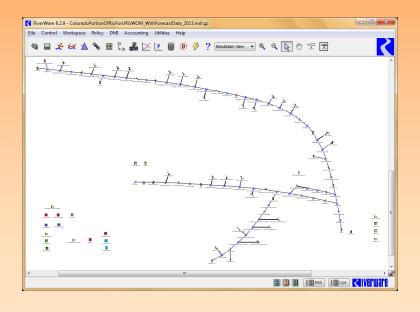
# RiverWare Model for the Colorado Portion of the Rio Grande Basin for Use with URGWOM



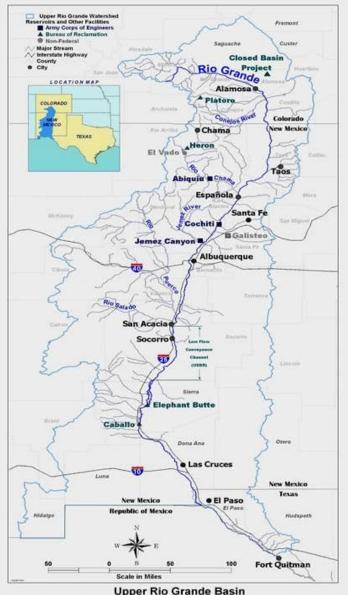
URGWOM Technical Team Meeting with Colorado Division of Water Resources at Division 3 Office, Alamosa, Colorado June 24, 2013



Lobatos Gage

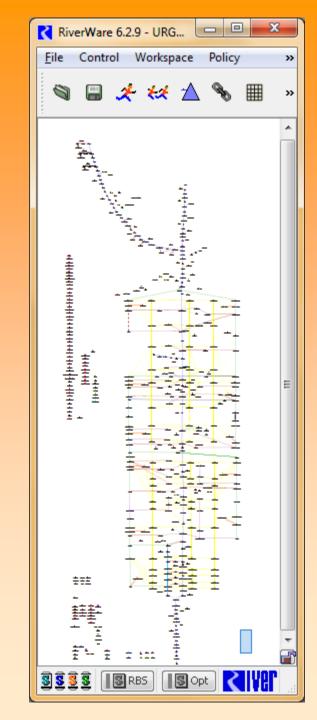
# URGWOM

- The Upper Rio Grande Water
   Operations Model (URGWOM)
   was developed through an
   interagency effort led by the
  - U.S. Army Corps of Engineers,
  - Bureau of Reclamation, and
  - New Mexico Interstate Stream Commission
  - with many other contributing and cooperating agencies.
- Used to simulate processes and operations of facilities in New Mexico.



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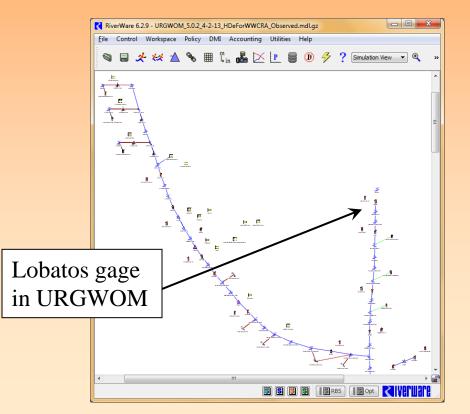
# URGWOM

- URGWOM was developed with RiverWare and is used extensively for
  - daily Accounting to track water for individual users including contractors for San Juan-Chama Project water,
  - planning studies to evaluate operations in New Mexico, and
  - preparing Annual Operating Plans (AOPs).

#### Modeling Needs for Colorado Portion of the Rio Grande Basin for Use with URGWOM

• For planning studies, it has been assumed that historical Lobatos flows would be repeated if the same upstream hydrology in Colorado is repeated.



