

October 14, 2003



**San Juan River Basin Recovery
Implementation Program
Hydrology Committee
Meeting Summary
August 5, 2003**

Members/Alternates Present:

Pat Page, Chairman
Ray Alvarado
Ron Bliesner
Rick Cox
Dave Frick
Steve Harris
Bill Miller
John Simons
Bernadette Tsosie
John Whipple
Brian Westfall

Others present:

Dave Byrd
Dave King
Mike Roark
Marilyn Greenberg, Program Assistant
Shirley Mondy, Program Coordinator

Representing:

U.S. Bureau of Reclamation
State of Colorado
U.S. Bureau of Indian Affairs
Water Development Interests
Jicarilla Apache Nation
Water Development Interests
Southern Ute Indian Tribe
U.S. Bureau of Reclamation
Navajo Nation
State of New Mexico
U.S. Bureau of Indian Affairs

Representing:

U.S. Geological Survey
U.S. Bureau of Reclamation
U.S. Geological Survey
U.S. Fish and Wildlife Service
U.S. Fish and Wildlife Service

Introductions and Review and Approval of Agenda Items

Pat Page welcomed the attendees, who then introduced themselves. The agenda was approved as amended.

Review of June 3, 2003, Draft Conference Call Summary

This meeting summary was approved without modification.

Review of Action Item Log (attached to 06/03/2003 Draft Conference Call Summary)

The action item log was reviewed and updated.

USGS Gaging Stations Update - Mike Roark, USGS

Mike Roark discussed how shifting on gaging stations is done to the ratings, depending on the conditions of the control at the time of the reading. Four ratings are used: excellent (rare-perfect channel, usually no flow), good (uncertainty is less than 5%), fair (uncertainty is less than 8%), poor (uncertainty is greater than 8%).

The **San Juan at Archuleta** gage is very stable over the whole range and stage; it is one of the best gages in the state. Additional measurements are not needed at this gage. One variable shift has been used for all of water year 2003 to date. Averaging of shifts may contribute to the discrepancies between what USGS personnel is giving to Reclamation and what is on the website. The last measured shift is not the official shift. Dave Byrd is in charge of the gaging stations; committee members can get the variable shift curve from him to know exactly what the shift is/will be.

The **San Juan River at Farmington** gage is almost a straight -0.03 shift for the entire year. It has a fairly stable control over most stages and additional measurements are not needed, unless there is a high flow event.

At the **San Juan at Shiprock** gage, the cable way is way downstream, not near the gage, and there is no access available to the cableway. There are some other issues with this gage and it needs to be moved. The control is not as stable as the two upstream stations. There have been three shifts in water year 2003.

The **San Juan at Four Corners** gage becomes unstable at high flow and immediately afterward. Additional measurements need to be made during and after high flows until it is again stable.

Instead of just making additional measurements each month, it might be useful to make measurements as needed such as during high flow events or if something questionable shows up.

An analysis for the Interstate Stream Commission/State Engineers' office is being performed to look at the need for improvements to the gages. At the Archuleta gage, USGS is looking at moving the reference gages outside of the bulkhead to measure the draw down and build up. At Farmington, they need to build the cableway. Measuring off the bridge was giving vertical velocities and strange figures. USGS is working with the new land owner where the cableway could be moved.

Every gaging station has verbal landowner permission for access, but if the land changes hands, permission has to be obtained from the new landowner. There are no permanent easements. Asking for a permanent easement from a landowner may scare some away. There was some discussion regarding the feasibility of obtaining permanent easements, especially at Archuleta - because the gage is the only measuring device available to Reclamation to regulate releases to the river.

Reclamation and USGS will both research how each agency could obtain a permanent easement.

At Shiprock, USGS does not have access to the cableway. ***Bernadette Tsosie will work with USGS to determine a good site to move the cableway to and will assist in obtaining access permission.***

USGS recommends moving the Shiprock gage. If we have to stay there, there needs to be a new reference gage and a cableway.

The Four Corners gage recommendation is to make some strategic moves in the orifice and then it will be in good shape.

The Committee will want to revisit the FY04 Scope of Work on Stream Gaging. It currently shows additional readings at each gage for approximately nine months out of the year. Mike Roark indicated that there may only be five additional measurements total needed for FY04. A day and a half would be required for each additional measurement.

The New Mexico ISC or State Engineers' office will be approaching the State Legislature for money for the improvements recommended above. Acoustic doppler current profilers (ADCP) give vertical, not just horizontal, velocities/flows and can measure shallow rivers. ADCP would be able to measure off the bridge at Farmington. This could be considered as a funding option by the Program for the next year however it may not be viable since the equipment would be used for much more than Program purposes. Water that carries a lot of sediment may cause problems for the doppler readings. The water is probably clean enough in the San Juan to measure with ADCP, especially to measure snow runoff; although maybe not for high flows with a lot of sediment.

The FY02 money was used for additional measurements; \$24,000 this year will pay for the cableway. ***USGS said they would come and give a presentation each October regarding the effectiveness of the gage readings.***

Based on the USGS recommendation that only five additional measurements should be taken, the budget for the FY04 scope of work for Stream gage Improvements should be reduced from \$25,250 to \$5,500, including labor and travel. The committee approved this reduction in the SOW.

Pat Page and Shirley Mondy will look at the possibility of a permanent easement for the Archuleta gage. USGS will check into it with their solicitor also. This could be discussed with the Coordination Committee when the budget is presented to them, and funds could be approved as capital improvements later if it is found that easements could be obtained. The San Juan Program cannot own the easements, it can only

provide the funds to Reclamation or USGS.

Discussion on Incidental Losses – PowerPoint handout

Ron Bliesner and Brian Westfall described the problems with the current methods/procedures for estimating incidental loss which include that import water is not considered in the current procedures and projects that change with time are difficult to assess.

The Committee discussed the differences in how incidental losses are calculated (i.e., percentage of diversion, return flow, or depletions). In McElmo Basin, the incidental loss rate was calculated to be 40% of gross return flow. We are trying to tie the incidental losses to depletions associated with irrigation and stream flow.

Steve Harris motioned to accept the proposal of handling the Colorado incidental losses as proposed by Keller-Bliesner (per the conclusion and recommendation of the Bliesner 7/28/03 memo regarding calculation of incidental losses in StateMod and RiverWare). The motion was seconded and approved by the Hydrology Committee. New Mexico agreed that the approach was appropriate for McElmo Basin but not for other parts of the Basin.

Extension of Period of Record and Request for Model Runs

The Committee agreed that any request for a model run from an entity that is not for a Program purpose would be paid for by the entity requesting the model run. Funding was not considered for extending the period of record because this work is inclusive with the annual model maintenance budget.

Review of FY04 Scopes of Work

There was a long discussion about the costs of completing the third generation model and documentation, as well as the costs of maintaining and operating the model. ***Pat Page and Dave King will develop a budget and two scopes of work not to exceed \$150,000, which show a completion date of March 2004 for the draft model documentation. The scopes will be sent to Shirley Mondy by August 6, 2003.***

The Stream Gaging scope of work will now be \$5,500 in accordance with the decision to reduce the monitoring effort. ***Shirley Mondy will modify the Stream Gaging and Program Management Scopes of Work, as approved by the Hydrology Committee.***

Navajo Reservoir Operations – Shortage Sharing Update

Predictions for inflow into Navajo are less than average for this fall. As of July, the anticipated shortage is 6.4%. The shortage sharing agreement is a very good first step in getting water users to think about conservation and cooperation. Everyone is doing a good job in coming forward and cooperating. It appears that we will be going into next year with little to no carry-over storage, so next year's water supply will be

dependent on runoff. Because of this, we cannot wait until May 2004 to develop another agreement. It will have to be in place early in the year if we are going to be able to accomplish anything with it.

Hydrologic Conditions Discussion

Due to an extremely low reservoir storage level and no forecast for increased inflow for next year, the Hydrology Committee recommends that the determination of extreme hydrologic conditions be extended until conditions are re-evaluated in the spring of 2004, when runoff forecasts become available. As such, the Hydrology Committee encourages the SJRIP to consider and take all possible measures to promote the conservation of stored water for meeting the demands in the basin in 2004. . ***A memo to the Coordination Committee to extend the extreme conditions determination will be drafted and circulated by Ron Bliesner on August 6, 2003. This will be presented to the Coordination Committee at the August 26, 2003 meeting. A subcommittee consisting of Rick Cox, Bernadette Tsosie, Ron Bliesner, John Simons, and John Whipple will meet to determine a general trigger for extreme conditions for future use.***

Methodology used to define extreme conditions for 2003.

