Final Report of URGWOM Phase II Testing

Introduction

The Upper Rio Grande Water Operations Model (URGWOM) has been developed over several years by a team of water-resource professionals (Tech Team) from several Federal and Stage agencies. Phase I testing was accomplished in 2003 by furnishing 3 scenario runs of URGWOM to selected individuals to view results and comment on the capability of URGWOM to simulate the Rio Grande and Rio Chama river system. URGWOM Phase II testing was planned to have persons interested and knowledgeable in the Rio Grande and Rio Chama river system become familiar with and run the model for selected scenarios and evaluate model run results. The purpose of testing was to verify that the model correctly simulates the river system and river operations through the use of non Tech Team water-resource professionals. Additionally, testing was an opportunity to present and release URGWOM to the public. URGWOM and RiverWare© training was designed to provide the necessary information to those that agreed to test URGWOM so they could generate model scenarios and evaluate URGWOMs capability to simulate the river system. The Tech Team selected 3 scenarios for all testers to use that would allow analysis of how well URGWOM simulates the river system for the selected model changes. Testing training was held in Albuquerque in August 9 and 10, 2005. Twenty three individuals from 16 organizations attended the training and 11 individuals from 8 organizations tested URGWOM.

Testing Design

The calibrated and verified URGWOM was the base-line model populated with data for calendar years 1995-1997. The base-line model could not be changed by a tester but could temporarily be modified and run by testers using the scenario manager. The scenario manager allows a model to execute with changes to input using a scenario file. A base-line scenario file was developed by the Tech Team which contained all the slots that could potentially be changed to run the 3 selected scenarios. Table 1 shows the URGWOM objects and the slots that could be changed to run the 3 scenarios. At the training each individual that attended was given a USB storage device that contained the base-line model with the base-line scenario, the rule set, and 3 EXCEL spreadsheets with selected model results from running the model using the 3 scenarios.

Scenario 1 changed the inflow hydrology of the river system by reducing all model inflows (Table 1). Scenario 2 changed the initial water in storage in the river system by reducing initial storage in El Vado, Elephant Butte and Caballo reservoirs and initial reservoir storage in water accounts in El Vado and Elephant Butte (Table 1). Scenario 3 changed the way the river system is operated by setting target flows at the Central gage the San Acacia floodway gage. Associated with the target flows was setting an available conservation pool at Abiquiu (Table 1).

The Tech Team provided model output for 17 model slots that a tester could use to compare results from their model run to Tech Team model results (table 2). The base-line model contained output for the 17 selected slots with no changes to the model

Model testers were provided with a user survey that consisted of 10 questions for the tester to answer using a numeric responses and additional comments. Table 3 is a summary of responses from the user survey by the 11 individuals that returned models, model results, or saved scenario files.

A testing document was provided to all attendees of the testing training. This document included step-by-step instructions for changing model input and running the 3 scenarios. It also provided space for model testers to comment about each model step. At the time of development of the testing document the scenario manager was not operational so some instructions had to be modified at the training. Table 4 is a summary of responses in the testing document.

An optional user survey was provided for testers that tested URGWOM using scenarios they developed during testing. Table 5 is a summary of responses to the optional survey.

Testing Results

The levels of responses from the 11 model testers were mixed. Testers from the University of New Mexico (UNM) returned some analysis of running the scenarios and how the modeled system responded to changing input hydrology or system operations. With one exception, analysis of these testers was “The model appears to reasonably represent the river system and the changes in model input produced the expected results.” The one exception was a scenario created by a UNM tester that increased flow in the North Floodway Channel to 27,500 cubic feet per second (cfs) for August 14, 1995. Observations by the tester to the modeled event were as expected except that the New Mexico credit water account showed decreased storage. One tester returned saved non baseline models. Five testers returned model results and saved scenario files. Five testers returned only saved scenario files. The Tech Team ran the base-line model using all saved scenario files.

Tables 6-8 present average, maximum, and minimum differences between tester model results and Tech Team model results or between results from models ran by the Tech team using tester saved scenario files. In tables 6-8 is a column that summarizes changes made to the base-line model by the testers. It was pointed out by one tester that results in the provided spreadsheets were in error and these data were corrected by sending the correct data to all testers. Tech Team supplied model results for the 3 scenarios were taken from models that were run before the scenario manager became available. To assure that all Tech Team model results were exactly comparable to tester model run results or the Tech Team model results using tester saved scenario files each of the 3 base run models were run again using the scenario manager. Results from these scenario model runs were used to compare with each of the tester model runs.

Scenario 1-- 50 Percent Reduced Inflows

Ten of the 11 testers that returned testing results changed the model input correctly. Table 6 shows summary statistics for the differences between the Tech Team base run model results and tester model results or Tech Team model results using tester saved scenario files for each of the 17 selected output slots. Reported results from tester run models generally show no differences from the base run model except for the University of New Mexico 2 and Consultant to the Pueblo of Isleta testers. Reported model results for these 2 testers show the same differences from the Tech Team base run model as do all Tech Team model results using tester saved scenario files where scenario changes were made correctly (table 6). To try and isolate the cause of the consistent differences from the base run model the Tech Team compared the one non base-line model that was returned by Texas A and M University (TAMU) for scenario 1 with the Tech Team base run model. The comparison was made using the program "modelcomp" which is used by CADWES to check for changes in RiverWare. The model saved by the TAMU tester and the Tech Team model had the same input values. The comparison showed some variations in some account slots but these differences would not explain why several model results are consistently different from base run model results. The reasons for these small differences are not known. All saved scenario files have identical input values for inflow except those discussed below. Using the saved scenario provided by the United States Geological Survey (USGS) result in differences from the Tech Team base run model that are larger than for most other testers. Note in table 6 that Taos to Embudo local inflow appears to have been changed twice by 50 percent each time changing model input from the standard scenario 1 model input (table 6). Model results provided by the Corps consultant 2 shows no differences from the Tech Team base run model results but model results from the Tech Team running the model using the Corps consultant 2 saved scenario file result in larger differences than for other model runs. The saved scenario input data shows inflows at Embudo Creek at Dixon and at Rio Puerco were changed twice, each time by 50 percent (table 6). Apparently the tester ran the model using the standard scenario 1 input. The saved scenario 1 file was not used to run the model for which model results were reported.

Scenario 2—Reduced Initial Reservoir Storage

Scenario 2 called for reducing initial reservoir storage in El Vado to 10,000 acre-feet (ac-ft), Elephant Butte to 200,000 ac-ft, and Caballo to 30,000 ac-ft and modifying initial account storages in El Vado for Espanola, Los Alamos, Los Lunas, Santa Fe, Taos, and Twinning to 0 ac-ft and setting the MRGCD account to 6,950 ac-ft. Initial storage for the Rio Grande account in Elephant Butte was set to 200,000 ac-ft. Five of the 11 testers that returned model results changed input correctly for this scenario. Table 7 shows there were three common sets of inputs to the base-line model for this scenario. When all initial reservoir storages and all initial account storages were set correctly there were no differences in any testers model output compared to the Tech Team base run model output (table 7). If only initial reservoir storage values were set and no initial account storages were changed differences from the Tech Team model output were consistent with small differences in tester model results. Model input changes of correct initial

reservoir storage values and all initial account storage values in El Vado but no changes to the initial storage value to the Rio Grande account in Elephant Butte result in a differences from the Tech Team model that are consistent for all model runs with this set of changes with small differences in tester model results (table 7).

Scenario 3—Target Flows

Scenario 3 called for target flows of 200 cfs be set at the Central gage and 100 cfs at the San Acacia gage for 4 months. Conservation storage in Abiquiu reservoir had to be set to 75,000 ac-ft. The saved scenario file provided by the USGS was the only one that made all changes correctly and resulted in model results that were the same as the Tech Team base run model results (table 8). Most other testers only set target flow at the Central and San Acacia gages for January but did set conservation storage in Abiquiu correctly. These model results, provided by the tester or from Tech Team runs using tester saved scenario files are consistent with small differences in tester's model results (table 8). Model results provided by Corps consultant 2 shows larger differences when compared to the Tech Team base run than for any other scenario 3 model runs (table 8). Model results from the Tech Team running the model using the Corps consultant 2 saved scenario file result in consistent differences from Tech Team base run model results for target flows set at Central and San Acacia only for January. It appears the tester ran the model using some modified model input but used standard input in the saved scenario file target flows in January and for conservation storage in Abiquiu.

Conclusions

Summary of conclusions from URGWOM testing and testing training

- ✓ Limited changes can correctly be made to URGWOM by technical individuals
- ✓ URGWOM generally simulates the river system and water operations
- ✓ Interest in URGWOM ranges from water-resource professionals to biologists
- ✓ Analysis of URGWOM results are complicated and time consuming
- ✓ Software and models should be finalized several weeks prior to training
- ✓ The scenario manager greatly assists changes to models by the uninitiated
- ✓ Model changes should be discussed in detail during training
- ✓ Different computers may produce slightly different model results
- ✓ URGWOM is perceived to take large computer resources and long run times
- ✓ Initial Rio Grande and San Juan water account values can affect model results
- ✓ URGWOM is sensitive to input values

URGWOM was run by 11 of 23 attendees at testing training. Analysis of model runs by testers was sparse and was not especially useful to the Tech Team in finding problems in the model or the rule set. One tester that ran an extra scenario revealed a problem in New Mexico credit water stored in Elephant Butte. Analysis by the Tech Team of this model run showed there was a problem with the logic in the rule set used in testing. The logic has been corrected in an updated rule set.

There are some differences in model run results for scenario 1 that cannot be explained. Comparison of the one scenario 1 model that was returned with the Tech Team scenario 1 base run model did not isolate any model input differences. The Tech Team ran several models on different computers and found no differences in model output. Model results are fairly consistent comparing model results from testers and model results from models ran by the Tech Team using tester saved scenario files to the Tech Team base run models. For the same inputs, regardless of the scenario, differences between all testing models for a given scenario are usually less than 1 whether comparing storages or flows. The table below is summary of the percent differences between model run results made by testers or made by the Tech Team using a scenario saved by a tester and the Tech Teams base run model for each of the scenarios. Model runs used in this analysis had all input values changed correctly, 10 scenarios were set up correctly for scenario 1, 5 for scenario 2, and 1 scenario 3.

