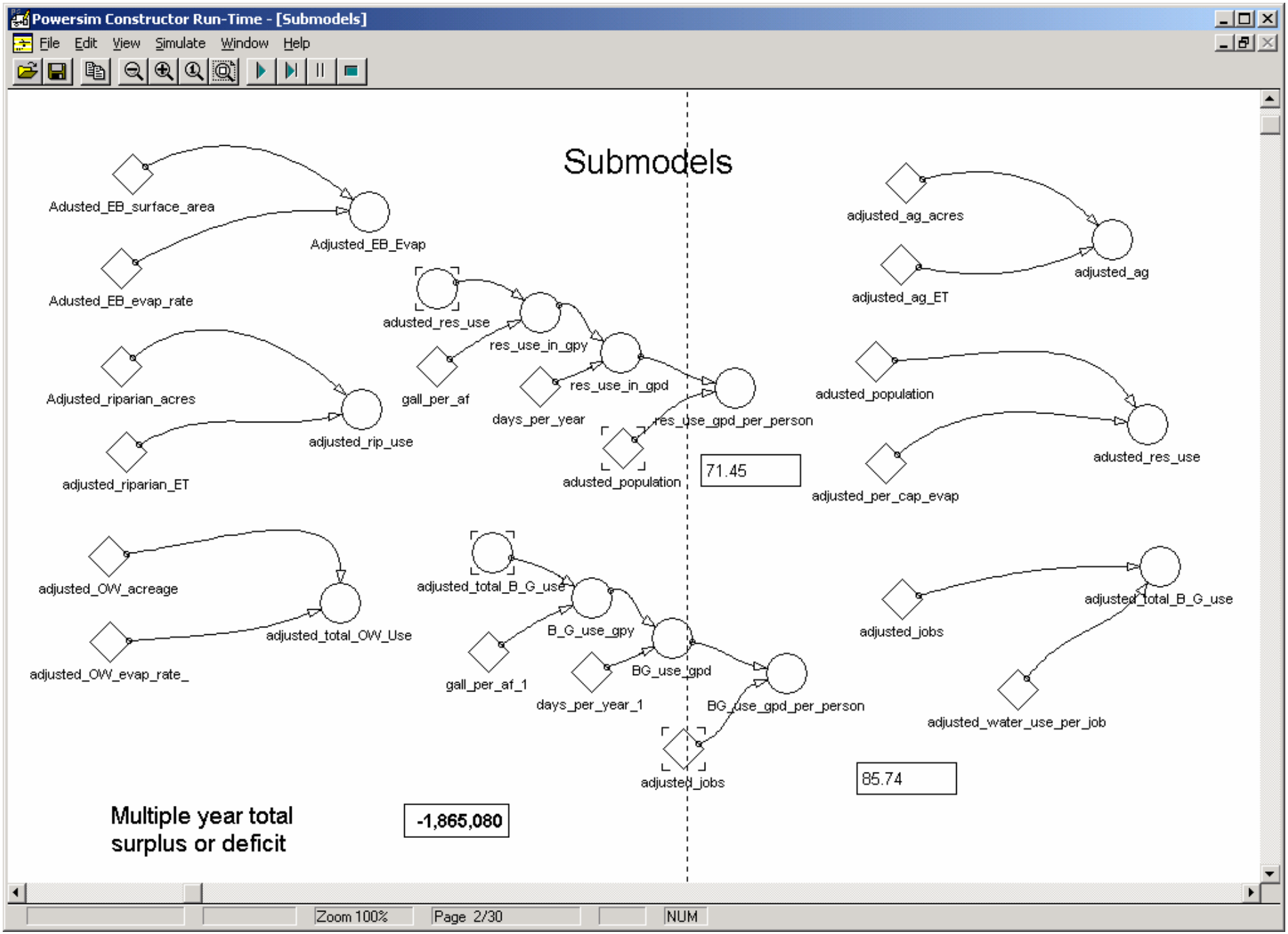



Inflows | R.G. Compact | Elephant Butte | Riparian | Agri-culture | Socorro & Sierra | Open Water | Resi-dential | Business & Gov. | Totals

Zoom 100% Page 8/30 NUM


Powersim Constructor Run-Time - [Main Model]
File Edit View Simulate Window Help
Main Model
Inflows
Outflows
Native_Rio_Grande
Tribs_and_GW
SJ_Chama
Imports_from_Socorro_and_Sierra
Imports_from_other_sources
Urban_Storms
Renewable_Water
Water_Balance
Water_Balance_2
Water_Use
Rio_Grande_Compact
Adjusted_EB_Evap
adusted_deliveries_to_Socorro_and_Sierra
adjusted_rip_use
adjusted_ag
adjusted_total_OW_Use
adusted_res_use
adjusted_total_B_G_use
Renewable Water 1,426,000
Water Use 1,479,288
Water Balance -53,288
Zoom 100%
Page 1/30
NUM


Powersim Constructor Run-Time - [Submodels]
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Submodels
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gall_per_af
days_per_year
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res_use_gpd_per_person
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adjusted_ag_acres
adjusted_ag_ET
adjusted_ag
Adjusted_riparian_acres
adjusted_riparian_ET
adjusted_rip_use
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adusted_res_use
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adjusted_OW_evap_rate_
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adjusted_total_B_G_use
B_G_use_gpy
gall_per_af_1
days_per_year_1
BG_use_gpd
BG_use_gpd_per_person
adjusted_jobs
85.74
adjusted_jobs
adjusted_total_B_G_use
adjusted_water_use_per_job
Multiple year total surplus or deficit
-1,865,080
Zoom 100%
Page 2/30
NUM