The Committee reviewed the two memos developed by the committee members regarding what was used in 2003 to define extreme conditions. Ron Bliesner explained that 900,000 acre-feet of storage was shown in the model to meet the all of the flow needs. If the storage goes below this, we will risk shortages in the spring. The Committee agreed to edit John Whipple's version. ***Ron Bliesner will edit the 2003 Whipple memo and send it out to the Committee for review and comment.***

Update on Long Range Plan and Subcontracting Subcommittee

Shirley Mondy stated that the budget process has been sent out, but no revisions to the Long Range Plan have been sent out yet. Who is going to do peer review, how will it be handled, and selection criteria - none of this is spelled out yet in the budget process, and is somewhat problematic.

Outstanding Data Needs to Complete Modeling Work

New Mexico data is still provisional. John Simons obtained the necessary data to update the forecast error regression.

The bridge model (second generation operation with third generation data) is implemented. The three base flow options (three gage, two gage maximum, and two gage minimum) have been added to the model.

Keller-Bliesner and Dave King had a short discussion on August 4 regarding possible adjustments to the operating rules in the new model. The third generation model provides daily data with which to make improved decisions. For instance, with the new

model, the duration of the peak could be shortened on a short notice if all necessary conditions have been met.

Erik Knight will go to Denver to obtain technical information from Dave King. Dave King will detail some tasks to Erik.

Coordinator Updates

The FY03 Final Workplan was handed out. If anyone needs another one, please let Shirley Mondy know.

The model website has moved. The new address is:
<<http://www.usbr/uc/wcao/engprog/sjrip/>>.

The links on the San Juan Meeting Summary webpage are not working at the moment.

Also, the listserve is not delivering to FWS email addresses, so please send Shirley Mondy a copy of any emails that you have, or want, sent to the listserve.

It was announced that Marilyn Greenberg had accepted employment elsewhere and this was her last Hydrology Committee meeting. The Committee expressed its appreciation for Marilyn's efforts and wished her well in her new employment.

Steve Cullinan will again represent the Service on the Hydrology Committee.

Review New Action Items

The new action items were reviewed and will be added to the Action Item Log updated with this meeting summary.

Next Meeting

The next meeting will be a conference call scheduled for October 14, 2003 from 9:00am - 12 Noon. Please have your calendars available to determine meetings and conference calls for 2004.

Maintenance and Operation of the San Juan River Basin Hydrology Model
San Juan River Basin Recovery Implementation Program - Hydrology Committee
Fiscal Year 2004 Project Proposal

Principal Investigator: Pat Page
Bureau of Reclamation
835 E. 2nd Avenue, Suite #300
Durango, CO 81301
(970) 385-6560 ppage@uc.usbr.gov

Background:

The model will be made available to generate and analyze runs associated with Section 7 Consultations and/or special requests from the Biology or Coordination Committees related to the flow recommendations or other hydrological aspects of the Program. In order for the model to be available for such requests, the model and data must be maintained to adjust configurations, correct for errors, update documentation, and evolve the data set forward through time.

Study Area:

San Juan River Basin

Objectives:

1. Maintain data to evolve the data set forward through time.
2. Maintain the model to adjust model configuration, methodologies, data, or assumptions, and provide documentation.
3. Provide hardware and software support.
4. Implement Riverware upgrades and receive technical support.
5. Generate and analyze model runs associated with Section 7 consultations or special requests from the Biology and/or Coordination Committees. Assumes that three consultations in FY04 will be requested, requiring five model runs/consultation. It also assumes that the Coordinating Committee will request two special runs in FY04. A consultation run will usually require a model reconfiguration and the implementation of operating criteria. Each consultation request will require approximately eleven staff days; each special run will require five staff days.
6. Provide technology transference to Reclamation's Western Colorado Area Office staff in the details of maintaining the data and models, and in operating the models.

Products:

1. Hydrological analysis of water development scenarios or other scenarios as requested by stakeholders or Program committees.

Budget FY-2004:

	Staff Days	Labor	Travel	Equipment and Supplies
Objective 1				
Personnel	15	\$11,000		
Travel				
Equipment and Supplies				
Objective 2				
Personnel	15	\$11,000		
Travel				
Equipment and Supplies				
Objective 3				
Personnel				
Travel				
Equipment and Supplies		\$5,500		
Objective 4				
Personnel				
Travel				
Equipment and Supplies				\$5,000
Objective 5				
Personnel	43	\$32,750		
Travel				
Equipment and Supplies				
Objective 6				
Personnel	10	\$8,000		
Travel				
Equipment and Supplies				
Subtotal	83	\$68,250		\$5,000
Total				\$73,250

*Note: Staff costs include USBR Denver Technical Service Center staff (\$800/day) and USBR Western Colorado Area Office staff (\$600/day)

Estimated Out Year Funding (Based on 5% allowance for inflation)

(Note: Out year budget could be increased if additional hydrological Program duties are identified and assigned to the Reclamation modeler. The Hydrology Committee encourages Reclamation to staff this person in the Durango office.)

Fiscal Year 2005	\$76,900
Fiscal Year 2006	\$80,750
Fiscal Year 2007	\$84,800
Fiscal Year 2008	\$89,000

Backup Information for Scope of Work Objectives:

1. Data maintenance is to evolve the data set forward through time and make other adjustments to the data.
2. Model maintenance is to adjust the model configuration or operating criteria to correct for errors or other changes.
3. RiverWare maintenance cost is contribution of SJRIP to Upper Colorado Region's RiverWare support costs.
4. Program support is to make and analyze all model runs that are associated with Section 7 Consultations or to make special runs for the Coordinating Committee. The above computation assumes that 3 consultations per year will occur, requiring 5 model runs/consultation. It also assumes that the Coordinating Committee will request 2 special runs/year. A consultation run will usually require a model reconfiguration and operating criteria implementation and testing. Special runs may also require some setup time. The cost estimate assumes that a consultation run will require 3 days of setup time, 1 day to run and analyze each run, and 3 days to report the results. Therefore, each consultation run will take approximately 11 days. It is assumed that special runs will require 2 days of setup time, 1 day to run and analyze, and 1 day to report results.
5. Technical transfer is to provide transfer of technology necessary to operate and maintain the data and model

Improve Stream Gaging and Flow Measurements
San Juan River Basin Recovery Implementation Program - Hydrology Committee
Fiscal Year 2004 Project Proposal

Principal Investigator: Pat Page
 Bureau of Reclamation
 835 E. 2nd Avenue, Suite #300
 Durango, CO 81301
 (970) 385-6560 ppage@uc.usbr.gov

Background:

There are five USGS streamflow gaging stations on the main stem of the San Juan River that are very important to the operation of the river and play an important role in the implementation of the flow recommendations. Stream gaging data on the San Juan River are needed to attempt to reliably develop and implement flow recommendations.

Study Area:

San Juan River Basin in New Mexico

Objectives:

1. Provide funding to the USGS to take one additional flow measurement per month at the four San Juan River gages in New Mexico. (Note: Base cost for operation of the stations is paid for by non-Program funds.)

Products:

1. Improved flow measurement and more accurate gage readings.
2. Technical Report from USGS summarizing the activities completed and the value of obtaining additional readings.

Budget FY-2004:

Objective	Staff days	Labor	Travel	Equipment and supplies
Objective 1				
Personnel	36	21,350		
Travel			4,900	
Equipment and supplies				
Total				\$26,250

Estimated Outyear Funding (Based on 5% allowance for inflation)

Fiscal Year 2005	\$27,560
Fiscal Year 2006	\$28,940
Fiscal Year 2007	\$30,390
Fiscal Year 2008	\$31,900

**Program Management
Base Funding
Fiscal Year 2003 Project Proposal**

Tom Chart and Pat Page
U.S. Bureau of Reclamation
125 S. State St. Salt Lake City, UT 84138-1147 / 835 E. 2nd Ave, Durango, Colorado 81301
801-524-3863 / 970-385-6560

Background:

Program Management funds support Reclamation staff involved in program administration. Funds are used for the administration of funding agreements, including issuing requisitions for program supplies, and the preparation and oversight of work conducted under interagency agreements, cooperative agreements, contracts, and grants. The funds are also used for participation on the technical committees, implementation of committee assignments not specifically identified in a scope of work, reporting, and coordination of water operations.