Average percent difference of tester or Tech Team run using tester saved scenario and Tech Team base run			
	Scenario 1	Scenario 2	Scenario 3
Object and Slot	Average percent difference from Tech Team base run model		
Heron.Storage (ac-ft)	0.0001%	0.0000%	None
ElVado.Storage (ac-ft)	0.0027%	0.0000%	None
Abiquiu Alb-SJC storage (ac-ft)	0.0024%	0.0000%	None
Abiquiu MRGCD-SJC storage (ac-ft)	None	0.0559%	None
Abiquiu.Storage (ac-ft)	0.0020%	0.0000%	0.0000%
Otowi.Gage Inflow (cfs)	0.1562%	0.0002%	None
Cochiti.Evaporation (ac-ft)	0.0466%	0.0324%	None
Cochiti.Outflow (cfs)	0.6087%	0.0002%	None
Cochiti.Storage (ac0ft)	0.0011%	0.0000%	None
Central.Gage Inflow (cfs)	1.9863%	0.0004%	None
SanAcaciaFloodway.Gage Inflow (cfs)	0.6772%	0.0010%	None
ElephantButte.Evaporation (ac-ft)	0.0017%	0.0040%	None
ElephantButte.Inflow (cfs)	0.4398%	0.0008%	None
ElephantButte New Mexico credit water storage (ac-ft)	-0.0007%	-0.0005%	None
ElephantButte Rio Grande storage (ac-ft)	0.0040%	0.1093%	None
ElephantButte.Storage (ac-ft)	0.0055%	0.2639%	None
Caballo.Storage (ac-ft)	0.0000%	0.0000%	None

It appears that training was sufficient for professionals to run and change the model, although more attention to the specific details of the changes could have been done. URGWOM and RiverWare training were considered to be a success because 23 individuals were introduced to the model and the software. Eleven individuals became competent enough to run and change URGWOM and did report model results with some analysis of the model runs. Time and RiverWare© license limitations appear to have limited tester response more than not understanding URGWOM or RiverWare©.

Tables

Table 1.--URGWOM objects and slots in the base-line scenario	
Scenario 1—URGWOM inflow objects and slots	All inflow reduced 50 percent
AbiquiuToChamitaLocalInflow.Local Inflow	
CerroToTaosLocalInflow.Local Inflow	
ElVadoLocalInflow.Local Inflow	
ElVadoToAbiquiuLocalInflow.Local Inflow	
EmbudoToOtowiLocalInflow.Local Inflow	
JemezLocalInflow.Local Inflow	
LobatosToCerroLocalInflow.Local Inflow	
OtowiToCochitiLocalInflow.Local Inflow	
TaosToEmbudoLocalInflow.Local Inflow	
EmbudoCreekAtDixon.Gage Inflow	
Galisteo.Gage Inflow	
Lobatos.Gage Inflow	
NorthFloodwayChannel.Gage Inflow	
Nr.Jemez.Gage Inflow	
RedRiverBlwFishHatchery.Gage Inflow	
RioPuebloDeTaosAtLosCordovas.Gage Inflow	
RioPuerco.Gage Inflow	
SantaFeRiverAbvCochiti.Gage Inflow	
SouthDiversionChannel.Gage Inflow	
TijerasArroyo.Gage Inflow	
LittleNavajoRiver.Inflow	
NavajoRiver.Inflow	
RioBlanco.Inflow	
Scenario 2--Low Initial Reservoir Storage objects and slots	Slot values
Storage slots	
ElephantButte.Storage	200,000 ac-ft
Caballo.Storage	30,000 ac-ft
ElVado.Storage	10,000 ac-ft
Account slots	
ElephantButte^RioGrande.Storage	200,000 ac-ft
ElVado^Espanola.Storage	0 ac-ft
ElVado^LosAlamos.Storage	0 ac-ft
ElVado^LosLunas.Storage	0 ac-ft
ElVado^MRGCD.Storage	6,950 ac-ft
ElVado^SantaFe.Storage	0 ac-ft
ElVado^Taos.Storage	0 ac-ft
ElVado^Twinning	0 ac-ft
Scenario 3--Target Flows objects and slots	Slot values
AbiquiuData.RGConservationSpaceAvailable	75,000 ac-ft
Abiquiu.Storage	54,110 ac-ft
MiddleValleyDemands.MinTargetFlows	200 cfs Central gage
	100 cfs San Acacia gage

Table 2.--Objects and slots for which model output were provided to URGWOM testers	
Heron storage	Flow at Central gage
El Vado storage	Floodway flow at San Acacia gage
Abiquiu--Account: Albuquerque -San Juan Chama storage	Elephant Butte evaporation
Abiquiu --Account: Middle Rio Grande Conservancy District San Juan Chama storage	Elephant Butte inflow
Abiquiu storage	Elephant Butte--Account: New Mexico credit water storage
Flow at Otowi gage	Elephant Butte--Account: Rio Grande storage
Cochiti evaporation	Elephant Butte storage
Cochiti outflow	Caballo storage
Cochiti storage	

Table 3.--Summary of responses from URGWOM testers to the Users Survey

Question Number	Question	Response	Tester	Explanation for Response number
1	The model objects and slots correctly represent the river, storage, and distribution system	5--	University of New Mexico 1	5-- Always
2	Interactions between model objects correctly represent interactions within the physical hydrologic system	5--		4-- Usually
3	The snapshot function allows comparison of scenario run results with the baseline	5--		3-- Improvement needed
4	Scenario 1(decreasing all inflow by 50 percent) showed that the model would properly store and release water while taking into account diversions and water account priorities according to the standard operating authority. It stressed the model and showed the capability of the model to handle unusual hydrologic events	5--		2-- Unacceptable
5	Scenario 2 (decreasing initial reservoir storage in El Vado, Elephant Butte, and Caballo) showed the capability of the model to adjust operations based on the standard operating authority and produce reasonable river operations and diversion deliveries	5--		1-- Not applicable
6	Scenario 3 (meeting target flows at Central and San Acacia) shows that the system is modeled in accordance to enhance species recovery and represents best practice operations for wet, average, and dry hydrologic conditions	5--		
7	UGWOM Model testing matches results presented in the spreadsheets supplied on the USB drive	3 to 4-- Discrepancies with scenarios 1 and 3		
8	As I progressed through the model scenarios I knew what to do next	Most of the time		
9	The model performed according to my expectations	Yes		
10	The model executed rapidly and ran well	Each run took approximately 1 hour. Sometimes the program would not respond to exiting the program		
	Additional comments	Enclosed a summary letter		

Table 3—Continued

1	The model objects and slots correctly represent the river, storage, and distribution system	5-- all variable data in the system was presented in a slot	University of New Mexico 2
2	Interactions between model objects correctly represent interactions within the physical hydrologic system	5-- the storage/outflow relationships were maintained and hydrologic routing was evident	
3	The snapshot function allows comparison of scenario run results with the baseline	5-- the snapshot manager provided an easy way to compare the baseline and scenario runs	
4	Scenario 1(decreasing all inflow by 50 percent) showed that the model would properly store and release water while taking into account diversions and water account priorities according to the standard operating authority. It stressed the model and showed the capability of the model to handle unusual hydrologic events	5-- The reduced inflows were managed by reducing the storage in the reservoirs. EB handled the bulk so that the storage at Caballo was close the base run.	
5	Scenario 2 (decreasing initial reservoir storage in El Vado, Elephant Butte, and Caballo) showed the capability of the model to adjust operations based on the standard operating authority and produce reasonable river operations and diversion deliveries	5-- Flows remained relatively the same with the storage remaining low throughout the run	
6	Scenario 3 (meeting target flows at Central and San Acacia) shows that the system is modeled in accordance to enhance species recovery and represents best practice operations for wet, average, and dry hydrologic conditions	5-- The storage at Abiquiu Reservoir is increased and stays high throughout the run	
7	UGWOM Model testing matches results presented in the spreadsheets supplied on the USB drive	4-- Excel spreadsheets for comparing Tech Team results are included	
8	As I progressed through the model scenarios I knew what to do next	4-- a few discrepancies are marked	
9	The model performed according to my expectations	4-- In general what I expected occurred	
10	The model executed rapidly and ran well	4-- Model took 1.5 to 2 hours to run. Ran smoothly, no errors occurred	
	Additional comments	See enclosed document for additional description of my testing results	

Table 3—Continued

1	The model objects and slots correctly represent the river, storage, and distribution system	5--	New Mexico Interstate Stream Commission 1	
2	Interactions between model objects correctly represent interactions within the physical hydrologic system	4--		
3	The snapshot function allows comparison of scenario run results with the baseline	5--		
4	Scenario 1(decreasing all inflow by 50 percent) showed that the model would properly store and release water while taking into account diversions and water account priorities according to the standard operating authority. It stressed the model and showed the capability of the model to handle unusual hydrologic events	4--		
5	Scenario 2 (decreasing initial reservoir storage in El Vado, Elephant Butte, and Caballo) showed the capability of the model to adjust operations based on the standard operating authority and produce reasonable river operations and diversion deliveries	5--		
6	Scenario 3 (meeting target flows at Central and San Acacia) shows that the system is modeled in accordance to enhance species recovery and represents best practice operations for wet, average, and dry hydrologic conditions	5--		
7	UGWOM Model testing matches results presented in the spreadsheets supplied on the USB drive	4-- Slight but no consequential discrepancies		
8	As I progressed through the model scenarios I knew what to do next	5--		
9	The model performed according to my expectations	5--		
10	The model executed rapidly and ran well	2-- Didn't execute rapidly, but ran well		
	Additional comments			

