

Development of RiverWare models of the Rio Grande flow for flood control and water operations planning

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The Stormwater Coalition Meeting

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Acknowledgement

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- 4 Irrigation Districts
- URGWOM Tech Team
- USBR & IBWC & USDA
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- WRRI – NMSU
- UACJ




Project Team

- TAMU – Z. Sheng, R. Marmolejo, A. Michelsen, and B. Mohanty
- NMSU – J.P. King, S. Abudu, and C. Brown
- UACJ – A. Granados and Víctor Esquivel-Ceballos
- Conrad G. Keyes, Jr., Consultant



SOW - LRG

RiverWare Model for Rincon Valley and Mesilla Basin (NMSU & TAMU)

- ❖ Surface water diversions linked to cropped area demand
 - ❖ Interactive groundwater objects linked to drain return flows
 - ❖ Expand the RiverWare model to represent the main canal system
 - ❖ Simulate river flow and water operations planning scenarios
 - ❖ Enhance coordinated water resources database
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SOW - LRG

RiverWare Model for Lower El Paso Valley (TAMU and UACJ)

- ❖ Compile flow and crop data
- ❖ Develop the RiverWare™ model to simulate the river flow and water operations planning scenarios
- ❖ Incorporate data into the coordinated water resources database
- ❖ Evaluate USGS MODFLOW model for Hueco Bolson for SW/GW interaction



RiverWare Daily Model – River & Irrigation Network

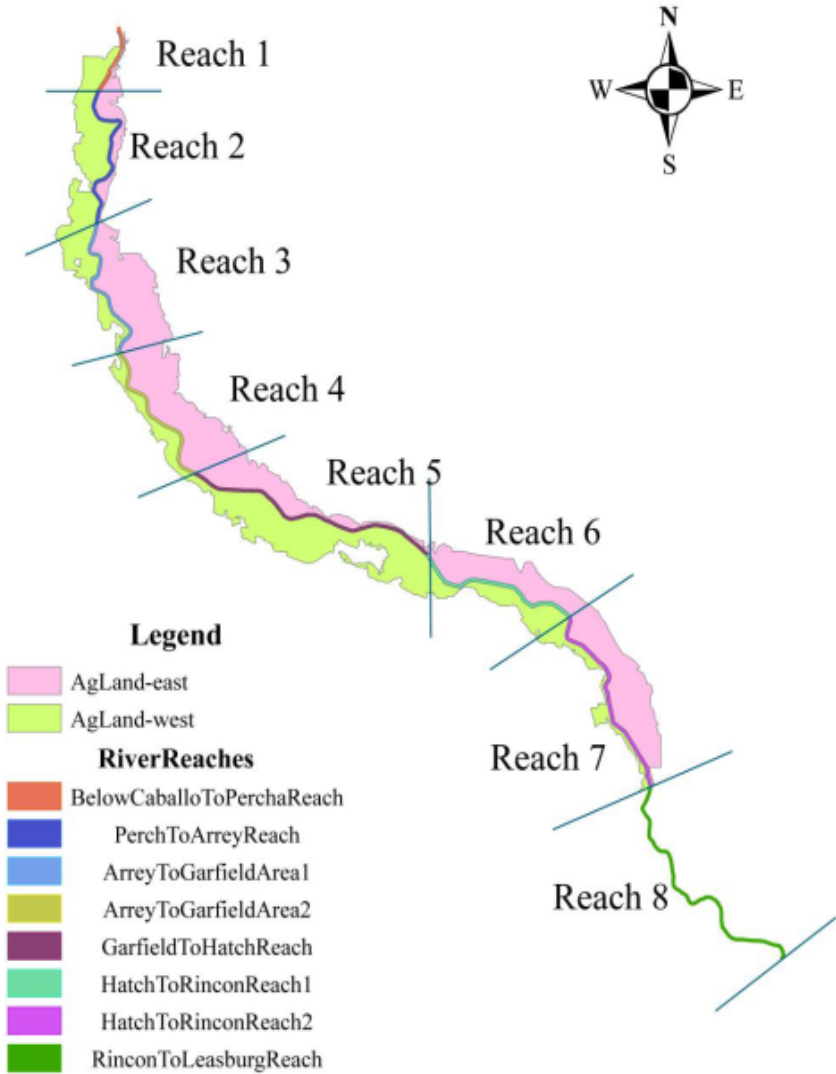
- Daily time step
- Include river reaches, canals, and drains
- Rincon and Mesilla Basin – Groundwater-Surface Interactions using groundwater objects link MODFLOW and RiverWare
- Expand the RiverWare model into El Paso-Juarez valley