Management support for Capital fund projects, including technical oversight, budgeting, preparation of bids and funding agreements is covered in a separate scope of work

Tasks - 2004

1. Coordinate and manage the hydrology-related tasks performed by the Hydrology Committee, including administering cooperative agreements and contracts with consultants, accounting for expenditures, developing and providing status reports, and coordinating work items to ensure work is completed as planned.
2. Coordinate, administer, and manage funding agreements (cooperative agreements, grants, interagency acquisitions, and service orders) and equipment purchase requisitions as identified in the annual Work Plan (other than those covered in Task 1.)

***Budget FY-2004:**

Task 1:

Personnel (17 staff days (\$705/day))	\$12,000
Travel (3 trips @ \$500)	<u>\$1,500</u>
<i>Subtotal</i>	\$13,500

Task 2:

Personnel (90 regional staff days (450/day))	\$40,500
Travel (4 trips @ \$600)	<u>\$2,400</u>
<i>Subtotal</i>	\$42,900

TOTAL **\$56,400**

* Note: This budget will likely increase in out years as the Program implements the Contracting Procedures and Reclamation develops a better sense of the associated increased workload, i.e. new start requests and unsolicited proposals. Staff day costs under Task 1 represent an average of personnel costs from Reclamation's Western Colorado Area Office (\$602) and the Denver Technical Service Center (\$808).

HYDROLOGY COMMITTEE COMPLETED ACTION ITEMS FY02 - FY03

	<i>Action Item</i>	<i>Meeting/ Origination Date</i>	<i>Responsible Party</i>	<i>Due Date</i>	<i>Revised Date</i>	<i>Date Completed</i>
1	Complete 2nd generation model documentation. Reclamation portion was mostly the data. Still being reviewed. Responses to commentators have been written. Done. Needs to be added to the website.	7/25/01	Reclamation Keller-Bliesner	11/27/01	John Simons needs to review 7/15/02 9/30/02	10/29/02
2	Write letter to the water districts.	7/25/01	Reclamation	10/31/01		11/27/01
3	Draft Progress Report using Dave King's information. (See #9) A letter documenting the status of the model will be sent to Hydrology Committee by the end of April.	7/25/01	Pat Page	4/30/02		5/7/02
6	Give Dave King and Ron Bliesner the water allocations information (in particular, non-irrigation return flow locations and depletions) from the meeting with New Mexico.	7/25/01	John Simons			9/26/01
7	Let Brent Uilenberg know what funds will not be used in FY 01.	7/25/01	Errol Jensen			9/26/01
8	Send completed FY 2002 budget to Program Coordinator.	7/25/01	Errol Jensen			9/26/01
9	Provide Progress Report information to Errol Jensen.	7/25/01	Colorado (Keller-Bliesner has no progress to report)	10/3/01		10/3/01
10	The Hydrology Committee would like to see the proposal on handling water rights before it is implemented.	7/25/01	Dave King	11/27/01		Decided not to do water rights.
11	Forward the GIS methodology and information to Colorado, and notify John Whipple and Pat Turney when that will happen.	7/25/01	John Simons			Done
13	Add a notation to the Work Plan that Items 1 - 16 will be completed (funds obligated/used) in 2001.	7/25/01	Errol Jensen	7/27/01		9/26/01
14	Prepare Tables 1 and 2 for presentation to the Coordination Committee. (Use Table 3 for the Hydrology Committee only.)	7/25/01	Errol Jensen	7/27/01		9/26/01

	Action Item	Meeting/ Origination Date	Responsible Party	Due Date	Revised Date	Date Completed
15	Table 2 needs to be revised to update the schedule.	7/25/01	Errol Jensen	7/27/01		9/26/01
16	Verify how the \$237,000 will be spent in 2001, if much of the remaining work will be completed by Reclamation staff.	7/25/01	Errol Jensen			9/26/01
17	Work through the details and update revised target dates for 2001 funding information and get to Program Coordinator ASAP.	7/25/01	Errol Jensen Dave King	7/27/01		9/26/01
18	Once the scopes of work are complete, notify the Hydrology Committee so that people can express interest in performing the work.	7/25/01	Reclamation	Ongoing		5/7/02
19	Incorporate Product Deliverables and Delivery Dates into the Work Plan. Current tables could be updated with 2003 outcomes and a delivery date for each task.	7/25/01	Pat Page	7/02		6/25/02
20	Anyone interested in attending the San Juan Congressional briefing and tour should let the Program Coordinator know.	7/25/01	Everyone	8/3/01		Cancelled
21	The Hydrology Committee will finalize meeting dates and set conference calls.	9/26/01	Everyone	11/27/01		11/27/01
22	When the report on the Navajo Reservoir Operations Low Flow Test is complete, a copy will be sent to Shirley to be sent out or linked to the San Juan website.	9/26/01	John Simons	March or April 2002	5/14/02 7/1/02	7/1/02
23	The July 25, 2001 Conference Call Summary will be updated on the website.	9/26/01	Marilyn Greenberg	12/1/ 01		11/20/01
24	Reclamation will extend Arizona and Utah historic irrigated acreage data back to 1929, in a spreadsheet format, as needed for the model. Provisional data is complete. Summary of provisional data set has been sent out by Dave King. Final data is pending CRSS process (as of 10/29/02).	9/26/01	Reclamation (11/27/01)	mid May 2002	7/15/02 9/15/02 Extended indefinitely	5/5/03

	Action Item	Meeting/ Origination Date	Responsible Party	Due Date	Revised Date	Date Completed
25	The Hydrology Committee will vote to determine if it is appropriate to move forward with the model as proposed, and to bring up concerns for the technical subcommittee to work on.	9/26/01	Everyone	11/27/01		11/27/01
26	Ray Alvarado will put the study on how Colorado did their disaggregation for both hydrologic inflows and diversions on the listserve.	9/26/01	Ray Alvarado			2/1/02
27	Dave King will prepare a concise summary report from the technical subcommittee for the Hydrology Committee to take back and review prior to voting at our next meeting. If anyone has questions, contact a subcommittee member and be ready to vote at the next meeting.	9/26/01	Dave King / Hydrology Committee	11/27/01	3/26/02	3/26/02
28	Dave King will talk with folks, one on one, and find out what they think is a reasonable approach for diversion disaggregation, then consolidate comments (pros and cons), and send it out to the listserve (if approved) for comments. This will be discussed at the Nov. 27 th meeting.	9/26/01	Dave King	11/27/01	3/26/02	3/26/02
29	Keller-Bliesner Engineering will put together information on incidental losses for our next meeting, with a review of products for the committee's review.	9/26/01	Keller-Bliesner	11/27/01	Add'l comments to Bliesner and BOR by 4/29/02	3/26/02
30	The San Juan website will have a link to the model website soon: http://wcao.uc.usbr.gov/envprog/sjrip/	9/26/01	Marilyn Greenberg	12/1/01		11/20/01
31	Pat Page and Bill Miller agreed to schedule a Biology/Hydrology Summit to sort out the data, impacts, and extent of our flexibility.	3/26/02 9/26/01	Pat Page Bill Miller	June or August 2002		6/25/02
32	Reclamation is tasked with tracking and managing the Committee's time and money. A percent complete and percent expended table will be provided by Reclamation and Keller-Bliesner and available for a budget and schedule review at the March 26 th meeting. Pat Page and Dave King will work together to send out a monthly expenditures report.	11/27/01	Dave King Reclamation Keller-Bliesner	Monthly March 26 Ongoing		2/11/03 - process is standardized. Move to completed log.