Table 3—Continued

1	The model objects and slots correctly represent the river, storage, and distribution system	5-- Overall, objects and slots represent the surface water system well	Texas A and M University
2	Interactions between model objects correctly represent interactions within the physical hydrologic system	4-- Interactions between surface water features are correctly represented. However, interactions between surface water and ground water need to be improved	
3	The snapshot function allows comparison of scenario run results with the baseline	5-- With the help of SCT function this comparison is clear	
4	Scenario 1(decreasing all inflow by 50 percent) showed that the model would properly store and release water while taking into account diversions and water account priorities according to the standard operating authority. It stressed the model and showed the capability of the model to handle unusual hydrologic events	The tools to change scenario are easy to operate. It does show the stress in scenario. However, no comparison can be done to show how well the model handles the unusual hydrologic events by verifying with true measurements	
5	Scenario 2 (decreasing initial reservoir storage in El Vado, Elephant Butte, and Caballo) showed the capability of the model to adjust operations based on the standard operating authority and produce reasonable river operations and diversion deliveries	The tools to change scenario are easy to operate. This scenario does show the capability of the model to adjust operations. However, no measurements are available to demonstrate how well the model represent the system under adjusted operations	
6	Scenario 3 (meeting target flows at Central and San Acacia) shows that the system is modeled in accordance to enhance species recovery and represents best practice operations for wet, average, and dry hydrologic conditions	The tools to change scenario is easy to operate. The results demonstrate well in best practice operation for species recovery.	
7	UGWOM Model testing matches results presented in the spreadsheets supplied on the USB drive	3-- There are differences between our testing results and the ones supplied on the USB drive. For some slots, for some periods, the differences are unacceptable large. It may be caused by software bugs or simply mismatched output data.	
8	As I progressed through the model scenarios I knew what to do next	4--In general sense, it is easy to operate the Riverware© software. However, the design of menus and buttons for scenarios and snapshots management make the operation a little complex. Also, there are too many windows appear in the screen when we manage scenarios and snapshots. More user-friendly interface and transition will help to improve the performance of the software.	
9	The model performed according to my expectations	4--In general sense, yes. However, some slots, Abiquiu MRGCD-SJC Storage, show abnormal responses for different scenarios.	
10	The model executed rapidly and ran well	4--It takes about 3 to 4 minutes to load the model, the average time of running the model is about one hour	
	Additional comments	Please refer to separate sheet	

Table 3—Continued

1	The model objects and slots correctly represent the river, storage, and distribution system	5--	International Boundary and Water Commission
2	Interactions between model objects correctly represent interactions within the physical hydrologic system	5--	
3	The snapshot function allows comparison of scenario run results with the baseline	5--	
4	Scenario 1(decreasing all inflow by 50 percent) showed that the model would properly store and release water while taking into account diversions and water account priorities according to the standard operating authority. It stressed the model and showed the capability of the model to handle unusual hydrologic events	5--	
5	Scenario 2 (decreasing initial reservoir storage in El Vado, Elephant Butte, and Caballo) showed the capability of the model to adjust operations based on the standard operating authority and produce reasonable river operations and diversion deliveries	5--	
6	Scenario 3 (meeting target flows at Central and San Acacia) shows that the system is modeled in accordance to enhance species recovery and represents best practice operations for wet, average, and dry hydrologic conditions	5--	
7	UGWOM Model testing matches results presented in the spreadsheets supplied on the USB drive	4-- Didn't match exactly	
8	As I progressed through the model scenarios I knew what to do next	4-- Different version shows different screen which may not be the same on the hard copies	
9	The model performed according to my expectations	5--	
10	The model executed rapidly and ran well	3-- It took 50 minutes to run each scenario which is too long. Improvement is deemed necessary	
	Additional comments		

Table 3—Continued

	Survey was not included in the return packet		Consultant to the Pueblo of Isleta
1	The model objects and slots correctly represent the river, storage, and distribution system	1--	New Mexico State University
2	Interactions between model objects correctly represent interactions within the physical hydrologic system	1--	
3	The snapshot function allows comparison of scenario run results with the baseline	5--	
4	Scenario 1(decreasing all inflow by 50 percent) showed that the model would properly store and release water while taking into account diversions and water account priorities according to the standard operating authority. It stressed the model and showed the capability of the model to handle unusual hydrologic events	5--	
5	Scenario 2 (decreasing initial reservoir storage in El Vado, Elephant Butte, and Caballo) showed the capability of the model to adjust operations based on the standard operating authority and produce reasonable river operations and diversion deliveries	5--	
6	Scenario 3 (meeting target flows at Central and San Acacia) shows that the system is modeled in accordance to enhance species recovery and represents best practice operations for wet, average, and dry hydrologic conditions	5--	
7	UGWOM Model testing matches results presented in the spreadsheets supplied on the USB drive	3-- No directions for doing this. Items in snapshot don't match items in spreadsheet	
8	As I progressed through the model scenarios I knew what to do next	5--	
9	The model performed according to my expectations	5--	
10	The model executed rapidly and ran well	3-- Not rapid, takes 45 minutes with 2GB of memory	
	Additional comments	Riverware© needs 'real' on-line help system. While Riverware© running, other windows programs are really slow-should be able to do other things while Riverware© runs.	

Table 3—Continued

1	The model objects and slots correctly represent the river, storage, and distribution system	4-- Middle Valley needs updating	United States Geological Survey
2	Interactions between model objects correctly represent interactions within the physical hydrologic system	4-- Middle Valley	
3	The snapshot function allows comparison of scenario run results with the baseline	5--	
4	Scenario 1(decreasing all inflow by 50 percent) showed that the model would properly store and release water while taking into account diversions and water account priorities according to the standard operating authority. It stressed the model and showed the capability of the model to handle unusual hydrologic events	5-- Compared site plots for baseline and decrease inflow scenario	
5	Scenario 2 (decreasing initial reservoir storage in El Vado, Elephant Butte, and Caballo) showed the capability of the model to adjust operations based on the standard operating authority and produce reasonable river operations and diversion deliveries	5-- Compared site plots for baseline and reduced initial storage scenario	
6	Scenario 3 (meeting target flows at Central and San Acacia) shows that the system is modeled in accordance to enhance species recovery and represents best practice operations for wet, average, and dry hydrologic conditions	4-- Detail of river flows not as realistic for Middle Valley	
7	UGWOM Model testing matches results presented in the spreadsheets supplied on the USB drive	5 Plotted EXCEL data for sites and compared to plots of same site for reservoirs	
8	As I progressed through the model scenarios I knew what to do next	5-- Instructions easy to follow after training	
9	The model performed according to my expectations	5-- It seemed to although I would enjoy comparing Middle Valley to my measurement data	
10	The model executed rapidly and ran well	5-- Had to use another computer in office to run model	
	Additional comments		

Table 3—Continued

1	The model objects and slots correctly represent the river, storage, and distribution system	5-- based on limited testing	New Mexico Interstate Stream Commission 2
2	Interactions between model objects correctly represent interactions within the physical hydrologic system	3-- as model becomes more refined groundwater/surface water interaction should be incorporated to more accurately reflect the hydrologic system	
3	The snapshot function allows comparison of scenario run results with the baseline	5--	
4	Scenario 1(decreasing all inflow by 50 percent) showed that the model would properly store and release water while taking into account diversions and water account priorities according to the standard operating authority. It stressed the model and showed the capability of the model to handle unusual hydrologic events	5--	
5	Scenario 2 (decreasing initial reservoir storage in El Vado, Elephant Butte, and Caballo) showed the capability of the model to adjust operations based on the standard operating authority and produce reasonable river operations and diversion deliveries	5--	
6	Scenario 3 (meeting target flows at Central and San Acacia) shows that the system is modeled in accordance to enhance species recovery and represents best practice operations for wet, average, and dry hydrologic conditions	5--	
7	UGWOM Model testing matches results presented in the spreadsheets supplied on the USB drive	4-- there were slight variations in the results in the provided graphs and spreadsheets	
8	As I progressed through the model scenarios I knew what to do next	4-- instructions in the handouts differed from what was presented in the training class	
9	The model performed according to my expectations	5--	
10	The model executed rapidly and ran well	5--	
	Additional comments		

Table 3—Continued

1	The model objects and slots correctly represent the river, storage, and distribution system	5-- for the objects I reviewed	Consultant 2 to the Corps
2	Interactions between model objects correctly represent interactions within the physical hydrologic system	5-- Reservoir rules appear to be functioning properly-cannot comment on hydrology	
3	The snapshot function allows comparison of scenario run results with the baseline	5-- Snapshot function easy to use and allows for easy comparison	
4	Scenario 1(decreasing all inflow by 50 percent) showed that the model would properly store and release water while taking into account diversions and water account priorities according to the standard operating authority. It stressed the model and showed the capability of the model to handle unusual hydrologic events	Model appears to be responding properly-not sure about all results, Heron Storage	
5	Scenario 2 (decreasing initial reservoir storage in El Vado, Elephant Butte, and Caballo) showed the capability of the model to adjust operations based on the standard operating authority and produce reasonable river operations and diversion deliveries	Model appears to functioning properly, not sure about all results, El Vado Storage-not sure why model responded the way it did-more detailed review/discussion would be helpful. (also see Abiquiu Storage)	
6	Scenario 3 (meeting target flows at Central and San Acacia) shows that the system is modeled in accordance to enhance species recovery and represents best practice operations for wet, average, and dry hydrologic conditions	5-- Appears that model responded as anticipated for those slots that I reviewed	
7	UGWOM Model testing matches results presented in the spreadsheets supplied on the USB drive		
8	As I progressed through the model scenarios I knew what to do next	5-- Instructions quite clear-perhaps a little to detailed or redundant	
9	The model performed according to my expectations	Yes-except for those runs that aborted	
10	The model executed rapidly and ran well	5-- Test scenarios ran well. Runs took about 1 hour each-not sure this is rapid	
	Additional comments		

Table 3—Concluded

1	The model objects and slots correctly represent the river, storage, and distribution system	Seemed fine	Consultant 1 to the Corps
2	Interactions between model objects correctly represent interactions within the physical hydrologic system	Looked OK in training	
3	The snapshot function allows comparison of scenario run results with the baseline	Just checked one in scenario 1	
4	Scenario 1(decreasing all inflow by 50 percent) showed that the model would properly store and release water while taking into account diversions and water account priorities according to the standard operating authority. It stressed the model and showed the capability of the model to handle unusual hydrologic events	Used Wilkins handout to reduce inflows	
5	Scenario 2 (decreasing initial reservoir storage in El Vado, Elephant Butte, and Caballo) showed the capability of the model to adjust operations based on the standard operating authority and produce reasonable river operations and diversion deliveries	Also used account slots-used by Wilkins's handout	
6	Scenario 3 (meeting target flows at Central and San Acacia) shows that the system is modeled in accordance to enhance species recovery and represents best practice operations for wet, average, and dry hydrologic conditions	Changed according to Wilkins list	
7	UGWOM Model testing matches results presented in the spreadsheets supplied on the USB drive	Didn't check	
8	As I progressed through the model scenarios I knew what to do next	Most of the time but had problems with 256 RAM computer	
9	The model performed according to my expectations	After getting a new computer	
10	The model executed rapidly and ran well	1 1/2 hours for a scenario	
	Additional comments		