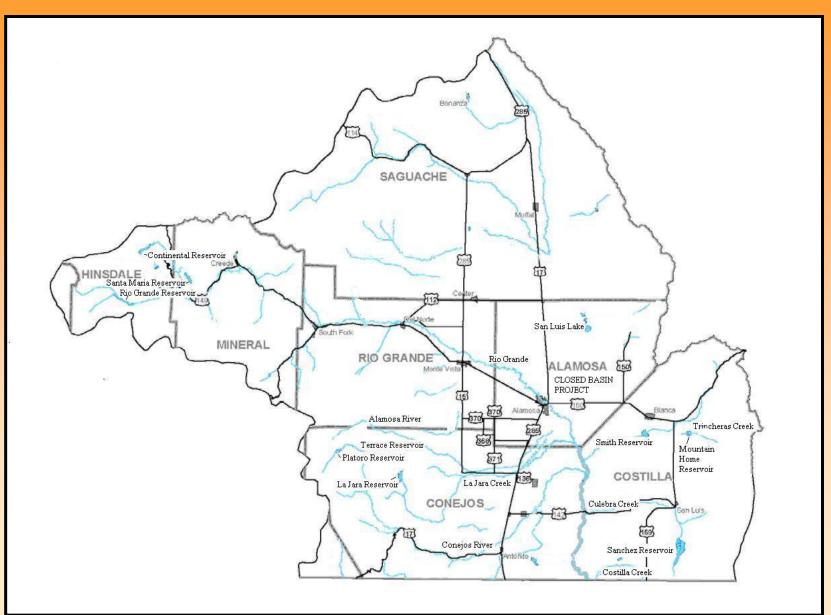


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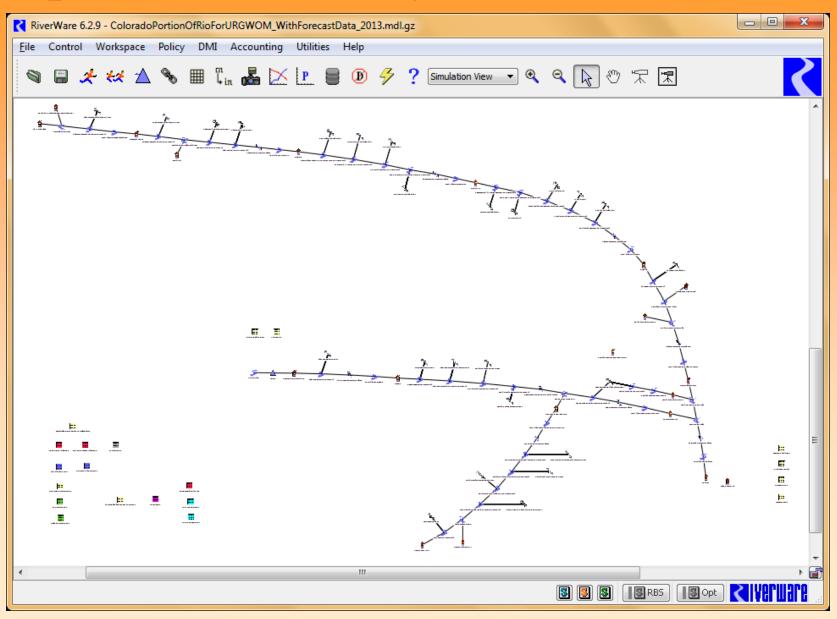
#### Modeling Needs for Colorado Portion of the Rio Grande Basin for Use with URGWOM

- For planning studies, it has been assumed that historical Lobatos flows would be repeated if the same upstream hydrology in Colorado is repeated.
- For AOPs, forecasted flows are provided by the Colorado Division of Water Resources.
- The Corps also needs a modeling tool for evaluating Platoro Dam flood control operations.

#### Rio Grande Basin in Colorado

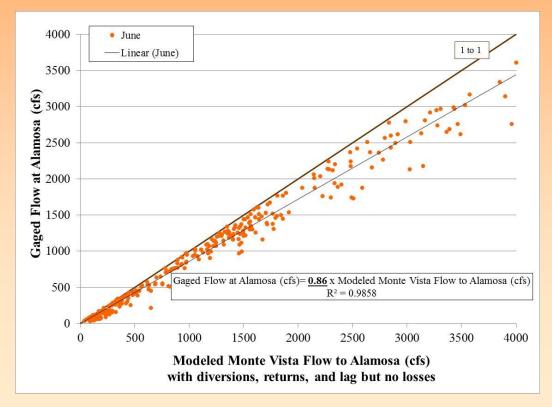


#### Representation of System in RiverWare



#### Methods for Physical Processes

- Monthly loss coefficients calibrated for major reaches between gages.
  - Coefficients reflect conveyance losses to open water evaporation, evapotranspiration, seepage.



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  - Three one-day lags from Platoro Dam to La Sauces.
- Evap and precip at Platoro Reservoir.

#### Diversions

• Diversions included for each physical diversion along the mainstem and for the Conejos River Basin as included on the call sheets for District 20 and 22.