	Action Item	Meeting/ Origination Date	Responsible Party	Due Date	Revised Date	Date Completed
35	John Whipple suggested that the June 14, 2001 version of the Hydrology Committee Model Disclaimer, as approved at the June 19, 2001 Coordination Committee Meeting, be used on Model documentation. Shirley will mail it out on the listserve.	11/27/01	Shirley Mondy			5/1/02
36	Please get comments regarding the September 26, 2001 draft meeting summary to Marilyn Greenberg by 12/7/01. FWS will send out a revised copy.	11/27/01	Everyone Marilyn Greenberg	12/7/01	Revisions still needed. Dave King will assist	1/29/02
37	The Hydrology Committee would like to quantify the benefits of continuing to fund USGS for additional gage readings on the San Juan beyond 2002. The Committee decided to allocate the funds for the additional gage readings and the allocation can be removed later if it needed after the re-evaluation in #34.	1/15/02	Hydrology Committee	after Oct. 29, 2002 Hydrology meeting		10/29/02
38	A Long Term Hydrology Committee Budget Proposal was requested by the Coordination Committee. Please provide your comments to Pat Page. Pat will put the long term budget into a format that is compatible with the work plan and send it back to the Hydrology Committee for comment.	3/26/02 11/27/01	Pat Page Hydrology Committee	3/26/02		5/7/02
39	The final summary of the November 27, 2001 Hydrology Committee conference call will be mailed out to Committee members when revised.	1/15/02	Marilyn Greenberg			1/29/02
40	Dave King will review the budget and progress report targets and address the impacts of missed targets. Dave King and Pat Page will include more details, such as impacts, in the progress reports.	1/15/02	Dave King Pat Page	Ongoing		3/26/02 Format has been established. Ongoing Reports
41	Dave King and Reclamation will develop and add a statement about not using water rights in RiverWare in the model documentation. Statements regarding water rights have been removed from the model documentation.	1/15/02	Dave King			3/26/02

	Action Item	Meeting/ Origination Date	Responsible Party	Due Date	Revised Date	Date Completed
42	The Committee is requested to provide additional comments on Keller-Bliesner's 1/11/02 "Draft Plan of Approach" to Ron Bliesner or John Simons by 1/29/02.	1/15/01	Hydrology Committee	1/29/02		3/2/02
43	The January 15, 2002 Conference Call Summary was approved as amended. Marilyn Greenberg will send out the final version to Committee members and post it on the website when revisions have been completed.	3/26/02	Marilyn Greenberg			5/1/02
44	The Committee agreed to talk with USGS, or invite them to come to the Committee and give us a report at the end of the calendar year - around October 22 Hydrology Meeting? (See # 37) USGS has been contacted and they have indicated that they will attend the HC Oct. meeting.	3/26/02		10/22/02		6/25/02
45	The Hydrology Committee voted to recommend moving forward with the "Key Model Input Draft Plan of Approach" dated 3/22/02. New Mexico was the only vote not in favor.	3/26/02	Dave King			3/26/02
46	John Whipple will try to get some written technical comments regarding the Draft Plan of Approach (3/22/02), that was approved, out to Keller-Bliesner and the Hydrology Committee within the next month.	3/26/02	John Whipple	4/26/02 Ongoing	6/7/02	5/22/02
47	The SJRIP 3 rd Generation Hydrologic Data and Model Development plan of approach (3/23/02) will be revised and sent out to the Committee in a couple of days. It should be reviewed by Committee members and comments forwarded to Dave King prior to April 15.	3/26/02	Dave King Hydrology Committee	4/15/02		5/7/02
48	Pat Page and Steve Harris agreed to create a budget and status report with a conversion column to ensure that tasks A-L remain associated with the \$535,500 that was allocated.	3/26/02	Pat Page Steve Harris			5/7/02

	Action Item	Meeting/ Origination Date	Responsible Party	Due Date	Revised Date	Date Completed
49	Pat Page will create a reasonable schedule, with a bar chart, to show where we are in terms of completion of tasks and budget that has been utilized/allocated. The chart will also show which tasks can be done concurrently and which work must be completed in order for other work to begin. Work that John Simons was going to do, but cannot do, will be included; as well as the work that needs to wait for John Simons to complete.	3/26/02	Pat Page	4/30/02		5/7/02
50	Steve Harris and Pat Page will send out a long term budget revision. The Committee should review and be ready to discuss at the May 7 Conference Call.	3/26/02	Steve Harris Pat Page	4/30/02		5/7/02
51	The Committee is seeking direction from FWS on whether running the model for 500 acre feet is worth it. Steve Cullinan will check into this and find out what has been approved under the two different 3000 af blocks. Shirley Mondy reported that a few hundred af has been used out of the 2 nd 3000 block of minor depletions so far. 100 af or less is covered by the 2 nd 3000 af of minor depletions, so 500 af is not covered.	3/26/02	Steve Cullinan	4/30/02	6/25/02	6/25/02 Baseline Discussion
52	The Committee will add Hydrology Committee tasks into the LRP. Pat Page and Steve Harris will send a version out for the Committee to review prior to April 30.	3/26/02	Pat Page Steve Harris	4/30/02	5/14/02 Biology Comm. meets 5/21/02	5/7/02
53	Pat Page was asked by the Committee to inquire as to why the Hydrology Committee was not asked, in addition to the Biology Committee, about the flexibility of operations recommendations.	3/26/02	Pat Page	4/30/02		5/7/02
54	The Committee will decide on the FY03 budget request, and whether there is any FY02 give up on 5/ 7/02 conf. call.	3/26/02	Hydrology Committee	5/7/02		5/7/02

	Action Item	Meeting/ Origination Date	Responsible Party	Due Date	Revised Date	Date Completed
55	The March 26, 2002 Draft Meeting Summary will be updated with the edits from 5/7 and forwarded to John Whipple for his input. The revised summary will then be sent out to the Committee. The May 7 draft meeting summary and the updated action item log will be sent to the Committee for review. The March 26 th and the May 7 th draft meeting summaries will be reviewed for approval on June 25, 2002.	5/7/02	Marilyn Greenberg John Whipple Hydrology Committee	June 25 for final review/ approval by Committee		6/25/02
56	The Committee agreed to change the meeting summary format to include "Discussion", "Decision", and "Action" sections.	5/7/02	Marilyn Greenberg	Effective Immediately		6/25/02
57	The Committee requested that the Status Report be titled "Status Report" and that the percent expended column be placed next to the percent completions column.	5/7/02	Pat Page			6/25/02
59	There was a motion for the Committee to evaluate the consistency of baseline depletions for the San Juan Basin throughout the model. Further discussion was tabled until the next meeting.	5/7/02	Hydrology Committee	6/25/02		6/25/02
60	Pat Page will revise and send the long term budget out to the listserve for review and approval within the week. Page's time for the rest of the year will be paid for with non-Program funds. Once comments have been received and the Committee approves, the long term budget will be submitted to the Coordination Committee.	5/7/02	Pat Page Hydrology Committee	5/14/02		5/14/02
61	The Committee members will come up with suggestions regarding the target base flow as it relates to the flow recommendations prior to the next meeting. These suggestions will be offered to Reclamation. Page and Simons will attend the May 21 Biology Committee meeting to discuss this item. Reclamation is utilizing a more strict interpretation of flow recommendations because of current drought conditions, and the Farmington gage is being used.	5/7/02	Hydrology Committee Pat Page/John Simons	6/25/02		6/25/02

	Action Item	Meeting/ Origination Date	Responsible Party	Due Date	Revised Date	Date Completed
62	Pat Page and Dave King will add a total percent expended and completed line at the bottom of the monthly status report.	6/25/02	Pat Page Dave King	Immediate Ongoing		8/2/02
63	In the development of the model, if another data set is found that disagrees with the data provided by the state (or anyone else), then that information needs to be discussed at a Hydrology Committee meeting.	6/25/02	Modelers Hydrology Committee	Immediately Ongoing		8/5/03
64	Reclamation will compare their Hammond Project irrigated acreage data with New Mexico's data. Dave King will send an email out to the Hydrology Committee indicating if any discrepancies are found. No discrepancies were found (8/20/02 meeting).	6/25/02	Dave King			7/1/02
65	The discussion on zero flows, on handout #2 from Keller-Bliesner, needs to be strengthened to describe the need for spreading flows out over a month instead of showing several days of zero flow. More description of the magnitude of the missing data would make it easier to understand the methodology. Alvarado & Westfall will discuss (per 8/20/02).	6/25/02	Keller-Bliesner			10/29/02
66	Shirley Mondy will see if Joy Nicholopoulos is available to be on the next Hydrology Committee conference call to answer consultation and baseline questions.	6/25/02	Shirley Mondy		10/29/02	10/29/02
67	Baseline depletions will be discussed further at the 10/29/02 Hydrology Committee meeting.	6/25/02		August 20 conf. call	10/29/02	10/29/02
68	New Mexico water users will meet to discuss strategy for dealing with depletions in the baseline.	6/25/02		Ongoing		Cancelled
69	Jim Brooks would like comments on his revision of the LRP by August 1 st . Steve Harris and Pat Page will review the LRP and put together Hydrology Committee comments and send them out to the Hydrology Committee prior to 8/1/02.	6/25/02	Steve Harris Pat Page Hydrology Committee	August 1		7/10/02