Table 4.--Response of testers found in the Testing Document

Scenario 1: Reducing all inflows	Scenario 2: Reduced initial reservoir storage	Scenario 3: Target flows	Tester
Step 8 Noted change because of Scenario Manager becoming available, Steps 9+: Tester would like to select more than one slot at a time to change and a way to undo the change, Step 17: took about 53 minutes to run	Step 20: Not sure how to edit account slots	All checked OK	University of New Mexico 1
Step 2: No scenario dialog box came up, Step 8: noted the change to the Scenario Manager	Step2: No scenario dialog box came up	Step2: No scenario dialog box came up, Step30: No Central gage outflow only inflow	University of New Mexico 2
Step 2 Dialog didn't appear, Step 8 Noted change because of Scenario Manager becoming available	All checked OK	All checked OK	New Mexico Interstate Stream Commission 1
Step 2: Noted changes in new model version, Step 8: Noted changes in scenario manager	Step2: No scenario dialog box came up, Step 23: Confusion about rule set name	Step2: No scenario dialog box came up, Step 23: Confusion about rule set name, Step 30 Central slots in snapshot didn't match picture	Texas A and M University
Step 8:Noted change because of Scenario Manager becoming available	All checked OK	All checked OK	International Boundary and Water Commission
Step1and step 8: Noted changes because of Scenario Manager, Step 17: noted problem running and saving a model	Step1: Noted changes because of Scenario Manager, Step 25: noted problems in running and saving the model	Step1: Noted changes because of Scenario Manager	Consultant to the Pueblo of Isleta
Step 2 and 3: No scenario name in dialog, Step 4: select 'unsaved scenario', Step 8:Noted change because of Scenario Manager becoming available, Step13: Now the name of scenario is added to the tab	Step 2 and 3: No scenario name in dialog	Step 2 and 3: No scenario name in dialog	New Mexico State University
No checks but tester used the document	No checks but tester used the document	No checks but tester used the document	United States Geological Survey
Step 7: note about changed slots in Baseline scenario, Step 9: noted change because of Scenario Manager becoming available, Step 17: Noted SanFelipe2PDN slots did not dispatch	All checked OK	All checked OK	New Mexico Interstate Stream Commission 2
Step 1. Followed training slides	Step 2: Used the 'save as' function, Step 19: also changed ElVado SJC account	All checked OK	Consultant 2 to the Corps of Engineers
Step 2 and 3: No scenario name in dialog, Step 4: select 'unsaved scenario', Step 8:Noted change because of Scenario Manager becoming available, Step 17: Diagnostics messages gave tester concern	Step 2 and 3: No scenario name in dialog	Step 2 and 3: No scenario name in dialog, Step 25: Diagnostics messages gave tester concern	Consultant 1 to the Corps

Table 5.--Tester response to the optional survey

Question Number	Question	Response	Tester
1	I correctly defined my own baseline model and scenarios and completed model runs	Yes	University of New Mexico 1
2	I defined these scenarios (names of files)	Increased (doubled) inflow at Santa Fe River and Rio Puerco	
3	I obtained these model results for the scenarios I ran	Very little change seen at Central and San Marcial gages but moderate increase in EB	
4	I evaluated these model results for the scenarios I ran	Reasonable	
5	I changed the model and rule set as follows	Increased flow on Santa Fe River and Rio Puerco	
6	With my changes to the model and rule set, I completed model runs	Yes	
	Additional comments	Tester attached a summary letter	
1	I correctly defined my own baseline model and scenarios and completed model runs	5	University of New Mexico 2
2	I defined these scenarios (names of files)	NorthDiversionFlows.scn	
3	I obtained these model results for the scenarios I ran	See enclosed statement	
4	I evaluated these model results for the scenarios I ran	See enclosed statement	
5	I changed the model and rule set as follows	1	
6	With my changes to the model and rule set, I completed model runs	1	
	Additional comments		
1	I correctly defined my own baseline model and scenarios and completed model runs	Inflow increase	Consultant 2 to the Corps
2	I defined these scenarios (names of files)	1. Increased inflow (and local inflows-5x,2x,1.5x-of various slots	
3	I obtained these model results for the scenarios I ran	1. All inflow increase runs aborted, except for Lobatos 1.5x) 2. Increased flow at Lobatos by 1-5x.	
4	I evaluated these model results for the scenarios I ran	Reviewed plots of discharge at Otowi, Central, EB inflow, and storage at Abiquiu, Cochiti, and EB.	
5	I changed the model and rule set as follows	NA	
6	With my changes to the model and rule set, I completed model runs	NA	
	Additional comments	For scenario Lobatos 1-5x, stream flow and storage reservoirs appear to reflect proper functioning of reservoir operation	

Table 6.--Summary statistics of differences between Tech Team scenario base run and the tester run or Tech Team run using tester saved scenario files for model inflow reduced 50 percent

Scenario 1	Scenario Summary	Heron storage-50%Inflow		
		Statistic		
		Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
University of New Mexico (UNM) 1	All inflows were changed correctly	0.00	0.00	0.00
Tech Team using UNM 1 Scenario		0.27	1.21	0.00
UNM 2	All inflows were changed correctly	0.27	1.21	0.00
Tech Team using UNM2 Scenario	All inflows were changed correctly	0.27	1.21	0.00
Tech Team using New Mexico Interstate Stream Commission (NMISC) 1 scenario	All inflows were changed correctly	0.27	1.21	0.00
Texas A and M University (TAMU)	All inflows were changed correctly	0.00	0.00	0.00
Tech Team using TAMU scenario		0.27	1.21	0.00
International Boundary and Water Commission (IBWC)	All inflows were changed correctly	0.00	0.00	0.00
Tech Team using IBWC scenario		0.27	1.21	0.00
Pueblo of Isleta consultant	All inflows were changed correctly	0.27	1.21	0.00
Tech Team using Pueblo of Isleta consultant scenario		0.27	1.21	0.00
Tech Team using New Mexico State University (NMSU) scenario	All inflows were changed correctly	0.27	1.21	0.00
Tech Team using United States Geological Survey (USGS) scenario	All inflows were changed correctly except Taos to Embudo local inflow which appears to have been reduced twice by 50 percent	3.23	18.15	0.00
Tech Team using NMISC 2 scenario	All inflows were changed correctly	0.27	1.21	0.00
Corps Consultant 2	Apparently all inflows were changed correctly	0.00	0.00	0.00

Tech Team Using Corps Consultant 2 scenario	In the tester saved scenario Embudo Creek at Dixon and Rio Puerco appear to have been reduced twice by 50 percent	4.26	12.61	0.00	
Tech Team using Corps Consultant 1 scenario	All inflows were changed correctly	0.27	1.21	0.00	

Table 6—Continued

	ElVado storage-50%Inflow			Abiquiu Alb-SJC storage-50%Inflow		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	-25.82	24.33	-180.55	2.24	8.12	-5.50
UNM2	-25.82	24.33	-180.55	2.24	8.12	-5.50
Tech Team using UNM 2 Scenario	-25.82	24.33	-180.55	2.24	8.12	-5.50
Tech Team using NMISC 1 scenario	-25.82	24.33	-180.55	2.24	8.12	-5.50
TAMU	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using TAMU scenario	-25.82	24.33	-180.55	2.24	8.12	-5.50
IBWC	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using IBWC scenario	-25.82	24.33	-180.55	2.24	8.12	-5.50
Pueblo of Isleta consultant	-25.82	24.33	-180.55	2.24	8.12	-5.50
Tech Team using Pueblo of Isleta consultant scenario	-25.82	24.33	-180.55	2.24	8.12	-5.50
Tech Team using NMSU scenario	-25.82	24.33	-180.55	2.24	8.12	-5.50
Tech Team using USGS scenario	251.15	1,275.20	-26.11	1.67	39.57	-9.45
Tech Team using NMISC 2 scenario	-25.82	24.33	-180.55	2.24	8.12	-5.50
Corps Consultant 2	0.00	0.00	0.00			
Tech Team Using Corps Consultant 2 scenario	813.57	4,172.15	-0.01	0.09	103.87	-0.62
Tech Team using Corps Consultant 1 scenario	-25.82	24.33	-180.55	2.24	8.12	-5.50

Table 6—Continued

	Abiquiu MRGCD-SJC storage-50%Inflow			Abiquiu storage-50%Inflow		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.00	0.00	0.00	-11.20	8.37	-573.91
UNM2	2.47	208.87	-4.90	-11.20	8.37	-573.91
Tech Team using UNM 2 Scenario	0.00	0.00	0.00	-11.20	8.37	-573.91
Tech Team using NMISC 1 scenario	0.00	0.00	0.00	-11.20	8.37	-573.91
TAMU	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using TAMU scenario	0.00	0.00	0.00	-11.20	8.37	-573.91
IBWC	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using IBWC scenario	0.00	0.00	0.00	-11.20	8.37	-573.91
Pueblo of Isleta consultant	0.00	0.00	0.00	-11.20	8.37	-573.91
Tech Team using Pueblo of Isleta consultant scenario	0.00	0.00	0.00	-11.20	8.37	-573.91
Tech Team using NMSU scenario	0.00	0.00	0.00	-11.20	8.37	-573.91
Tech Team using USGS scenario	-0.05	1.90	-13.43	-17.73	193.70	-875.32
Tech Team using NMISC 2 scenario	0.00	0.00	0.00	-11.20	8.37	-573.91
Corps Consultant 2				0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	-2.05	2.16	-171.82	-6.09	833.06	-879.63
Tech Team using Corps Consultant 1 scenario	0.00	0.00	0.00	-11.20	8.37	-573.91