				• Prelin				Water Resour Report - Divisio		rict 20				
											Date		10/19/11	
							Over/		Reservoir	Release		High		
				Content		Legal	Under		(cfs)	10.0050		Low		
		G.H.	Actual			Content	Legal	To River	To			Precip:		
Reservoir Rio Grande		42.20	(ac-ft) 9,930			(ac-#) 9.930	(ac-ft) 0	River	Headgate	Det	ver to	Remarks:		
Santa Maria		42.20	7,125			7,106	19					-		
Continental		30.79	2.029			2,000	29							
Beaver Park		49.15	1,623	_		1,647	-24	7.4	7.0	CPD's				
Total						20,683						-		
						Edymen								
Transmouri														
Delivery or Re	iease		To:				(cfs)		Today's	Status of	Reservoir	r Storage (a	ac-ff)	
Weminuche Pass Pine River Wem P										Priority Native	Trans-	Direct Flow	Com- pact	Exchan
fabor	699							Rio Grande		TRATING	9.797	PR/K	pact	133
Alliams-Squaw P	865							Santa Maria		6.970	136			100
Inanu na Pass						_		Continental			2.000			
Don La Font#1 D	itch .							Beaver Park			1,647			
Don La Font #2 D	Total						0.0	Total		6.970	13,580	0	0	1
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its near the nom Auth Div below	) /14/		-	395	617			s day TM import at I low at Del Norte (#1						Ę
IG at Monte Vista				82			5 Previous	s day compact store	-+2:+3) kae (#8 fror	opresious	divi			
auth Div bolow	MV			67			6. Previous	s day direct flow sto	rage (net a	t Dei Norte	e)			
RG at County Lin				42			7. Comput	ted flow at Del North	a (#4+#5+#					Ę
Auth Div bolow	CL			82			8. Today's	compact storage			% of # 7			
RG at Alamosa. Auth Div below.	442			81 26				direct ourtailment daustments (+ or -)		0	% of # 7			
CBP at Gage	nu.			28				ted available in prior	ity at Del N	orte (#7 - 1	<b>2</b> 90			E
RG above Trinche	ra Creek			51			12 Total av	allable for diversion	DM (all not	mone's 1911	- #9 - #10			-
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Conejos at LaiSau RG at Lobatos	505			119 160			13. Nafive v	vater available for d	iversion [#4	-09-010	4			
RG at Lobatos		Amount		160 Previo	as Day		13. Native v	vafer available for d	iversion [#4	- #9 - #10	1	Previous	Day	6
RG at Lobatos	Avail	Not	DF	160 Previo Res	as Day	TM	Actual	vater available for d	Avai	-#9-#10 Amount Not	DF	Previous	TM	6 Actua
RG at Lobatos	Avail In	Not Diverted	Storage	Ptevio Res Release	as Day	Water	Actual Div-	vater available for d	Avail	- #9 - #10 Amount Not Diverted	DF	Provious Res Release	TM Water	Actua Div-
Ditch	Avail	Not		160 Previo Res	as Day		Actual Div- ersion	Ditch	Avai	-#9-#10 Amount Not	DF	Previous	TM	6 Actua
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Ditch San Juan Sering Ranch Jessup 5. Fork Highline Inaconda	Avail In Priority 0.0 0.0 0.0 0.0 0.0 0.0 7.7	Not Diverted	Storage	Ptevio Res Release (+)	as Day	Water	Actual Dir- ersion 0.0 0.0 0.0 0.0 0.0 0.0	Ditch Ditch Silva Atencio No. 2 McDonald Prairie Nacte Veta Cenal	Avai In Priority 16.8 14.4 3.0 0.0	Amount Not Diverted (-) 3.0	DF	Provious Res Release	TM Water	Actu Diversio
Ditch San Juan Ipring Ranch Iessup 5. Fork Highline Inaconda Iesdow Gien	Aval In Priority 0.0 0.0 0.0 0.0 0.0	Not Diverted (*)	Storage	160 Provio Release (+) 2.5	as Day	Water	Actual Dis- ersion 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Ditch Silva Mencio No. 2 McDonald Prairie Norte Vista Canal RIS & Piedra San Joree or Lucere	Avai In Priority 16.8 4.0 14.4 3.0	Amount Not Diverted (-) 3.0	DF	Provious Res Release	TM Water	Actu Diversio