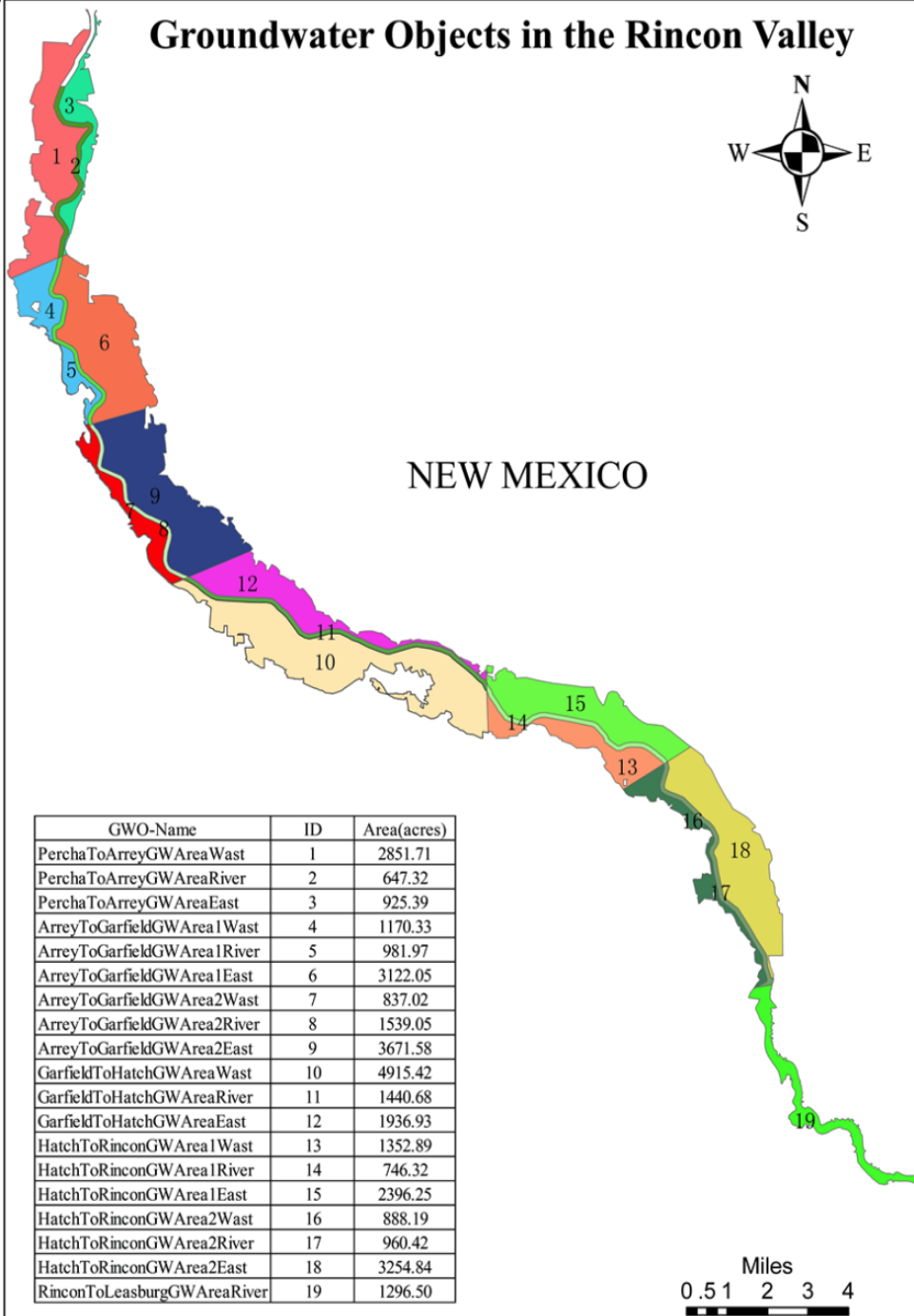
Rincon Valley Model



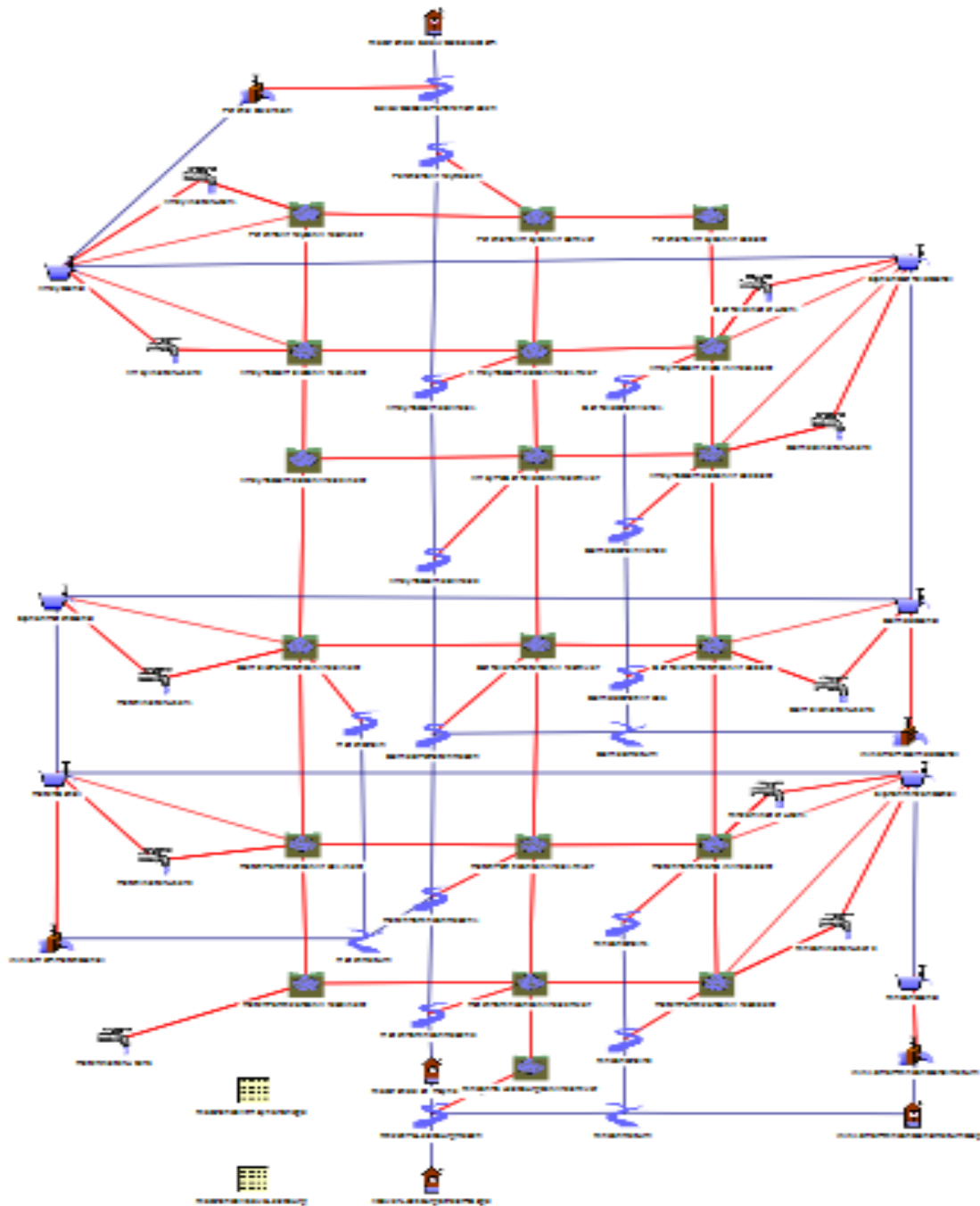
River Reaches in the Rincon Valley



Groundwater Objects in the Rincon Valley

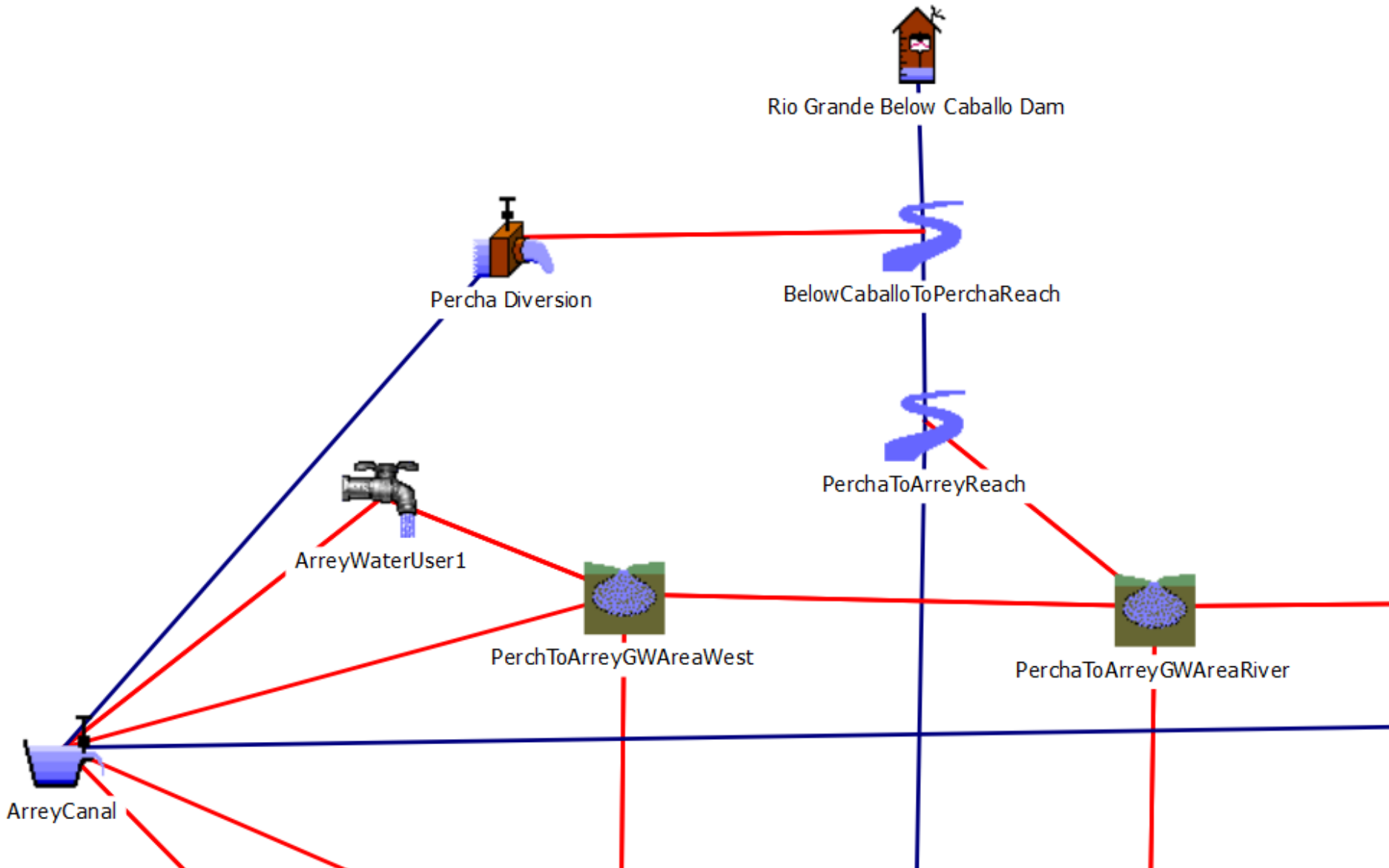


GWO-Name	ID	Area(acres)
PerchaToArreyGWAreaWest	1	2851.71
PerchaToArreyGWAreaRiver	2	647.32
PerchaToArreyGWAreaEast	3	925.39
ArreyToGarfieldGWArea1 West	4	1170.33
ArreyToGarfieldGWArea1 River	5	981.97
ArreyToGarfieldGWArea1 East	6	3122.05
ArreyToGarfieldGWArea2West	7	837.02
ArreyToGarfieldGWArea2River	8	1539.05
ArreyToGarfieldGWArea2East	9	3671.58
GarfieldToHatchGWArea West	10	4915.42
GarfieldToHatchGWAreaRiver	11	1440.68
GarfieldToHatchGWAreaEast	12	1936.93
HatchToRinconGWArea1 West	13	1352.89
HatchToRinconGWArea1 River	14	746.32
HatchToRinconGWArea1 East	15	2396.25
HatchToRinconGWArea2West	16	888.19
HatchToRinconGWArea2River	17	960.42
HatchToRinconGWArea2East	18	3254.84
RinconToLeasburgGWAreaRiver	19	1296.50