Table 6—Continued

	Flow at Otowi-50%Inflow			Cochiti evaporation-50%Inflow		
	Statistic			Statistic		
	Average (cfs)	Maximum (cfs)	Minimum (cfs)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.04	140.45	-159.28	0.00	0.01	-0.01
UNM2	0.04	140.45	-159.28	0.00	0.01	-0.01
Tech Team using UNM 2 Scenario	0.04	140.45	-159.28	0.00	0.01	-0.01
Tech Team using NMISC 1 scenario	0.04	140.45	-159.28	0.00	0.01	-0.01
TAMU	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using TAMU scenario	0.04	140.45	-159.28	0.00	0.01	-0.01
IBWC	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using IBWC scenario	0.04	140.45	-159.28	0.00	0.01	-0.01
Pueblo of Isleta consultant	0.04	140.45	-159.28	0.00	0.01	-0.01
Tech Team using Pueblo of Isleta consultant scenario	0.04	140.45	-159.28	0.00	0.01	-0.01
Tech Team using NMSU scenario	0.04	140.45	-159.28	0.00	0.01	-0.01
Tech Team using USGS scenario	4.16	192.22	-237.71	0.00	0.02	-0.11
Tech Team using NMISC 2 scenario	0.04	140.45	-159.28	0.00	0.01	-0.01
Corps Consultant 2	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	18.23	278.20	-133.69	0.01	0.33	-0.12
Tech Team using Corps Consultant 1 scenario	0.04	140.45	-159.28	0.00	0.01	-0.01

Table 6—Continued

	Cochiti outflow-50%Inflow			Cochiti storage-50%Inflow		
	Statistic			Statistic		
	Average (cfs)	Maximum (cfs)	Minimum (cfs)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.03	115.47	-133.51	0.01	0.20	-0.08
UNM2	-3.98	80.48	-238.61	-2.47	57.78	-58.37
Tech Team using UNM 2 Scenario	0.03	115.47	-133.51	0.01	0.20	-0.08
Tech Team using NMISC 1 scenario	0.03	115.47	-133.51	0.01	0.20	-0.08
TAMU	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using TAMU scenario	0.03	115.47	-133.51	0.01	0.20	-0.08
IBWC	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using IBWC scenario	0.03	115.47	-133.51	0.01	0.20	-0.08
Pueblo of Isleta consultant	0.03	115.47	-133.51	0.01	0.20	-0.08
Tech Team using Pueblo of Isleta consultant scenario	0.03	115.47	-133.51	0.01	0.20	-0.08
Tech Team using NMSU scenario	0.03	115.47	-133.51	0.01	0.20	-0.08
Tech Team using USGS scenario	3.99	151.44	-187.42	2.50	77.15	-61.39
Tech Team using NMISC 2 scenario	0.03	115.47	-133.51	0.01	0.20	-0.08
Corps Consultant 2	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	17.44	294.67	-86.12	17.52	160.70	-68.02
Tech Team using Corps Consultant 1 scenario	0.03	115.47	-133.51	0.01	0.20	-0.08

Table 6—Continued

	Flow at Central-50%Inflow			Floodway flow at San Acacia-50%Inflow		
	Statistic			Statistic		
	Average (cfs)	Maximum (cfs)	Minimum (cfs)	Average (cfs)	Maximum (cfs)	Minimum (cfs)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.00	92.72	-100.53	0.07	37.95	-54.31
UNM2	-3.89	92.62	-211.89	0.07	37.95	-54.31
Tech Team using UNM 2 Scenario	0.00	92.72	-100.53	0.07	37.95	-54.31
Tech Team using NMISC 1 scenario	0.00	92.72	-100.53	0.07	37.95	-54.31
TAMU	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using TAMU scenario	0.00	92.72	-100.53	0.07	37.95	-54.31
IBWC	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using IBWC scenario	0.00	92.72	-100.53	0.07	37.95	-54.31
Pueblo of Isleta consultant	0.00	92.72	-100.53	0.07	37.95	-54.31
Tech Team using Pueblo of Isleta consultant scenario	0.00	92.72	-100.53	0.07	37.95	-54.31
Tech Team using NMSU scenario	0.00	92.72	-100.53	0.07	37.95	-54.31
Tech Team using USGS scenario	3.81	190.50	-159.69	3.19	77.05	-122.24
Tech Team using NMISC 2 scenario	0.00	92.72	-100.53	0.07	37.95	-54.31
Corps Consultant 2	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	16.85	205.87	-100.29	21.43	312.88	-117.76
Tech Team using Corps Consultant 1 scenario	0.00	92.72	-100.53	0.07	37.95	-54.31

Table 6—Continued

	ElephantButte evaporation-50%Inflow			ElephantButte inflow-50%Inflow		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (cfs)	Maximum (cfs)	Minimum (cfs)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	-0.01	0.08	-0.08	-0.04	29.49	-58.78
UNM2	-0.98	0.00	-7.06	-0.04	29.49	-58.78
Tech Team using UNM 2 Scenario	-0.01	0.08	-0.08	-0.04	29.49	-58.78
Tech Team using NMISC 1 scenario	-0.01	0.08	-0.08	-0.04	29.49	-58.78
TAMU	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using TAMU scenario	-0.01	0.08	-0.08	-0.04	29.49	-58.78
IBWC	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using IBWC scenario	-0.01	0.08	-0.08	-0.04	29.49	-58.78
Pueblo of Isleta consultant	-0.01	0.08	-0.08	-0.04	29.49	-58.78
Tech Team using Pueblo of Isleta consultant scenario	-0.01	0.08	-0.08	-0.04	29.49	-58.78
Tech Team using NMSU scenario	-0.01	0.08	-0.08	-0.04	29.49	-58.78
Tech Team using USGS scenario	1.04	7.21	0.00	3.52	84.50	-48.05
Tech Team using NMISC 2 scenario	-0.01	0.08	-0.08	-0.04	29.49	-58.78
Corps Consultant 2	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	7.97	50.88	0.00	22.29	224.98	-43.74
Tech Team using Corps Consultant 1 scenario	-0.01	0.08	-0.08	-0.04	29.49	-58.78

Table 6—Continued

	ElephantButte New Mexico credit water storage-50%Inflow			ElephantButte Rio Grande storage-50%Inflow		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.72	103.37	0.00	-25.97	230.83	-178.28
UNM2	0.72	103.37	0.00	-25.97	230.83	-178.28
Tech Team using UNM 2 Scenario	0.72	103.37	0.00	-25.97	230.83	-178.28
Tech Team using NMISC 1 scenario	0.72	103.37	0.00	-25.97	230.83	-178.28
TAMU	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using TAMU scenario	0.72	103.37	0.00	-25.97	230.83	-178.28
IBWC	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using IBWC scenario	0.72	103.37	0.00	-25.97	230.83	-178.28
Pueblo of Isleta consultant	0.72	103.37	0.00	-25.97	230.83	-178.28
Tech Team using Pueblo of Isleta consultant scenario	0.72	103.37	0.00	-25.97	230.83	-178.28
Tech Team using NMSU scenario	0.72	103.37	0.00	-25.97	230.83	-178.28
Tech Team using USGS scenario	183.89	500.11	-103.87	2,871.65	6,833.74	0.00
Tech Team using NMISC 2 scenario	0.72	103.37	0.00	-25.97	230.83	-178.28
Corps Consultant 2	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	4,449.55	9,340.30	0.00	18,969.05	35,385.82	0.00
Tech Team using Corps Consultant 1 scenario	0.72	103.37	0.00	-25.97	230.83	-178.28

Table 6—Concluded

	ElephantButte storage-50%Inflow			Caballo storage-50%Inflow		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	-25.26	230.98	-103.45	0.00	0.00	0.00
UNM2	-25.26	230.98	-103.45	0.00	0.00	0.00
Tech Team using UNM 2 Scenario	-25.26	230.98	-103.45	0.00	0.00	0.00
Tech Team using NMISC 1 scenario	-25.26	230.98	-103.45	0.00	0.00	0.00
TAMU	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using TAMU scenario	-25.26	230.98	-103.45	0.00	0.00	0.00
IBWC	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using IBWC scenario	-25.26	230.98	-103.45	0.00	0.00	0.00
Pueblo of Isleta consultant	-25.26	230.98	-103.45	0.00	0.00	0.00
Tech Team using Pueblo of Isleta consultant scenario	-25.26	230.83	-178.28	0.00	0.00	0.00
Tech Team using NMSU scenario	-25.26	230.98	-103.45	0.00	0.00	0.00
Tech Team using USGS scenario	3,055.54	6,733.15	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	-25.26	230.98	-103.45	0.00	0.00	0.00
Corps Consultant 2	0.00	0.00	0.00	0	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	23,418.60	41,274.19	0.00	0.00	0.00	0.00
Tech Team using Corps Consultant 1 scenario	-25.26	230.98	-103.45	0.00	0.00	0.00

Table 7.---Summary statistics of differences between Tech Team scenario base run and the tester run or Tech Team run using tester saved scenario files for reduced initial reservoir storage

Scenario 2	Scenario Summary	Heron storage-Reduced Storage		
		Statistic		
	Statistic	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
University of New Mexico (UNM) 1	All initial storage values and all initial account storage values were changed correctly	0.00	0.00	0.00
Tech Team using UNM 1 Scenario		0.00	0.00	0.00
UNM2	All initial storage values were changed correctly but no initial account storage values were changed	-10,271.93	0.56	-44,048.91
Tech Team using UNM 2 Scenario		-10,255.15	0.56	-43,913.96
Tech Team using New Mexico Interstate Stream Commission (NMISC) 1 scenario	All initial storage values and all initial account storage values were changed correctly	0.00	0.00	0.00
Texas A and M University (TAMU)	All initial storage values were changed correctly but no initial account storage values were changed	-10,271.93	0.56	-44,048.91
Tech Team using TAMU scenario		-10,255.15	0.56	-43,913.96
International Boundary and Water Commission (IBWC)	All initial storage values were changed correctly but no initial account storage values were changed	-10,271.93	0.56	-44,048.91
Tech Team using IBWC scenario		-10,255.15	0.56	-43,913.96
Pueblo of Isleta consultant	All initial storage values and all initial account storage values were changed correctly except for Elephant Butte Rio Grande storage which was not changed	55.42	597.05	-0.62
Tech Team using Pueblo of Isleta consultant scenario		55.42	597.05	-0.62