Ditch San Juan Sering Ranch Jessup S. Fork Highline Ivaconda Jeadow Gien Jinor	Avai In Priority 0.0 0.0 0.0 2.5 7.7 3.3 14.5 0.0	Not Diverted (*) 4.2	Storage	Ptevio Res Release (+)	as Day	Water	Actual Dir- ersion 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Ditch Ditch Silva Meencio No. 2 MicDonald Phane Ris & Piedra San Jose or Lucero Piace	Avai In Priority 16.8 4.0 14.4 3.0 0.0 42.9 1.4	Amount Not Diverted (-) 3.0	DF	Provious Res Release	TM Water	Actu Diversio
Ditch Ditch San Juan Ipring Ranch lessup 3. Fork Highline Iwaconda Ileadow Glen Ifror Welfer Medpendent #2	Aval In Priority 0.0 0.0 2.5 7.7 3.3 14.5 0.0 0 17.4	Not Diverted (*)	Storage	160 Provio Release (+) 2.5	as Day	Water	Actual Div- ension 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Ditch Silva Atencio No. 2 McDonald Pracie Morte Velta Canal Ris & Pedra San Jose or Luciero Pace Marajo	Avail In Priority 16.8 4.0 1.4.4 3.0 0.0 42.9 1.9 1.4 0.0	Amount Not Diverted (-) 3.0	DF	Provious Res Release	TM Water	Actu Diversion 1
Ditch Ditch an Juan ening Ranch essup i. Fork Highline naconda leadow Gien finor Teelfer referent #2 noblauch	Avail In Priority 0.0 0.0 2.5 7.7 3.3 145 0.0 17.4 0.0	Not Diverted (*) 4.2	Storage	160 Previo Release (+) 2.5 3.0	as Day	Water	Actual Div- ersion 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Ditch Silva Atencio No. 2 McDonald Pratie Morte Vista Canal RS & Pedra San Jose or Lucies Pace Margio Star	Avail In Priority 168 4.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Amount Not Diverted (-) 3.0	DF	Provious Res Release	TM Water	Actu Diversion 1 1 1
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Dicksh an Juan geng Ranch lesspe 5. Fork Fightine Inscords Inscords Inscord Can Market C	Avail In Phiothy 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 174 0 0 0 0 0 25 777 73 38 38 38 38 32 0 0 0 0 0 27 32 33 32 0 0 0 0 0 20 32 32 30 0 0 0 0 0 20 5 77 77 77 77 77 77 77 77 77 77 77 77 7	Not Diverted () 10.9 16.1 10.9 10.9 10.9 10.9 10.9 10.9 10.9 10	Storage (*)	160 Previo Res Release (*) 2.5 3.0	as Day	Water (+)	13. Name + Actual Diversion 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Ditch Sha America No. 2 MacDonal America No. 2 MacDonal America No. 2 MacDonal America No. 2 Margio Sour Source No. 2 Margio Source No. 2 Margio S	And In Prosty 1658 40 00 00 1566 62 20 10 10 20 10 20 10 20 10 10 20 20 10 20 20 20 20 20 20 20 20 20 20 20 20 20	-#9-#10 Not Deserted 10 10 10 112 78 31 31 374	DF	Provious Res Release	TM Water	E E Actu Dir- ersion 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
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Date:						Prehr	ninary report	t subjec	t to char	91									
11-May-10							Distric		Divid	lee '	2								
Curtailment	20%					Con	ejos Riv												
	20%					Con	ejos Kn	ver D	aina	je c	ansnee	FL.							
Delivery %					10-May-10								10-May-10						
Upper					Avg 930.9		Lower						Ave 509.3						
Conejos @ N							North C												
Los Pinos @						cfs	South (							cfs					
San Antonio						cfs			ower	Inde	x Tota	I	515.3	cts	-				
Platoro Char	nge in St					cfs													
			Total		2263.1	cfs	San An					a	745.2						
Calculated c			453				Rio Gra	ande	@ Lo	bato	IS		654.1	cfs					
Available for	r Diversi	on	1810	cfs	1384														
Readings taken a	at Midnight		A	F	AF	AF	Over/	CF	s	0	FS	AF	AF	A	F	AF			AF
	G.F	4.	Act	ual	Legal	Working	Under	A			Ave.	Direct	Direct	Pro	ect	Proje	ect	Ca	mpact
Reservoir	(lea	6)	Con	tent	Conter	t Legal	AF	Infi	w	0	tflow	Store in	Store Out		1	Ou	t .	Store C	but
Platoro	1000	0.30	3115	95.8	30670.	4 31214.6	-18.8	19	9	4	0.07	0.0	0	31	5.3	0.0			0.0
Trujilo Meadows	22	7	744	4.0	31-Aug-I	9 0		8			8								0
Compact Storage	e		0	0															
Last Prio Served		CWCD	Project			Last Prio Served	San Anto	nio	AliCor	npact									