	Action Item	Meeting/ Origination Date	Responsible Party	Due Date	Revised Date	Date Completed
70	The Hydrology Committee will request to be included in the peer review process for the temperature analysis model. Shirley Mondy will send Amy Cutler's status report out to the Hydrology Committee.	6/25/02	Shirley Mondy			6/27/02
71	Shirley Mondy will talk with Brent Uilenberg about the proposed grow out ponds to see what the capital expenditure implications would be.	6/25/02	Shirley Mondy		9/25/02 Coordination Meeting	10/29/02
72	Ron Bliesner will send NIIP demands for next year to John Simons, so that information can be included in the Hydrology Committee's flow recommendation memo to the Biology Committee/FWS/Reclamation.	6/25/02	Ron Bliesner John Simons			10/29/02
73	John Simons, Dave King, and Keller-Bliesner agreed to formulate some new operating criteria for the model by August 6, to be discussed at the HC conference call on August 20, 2002.	6/25/02	John Simons Dave King Keller-Bliesner	August 6		8/19/02
74	John Simons will meet with John Whipple on July 11 to discuss the New Mexico data still needed for the model.	6/25/02	John Simons John Whipple	July 11		7/11/02
75	Pat Page will incorporate John Whipple's comments on the "Status Report to the Coordination Committee" in redline and send it back out to the Hydrology Committee for review.	6/25/02	Pat Page Hydrology Committee			7/18/02
76	Hydrology Committee members should email their comments on the Third Generation Navajo Draft Operating Criteria, dated 8/19/02, to Dave King, Ron Bliesner, and/or Brian Westfall by September 13, 2002.	8/20/02	Hydrology Committee	9/13/02	Ongoing	2/11/03
77	Discuss the need for peer review for Hydrology Committee work. Committee members should bring ideas and suggestions to the next meeting. [See #86]	8/20/02	Hydrology Committee	10/29/02	April 1, 2003	4/1/03
79	Ron Bliesner will get the Program temperature data to Amy Cutler, but it may only be data from one location.	10/29/02	Ron Bliesner			11/1/02

	Action Item	Meeting/ Origination Date	Responsible Party	Due Date	Revised Date	Date Completed
80	Marilyn Greenberg will send a copy of this meeting summary to Amy Cutler, per her request.	10/29/02	Marilyn Greenberg			11/1/02
82	John Simons will prepare a risk analysis on the effects of the current drought year to the water supply. This information will be given to Bill Miller to give to the Biology Committee.	10/29/02	John Simons			November 2002
83	Ron Bliesner will extract language out of the flow report to add a section on base flow into the 8/19/2002 operating criteria.	10/29/02	Ron Bliesner	2/15/03		3/31/03
84	Ron Bliesner will notify the Hydrology Committee when the presentation on habitat hydrology will be given in the Biology subcommittee meeting. August 5, 2003 Hydrology Committee meeting (added 2/11/03). Bliesner will present it today if there is time.	10/29/02	Ron Bliesner	May 2003 subcommittee meeting in Logan, UT		4/1/03
85	Defining triggers for extreme conditions - add to agenda for conference call in February.	10/29/02	Pat Page Shirley Mondy			2/11/03
86	The Committee agreed to discuss the need for a peer review panel to oversee all Hydrology Committee work at the April 1, 2003 meeting.	2/11/03	Committee	April 1, 2003		4/1/03
87	Reclamation will revise the budget schedule and report at the next meeting to indicate that work will be complete this fiscal year and within budge. Dave King and Pat Page will set up a conference call with Ron Bliesner and Brian Westfall to determine the plan for the rest of 2003.	2/11/03	Dave King Pat Page Ron Bliesner Brian Westfall			4/1/03
88	Ron Bliesner will revise the entire base flow discussion and get it out to the Committee by Feb. 14, 2003.	2/11/03	Ron Bliesner	Feb. 14, 2003		3/31/03
89	Pat Page will reserve the 4 th floor conference room for the April 1, 2003 Hydrology Committee meeting	2/11/02	Pat Page			2/30/03
90	John Simons will take a look at the USGS data before Ron Bliesner presents at the Biology Committee meeting	2/11/03	John Simons	Feb. 23, 2003		2/23/03

	<i>Action Item</i>	<i>Meeting/ Origination Date</i>	<i>Responsible Party</i>	<i>Due Date</i>	<i>Revised Date</i>	<i>Date Completed</i>
91	John Leeper agreed to get a letter to USGS and to whomever controls the locations to ease access for USGS. This was added to #78 after Aug. 5, 2003 meeting.	4/1/03	John Leeper			8/5/03
92	The scope of work for model operation needs to be circulated by the June 3 rd conference call.	4/1/03	Pat Page	June 3, 2003		5/28/03
93	The Hydrology Committee agreed to add a discussion of hydrologic conditions to the agenda of each meeting or conference call to determine whether extreme conditions exist.	4/1/03	Hydrology Committee Pat Page		Ongoing	8/5/03
94	The Hydrology Committee determined that hydrologic conditions indicate that extreme dry conditions exist at present, and that the Program should consider appropriate water conservation measures. Shirley Mondy will transmit this information to the Coordination Committee.	4/1/03	Shirley Mondy			04/10/03
95	Dave King will add draft documentation on model data sharing and will add it to the model website.	4/1/03	Dave King			04/02/03
96	John Simons will sent a letter requesting permission for Reclamation to maintain and FTP site so they can continue to do the modeling work.	4/1/03	John Simons			5/29/03
97	Dave King will add "draft" documentation to the documents on the website so that it will be clear to everyone that these are working documents, not final documents.	4/1/03	Dave King			4/2/03
98	Dave King will have a documentation outline available in time to be discussed at the June conference call. Documentation outline will be added to the June 3 rd conference call. This documentation was emailed to the Committee on June 3, 2003. The Committee should get comments to Dave King by June 13, 2003.	4/1/03	Dave King Pat Page	June 3, 2003	June 13, 2003	8/4/03
99	Ron Bliesner will email the revised Operating Criteria to the Committee	4/1/03	Ron Bliesner			4/2/03

	Action Item	Meeting/ Origination Date	Responsible Party	Due Date	Revised Date	Date Completed
100	John Whipple and/or Shirley Mondy will take the Hydrology Committee's recommendation of no need for third party peer review to the next Coordination Committee.	4/1/03	John Whipple Shirley Mondy	May 23, 2003		4/10/03
101	Under the model maintenance scope of work, Pat Page will add the documentation for objective #2, add the specifics about the estimated/ projected model runs that are budgeted for FY04, and will take the administration tasks out of this scope of work. This will also be noted in the out year funding.	6/3/03	Pat Page			6/9/03
102	Pat Page will invite Mike Roark to the August Hydrology Committee meeting to get an update report on the effectiveness of additional gage readings. Pat Page will also call USGS and verify that the FY04 budget for the additional gage readings will cover the work. Pat will clarify with the Albuquerque Reclamation office whether there is a reporting requirement implicit in their contract with USGS. Pat Page will add this to the scope of work this week.	6/3/03	Pat Page			6/9/03
103	Pat Page and Steve Harris agreed to clarify the 2003 extreme condition decision and get it out to the Hydrology Committee for review.	6/3/03	Pat Page Steve Harris			7/23/03

August 20, 2003

HYDROLOGY COMMITTEE ACTION ITEM LOG FY03

	<i>Action Item</i>	<i>Meeting/ Origination Date</i>	<i>Responsible Party</i>	<i>Due Date</i>	<i>Revised Date</i>	<i>Date Completed</i>
4	Add model runs and other information to the permanent hydrology website: http://wcao.uc.usbr.gov/envprog/sjrip/ .	7/25/01	Dave King	Ongoing		Continues to Update
5	Model modification briefings.	7/25/01	Reclamation and Keller-Bliesner	Ongoing		
12	Any new data or methods incorporated into RiverWare or State Mod will be shared with the Hydrology Committee.	7/25/01	Keller-Bliesner and Reclamation	Ongoing		
33	New Mexico will work on developing data on non-irrigation depletions starting in March. [10/29/02] New Mexico has provided provisional data on the prior depletions. Staff will not be available for the next few months to work on this. <i>Dave King has extrapolated pre-1970 non-irrigation depletions data back to a baseline and will send the spreadsheet to Rick Cox.(completed as of 2/11/03)</i> Dave will provide written explanation of how extrapolation was done to Hydrology Committee. The model is operating with provisional generation II data until New Mexico submits further data.	11/27/01	New Mexico	March 2002	Extended	
34	Gage error analysis discussion: the Hydrology Committee still needs to determine whether big losses are due to daily disaggregation. The Committee has the option to re-evaluate losses once the 3 rd Generation model is complete.	11/27/01	Hydrology Committee		When the Model is complete	
58	John Whipple will provide a written statement of New Mexico's concerns re: State Mod. Based on that, Ray Alvarado will provide a written description of StateMod. New Mexico's comments have not yet been received. [10/29/02] Still on New Mexico's back burner.	5/7/02	John Whipple Ray Alvarado	6/17/02	Extended	