Tech Team using New Mexico State University (NMSU) scenario	All initial storage values were changed correctly and the account Rio Grande in Elephant Butte initial storage was changed correctly but no other initial account storage values were changed	55.42	597.05	-0.62	
Tech Team using United States Geological Survey (USGS) scenario	All initial storage values and all initial account storage values were changed correctly	0.00	0.00	0.00	
Tech Team using NMISC 2 scenario	All initial storage values and all initial account storage values were changed correctly	0.00	0.00	0.00	
Corps Consultant 2	Apparently all initial storage values and all initial account storage values were changed correctly	0.00	0.00	0.00	
Tech Team Using Corps Consultant 2 scenario	All initial storage values were changed correctly but no initial account storage values were changed in the tester saved scenario	-10,255.15	0.56	-43,913.96	
Tech Team using Corps Consultant 1 scenario	All initial storage values and all initial account storage values were changed correctly	0.00	0.00	0.00	

Table 7--Continued

	El Vado storage-Reduced Storage			Abiquiu Alb-SJC storage-Reduced Storage		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.00	0.00	0.00	0.00	0.00	0.00
UNM2	27,571.16	77,566.62	-6,617.25	3,944.86	41,763.51	-7,007.98
Tech Team using UNM 2 Scenario	27,587.09	77,566.62	-6,617.25	3,931.12	41,624.74	-7,007.98
Tech Team using NMISC 1 scenario	0.00	0.00	0.00	0.00	0.00	0.00
TAMU	27,571.16	77,566.62	-6,617.25	3,944.86	41,763.51	-7,007.98
Tech Team using TAMU scenario	27,587.09	77,566.62	-6,617.25	3,931.12	41,624.74	-7,007.98
IBWC	27,571.16	77,566.62	-6,617.25	3,944.86	41,763.51	-7,007.98
Tech Team using IBWC scenario	27,587.09	77,566.62	-6,617.25	3,931.12	41,624.74	-7,007.98
Pueblo of Isleta consultant	11,991.97	54,351.38	0.00	285.75	1,450.01	-414.93
Tech Team using Pueblo of Isleta consultant scenario	11,991.97	54,351.38	0.00	285.75	1,450.01	-414.93
Tech Team using NMSU scenario	11,991.97	54,351.38	0.00	285.75	1,450.01	-414.93
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	0.00	0.00	0.00	0.00	0.00	0.00
Corps Consultant 2	0.00	0.00	0.00			
Tech Team Using Corps Consultant 2 scenario	27,587.09	77,566.62	-6,617.25	3,931.12	41,624.74	-7,007.98
Tech Team using Corps Consultant 1 scenario	0.00	0.00	0.00	0.00	0.00	0.00

Table 7--Continued

	Abiquiu MRGCD-SJC storage-Reduced Storage			Abiquiu storage-Reduced Storage		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.00	0.00	0.00	0.00	0.00	0.00
UNM2	-34.92	79.60	-159.79	-44,347.93	537.51	-116,858.99
Tech Team using UNM 2 Scenario	-11.38	312.00	-302.11	-44,285.66	536.99	-116,858.99
Tech Team using NMISC 1 scenario	0.00	0.00	0.00	0.00	0.00	0.00
TAMU	-34.92	79.60	-159.79	-44,347.93	537.51	-116,858.99
Tech Team using TAMU scenario	-11.38	312.00	-302.11	-44,285.66	536.99	-116,858.99
IBWC	-34.92	79.60	-159.79	-44,347.93	537.51	-116,858.99
Tech Team using IBWC scenario	-11.38	312.00	-302.11	-44,285.66	536.99	-116,858.99
Pueblo of Isleta consultant	1.60	311.97	-376.88	7,104.94	15,497.61	-1,559.13
Tech Team using Pueblo of Isleta consultant scenario	1.60	311.97	-376.88	7,104.94	15,497.61	-1,559.13
Tech Team using NMSU scenario	1.60	311.97	-376.88	7,104.94	15,497.61	-1,559.13
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	0.00	0.00	0.00	0.00	0.00	0.00
Corps Consultant 2				0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	-11.38	312.00	-302.11	-44,285.66	536.99	-116,858.99
Tech Team using Corps Consultant 1 scenario	0.00	0.00	0.00	0.00	0.00	0.00

Table 7--Continued

	Flow at Otowi-Reduced Storage			Cochiti evaporation-Reduced Storage		
	Statistic			Statistic		
	Average (cfs)	Maximum (cfs)	Minimum (cfs)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.00	0.00	0.00	0.00	0.00	0.00
UNM2	8.81	1,119.73	-917.68	-0.26	12.96	-20.85
Tech Team using UNM 2 Scenario	8.63	1,119.73	-917.68	-0.26	12.96	-20.85
Tech Team using NMISC 1 scenario	0.00	0.00	0.00	0.00	0.00	0.00
TAMU	8.81	1,119.73	-917.68	-0.26	12.96	-20.85
Tech Team using TAMU scenario	8.63	1,119.73	-917.68	-0.26	12.96	-20.85
IBWC	8.81	1,119.73	-917.68	-0.26	12.96	-20.85
Tech Team using IBWC scenario	8.63	1,119.73	-917.68	-0.26	12.96	-20.85
Pueblo of Isleta consultant	-11.74	1,111.54	-946.74	0.00	0.00	-0.04
Tech Team using Pueblo of Isleta consultant scenario	-11.74	1,111.54	-946.74	0.00	0.00	-0.04
Tech Team using NMSU scenario	-11.74	1,111.54	-946.74	0.00	0.00	-0.04
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	0.00	0.00	0.00	0.00	0.00	0.00
Corps Consultant 2	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	8.63	1,119.73	-917.68	-0.26	12.96	-20.85
Tech Team using Corps Consultant 1 scenario	0.00	0.00	0.00	0.00	0.00	0.00

Table 7--Continued

	Cochiti outflow-Reduced storage			Cochiti storage-Reduced Storage		
	Statistic			Statistic		
	Average (cfs)	Maximum (cfs)	Minimum (cfs)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.00	0.00	0.00	0.00	0.00	0.00
UNM2	8.15	2,740.17	-1,026.50	-405.00	11,491.32	-21,571.45
Tech Team using UNM 2 Scenario	7.98	2,740.17	-1,026.50	-405.18	11,491.32	-21,571.45
Tech Team using NMISC 1 scenario	0.00	0.00	0.00	0.00	0.00	0.00
TAMU	8.15	2,740.17	-1,026.50	-405.00	11,491.32	-21,571.45
Tech Team using TAMU scenario	7.98	2,740.17	-1,026.50	-405.18	11,491.32	-21,571.45
IBWC	8.15	2,740.17	-1,026.50	-405.00	11,491.32	-21,571.45
Tech Team using IBWC scenario	7.98	2,740.17	-1,026.50	-405.18	11,491.32	-21,571.45
Pueblo of Isleta consultant	-11.47	1,037.63	-915.88	-3.25	0.00	-19.29
Tech Team using Pueblo of Isleta consultant scenario	-11.47	1,037.63	-915.88	-3.25	0.00	-19.29
Tech Team using NMSU scenario	-11.47	1,037.63	-915.88	-3.25	0.00	-19.29
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	0.00	0.00	0.00	0.00	0.00	0.00
Corps Consultant 2	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	7.98	2,740.17	-1,026.50	-405.18	11,491.32	-21,571.45
Tech Team using Corps Consultant 1 scenario	0.00	0.00	0.00	0.00	0.00	0.00

Table 7--Continued

	Flow at Central-Reduced storage			Floodway flow at San Acacia-Reduced storage		
	Statistic			Statistic		
	Average (cfs)	Maximum (cfs)	Minimum (cfs)	Average (cfs)	Maximum (cfs)	Minimum (cfs)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.00	0.00	0.00	0.00	0.00	0.00
UNM2	8.78	2,109.09	-891.84	8.34	1,908.59	-887.26
Tech Team using UNM 2 Scenario	8.62	2,109.09	-891.84	8.17	1,908.59	-887.26
Tech Team using NMISC 1 scenario	0.00	0.00	0.00	0.00	0.00	0.00
TAMU	8.78	2,109.09	-891.84	8.34	1,908.59	-887.26
Tech Team using TAMU scenario	8.62	2,109.09	-891.84	8.17	1,908.59	-887.26
IBWC	8.78	2,109.09	-891.84	8.34	1,908.59	-887.26
Tech Team using IBWC scenario	8.62	2,109.09	-891.84	8.17	1,908.59	-887.26
Pueblo of Isleta consultant	-11.91	980.70	-920.37	-17.75	542.51	-916.34
Tech Team using Pueblo of Isleta consultant scenario	-11.91	980.70	-920.37	-17.75	542.51	-916.34
Tech Team using NMSU scenario	-11.91	980.70	-920.37	-17.75	542.51	-916.34
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	0.00	0.00	0.00	0.00	0.00	0.00
Corps Consultant 2	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	8.62	2,109.09	-891.84	8.17	1,908.59	-887.26
Tech Team using Corps Consultant 1 scenario	0.00	0.00	0.00	0.00	0.00	0.00

Table 7--Continued

	Elephant Butte evaporation-Reduced storage			Elephant Butte inflow-Reduced storage		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (cfs)	Maximum (cfs)	Minimum (cfs)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.00	0.00	-0.04	0.00	0.00	0.00
UNM2	6.29	66.14	-1.50	6.89	1,717.46	-1,028.41
Tech Team using UNM 2 Scenario	6.26	66.14	-1.50	6.79	1,717.46	-1,028.41
Tech Team using NMISC 1 scenario	0.00	0.00	-0.04	0.00	0.00	0.00
TAMU	6.29	66.14	-1.50	6.89	1,717.46	-1,028.41
Tech Team using TAMU scenario	6.26	66.14	-1.50	6.79	1,717.46	-1,028.41
IBWC	6.29	66.14	-1.50	6.89	1,717.46	-1,028.41
Tech Team using IBWC scenario	6.26	66.14	-1.50	6.79	1,717.46	-1,028.41
Pueblo of Isleta consultant	-4.56	0.40	-71.69	-19.09	522.63	-1,054.75
Tech Team using Pueblo of Isleta consultant scenario	-4.56	0.40	-71.69	-19.09	522.63	-1,054.75
Tech Team using NMSU scenario	-4.56	0.40	-71.69	-19.09	522.63	-1,054.75
Tech Team using USGS scenario	0.00	0.00	-0.04	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	0.00	0.00	-0.04	0.00	0.00	0.00
Corps Consultant 2	0.00	0.00	-0.04	0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	6.26	66.14	-1.50	6.79	1,717.46	-1,028.41
Tech Team using Corps Consultant 1 scenario	0.00	0.00	-0.04	0.00	0.00	0.00