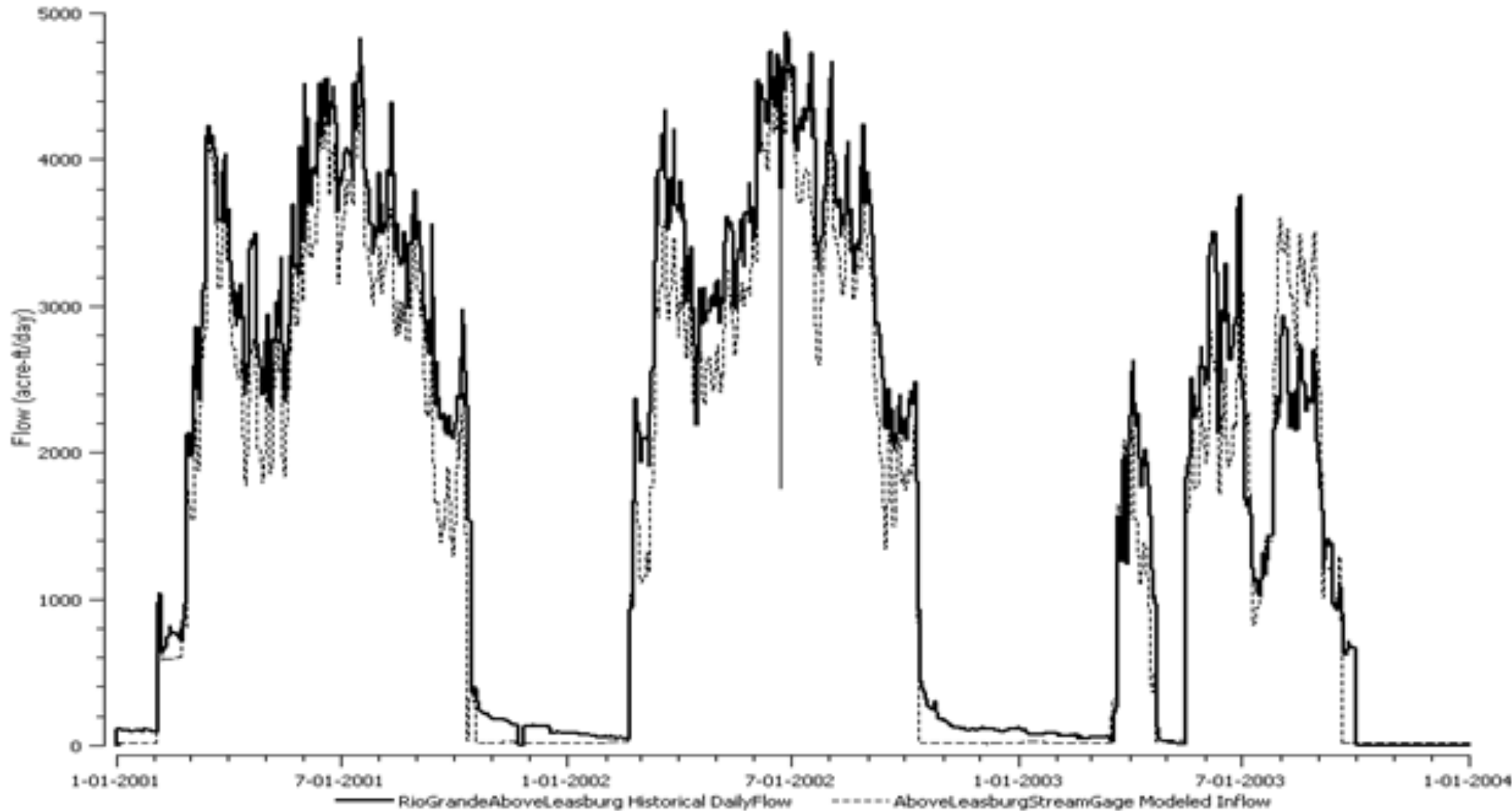


Rincon Valley RiverWare Layout

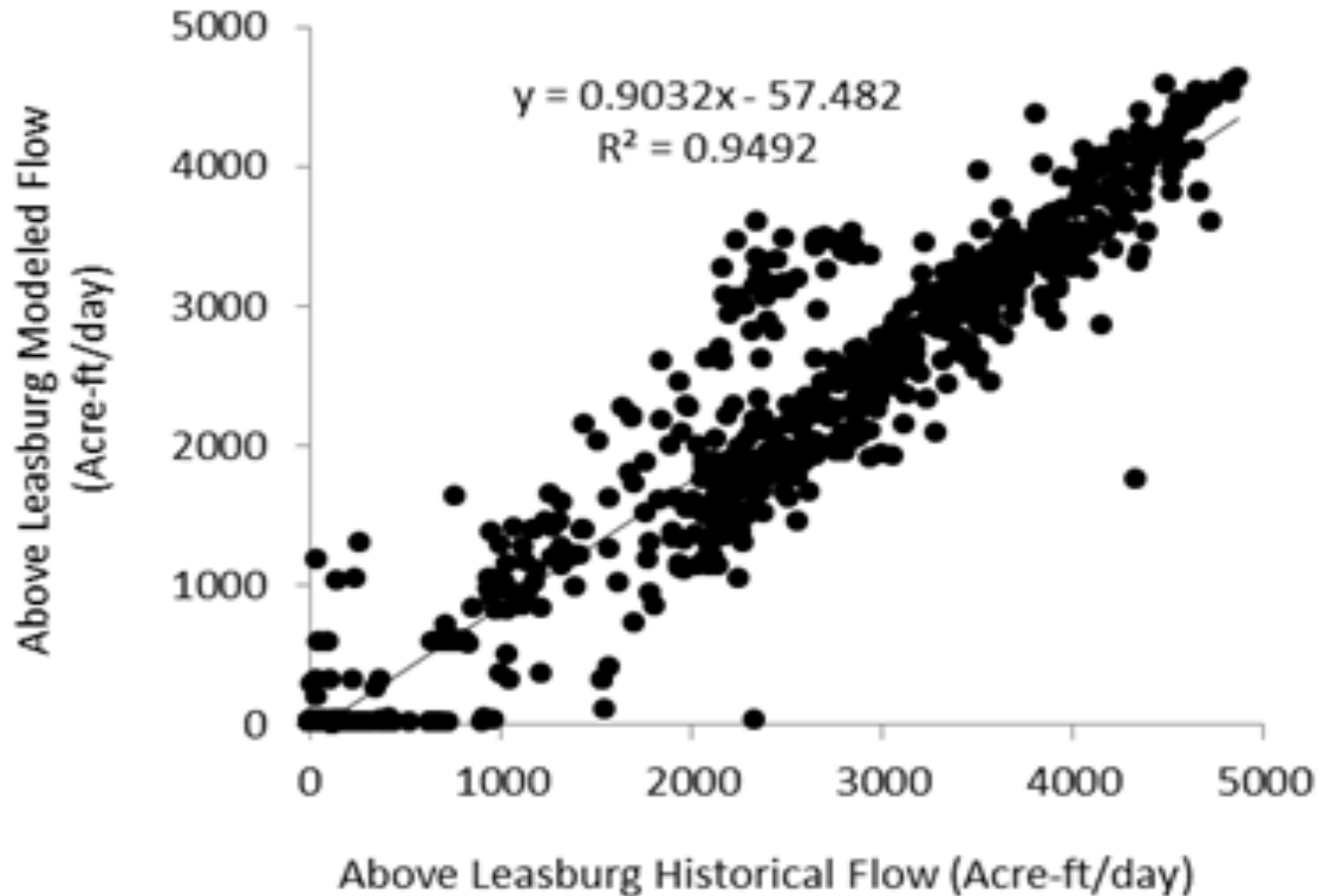
Rincon Valley RiverWare Layout



Rio Grande above Leasburg



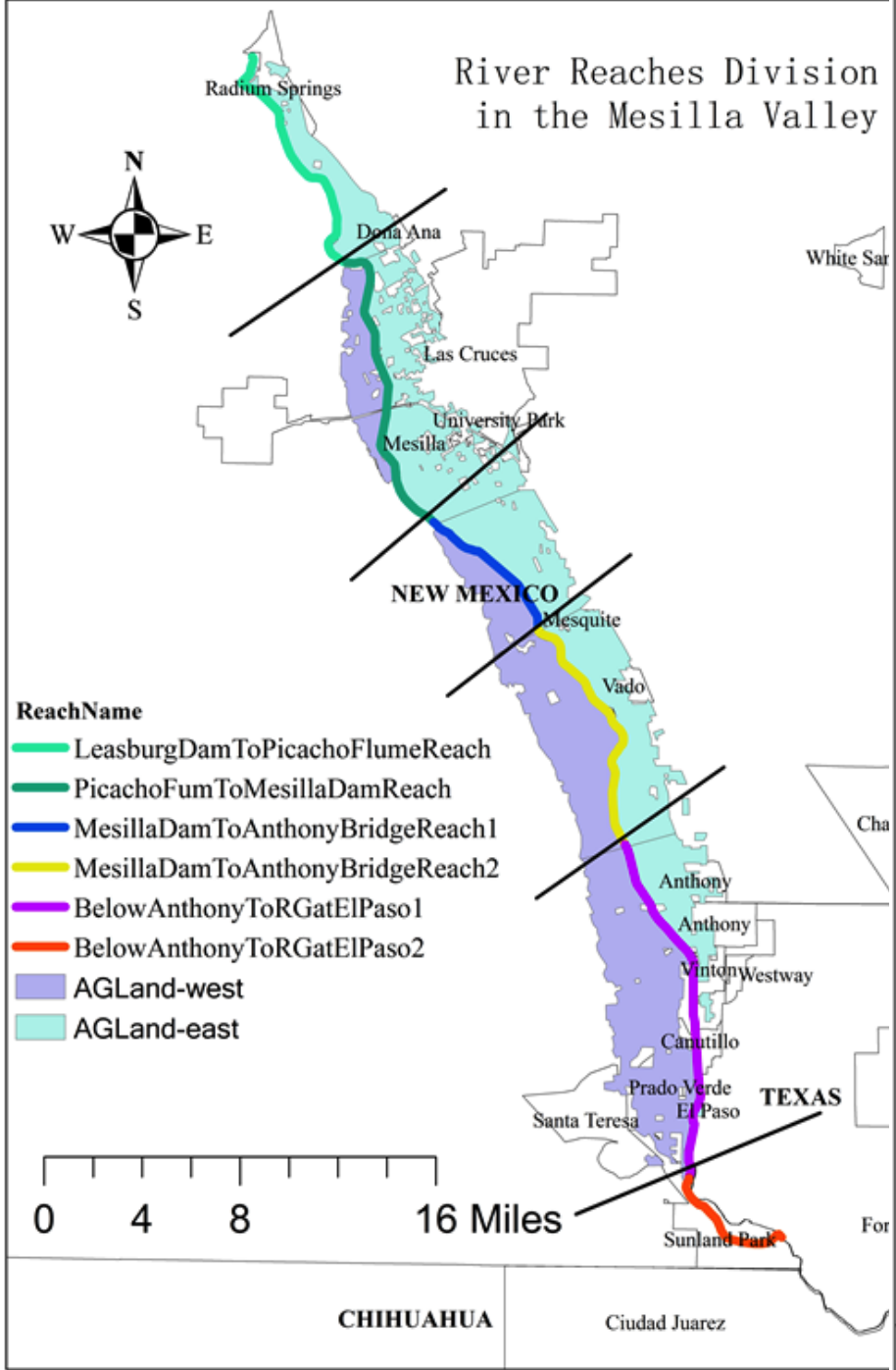
Rio Grande above Leasburg