	<i>Action Item</i>	<i>Meeting/ Origination Date</i>	<i>Responsible Party</i>	<i>Due Date</i>	<i>Revised Date</i>	<i>Date Completed</i>
78	The Committee agreed to fund add'l trips by USGS, and suggested that USGS fund the necessary improvements (new cableway) at Shiprock. Pat Page will talk to BOR contract people to get a contract going for USGS for 2003 (done Dec. 2, 2002). Ron Bliesner will talk with John Leeper to see if there is anything that can be done from Navajo Nation to assist USGS in obtaining access. Jerry Thomas at BIA in Shiprock manages those access contracts - he may also be able to help. John Leeper agreed to get a letter to USGS and to whomever controls the locations to ease access for USGS. (4/1/03)	10/29/02	Hydrology Committee Pat Page Ron Bliesner John Leeper		April 1, 2003 October 14, 2003	
81	Add peer review discussion to next summer's meeting agenda when Amy Cutler comes back to present progress and findings. Invite Amy to the August October meeting and discuss whether her model needs peer review.	10/29/02	Pat Page Shirley Mondy	April 1, 2003	August 5, 2003 October 14, 2003	
104	Bernadette Tsosie will work with USGS to determine a good site for the Shiprock cableway.	8/5/03	Bernadette Tsosie			
105	USGS agreed to give a presentation to the Hydrology Committee each October regarding the effectiveness of the gage readings.	8/5/03	USGS			
106	Pat Page and Shirley Mondy will check into the possibility of a permanent easement for the Archuleta gage. USGS will check with their solicitor as well.	8/5/03	Pat Page Shirley Mondy			
107	Pat Page and Dave King will develop a budget and two scopes of work equal to not more than \$150,000 which will show a completion date of March 2004 for the draft model documentation. The scopes will be sent to Shirley Mondy by August 6, 2003.	8/5/03	Pat Page Dave King	8/6/03		
108	Shirley Mondy will modify the Stream Gaging and Program Management Scopes of Work, as identified by the Hydrology Committee	8/5/03	Shirley Mondy			

	<i>Action Item</i>	<i>Meeting/ Origination Date</i>	<i>Responsible Party</i>	<i>Due Date</i>	<i>Revised Date</i>	
109	A memo to the Coordination Committee for an FY04 extreme conditions trigger will be drafted and circulated to the Hydrology Committee by Ron Bliesner on August 6, 2003. This will be presented to the Coordination Committee at their August 26, 2003 meeting.	8/5/03	Ron Bliesner Hydrology Committee	8/6/03		
110	A subcommittee consisting of Rick Cox, Bernadette Tsosie, Ron Bliesner, John Simons, and John Whipple will meet to determine a general trigger for extreme conditions for future use.	8/5/03	Rick Cox, Bernadette Tsosie, Ron Bliesner, John Simons, John Whipple			
111	Ron Bliesner will edit the 2003 extreme conditions memo from John Whipple, per the Committee's request, and send it out to the Hydrology Committee.	8/5/03	Ron Bliesner			

August 20, 2003

Memorandum

To: Hydrology Committee

From: Brian Westfall and Ron Bliesner

Date: July 28, 2003

Re: Calculation of Incidental Losses in StateMod and RiverWare

Background

In the March 22, 2002 San Juan River Basin Hydrology Model Key Model Input Draft Plan of Approach we discuss our recommendation on modeling incidental losses. It was basically stated that both Colorado and New Mexico are to set incidental losses for historical projects at their discretion and Reclamation would model them as requested. Incidental losses were set at 10% of depletion for New Mexico. Reclamation provided New Mexico diversion and efficiency data to the State of Colorado for inclusion in StateMod. Colorado chose not to include incidental losses directly because that functionality was not available in StateMod. Colorado's incidental losses were accounted for in the reach gains and losses that were necessary for gage closure.

Although we recognized that Colorado's method of handling incidental losses was not ideal, the Hydrology Committee approved the approach, provided that the affected projects did not materially change with time and that incidental losses associated with any substantial change between the historical condition and baseline or any future condition would be included. We further recommended that we proceed with the modeling because there did not appear to be a viable alternative.

In the RiverWare model, natural flow reach gains and losses (referred to as gains from this point on) are included just above each gage to account for natural and unaccounted for gains/losses. All simulation is done using these natural flow gains. Since we are using the Colorado generated natural flows to determine reach gains, incidental losses associated with irrigation projects in Colorado are included in the natural flow gains. Therefore, these data are not really natural flow gains. If a project was consistently operated historically and operated the same in a baseline or future condition, then none of this would really matter. However, any change in operation from that of the historical condition causes problems. It is particularly problematic to attempt to model a change in water use for a particular project when the project incidental losses are included in the reach gains.

Another problem is in the inclusion of imported water that is treated as a fixed input to the model. When we originally approved inclusion of incidental losses in the reach gain/loss, we did not consider the case of imported water. If we do not explicitly include incidental losses, the simulated return flows will be too large and the resulting computed natural flow gains will be too small. This would not necessarily be problematic if the baseline condition was the same as the historical time series used to develop the natural flows, but this clearly is not the case with imported water such as the Dolores Project. This came to light in the third generation model testing while looking at the McElmo area contribution to the San Juan, which affects flows at Bluff. In the McElmo Basin there are both large imports and changes in irrigation with time due to the Dolores project. Further, there are large phreatophyte areas in the Basin. These conditions

combined with the assumption of incidental losses being transferred to the reach gain/loss resulted in a large change in natural flows at Bluff.

New Approach

During a conference call between Dave King, Ray Alvarado, and Brian Westfall on July 16, 2003, Ray informed us that StateMod could effectively model incidental losses by reducing the return flow from a node by some factor (referred to as the return flow method). This is relatively new functionality added to StateMod because of some work being done in the Rio Grande Basin. This ability is a great enhancement to StateMod and solves many of the problems described in the previous section. However, this method is a change from historical Reclamation practice for calculating incidental losses. Reclamation has normally calculated incidental losses as a function of depletion. For example, incidental losses in New Mexico are 10% of the depletion (referred to as the depletion method). The depletions are rather constant for a given project and hence, so are the incidental losses. The irrigation efficiency does not affect the incidental loss calculation. Using the depletion method it would not matter if the irrigation efficiency is 10% or 90%, the incidental loss is the same (provided there is no shortage and depletion requests are fully met). In reality one would expect the incidental losses would increase as the efficiency drops with a larger loss occurring on the larger volume of return flow.

In both models we can return 0 to 100% of the return flow to a downstream node. In the return flow method of incidental loss computation we only return a portion of the return flow to the downstream node. The difference is tabulated as a loss. This loss will vary with irrigation efficiency. In both models irrigation efficiency varies with water supply due to a variable efficiency algorithm, resulting in varying incidental loss with time. This variability is real and may better match actual conditions than fixing incidental loss to depletion.

Table 1 shows an example of the Depletion method of incidental loss computation. The example efficiencies are 30%, 50% and 70%. The incidental loss is 10 units or 10% of the depletion. The calculated return flow factors are used in Tables 2 and 3 and are computed as the incidental loss divided by the return flow ($10/233.33=0.04$ at 30%). Table 2 shows the return flow method of incidental loss computation using the varying return flow factors calculated in Table 1. Note that the incidental loss is the same because the Return Flow Factors vary (0.04, 0.1, and 0.23). Since we can not vary the return flow factors by efficiency in either model, the return flow method would be implemented in both models as shown in Table 3. Colorado will apply their best judgment based on available data to arrive at an incidental loss rate for a project or basin as we approved in the above referenced plan of approach. A single return flow factor will be computed to match the average incidental loss with time, but the actual loss will vary from year-to-year.