	Native	DF	DF	Proj	Total		Native	DF	DF	Proj	Total				Native	DF	DF	Proj	Total
Pri. / Ditch Name	Flow	Stor	Res	Res	Diver	Pri. / Ditch Name	Flow	Stor	Res	Res	Diver	Pri. / Ditch	Name		Flow	Stor	Res	Res	Diver
1 GUADALUPE	13.6	0.0	0.0	0.0	13.6	39 SABINE	0.0	0.0	0.0	0.0	0.0	99 Bagwe			0.0	0.0	0.0	0.0	0.0
1 M-3 (et al)	90.0	0.0	0.0	0.0	90.0	43 WM. STEWA	11.4	0.0	0.0	0.0	11.4	102 Foxor	eek-2#		0.0	0.0	0.0	0.0	0.0
1 ROMERO	76.0		0.0	0.0		45 "Lovato Spgs	5.0	0.0	0.0	0.0	5.0	104 SANF			60.0	0.0	0.0	0.0	60.0
2 HEADSMILL	40.0			0.0		47 McCARROLI	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
3 El Coda	60.0		0.0	0.0		48 MANASSA E	25.0	0.0	0.0	0.0	25.0	108 ALAN			52.0	0.0	0.0	0.0	52.0
4 Llano	22.0	0.0	0.0	0.0	22.0	51 MARTINEZ	10.0	0.0	0.0	0.0	10.0	113 ANTO	OTIN		10.0	0.0	0.0	0.0	10.0
4.5 GARCIA+17	12.0		0.0	0.0		51T LOPEZ	1.5	0.0	0.0	0.0	1.5	114 Lob 8			5.0	0.0	0.0	0.0	5.0
5 SERVIETTA	20.0		0.0	0.0		52 J. M. ESPINO	7.0	0.0	0.0	0.0	7.0				60.0	0.0	0.0	0.0	60.0
6 SELEDONIA	30.0		0.0	0.0		52T BRANCH	7.0	0.0	0.0	0.0	7.0				17.0	0.0	0.0	0.0	17.0
7 Los Pinos	7.0		0.0	0.0		52T STOVER	8.0	0.0	0.0	0.0	8.0	120 WM. 4			1.5	0.0	0.0	0.0	1.5
8 SALAZAR+12	20.0		0.0	0.0		53 CORDOVA	6.5	0.0	0.0	0.0	6.5		aines 1 & 2		0.0	0.0	0.0	0.0	0.0
9 MLL	0.0		0.0	0.0		54 Chavez	0.0	0.0	0.0	0.0	0.0		PE&REEKE	RS	0.0	0.0	0.0	0.0	0.0
11 Sinecero	18.0		0.0	0.0		55 JACKS 56 EPHRAM	5.0	0.0	0.0	0.0	5.0				0.0	0.0	0.0	0.0	0.0
13 SAN RAFAEL			0.0	0.0			45.0	0.0	0.0	0.0	45.0		-, -		15.0	0.0	0.0	0.0	15.0
14 EL CERRITO 15 GABRIEL			0.0	0.0		57 Martinez	18.0	0.0	0.0	0.0	18.0	145 San C 146 Braid			5.0	0.0	0.0	0.0	5.0
	3.7		0.0	0.0		58 LOS OJOS-2				0.0								0.0	0.0
16 SANTIAGO 18 ARCHUTRO	21.0		0.0	0.0		59 RICHFIELD 63 LOS OJOS-1	30.0 35.0	0.0	0.0	0.0	30.0 35.0	148 Teod			4.0	0.0	0.0	0.0	4.0
19 ARCH-TRO S			0.0	0.0		64 ELLEDGES	4.5	0.0	0.0	0.0	35.0				0.0	0.0	0.0	0.0	0.0
20 OVERFLOW	0.0			0.0		64 ELLEDGES 65 ANGOSTUR	4.5	0.0	0.0	0.0	4.5	158 Jacob 152 Santa			4.0	0.0	0.0	0.0	4.0
21 TROGILLIO	29.0		0.0	0.0		66 N. EASTERN	12.0	0.0	0.0	0.0	12.0				0.0	0.0	0.0	0.0	0.0
22 CANON	5.0			0.0		71-72-73 Broyle	5.0	0.0	0.0	0.0	5.0				0.0	0.0	0.0	0.0	0.0
23 LA DEL RIO	0.0		0.0	0.0		74-75 Jaramilo	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
24 Rincones	22.0		0.0	0.0		76 VEGA	8.0	0.0	0.0	0.0	8.0				0.0	0.0	0.0	0.0	0.0
25 FUERTICITOS	A.A. 10		0.0	0.0		77 McCARROL	7.0	0.0	0.0	0.0	7.0				9.0	0.0	0.0	0.0	9.0
26 MECITOS	6.0		0.0	0.0		78 LE DUC	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
27 SANJUAN	25.0			0.0		79 Home	2.0	0.0	0.0	0.0	2.0				0.0	0.0	0.0	0.0	0.0
29 * Espinoza	6.0		0.0	0.0		80-81 BALLS B	42.0	0.0	0.0	0.0	42.0				10.0	0.0	0.0	0.0	10.0
31 CHACON	0.0	0.0	0.0	0.0		82-83 Hughs Ov	0.0	0.0	0.0	0.0	0.0	185 Star			6.0	0.0	0.0	0.0	6.0
32 LOS SAUCES	78.0	0.0	0.0	0.0		85 John Floyd	0.0	0.0	0.0	0.0	0.0	187 Sisne	ros		7.0	0.0	0.0	0.0	7.0
33 Lovato Irr	14.0		0.0	0.0		88 EASTBEND	14.0	0.0	0.0	0.0	14.0				0.0	0.0	0.0	0.0	0.0
33A Teodoro 2	12.0	0.0	0.0	0.0		89T EASTBEND	2.5	0.0	0.0	0.0	2.5	190 CHRI			0.0	0.0	0.0	0.0	0.0
35 BERNARDO	8.5	0.0	0.0	0.0	8.5	89 SMITH BROS	0.0	0.0	0.0	0.0	0.0	191A Islar	d-2		0.0	0.0	0.0	0.0	0.0
36 GaMs	11.0	0.0	0.0	0.0	11.0	94 Punche	15.0	0.0	0.0	0.0	15.0	191A Islar	d-3		0.0	0.0	0.0	0.0	0.0
37 SANCHEZ	4.0	0.0	0.0	0.0	4.0	95 COTTONWO	18.0	0.0	0.0	0.0	18.0	194 Eight	Mile		30.0	0.0	0.0	0.0	30.0
38 J.F.CHACON	15.0	0.0	0.0	0.0	15.0	98 WESTFIELD	25.0	0.0	0.0	0.0	25.0	Subtotal			295.5	0	0	0	295.5
								_	_	_				Nativ	DF	DF	Proj	Total	
Subtotal	714.3	0.0	0.0	0.0	714.3	Subtotal	374.4	0.0	0.0	0.0	374.4	Totals		1384.2	0.0	0.0	0.0		1384.2