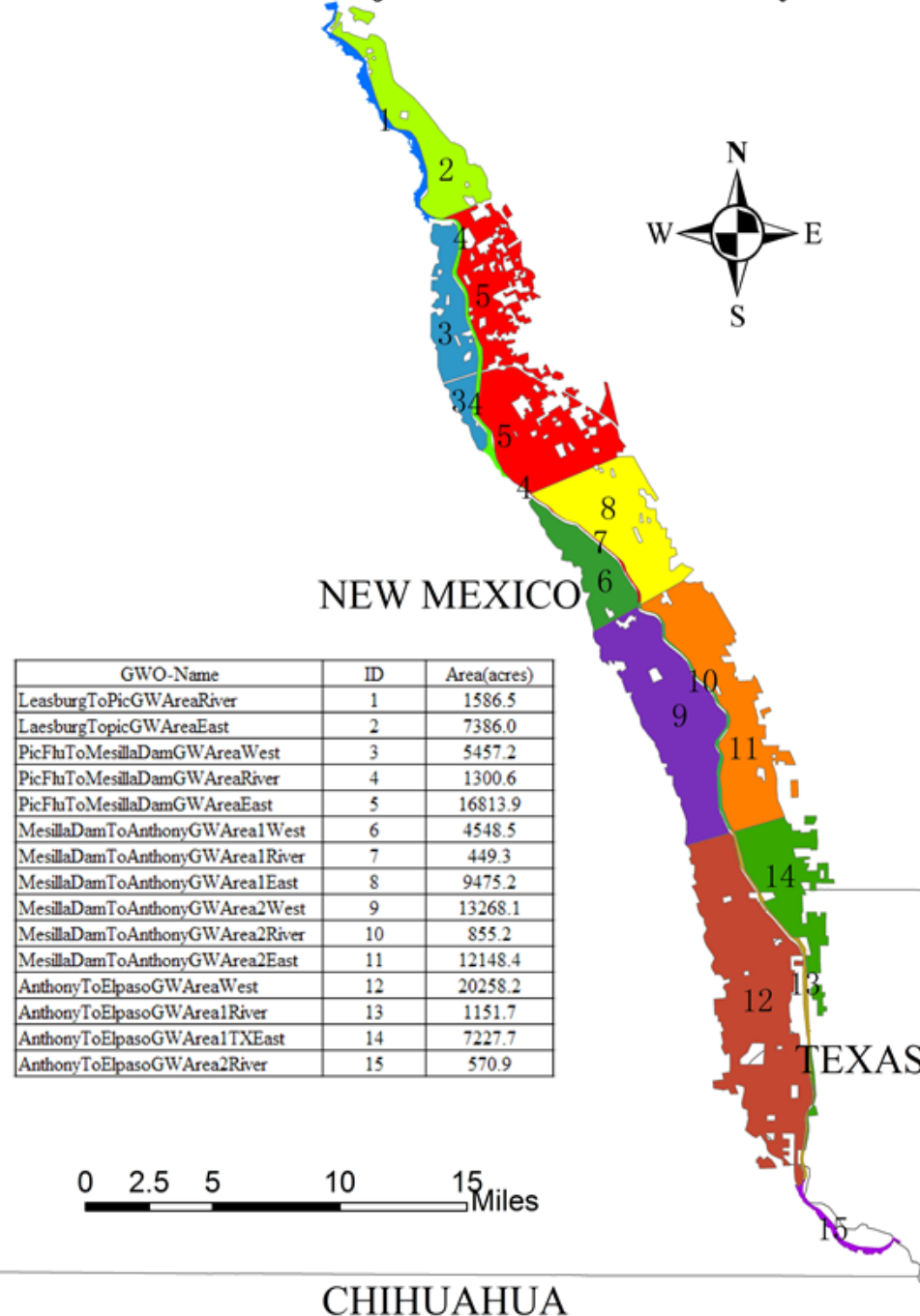
Mesilla Basin Model

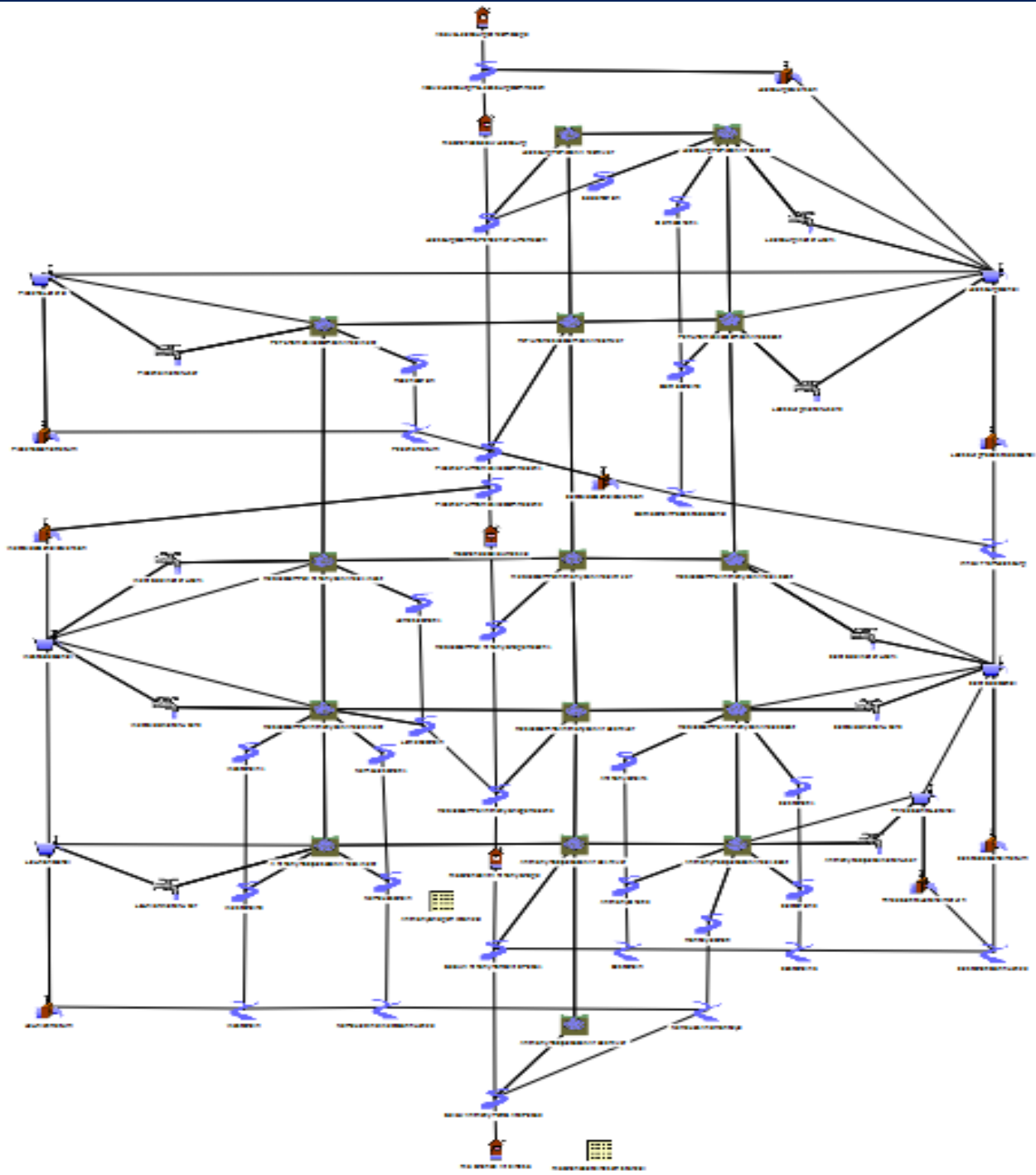


River Reaches Division in the Mesilla Valley

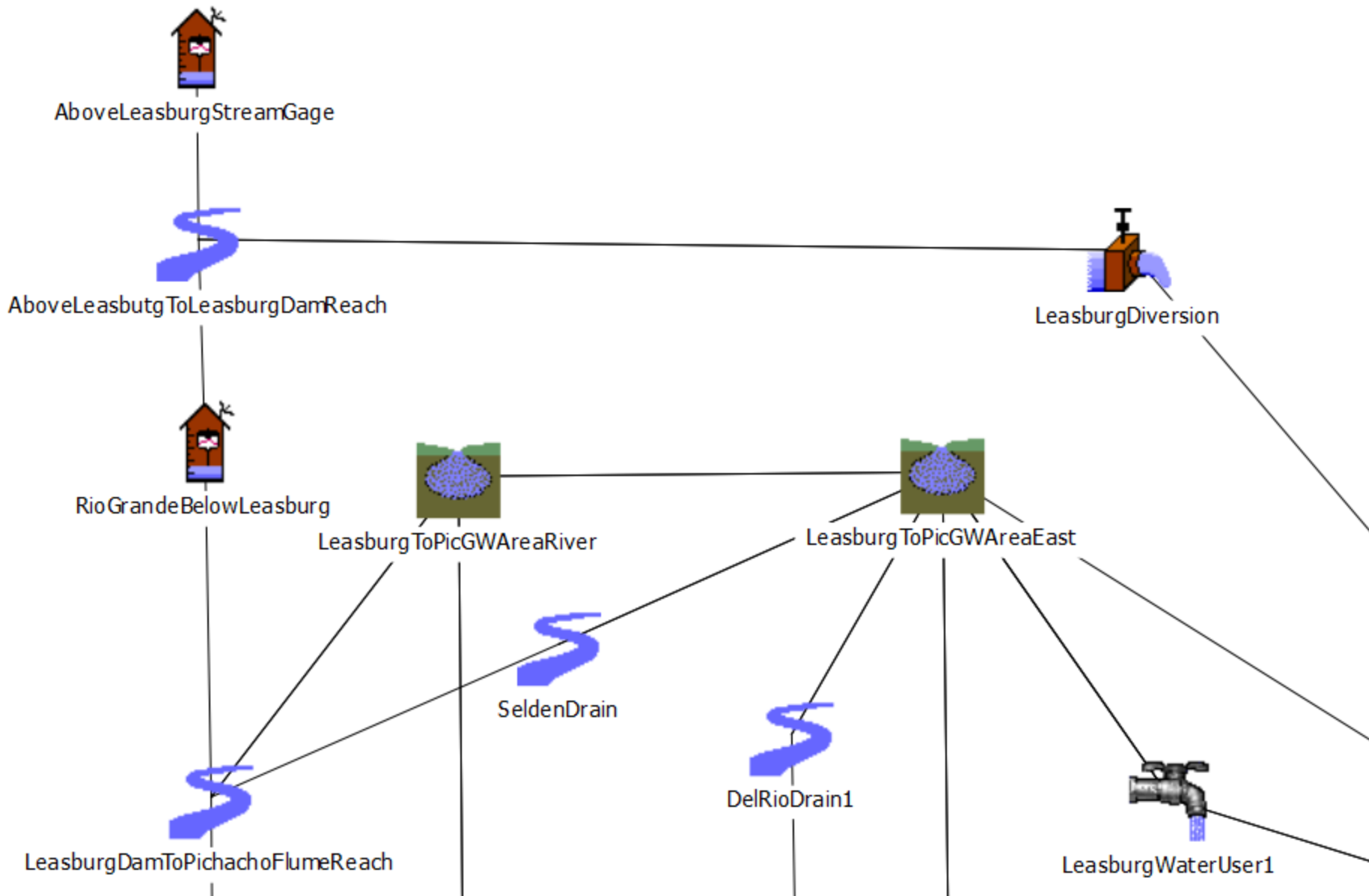


Groundwater Objects in the Mesilla Valley

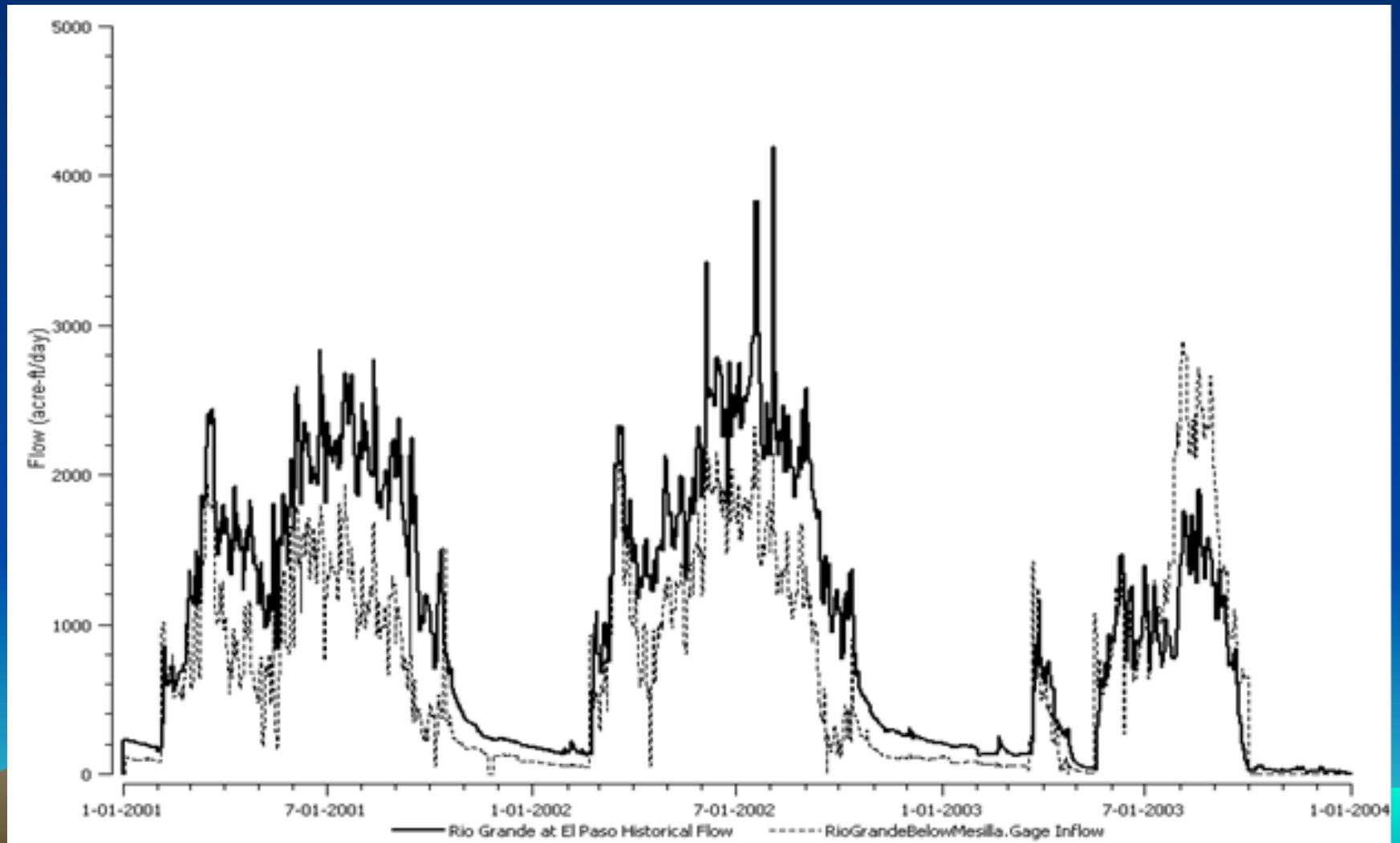