Table 7--Continued						
	Elephant Butte New Mexico credit water storage-Reduced storage			Elephant Butte Rio Grande storage-Reduced storage		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	0.03	0.24	0.00	-0.05	6.51	-25.44
UNM2	49,428.96	145,746.36	0.00	-35,727.79	59,319.57	-148,368.54
Tech Team using UNM 2 Scenario	49,428.24	145,746.36	0.00	-35,785.69	59,319.57	-148,368.54
Tech Team using NMISC 1 scenario	0.03	0.24	0.00	-0.05	6.51	-25.44
TAMU	49,428.96	145,746.36	0.00	-35,727.79	59,319.57	-148,368.54
Tech Team using TAMU scenario	49,428.24	145,746.36	0.00	-35,785.69	59,319.57	-148,368.54
IBWC	49,428.96	145,746.36	0.00	-35,727.79	59,319.57	-148,368.54
Tech Team using IBWC scenario	49,428.24	145,746.36	0.00	-35,785.69	59,319.57	-148,368.54
Pueblo of Isleta consultant	56,209.81	145,742.86	0.00	-63,675.22	0.00	-195,745.42
Tech Team using Pueblo of Isleta consultant scenario	56,209.81	145,742.86	0.00	-63,675.22	0.00	-195,745.42
Tech Team using NMSU scenario	56,209.81	145,742.86	0.00	-63,675.22	0.00	-195,745.42
Tech Team using USGS scenario	0.03	0.24	0.00	-0.05	6.51	-25.44
Tech Team using NMISC 2 scenario	0.03	0.24	0.00	-0.05	6.51	-25.44
Corps Consultant 2	0.03	0.24	0.00	-0.05	6.51	-25.44
Tech Team Using Corps Consultant 2 scenario	49,428.24	145,746.36	0.00	-35,785.69	59,319.57	-148,368.54
Tech Team using Corps Consultant 1 scenario	0.03	0.24	0.00	-0.05	6.51	-25.44

Table 7--Concluded

	Elephant Butte storage-Reduced storage			Caballo storage-Reduced storage		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using UNM 1 Scenario	-0.02	6.62	-25.19	0.00	0	0
UNM2	13,701.17	59,319.57	-4,132.53	1,065.63	8,581.38	-398.48
Tech Team using UNM 2 Scenario	13,642.55	59,319.57	-4,132.53	1,065.63	8,581.38	-398.48
Tech Team using NMISC 1 scenario	-0.02	6.62	-25.19	0.00	0.00	0.00
TAMU	13,701.17	59,319.57	-4,132.53	1,065.63	8,581.38	-398.48
Tech Team using TAMU scenario	13,642.55	59,319.57	-4,132.53	1,065.63	8,581.38	-398.48
IBWC	13,701.17	59,319.57	-4,132.53	1,065.63	8,581.38	-398.48
Tech Team using IBWC scenario	13,642.55	59,319.57	-4,132.53	1,065.63	8,581.38	-398.48
Pueblo of Isleta consultant	-7,465.41	309.51	-51,406.29	-13.30	0.00	-4,157.99
Tech Team using Pueblo of Isleta consultant scenario	-7,465.41	309.51	-51,406.29	-13.30	0.00	-4,157.99
Tech Team using NMSU scenario	-7,465.41	309.51	-51,406.29	-13.30	0.00	-4,157.99
Tech Team using USGS scenario	-0.02	6.62	-25.19	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	-0.02	6.62	-25.19	0.00	0.00	0.00
Corps Consultant 2	-0.02	6.62	-25.19	0.00	0.00	0.00
Tech Team Using Corps Consultant 2 scenario	13,642.55	59,319.57	-4,132.53	1,065.63	8,581.38	-398.48
Tech Team using Corps Consultant 1 scenario	-0.02	6.62	-25.19	0.00	0.00	0.00

Table 8.--Summary statistics of differences between Tech Team scenario base run and the tester run or Tech Team run using tester scenario for target flows at Central and San Acacia gages

Scenario 3	Scenario Summary	Heron storage-Target flows			
		Statistic			
		Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	
University of New Mexico (UNM) 1	Target flows were set only for January. All reservoir storages were set correctly	-650.96	418.14	-3,630.82	
Tech Team using UNM 1 Scenario		-650.94	418.14	-3,630.72	
UNM 2	Target flows were set only for January. All reservoir storages were set correctly	-650.96	418.14	-3,630.82	
Tech Team using UNM 2 Scenario		-650.94	418.14	-3,630.72	
Tech Team using New Mexico Interstate Stream Commission (NMISC) 1 scenario	Target flows were set only for January. All reservoir storages were set correctly	-650.92	418.16	-3,630.70	
Texas A and M University (TAMU)	Target flows were set only for January. All reservoir storages were set correctly	-650.96	418.14	-3,630.82	
Tech Team using TAMU scenario		-650.94	418.14	-3,630.72	
International Boundary and Water Commission (IBWC)	Target flows were set only for January. All reservoir storages were set correctly	-650.96	418.14	-3,630.82	
Tech Team using IBWC scenario		-650.94	418.14	-3,630.72	
Pueblo of Isleta consultant	Target flows were set only for January. All reservoir storages were set correctly	-650.96	418.14	-3,630.82	
Tech Team using Pueblo of Isleta consultant scenario		-650.94	418.14	-3,630.72	
Tech Team using New Mexico State University (NMSU) scenario	Target flows were set only for January. All reservoir storages were set correctly	-650.94	418.14	-3,630.72	
Tech Team using United States Geological Survey (USGS) scenario	Target flows were set correctly for all months. All reservoir storages were set correctly	0.00	0.00	0.00	
Tech Team using NMISC 2 scenario	Target flows were set only for January. All reservoir storages were set correctly	-650.92	418.16	-3,630.70	

Corps Consultant 2	Values were reported by the tester but model results do not match model results ran by the Tech Team using the tester saved scenario	3,347.54	37,505.12	0.00	
Tech Team Using Corps Consultant 2 scenario	Target flows were set only for January. All reservoir storages were set correctly	-650.94	418.14	-3,630.72	
Tech Team using Corps Consultant 1 scenario	Target flows were set only for January. All reservoir storages were set correctly	-650.92	418.16	-3,630.70	

Table 8--Continued						
	El Vado storage-Target flows			Abiquiu Alb-SJC storage-Target flows		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	230.19	1,194.81	-439.22	840.18	3,031.46	-333.55
Tech Team using UNM 1 Scenario	230.19	1,194.82	-439.22	840.10	3,031.29	-333.63
UNM2	230.19	1,194.81	-439.22	840.18	3,031.46	-333.55
Tech Team using UNM 2 Scenario	230.19	1,194.82	-439.22	840.10	3,031.29	-333.63
Tech Team using NMISC 1 scenario	230.19	1,194.82	-439.21	840.23	3,031.45	-333.47
TAMU	230.19	1,194.81	-439.22	840.18	3,031.46	-333.55
Tech Team using TAMU scenario	230.19	1,194.82	-439.22	840.10	3,031.29	-333.63
IBWC	230.19	1,194.81	-439.22	840.18	3,031.46	-333.55
Tech Team using IBWC scenario	230.19	1,194.82	-439.22	840.10	3,031.29	-333.63
Pueblo of Isleta consultant	230.19	1,194.81	-439.22	840.18	3,031.46	-333.55
Tech Team using Pueblo of Isleta consultant scenario	230.19	1,194.82	-439.22	840.10	3,031.29	-333.63
Tech Team using NMSU scenario	230.19	1,194.82	-439.22	840.10	3,031.29	-333.63
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	230.19	1,194.82	-439.21	840.23	3,031.45	-333.47
Corps Consultant 2	347.07	1,370.20	-2,770.92	677.66	6,680.01	-29,667.16
Tech Team Using Corps Consultant 2 scenario	230.19	1,194.82	-439.22	840.10	3,031.29	-333.63
Tech Team using Corps Consultant 1 scenario	230.19	1,194.82	-439.21	840.23	3,031.45	-333.47

Table 8--Continued						
	Abiquiu MRGCD-SJC storage-Target flows			Abiquiu storage-Target flows		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	1.41	107.01	-29.32	-2,394.64	1,335.28	-9,839.58
Tech Team using UNM 1 Scenario	1.41	107.00	-29.32	-2,395.11	1,335.28	-9,839.48
UNM2	1.41	107.01	-29.32	-2,394.64	1,335.28	-9,839.58
Tech Team using UNM 2 Scenario	1.41	107.00	-29.32	-2,395.11	1,335.28	-9,839.48
Tech Team using NMISC 1 scenario	1.41	107.00	-29.32	-2,395.77	1,335.28	-9,839.48
TAMU	1.41	107.01	-29.32	-2,394.64	1,335.28	-9,839.57
Tech Team using TAMU scenario	1.41	107.00	-29.32	-2,395.11	1,335.28	-9,839.48
IBWC	1.41	107.01	-29.32	-2,394.64	1,335.28	-9,839.57
Tech Team using IBWC scenario	1.41	107.00	-29.32	-2,395.11	1,335.28	-9,839.48
Pueblo of Isleta consultant	1.41	107.01	-29.32	-2,394.64	1,335.28	-9,839.58
Tech Team using Pueblo of Isleta consultant scenario	1.41	107.00	-29.32	-2,395.11	1,335.28	-9,839.48
Tech Team using NMSU scenario	1.41	107.00	-29.32	-2,395.11	1,335.28	-9,839.48
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	1.41	107.00	-29.32	-2,395.77	1,335.28	-9,839.48
Corps Consultant 2	-33.65	88.05	-324.74	45,728.09	68,958.39	-0.13
Tech Team Using Corps Consultant 2 scenario	1.41	107.00	-29.32	-2,395.11	1,335.28	-9,839.48
Tech Team using Corps Consultant 1 scenario	1.41	107.00	-29.32	-2,395.77	1,335.28	-9,839.48