The numbers indicated on this report are the best data available at time of printing and are not official rec

Signed.

Last Priority Served from Direct Flow: 21

## Diversions

- Diversions included for each physical diversion along the mainstem and for the Conejos River Basin as included on the call sheets for District 20 and 22.
  - 63 diversions along the mainstem of the Rio Grande.
  - 114 diversions in the Conejos River basin.



Diversion to Romero Ditch

# Diversions

- Diversions included for each physical diversion along the mainstem and for the Conejos River Basin as included on the call sheets for District 20 and 22.
  - 63 diversions along the mainstem of the Rio Grande.
  - 114 diversions in the Conejos River basin.
- Fractions used to set returns.
  - Returns generally set to 10 percent with 30 percent returns used above Del Norte.
  - No returns for diversions to the Closed Basin.

#### Accounting – Passthrough Accounts

- Water accounting used to track
  - portion of river flow allocatable for diversion versus
  - portion that may be specifically designated for Compact delivery.

#### Accounting – Diversion Accounts

- Separate diversion accounts used for water rights associated with each physical diversion.
  - 298 diversion accounts used for water rights along the mainstem of the Rio Grande.
  - 190 diversion accounts used for rights for the Conejos basin.
  - Priority date for water right set up for each account.
  - Water Owner names established that match name for the associated physical diversion.

#### Accounting – Diversion Accounts

🗙 Water Accounts Manager						x
<u>File Account System V</u> iew						
Image       Image         Im	NONE	Set Water Ov		/1950 🔹 00:00 🔹 Priority Date Clear	-	
Object	Account Name	Туре	Water Type	Water Owner	Priority Date	*
<ul> <li>AboveConejosBifurcationDiversions</li> <li>AboveConejosBifurcationDiversions</li> <li>AboveConejosBifurcationDiversions</li> <li>AboveConejosBifurcationDiversions</li> <li>AboveConejosBifurcationDiversions</li> <li>AboveConejosBifurcationDiversions</li> <li>AboveConejosBifurcationDiversions</li> <li>SanAntonioRiverAboveBifurcationDiversions</li> <li>LosPinosDiversions</li> <li>NorthBranchConejosDiversions</li> <li>NorthBranchConejosDiversions</li> <li>NorthBranchConejosDiversions</li> <li>NorthBranchConejosDiversions</li> <li>NorthBranchConejosDiversions</li> <li>NorthBranchConejosDiversions</li> </ul>	<ul> <li>0</li> <li>1</li> <li>1A</li> <li>1C</li> <li>1B</li> <li>2</li> <li>3</li> <li>4</li> <li>45</li> <li>5</li> <li>5</li> </ul>	Diversion Diversion Diversion Diversion Diversion Diversion Diversion Diversion	Conejos Conejos Conejos Conejos Conejos Conejos Conejos	Town Of Antonito Pipeline Guadalupe Main Manassa No 3 ROMERO Manassa No 3 Heads Mill Irg El Coda Llano Garcia Manassa No 3	Jan. 1, 1800 00:00 Mar. 1, 1855 00:00 Mar. 1, 1855 01:00 Mar. 1, 1855 02:00 Jun. 1, 1855 00:00 Jun. 1, 1855 01:00 Aug. 4, 1855 00:00 Aug. 20, 1855 00:00 Oct. 1, 1855 00:00 Mar. 5, 1856 00:00	
<ul> <li>NorthBranchConejosDiversions</li> <li>SouthBranchConejosDiversions</li> <li>LosPinosDiversions</li> <li>SouthBranchConejosDiversions</li> <li>SouthBranchConejosDiversions</li> <li>SouthBranchConejosDiversions</li> </ul>	<ul> <li>シ 5 A</li> <li>シ 6</li> <li>シ 7</li> <li>シ 8</li> <li>シ 9</li> <li>シ 10</li> </ul>	Diversion Diversion Diversion Diversion Diversion	Conejos Conejos Conejos Conejos Conejos	Servietta Seledonia Valdez Irr Los Pinos Salazar Mill San Jose	Mar. 5, 1856 01:00 Mar. 20, 1856 00:00 Apr. 1, 1856 00:00 Apr. 1, 1856 01:00 Apr. 1, 1856 02:00 Apr. 15, 1856 00:00	
SouthBranchConejosDiversions SanAntonioRiverAboveBifurcationDiversions	<b>D</b> 10 <b>D</b> 11	Diversion Diversion	-	Sinecero	Apr. 15, 1856 00:00 Apr. 15, 1856 01:00	-