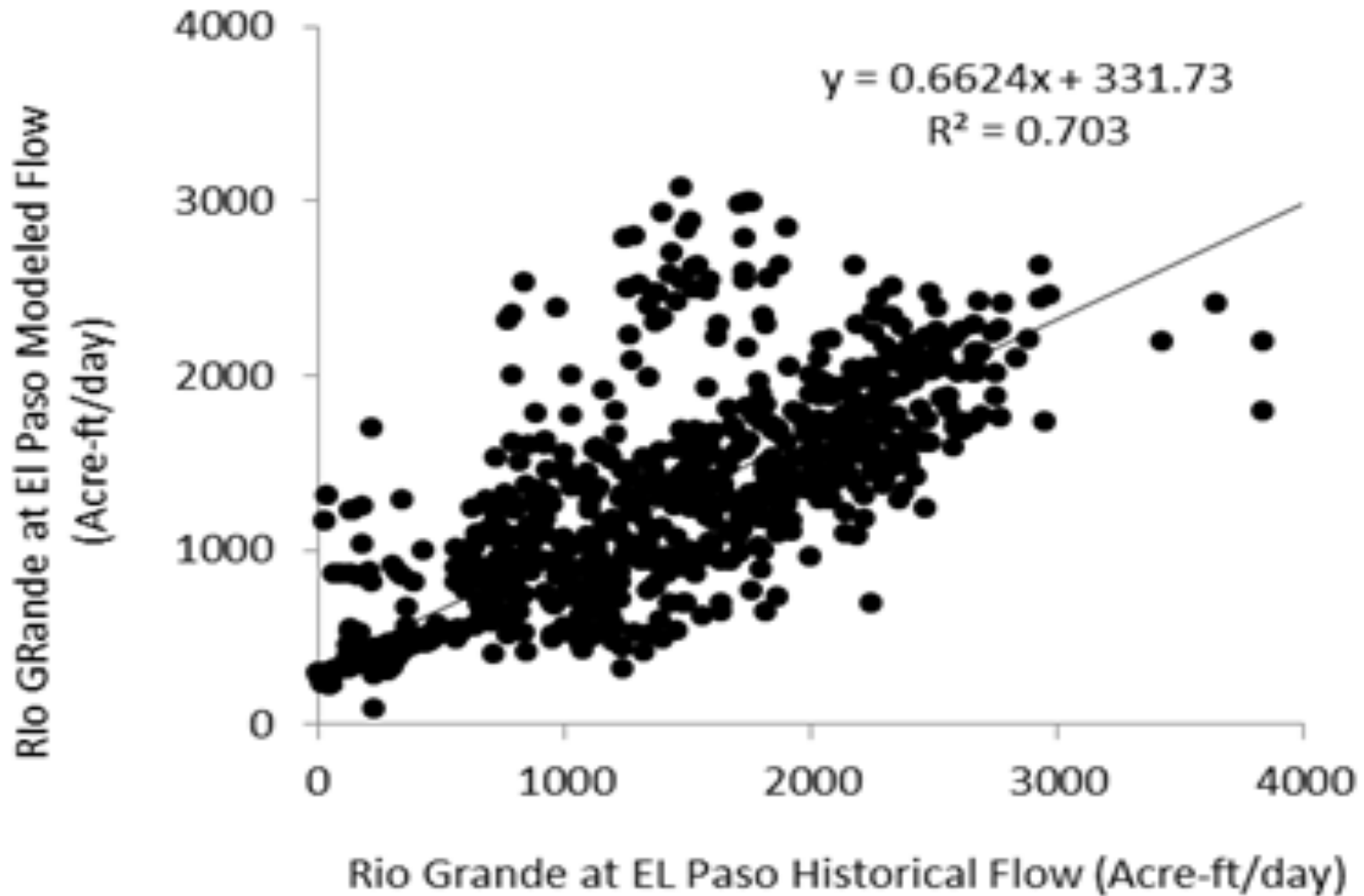
Mesilla Basin RiverWare Layout



Flow of Rio Grande at El Paso



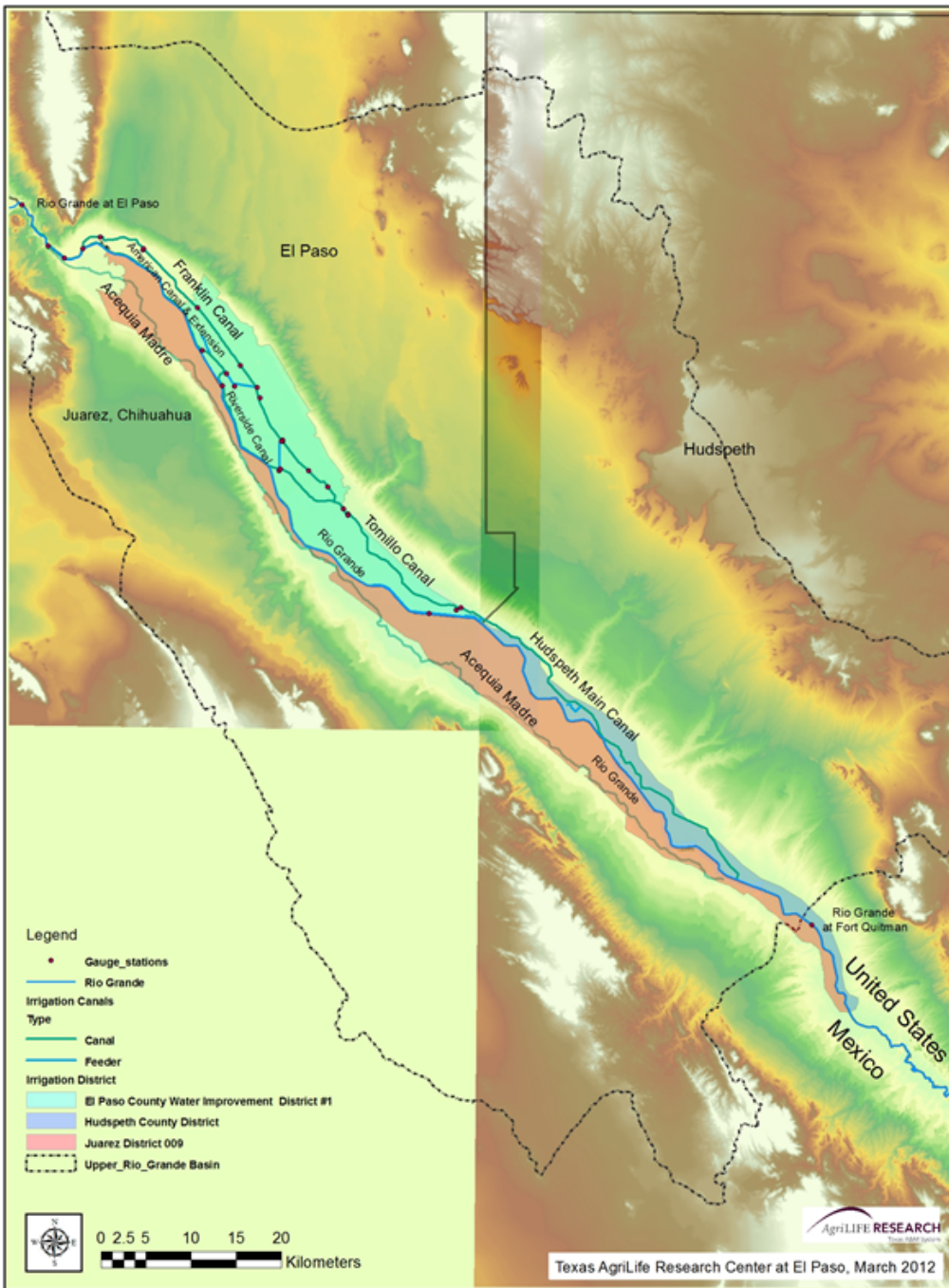
Rio Grande at El Paso



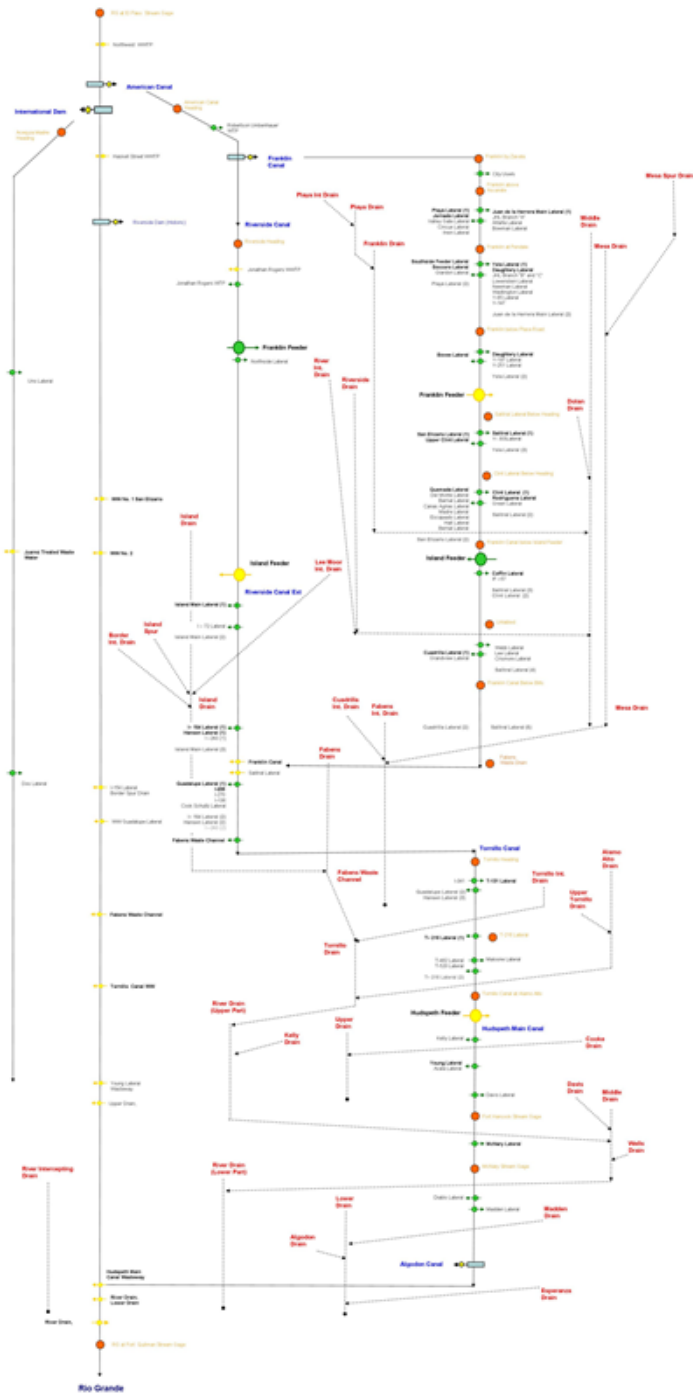
El Paso – Juarez Valley Model