Table 8--Continued						
	Flow at Otowi-Target flows			Cochiti evaporation-Target flows		
	Statistic			Statistic		
	Average (cfs)	Maximum (cfs)	Minimum (cfs)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	1.02	444.78	-403.99	0.21	8.29	-2.71
Tech Team using UNM 1 Scenario	1.02	444.78	-403.99	0.21	8.29	-2.71
UNM2	1.02	444.78	-403.99	0.21	8.29	-2.71
Tech Team using UNM 2 Scenario	1.02	444.78	-403.99	0.21	8.29	-2.71
Tech Team using NMISC 1 scenario	0.98	444.78	-403.99	0.21	8.29	-2.71
TAMU	1.02	444.78	-403.99	0.21	8.29	-2.71
Tech Team using TAMU scenario	1.02	444.78	-403.99	0.21	8.29	-2.71
IBWC	1.02	444.78	-403.99	0.21	8.29	-2.71
Tech Team using IBWC scenario	1.02	444.78	-403.99	0.21	8.29	-2.71
Pueblo of Isleta consultant	1.02	444.78	-403.99	0.21	8.29	-2.71
Tech Team using Pueblo of Isleta consultant scenario	1.02	444.78	-403.99	0.21	8.29	-2.71
Tech Team using NMSU scenario	1.02	444.78	-403.99	0.21	8.29	-2.71
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	0.98	444.78	-403.99	0.21	8.29	-2.71
Corps Consultant 2	-19.80	420.78	-1,203.48	0.18	8.23	-2.85
Tech Team Using Corps Consultant 2 scenario	1.02	444.78	-403.99	0.21	8.29	-2.71
Tech Team using Corps Consultant 1 scenario	0.98	444.78	-403.99	0.21	8.29	-2.71

Table 8--Continued

	Cochiti outflow-Target flows			Cochiti storage-Target flows		
	Statistic			Statistic		
	Average (cfs)	Maximum (cfs)	Minimum (cfs)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
Tech Team using UNM 1 Scenario	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
UNM2	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
Tech Team using UNM 2 Scenario	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
Tech Team using NMISC 1 scenario	0.76	1,907.96	-601.18	461.70	12,899.06	-1,689.25
TAMU	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
Tech Team using TAMU scenario	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
IBWC	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
Tech Team using IBWC scenario	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
Pueblo of Isleta consultant	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
Tech Team using Pueblo of Isleta consultant scenario	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
Tech Team using NMSU scenario	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	0.76	1,907.96	-601.18	461.70	12,899.06	-1,689.25
Corps Consultant 2	-19.16	1,907.93	-1,138.69	419.34	12,834.18	-1,752.21
Tech Team Using Corps Consultant 2 scenario	0.81	1,907.96	-601.18	461.73	12,899.09	-1,689.21
Tech Team using Corps Consultant 1 scenario	0.76	1,907.96	-601.18	461.70	12,899.06	-1,689.25

Table 8--Continued						
	Flow at Central-Target flows			Floodway flow at San Acacia-Target flows		
	Statistic			Statistic		
	Average (cfs)	Maximum (cfs)	Minimum (cfs)	Average (cfs)	Maximum (cfs)	Minimum (cfs)
UNM 1	14.27	1,758.43	-388.49	13.32	1,703.40	-389.65
Tech Team using UNM 1 Scenario	14.27	1,758.43	-388.49	13.30	1,703.40	-389.65
UNM2	14.27	1,758.43	-388.49	13.32	1,703.40	-389.65
Tech Team using UNM 2 Scenario	14.27	1,758.43	-388.49	13.30	1,703.40	-389.65
Tech Team using NMISC 1 scenario	14.22	1,758.43	-388.49	13.27	1,703.40	-389.65
TAMU	14.27	1,758.43	-388.49	13.32	1,703.40	-389.65
Tech Team using TAMU scenario	14.27	1,758.43	-388.49	13.30	1,703.40	-389.65
IBWC	14.27	1,758.43	-388.49	13.32	1,703.40	-389.65
Tech Team using IBWC scenario	14.27	1,758.43	-388.49	13.30	1,703.40	-389.65
Pueblo of Isleta consultant	14.27	1,758.43	-388.49	13.32	1,703.40	-389.65
Tech Team using Pueblo of Isleta consultant scenario	14.27	1,758.43	-388.49	13.30	1,703.40	-389.65
Tech Team using NMSU scenario	14.27	1,758.43	-388.49	13.30	1,703.40	-389.65
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	14.22	1,758.43	-388.49	13.27	1,703.40	-389.65
Corps Consultant 2	-5.77	1,758.41	-1,049.00	-9.85	1,703.38	-1,062.71
Tech Team Using Corps Consultant 2 scenario	14.28	1,758.43	-388.49	13.30	1,703.40	-389.65
Tech Team using Corps Consultant 1 scenario	14.22	1,758.43	-388.49	13.27	1,703.40	-389.65

Table 8--Continued						
	Elephant Butte evaporation-Target flows			Elephant Butte inflow-Target flows		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (cfs)	Maximum (cfs)	Minimum (cfs)
UNM 1	0.50	3.19	-6.15	2.07	1,426.05	-383.02
Tech Team using UNM 1 Scenario	0.50	3.17	-6.15	2.06	1,426.05	-383.02
UNM2	0.50	3.19	-6.15	2.07	1,426.05	-383.02
Tech Team using UNM 2 Scenario	0.50	3.17	-6.15	2.06	1,426.05	-383.02
Tech Team using NMISC 1 scenario	0.50	3.19	-6.15	2.03	1,426.05	-383.02
TAMU	0.50	3.19	-6.15	2.07	1,426.05	-383.02
Tech Team using TAMU scenario	0.50	3.17	-6.15	2.06	1,426.05	-383.02
IBWC	0.50	3.19	-6.15	2.07	1,426.05	-383.02
Tech Team using IBWC scenario	0.50	3.17	-6.15	2.06	1,426.05	-383.02
Pueblo of Isleta consultant	0.50	3.19	-6.15	2.07	1,426.05	-383.02
Tech Team using Pueblo of Isleta consultant scenario	0.50	3.17	-6.15	2.06	1,426.05	-383.02
Tech Team using NMSU scenario	0.50	3.17	-6.15	2.06	1,426.05	-383.02
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	0.50	3.19	-6.15	2.03	1,426.05	-383.02
Corps Consultant 2	-6.05	0.01	-38.83	-21.56	1,426.03	-1,045.61
Tech Team Using Corps Consultant 2 scenario	0.50	3.17	-6.15	2.07	1,426.05	-383.02
Tech Team using Corps Consultant 1 scenario	0.50	3.19	-6.15	2.03	1,426.05	-383.02

Table 8--Continued						
	Elephant Butte New Mexico credit water storage-Target flows			Elephant Butte Rio Grande storage-Target flows		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	1,203.93	3,809.48	-0.01	1,473.41	7,117.87	-10,265.42
Tech Team using UNM 1 Scenario	1,203.91	3,809.45	-0.01	1,463.84	7,099.71	-10,265.42
UNM2	1,203.93	3,809.48	-0.01	1,473.41	7,117.87	-10,265.42
Tech Team using UNM 2 Scenario	1,203.91	3,809.45	-0.01	1,463.84	7,099.71	-10,265.42
Tech Team using NMISC 1 scenario	1,203.93	3,809.48	-0.01	1,473.90	7,117.87	-10,265.42
TAMU	1,203.93	3,809.48	-0.01	1,473.41	7,117.87	-10,265.42
Tech Team using TAMU scenario	1,203.91	3,809.45	-0.01	1,463.84	7,099.71	-10,265.42
IBWC	1,203.93	3,809.48	-0.01	1,473.41	7,117.87	-10,265.42
Tech Team using IBWC scenario	1,203.91	3,809.45	-0.01	1,463.84	7,099.71	-10,265.42
Pueblo of Isleta consultant	1,203.93	3,809.48	-0.01	1,473.41	7,117.87	-10,265.42
Tech Team using Pueblo of Isleta consultant scenario	1,203.91	3,809.45	-0.01	1,463.84	7,099.71	-10,265.42
Tech Team using NMSU scenario	1,203.91	3,809.45	-0.01	1,463.84	7,099.71	-10,265.42
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	1,203.93	3,809.48	-0.01	1,473.90	7,117.87	-10,265.42
Corps Consultant 2	29,302.19	48,561.19	0.00	-47,247.12	22.94	-71,552.78
Tech Team Using Corps Consultant 2 scenario	1,203.91	3,809.45	-0.01	1,463.84	7,099.71	-10,265.42
Tech Team using Corps Consultant 1 scenario	1,203.93	3,809.48	-0.01	1,473.90	7,117.87	-10,265.42

Table 8--Concluded						
	Elephant Butte storage-Target flows			Caballo storage-Target flows		
	Statistic			Statistic		
	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)	Average (ac-ft)	Maximum (ac-ft)	Minimum (ac-ft)
UNM 1	2,677.34	7,122.38	-10,265.42	7.31	94.09	0.00
Tech Team using UNM 1 Scenario	2,667.75	7,104.20	-10,265.42	7.31	94.09	0.00
UNM2	2,677.34	7,122.38	-10,265.42	7.31	94.09	0.00
Tech Team using UNM 2 Scenario	2,667.75	7,104.20	-10,265.42	7.31	94.09	0.00
Tech Team using NMISC 1 scenario	2,677.82	7,122.38	-10,265.42	0.00	0.00	0.00
TAMU	2,677.34	7,122.38	-10,265.42	7.31	94.09	0.00
Tech Team using TAMU scenario	2,667.75	7,104.20	-10,265.42	7.31	94.09	0.00
IBWC	2,677.34	7,122.38	-10,265.42	7.31	94.09	0.00
Tech Team using IBWC scenario	2,667.75	7,104.20	-10,265.42	7.31	94.09	0.00
Pueblo of Isleta consultant	2,677.34	7,122.38	-10,265.42	7.31	94.09	0.00
Tech Team using Pueblo of Isleta consultant scenario	2,667.75	7,104.20	-10,265.42	7.31	94.09	0.00
Tech Team using NMSU scenario	2,667.75	7,104.20	-10,265.42	7.31	94.09	0.00
Tech Team using USGS scenario	0.00	0.00	0.00	0.00	0.00	0.00
Tech Team using NMISC 2 scenario	2,677.82	7,122.38	-10,265.42	0.00	0.00	0.00
Corps Consultant 2	-17,944.93	22.94	-44,928.52	-3177.666	94.09	-13,978.93
Tech Team Using Corps Consultant 2 scenario	2,667.75	7,104.20	-10,265.42	7.31	94.09	0.00
Tech Team using Corps Consultant 1 scenario	2,677.82	7,122.38	-10,265.42	0.00	0.00	0.00