Table 1. Depletion Method

Efficiency	0.30	0.50	0.70
Depletion	100.00	100.00	100.00
Diversion	333.33	200.00	142.86
Return Flow	233.33	100.00	42.86
Incidental Loss	10.00	10.00	10.00
Return Flow Factor	0.04	0.10	0.23
Realized Return Flow	223.33	90.00	32.86

Table 2. Return Flow Method with Variable Return Flow factors

Efficiency	0.30	0.50	0.70
Depletion	100.00	100.00	100.00
Diversion	333.33	200.00	142.86
Return Flow	233.33	100.00	42.86
Return Flow Factor	0.04	0.10	0.23
Incidental Loss	10.00	10.00	10.00
Realized Return Flow	223.33	90.00	32.86

Table 3. Return Flow Method with Fixed Return Flow factors

Efficiency	0.30	0.50	0.70
Depletion	100.00	100.00	100.00
Diversion	333.33	200.00	142.86
Return Flow	233.33	100.00	42.86
Return Flow Factor	0.10	0.10	0.10
Incidental Loss	23.33	10.00	4.29
Realized Return Flow	210.00	90.00	38.57

Conclusion and Recommendation

We recommend taking advantage of the new StateMod functionality in regards to incidental losses. This will require configuration changes in both StateMod and RiverWare with some additional rules required in RiverWare to tabulate the incidental losses. This method would be applied to return flows in Colorado. New Mexico return flows would remain a function of depletion as now modeled unless the committee believes that the method should be changed to match the Colorado method. While we remain consistent with the Plan of Approach previously approved in terms of implementing the States’ identified incidental losses, implementation of this new methodology is a departure from the description of Colorado’s methodology in the Plan of Approach, thus requiring Committee approval. This change is essential to accurately compute return flows from the McElmo basin and will improve accuracy when modeling changed conditions in the other Colorado basins.

Budget - As Requested August 2003

Task	FY2001 Proposal Schedule	Professional time - staff days			FY2001 Funds	FY2002 Funds	FY2003 Funds	FY2004 Funds	Estimated Cost	Target Schedule
		USBR	Consultants	Total						
A. Analyze and correct gage errors.	Nov-00	0.0	20.0	20.0	\$15,335	\$0	\$0	\$0	\$15,335	Dec-41
B. CDSS interface	Nov-00	77.5	9.5	87.0	\$28,321	\$25,343	\$3,394	\$0	\$57,058	Mar-56
C. Data systems development	Jan-01	77.5	9.5	87.0	\$28,321	\$25,343	\$3,394	\$0	\$57,058	Mar-56
D. Correct 1970 -1993 database	Mar-01	34.0	0.0	34.0	\$4,088	\$16,377	\$1,936	\$0	\$22,402	Apr-61
E. Extend data sets to 1929	Apr-01	17.0	0.0	17.0	\$0	\$9,471	\$1,936	\$0	\$11,407	Mar-31
F. Extend data sets from 1993 to 1999	May-01	17.0	0.0	17.0	\$0	\$9,471	\$1,936	\$0	\$11,407	Mar-31
G. Configure and Calibrate to CDSS	Jun-01	102.0	21.0	123.0	\$20,873	\$41,054	\$18,428	\$4,848	\$85,203	Apr-33
H. Implement functionality in Riverware	Jun-01	26.0	0.0	26.0	\$16,788	\$0	\$0	\$0	\$16,788	Dec-45
I. Daily disaggregation	Aug-01	27.0	35.0	62.0	\$0	\$36,855	\$9,312	\$0	\$46,167	May-26
J. San Juan Model upgrade / calibration	Sep-01	104.5	89.5	194.0	\$0	\$75,578	\$44,224	\$25,966	\$145,768	Feb-99
K. Coordination with stakeholders	Throughout	84.3	13.0	97.3	\$18,939	\$44,300	\$0	\$0	\$63,239	Feb-73
L. Develop complete documentation	Nov-01	73.6	30.0	103.6	\$13,601	\$16,974	\$8,660	\$33,461	\$72,697	Jan-99
Expenses					\$23,173	\$41,004	\$3,500	\$4,405	\$72,082	
Total		640	228	868	\$169,438	\$341,771	\$96,720	\$68,680	\$676,609	Jun-52

Expenses include travel, contracting costs, software, work station procurement and training, work station support, and RiverWare modifications.
FY2002 funds include \$108,465 of consultant work to be performed in 2003. Negative FY2003 costs also reflect contractor carryovers.

April 2003 Budget

Tasks By Tasks Status
07/31/03

Task	Actual Schedule	Target Schedule	Amount Expended	Percent Expended	Percent Completion	Status
A	Sep-01	Sep-01	\$15,335	100%	100%	Initial analysis is complete. Task may be revisited after new model is available.
B		Aug-03	\$56,352	99%	98%	Interfacing of daily and monthly time-series data is complete. Node and support data interfacing are partially completed.
C		Aug-03	\$56,352	99%	98%	Database interfacing is completed.
D		Oct-02	\$23,954	107%	100%	Provisional data set exists.
E	Jan-03	Oct-02	\$11,407	100%	100%	Provisional data set exists.
F		Aug-03	\$11,407	100%	95%	Provisional data set exists.
G		Sep-03	\$83,302	98%	92%	Reconfiguration has been completed.
H	Sep-01	Sep-01	\$16,788	100%	100%	StateMod return flow methods are implemented. New RiverWare requests types are implemented. It was demonstrated that StateMod water rights processing can be duplicated in RiverWare if required.
I		Jul-03	\$35,618	77%	96%	Data, models, and methods to support disaggregation are completed. Adjustment of process continues
J		Nov-03	\$61,280	42%	49%	Bridge model is implemented. Sensitivity testing and data analysis continues. Baseflow alternatives and initial scoping of flushing alternatives is complete. Scoping, testing, and implementation is ongoing.
K		Sep-04	\$61,751	98%	95%	Ongoing. Work plan, schedule, and budget are updated at least monthly
L		Mar-04	\$39,589	54%	51%	Web page has been implemented that includes links to models, rulesets, and documentation. Links are available to 2nd generation documentation and drafts of several third generation documents. Ongoing.
Expenses			\$51,196			
Total			\$524,331	77%	83%	Monthly Log
<p>Differences exist between percent expended and percent completed due to work funded by other sources of funds and other reporting factors. Percent completions are based upon all work to complete project whereas percent expended are based upon program funds that are budgeted to respective tasks.</p>						<p>A good deal of time was spent on analyzing, discussing adjustments, and making adjustments to the naturalized flows. These iterations have focused on incorporation of incidental losses in Colorado and problems with the water balance in the McElmo Creek basin. The primary decision model activity was the addition of the forecast error procedures to include a maximum and minimum percent forecast error check.</p>
Expenditures are through -----> 7/26/2003						

FY2002 funds include \$108,465 of consultant work to be performed in 2003. Negative FY2003 costs also reflect contractor carryovers.