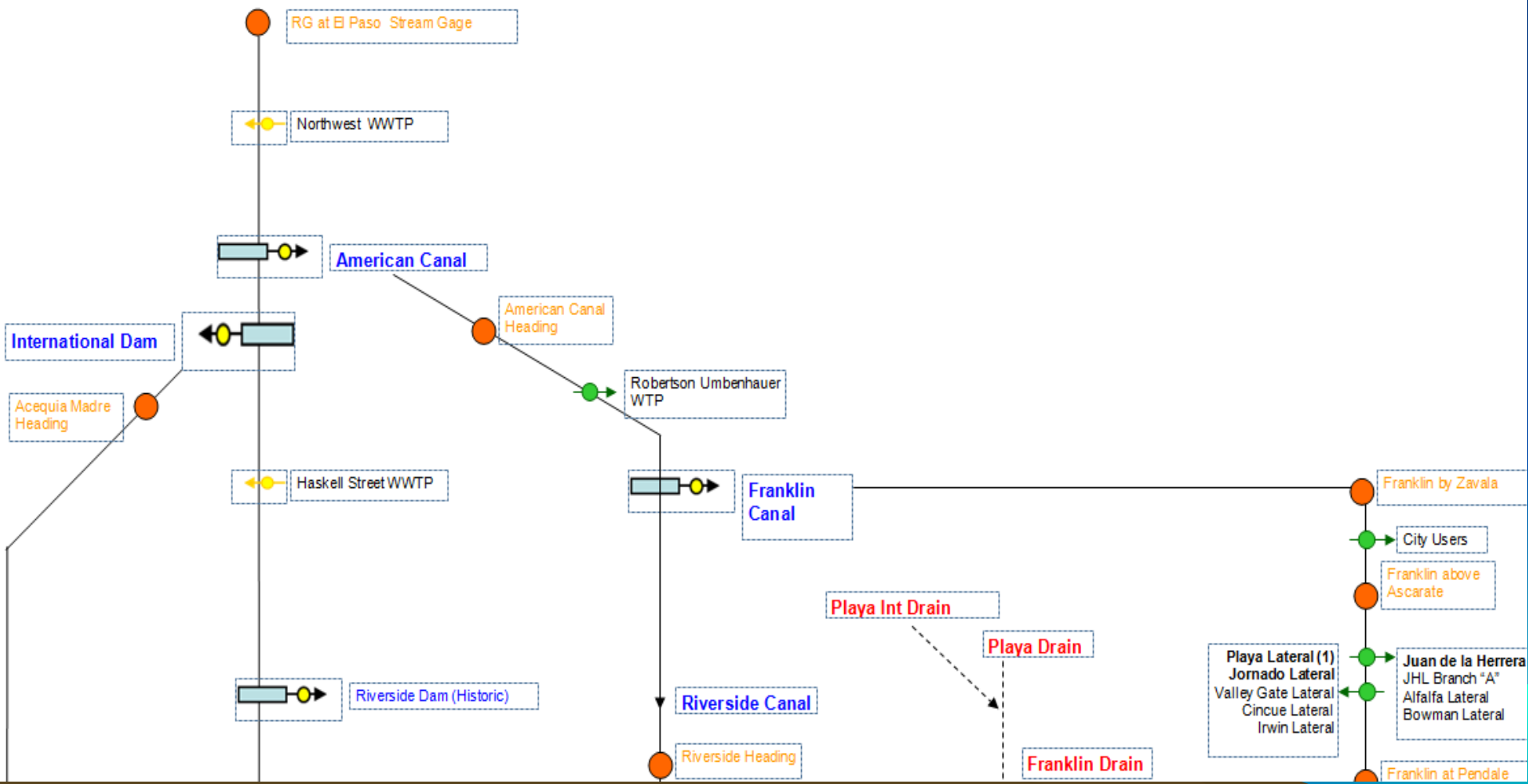
El Paso – Juarez Valley

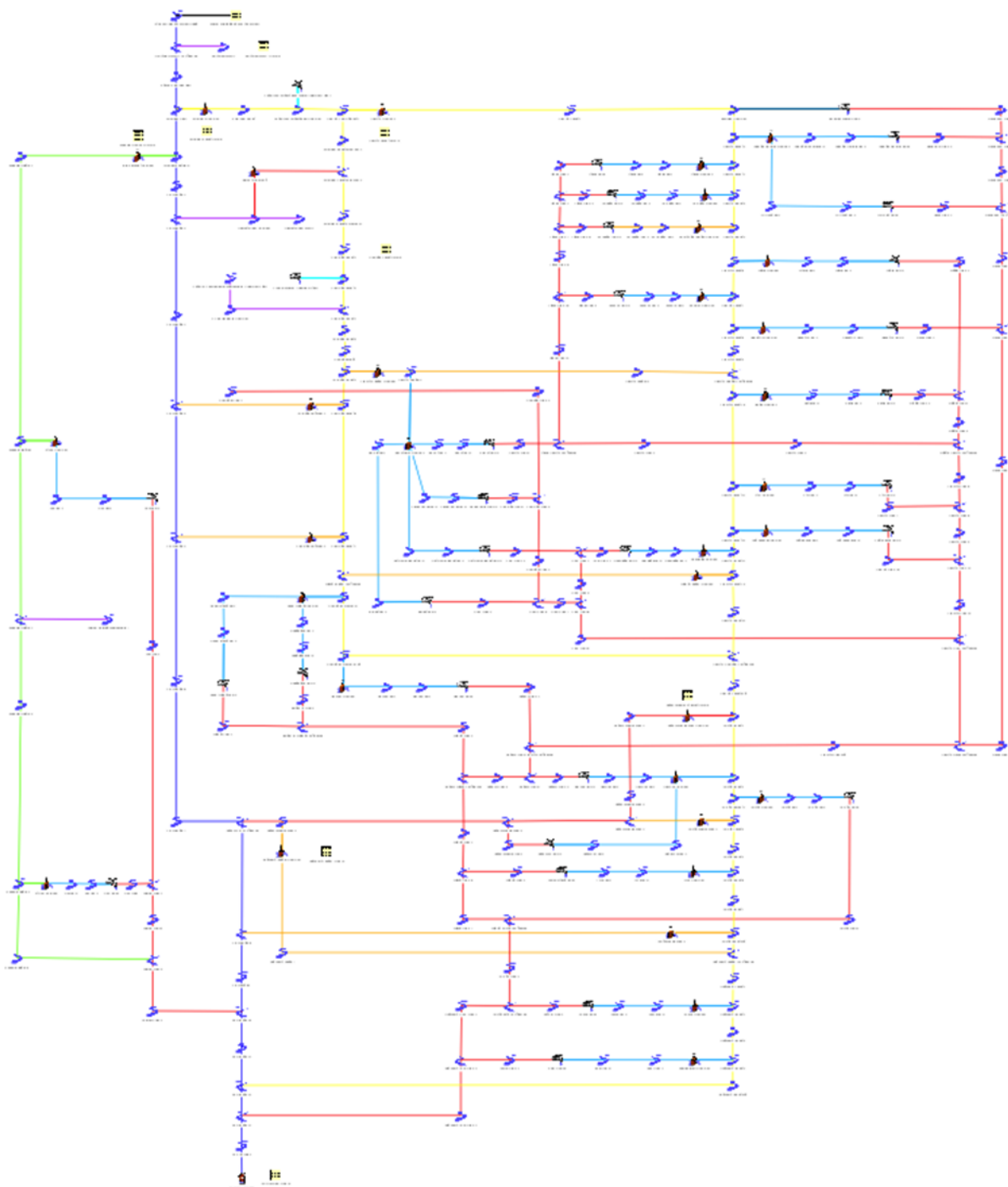


El Paso – Juarez Valley Conceptual Model



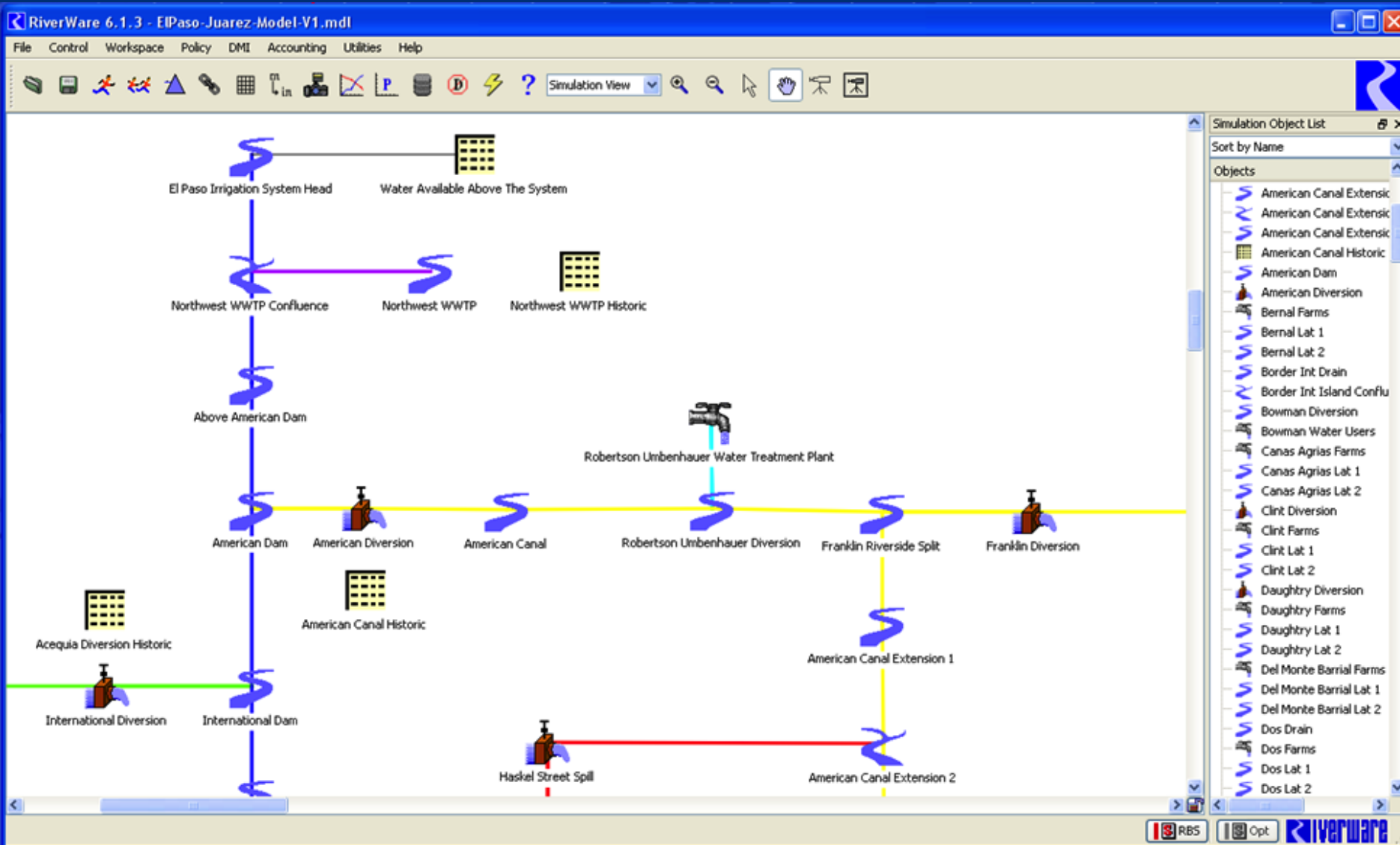
El Paso – Juarez Valley Conceptual Model