Edit ...

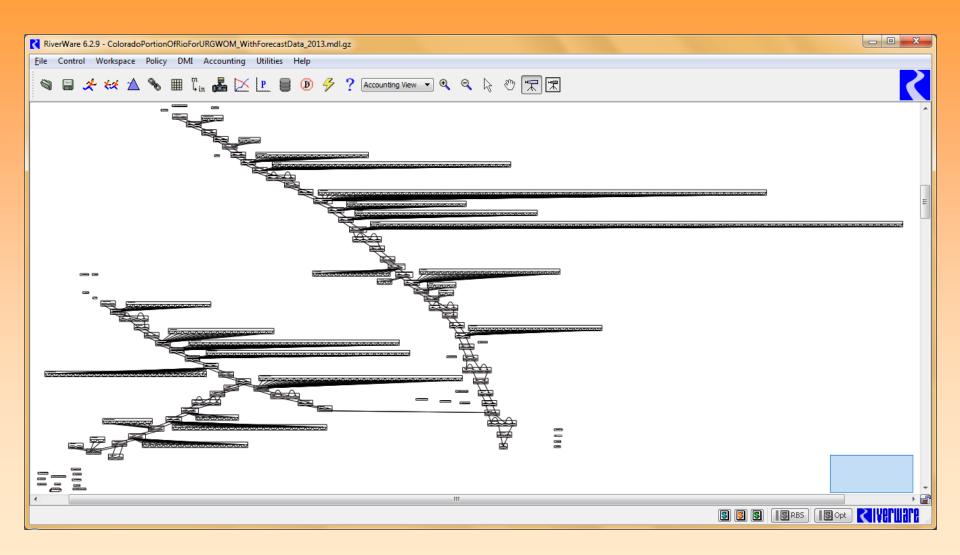
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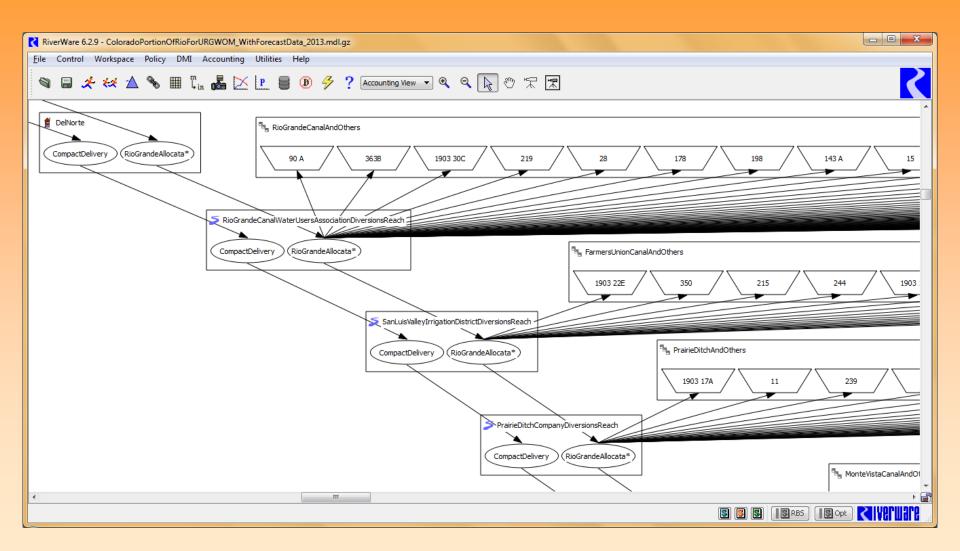
Delete

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#### Accounting View



#### Accounting View



#### Accounting Methods

- Accounting methods used to distribute physical gains/losses among passthrough accounts.
  - Gaged or ungaged local inflows may be designated for allocatable flow or specific for Compact delivery.
  - Lags and loss coefficients set up on passthrough accounts to exactly match lags and coefficients on physical methods.
- \* Methods all set to solve first each timestep.

## Water Rights Solver

• An initial request is set at each timestep for every diversion account that matches the water right amount for the diversion account.