April 2003 Budget

07/31/03

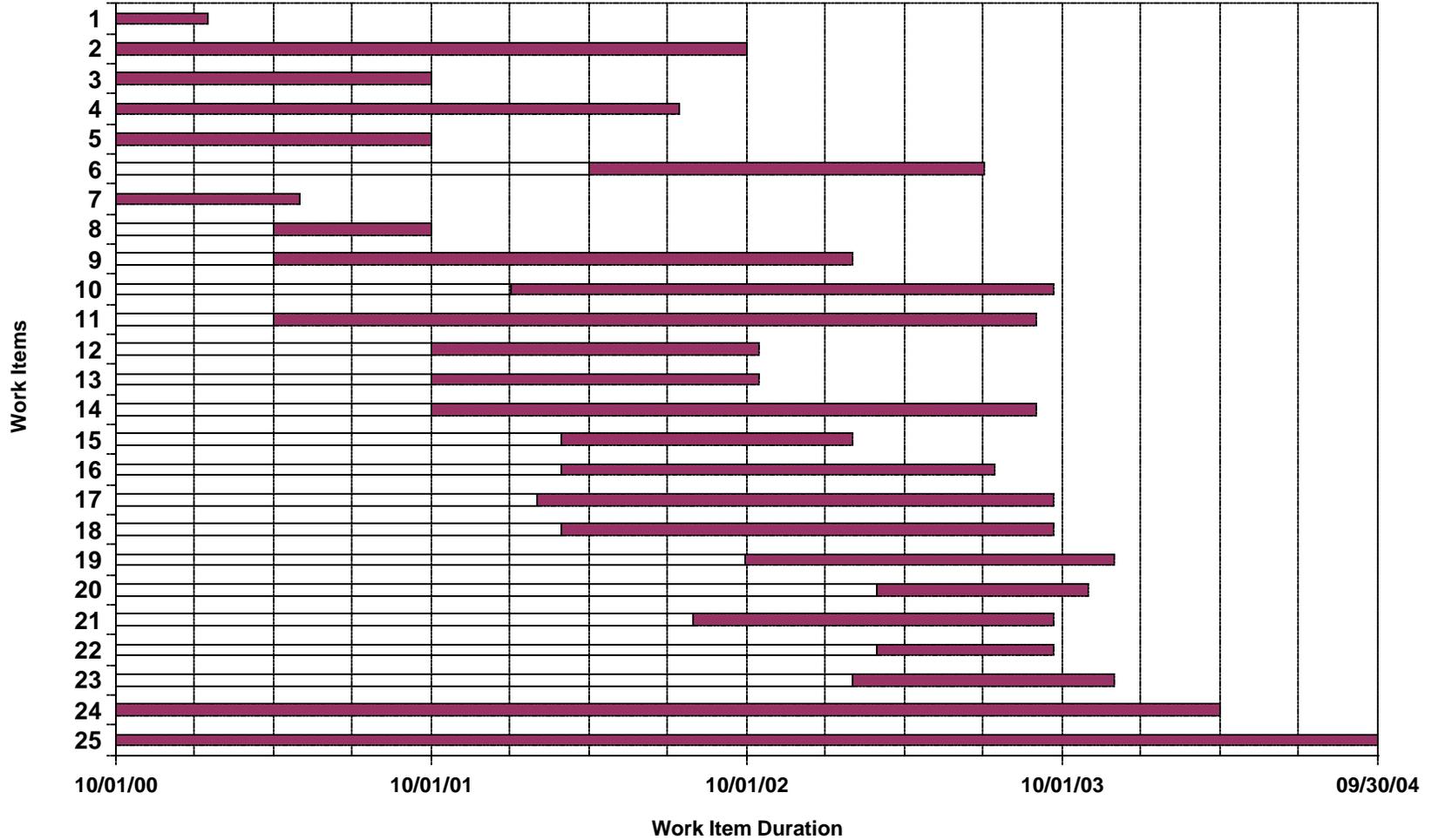
Task	Staff Days			Costs			Expenditures			Percent Expended
	BOR	Consultants	Total	BOR	Consultants	Program Budget	BOR	Consultants	Program Total	
A	0	20	20	\$0	\$15,335	\$15,335	\$0	\$15,335	\$15,335	100%
B	78	10	87	\$49,866	\$7,192	\$57,058	\$50,352	\$6,000	\$56,352	99%
C	78	10	87	\$49,866	\$7,192	\$57,058	\$50,352	\$6,000	\$56,352	99%
D	34	0	34	\$22,402	\$0	\$22,402	\$23,954	\$0	\$23,954	107%
E	17	0	17	\$11,407	\$0	\$11,407	\$11,407	\$0	\$11,407	100%
F	17	0	17	\$11,407	\$0	\$11,407	\$11,407	\$0	\$11,407	100%
G	102	21	123	\$69,306	\$15,897	\$85,203	\$68,142	\$15,160	\$83,302	98%
H	26	0	26	\$16,788	\$0	\$16,788	\$16,788	\$0	\$16,788	100%
I	27	35	62	\$19,672	\$26,495	\$46,167	\$19,672	\$15,946	\$35,618	77%
J	105	90	194	\$77,948	\$67,820	\$145,768	\$35,018	\$26,262	\$61,280	42%
K	84	13	97	\$53,398	\$9,841	\$63,239	\$53,398	\$8,353	\$61,751	98%
L	74	30	104	\$49,777	\$22,920	\$72,697	\$29,380	\$10,209	\$39,589	54%
Expenses				\$47,679	\$24,403	\$72,082	\$44,196	\$7,000	\$51,196	
D&MD	640	228	868	\$479,515	\$0	\$676,609	\$414,066	\$110,265	\$524,331	77%
Other									\$44,395	
Total									\$568,726	
FY2001				\$154,103	\$15,335	\$169,438	\$154,103	\$15,335	\$169,438	
FY2002				\$182,456	\$159,315	\$341,771	\$182,456	\$94,930	\$277,386	
FY2003				\$96,720	\$0	\$96,720	\$77,468	\$0	\$77,468	
FY2004				\$46,236	\$22,444	\$68,680	\$0	\$0	\$0	

Expenditures are through -----> 07/26/03

\$60,000 have been obligated by cooperative agreement for work on tasks B, C, I, G, K, and L.

\$99,315 have been obligated by contract for work on tasks I, J, K, and L.

SJRIP Hydrology Model Development - Detailed Tasks and Schedule Timeline



SJRIP Hydrology Model Development - Detailed Tasks and Schedule Timeline
07/31/03

Work Item Durations

Item	Start Date	End Date	Total Duration	FY2001 Duration	FY2002 Duration	FY2003 Duration	FY2004 Duration	Description
1	10/01/00	01/15/01	107	107	0	0	0	Migrate flushing release computations to RiverWare rules language.
2	10/01/00	09/30/02	730	365	365	0	0	Complete dourmentation of previous SJRIP Hydrology Model.
3	10/01/00	09/30/01	365	365	0	0	0	Analyze gage errors and correct gage record as required for reasonable water balance.
4	10/01/00	07/15/02	653	365	288	0	0	Evolve GIS coverages and databases to support new models including return flow apportions where necessary.
5	10/01/00	09/30/01	365	365	0	0	0	Review CDSS San Juan StateMod model and databases, engineering methods, water rights algorithm, and documentation. Identify RiverWare modifications to reproduce CDSS return flow methods and decision process.
6	04/01/02	07/03/03	459	0	183	276	0	Rule options and sensivity testing of 2nd generation and transition models to improve specification of 3rd generation model behavior.
7	10/01/00	04/30/01	212	212	0	0	0	Develop and test implementation of StateMod return flow procedures in RiverWare.
8	04/01/01	09/30/01	183	183	0	0	0	Develop and test StateMod water rights procedures in revised RiverWare.
9	04/01/01	01/31/03	671	183	365	123	0	Develop cross model data sets equivalent. This will consist of transforming CDSS input and output data into equivalent spreadsheet and RiverWare terms. Transformation of New Mexico, Utah, and Arizona data will also be required.
10	01/01/02	09/20/03	628	0	273	355	0	Identify and quantify incidental losses, efficiencies, and headgate capacities
11	04/01/01	08/31/03	883	183	365	335	0	Develop data storage, analysis and retrieval system, including Data Management Interfaces (DMI's) between respective applications and databases.
12	10/01/01	10/15/02	380	0	365	15	0	Update 1929-1973 data
13	10/01/01	10/15/02	380	0	365	15	0	Extend data sets backward to WY1929.
14	10/01/01	08/31/03	700	0	365	335	0	Extend data sets forward through WY2000.
15	03/01/02	01/31/03	337	0	214	123	0	Compute New Mexico La Plata shortages and identify offshore depletions.
16	03/01/02	07/15/03	502	0	214	288	0	Develop and implement disaggregation procedures.
17	02/01/02	09/20/03	597	0	242	355	0	Reconfigure StateMod and RiverWare models.
18	03/01/02	09/20/03	569	0	214	355	0	Build and validate reconfigured RiverWare models
19	09/30/02	11/30/03	427	0	1	365	61	Formulate and prototype decision model operating criteria including sensitivity testing of identified alternatives for improved performance.
20	03/01/03	10/31/03	245	0	0	214	31	Build and test revised decision model.
21	08/01/02	09/20/03	416	0	61	355	0	Recompute naturalized flows for reconfiguration with extended data sets.
22	03/01/03	09/20/03	204	0	0	204	0	Test models with revised naturalized flows and verify gage convergence.
23	02/01/03	11/30/03	303	0	0	242	61	Analyze runs of revised decision model.
24	10/01/00	03/31/04	1278	365	365	365	183	Develop documentation and incorporate comments
25	10/01/00	09/30/04	1461	365	365	365	366	Program Support And Coordination.

Fiscal Year Start Date 10/01/00 10/01/01 10/01/02 10/01/03
Fiscal Year End Date 09/30/01 09/30/02 09/30/03 09/30/04