El Paso – Juarez Valley RiverWare Layout

El Paso – Juarez Valley RiverWare Objects



Rule set

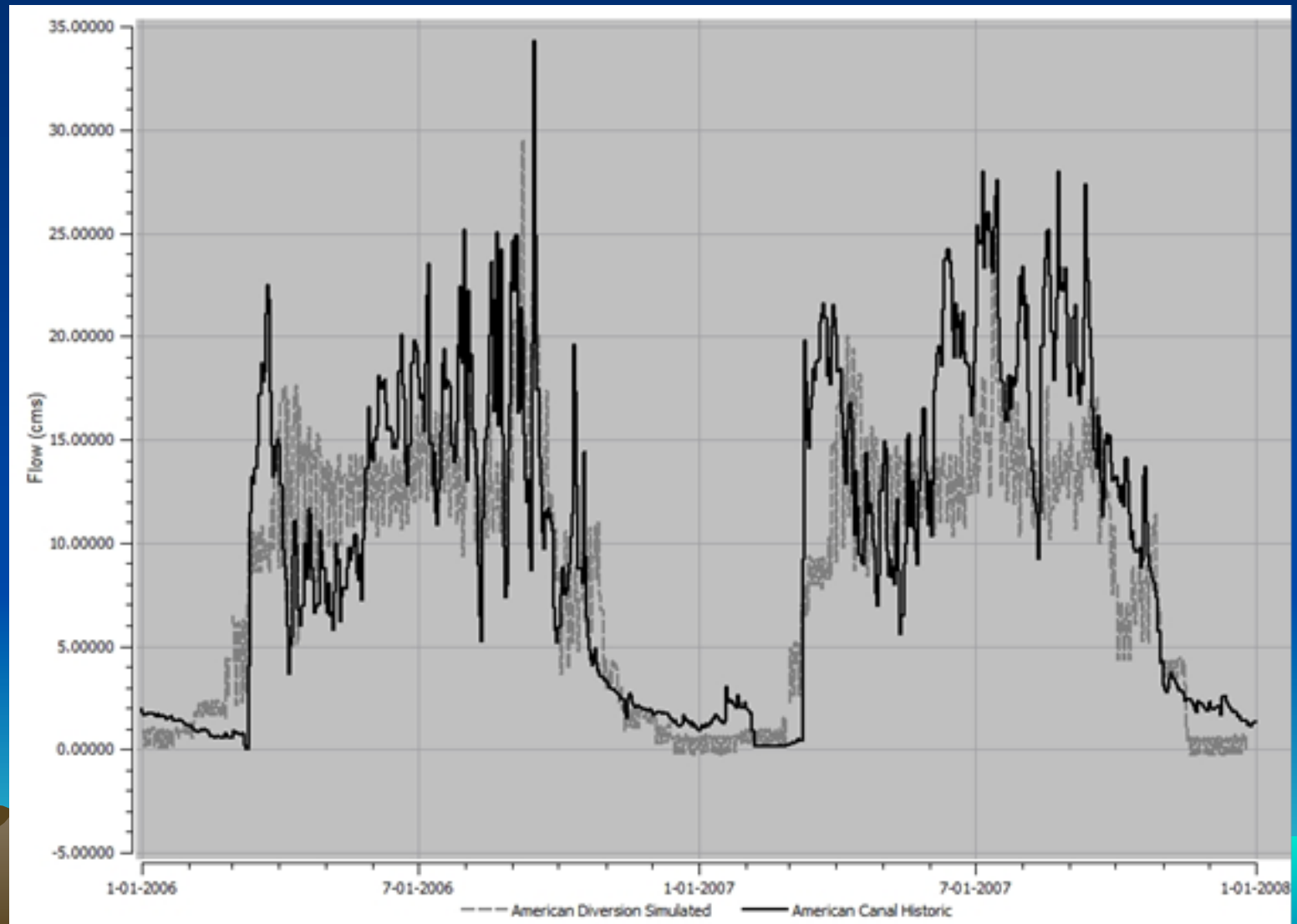
Rule Editor - "ElPaso-Juarez-Model-RulesetV1.rls : Policy Group : Hudspeth Feeder Rule"

File Edit Rule View

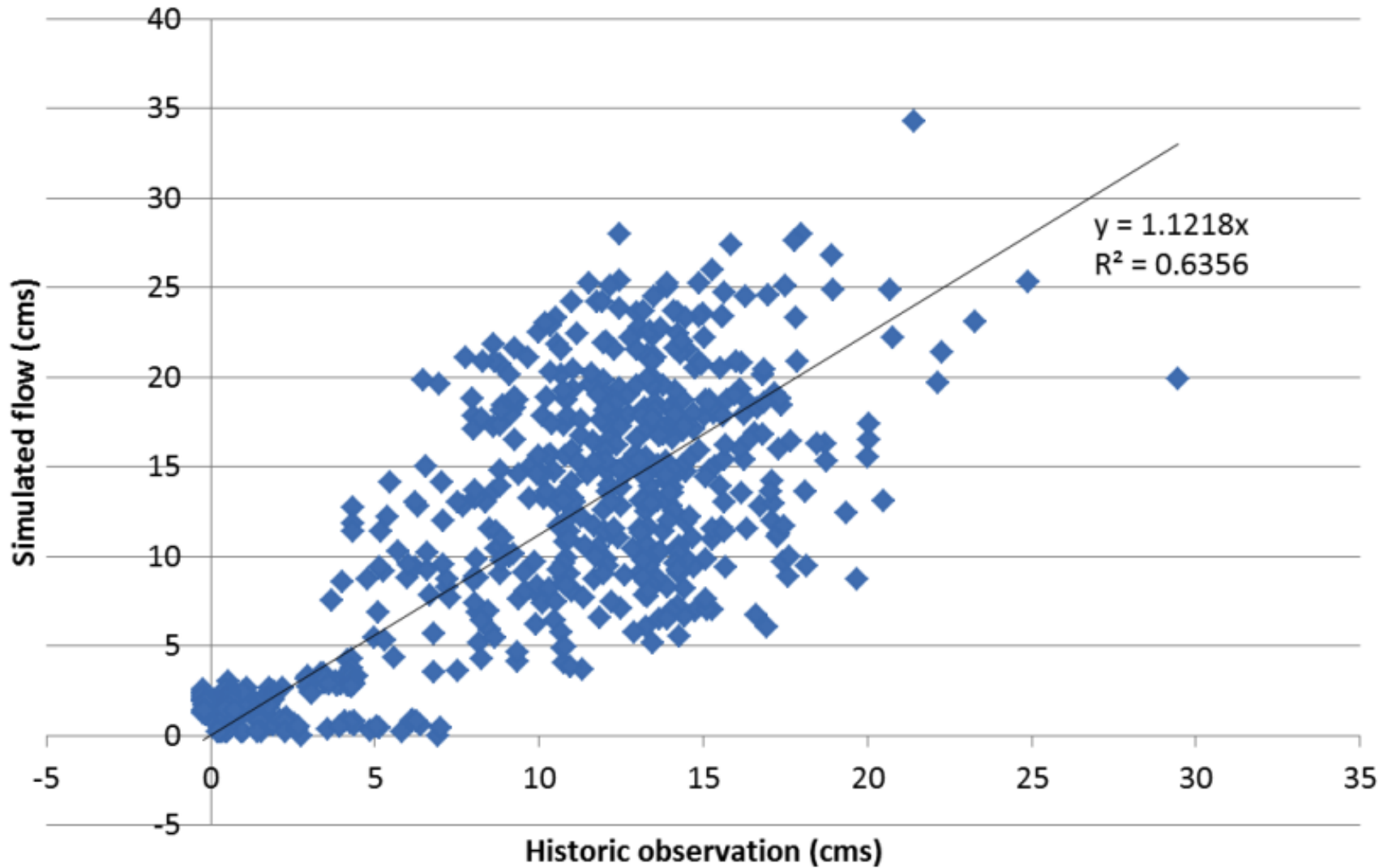
  Hudspeth Feeder Rule

```
IF ( Hudspeth Diversion Sent ( ) ) THEN
  IF ( All Fabens Drain Water Sent ( ) ) THEN
    Hudspeth Feeder.Outflow [ @"t + 4" ] = Fabens Waste Way 5.Inflow [ @"t + 4" ]
  ELSE
    Hudspeth Feeder.Outflow [ @"t + 4" ] = Hudspeth Feeder Confluence.Outflow [ @"t + 4" ]
  ENDIF
ELSE
  Hudspeth Feeder.Outflow [ @"t + 4" ] = 0.00000000 "cms"
ENDIF
```