# Water Rights Solver

- An initial request is set at each timestep for every diversion account that matches the water right amount for the diversion account.
- A water rights solver is called that references the chain of allocatable flow passthrough accounts and determines the diversions that can be met, in priority, at that timestep with the allocatable flow.
  - Two separate calls to the water rights solver completed for the mainstem of the Rio Grande and Conejos River basin.

# Compact

• Delivery obligations for Colorado under the Rio Grande Compact are computed separately for the Rio Grande versus the Conejos River basin.

## **Compact Delivery Obligation**

• Obligations computed based on an upstream index flow and a lookup table for each basin.

DISCHARGE OF CONEJOS RIVER Quantities in thousands of acre feet

Conejos Index Supply (1)

Conejos River at Mouths (2)

100	0
150	20
200	45
250	75
300	109
350	147
400	188
450	232
500	278
550	326
600	376
650	426
700	476

# **Compact Delivery Obligation**

- Obligations computed based on an upstream index flow and a lookup table for each basin.
  - Conejos Index Supply computed as
    - natural flow near Mogote for calendar year plus
    - gaged flow in the Los Pinos River at Ortiz from April to October plus
    - gaged flow in San Antonio River at Ortiz from April to October.





Los Pinos River gage at Ortiz



Mogote gage site

San Antonio River gage at Ortiz

## **Compact Delivery Obligation**

- Obligations computed based on an upstream index flow and a lookup table for each basin.
  - Conejos Index Supply computed as
    - natural flow near Mogote for calendar year plus
    - gaged flow in the Los Pinos River at Ortiz from April to October plus
    - gaged flow in San Antonio River at Ortiz from April to October.
  - Rio Grande index flow computed based on flow at Del Norte.

#### **Compact Calcs and Curtailment Percentage**

- Expression series slots are used to compute the index flow, delivery obligation, and the departure between delivery and obligation.
- A projected index flow for the year and projected annual delivery obligation are used to compute a Compact curtailment percentage to target the delivery obligation.

# Portion of Flow for Compact Delivery versus Flow Allocatable for Diversion

RiverWare 6.2.9 - ColoradoPortionOfRioForURGWOM_4-8-13_TestAOP.mdl.gz	
File Control Workspace Policy DMI Accounting Utilities Help	2
NorthClearCreekBelowContinentalReservoir     LobatosHistorical     ThirtyMileBridge	^
AboveWagonWheelGapDiversions	-
	🖅 🖌 I VELMELE 🖽

• RiverWare ruleset developed with rules used to set diversions and Platoro operations in steps.

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⊿ <u>P</u>		3	×	Policy Group
	SetConejosDistrict22DiversionAccounts	4	×,	Rule
. 🔊	SetRioGrandeDistrict20DiversionAccounts	4	×	Rule
⊿ P	SetDiversionAccountsToZeroForNonIrrigationSeason	F	×	Policy Group
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Þ 📍	Platoro	9-25	<b>~</b>	Policy Group
> P	SetInitialRequestsForAllDiversionRights	26-27	<b>~</b>	Policy Group
> 🛄	Date Functions		<b>~</b>	Utility Group
> <b>U</b>	FunctionsForWaterRightsSolver		<b>~</b>	Utility Group
> 🛄	PlatoroChannelCapacityFunctions		<b>~</b>	Utility Group
> 🛄	PlatoroFloodDiagramFunctions		<b>~</b>	Utility Group
> <b>U</b>	PlatoroFloodPoolFunctions		<b>~</b>	Utility Group
> 🛄	PlatoroMinimumStorageFunctions		<b>~</b>	Utility Group
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- RiverWare ruleset developed with rules used to set diversions and Platoro operations in steps.
  - Set initial request for diversion accounts,

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    - For the irrigation season April 1 to October 31,
      - Accounts set to zero in the non-irrigation season,
  - Physical diversions set to sum of resulting diversions for accounts (or water rights) associated with each diversion.

#### Database

- A DSS database file created with historical data, back to 1950, to use for model runs.
  - File set up in DSS.
  - Includes historical gaged and ungaged inflows, fraction return percentages for diversions, and historical diversions.
    - Platoro records are incomplete.

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## DMIs

- Data management interfaces (DMIs) set up to import data from the DSS file to the model as needed for
  - initial conditions,
  - series inputs for rulebased simulations, and
  - additional series for simulations for historical operations.

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# Next Steps

- CADSWES Review
- Set up reservoirs at headwaters of the Rio Grande.
  - Additional data and information needed.
- Model Use for AOP runs.
  - Work initiated by URGWOM Tech Team.
- Add rules for Platoro Dam ops for storage and deliveries for the Conejos Water Conservancy District.
- Identify needs and combine model with URGWOM.
- Set up model for real-time water operations modeling.
  - Simulations for upcoming 2 week period using forecasts from the NWS and other near-term forecast information.