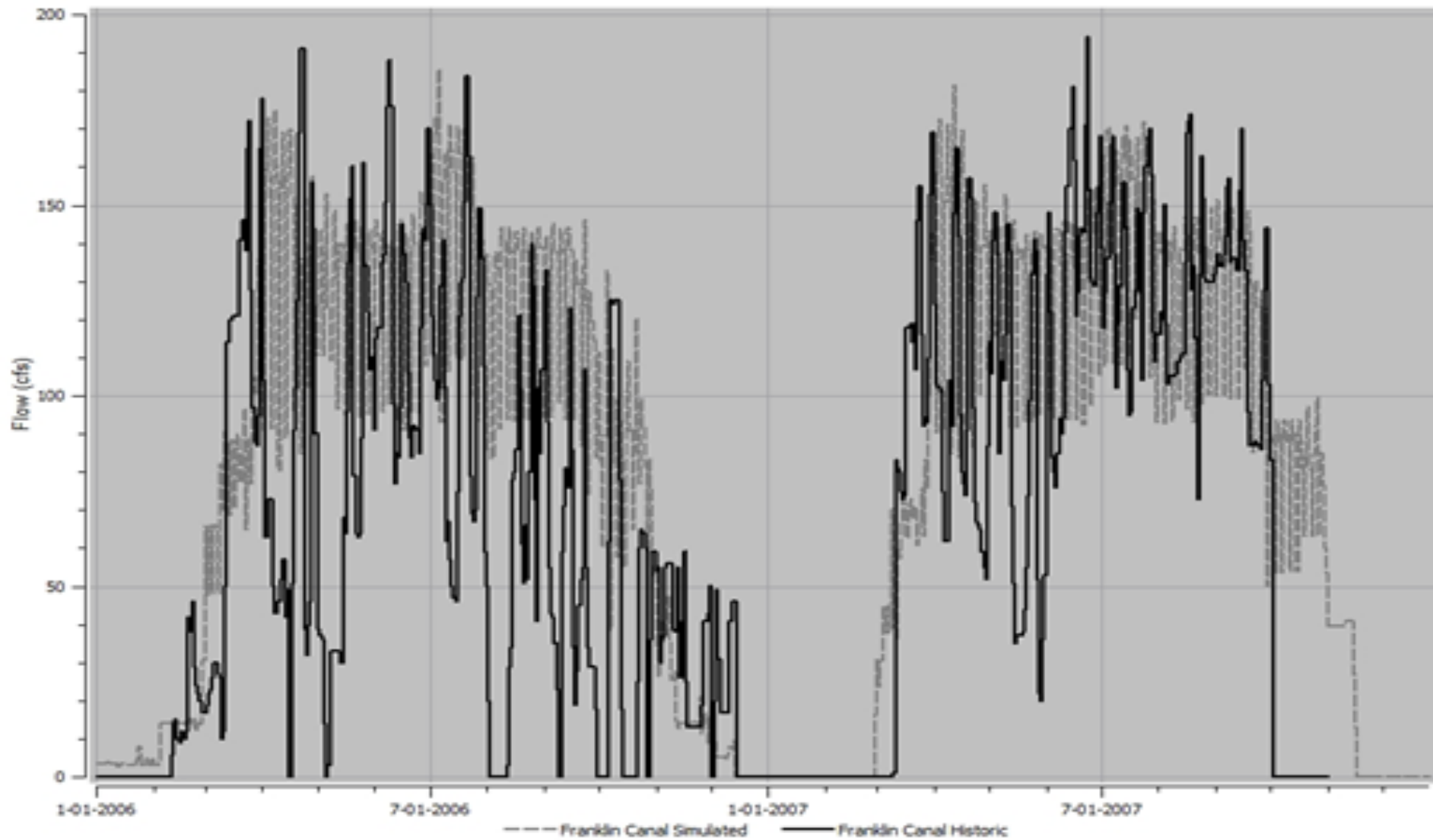
American Canal



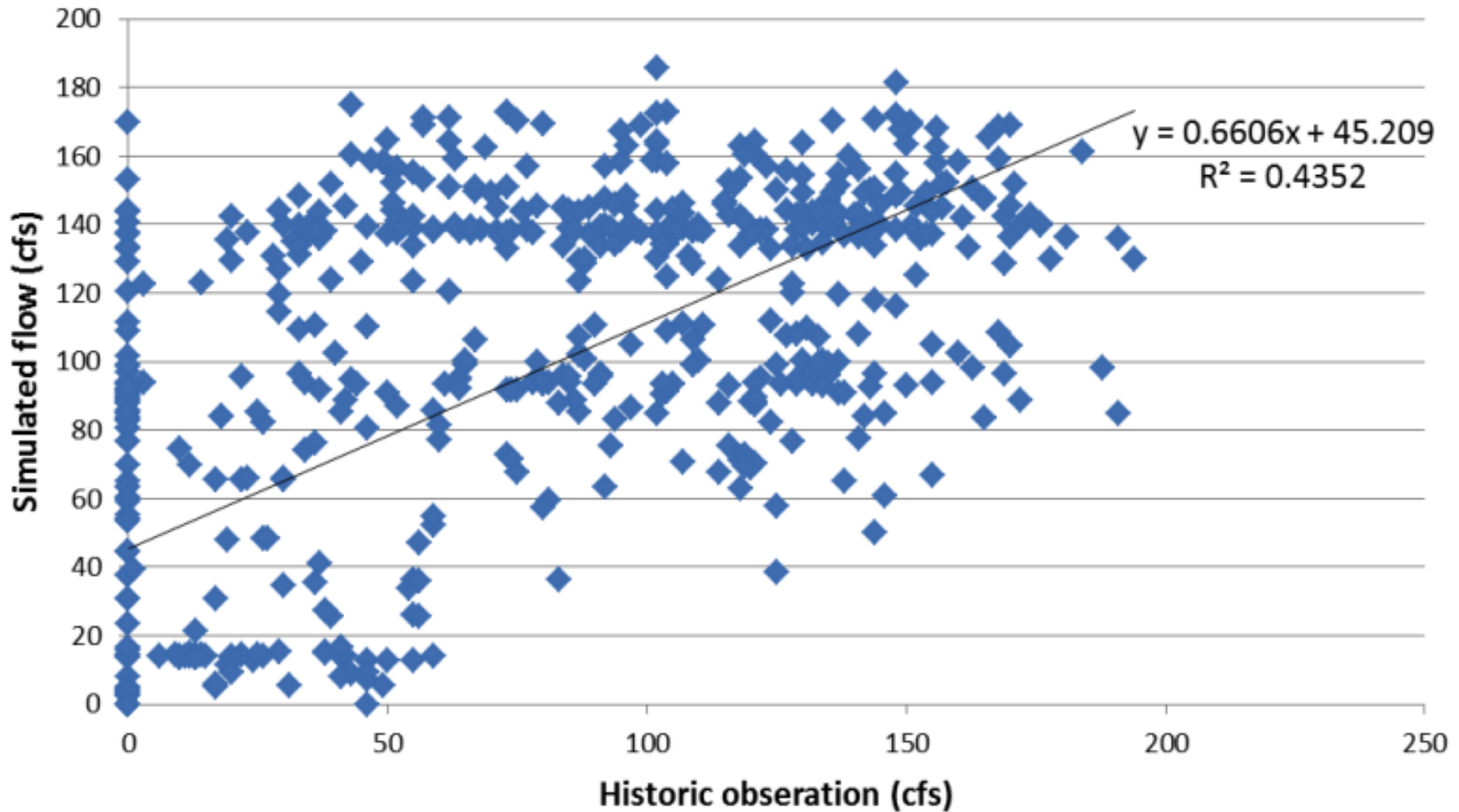
American Canal



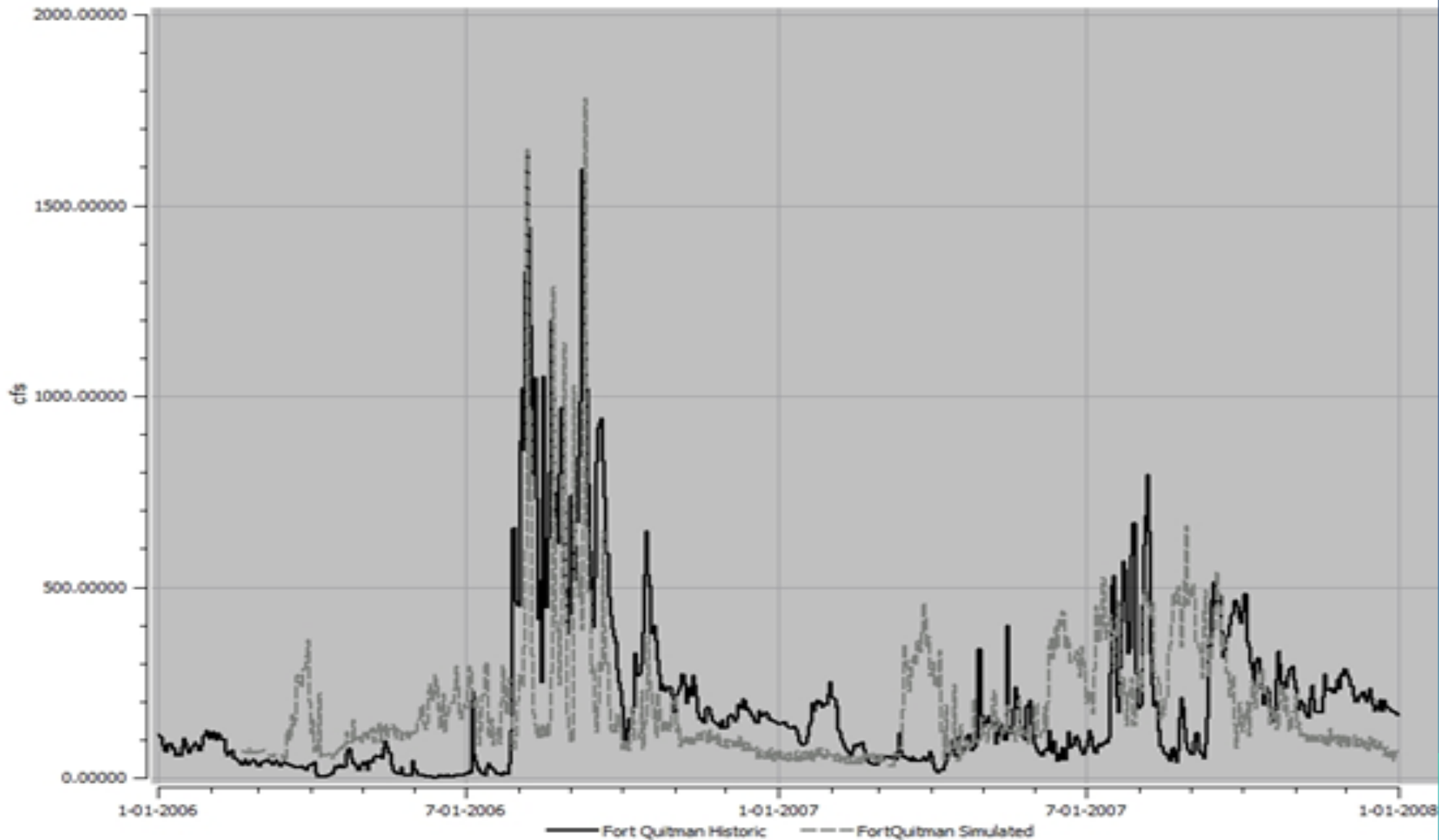
Franklin Canal



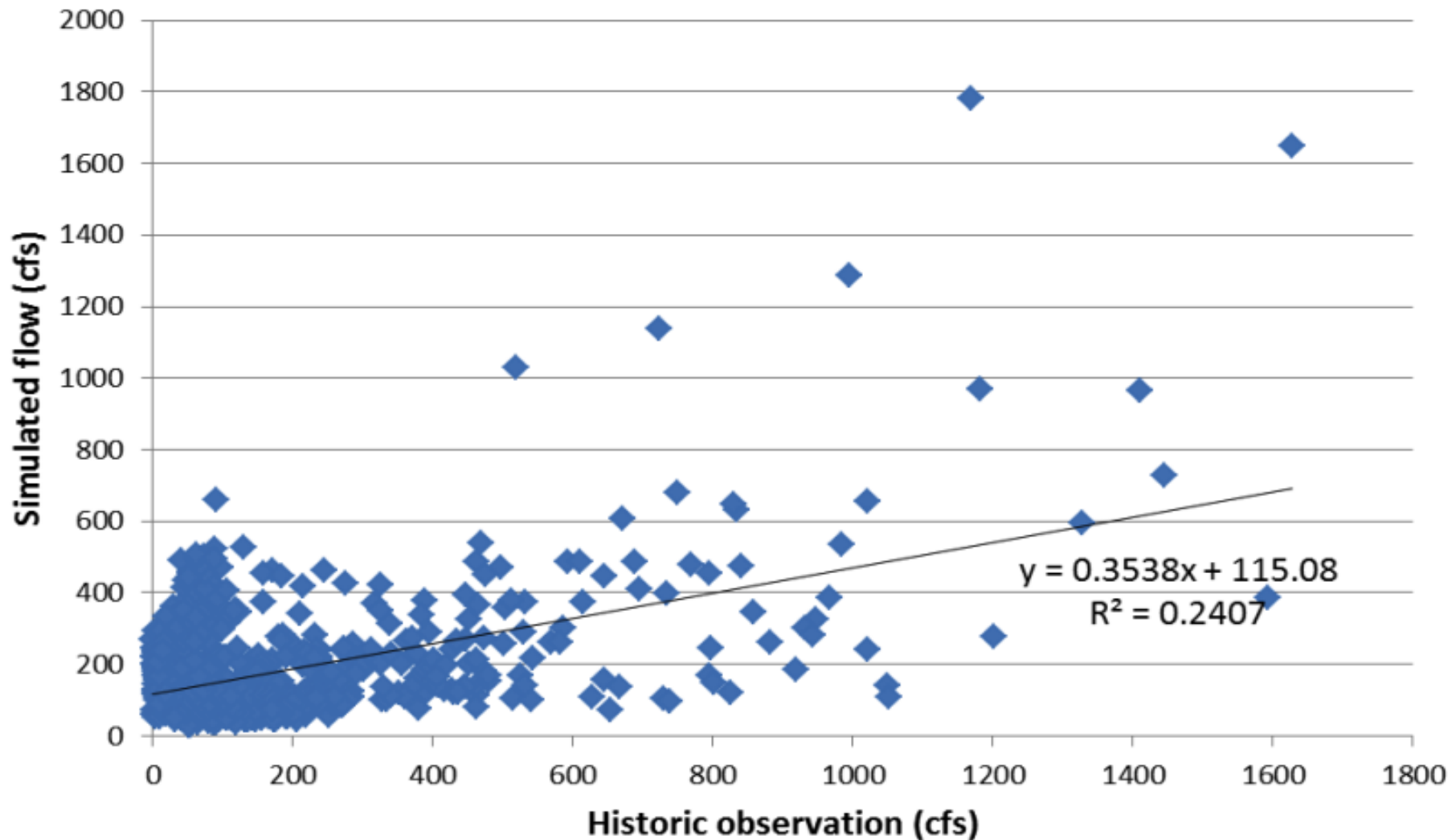
Franklin Canal



Rio Grande at Fort Quitman



Rio Grande at Fort Quitman



Recommendation for Future Work

- Enhancement of DB & GIS
- Enhancement of the RiverWare models
- Integration of models for the Rio Grande Project area
- Incorporate operations rules into the model
- Evaluation of different operations planning scenarios



Thank You!

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<http://www.pdnwc.org>