

From: Thurin, Steven M. [<mailto:Steven.Thurin@hdrinc.com>]
Sent: Monday, November 01, 2010 10:54 AM
To: Ben Floyd; Larry Vinsonhaler
Cc: Wendy Christensen; jhubble@usbr.gov
Subject: RE: TWSA, WASI and Adjusted Scenarios

Hi Larry,

To answer your questions on September 30 Reservoir Contents:

1. September 30, 1993: Yes, the contents include the additional storage from the Integrated Plan. This is because the Prorating level would be <70% if the IP facilities were not used to bring it up to 70. The contents include 4,000 in Easton, 8,800 in Wymer, 120,000 in Rimrock, 22,700 in Keechelus, -18,500 in Kachess (18,500 drawn from inactive pool), 15,400 in Cle Elum, and 93,800 in Bumping. This does include the Kachess inactive, as do all the following.
2. September 30, 1994 (1): The contents include 4,000 in Easton, 900 in Wymer, 10,300 in Rimrock, 9,600 in Keechelus, -148,000 in Kachess, 10,800 in Cle Elum, and 34,500 in Bumping.
3. September 30, 1994 (2) (without Bumping Enlargement): The -118,000 contents include 4,000 in Easton, 1,000 in Wymer, 10,300 in Rimrock, 9,400 in Keechelus, -155,000 in Kachess, 10,800 in Cle Elum, and 1,900 in Bumping. This does use more of Kachess inactive.
4. September 30, 1994 (3) (without Kachess Inactive): The 56,000 of contents include 4,000 in Easton, 870 in Wymer, 10,300 in Rimrock, 8,600 in Keechelus, 2,300 in Kachess, 11,000 in Cle Elum, and 19,300 in Bumping.
5. September 30, 1994 (4) (without Wymer): The -140,000 of contents include 4,000 in Easton, 0 in Wymer, 10,300 in Rimrock, 9,600 in Keechelus, -177,000 in Kachess, 11,000 in Cle Elum, and 2,000 in Bumping. This approaches the 200,000 assumed usable in Kachess.

With regard to your question on "Instream Conservation Benefits", irrigation conservation benefits first apply to achieving a full irrigation supply and then to increasing storage in reservoirs. The Parker Title XII flows are based on reservoir storage plus groundwater recharge projects, Wymer instream flow account, and these instream conservation benefits.

Hope this helps! Let me know if you need more clarification.

Steve

From: Ben Floyd [<mailto:bfloyd@anchorqea.com>]
Sent: Monday, November 01, 2010 8:39 AM
To: Thurin, Steven M.
Cc: Larry Vinsonhaler; Wendy Christensen; jhubble@usbr.gov
Subject: FW: TWSA, WASI and Adjusted Scenarios

Hi Steve,

Please see attached from Larry Vinsonhaler. He has requested clarification on several questions related to the modeling results that you are better suited to answer. Can you review his questions and comments and provide a response back to him?

Thanks
Ben

November 1, 2010

Ben,

A handout provided at the October 21 meeting summarizes the resource indicators for the Future Without Integrated Plan, the Integrated Plan, and three adjusted scenarios when a major water supply project is eliminated. My understanding of the manner in which Bumping Lake Enlargement, Kachess Inactive Storage, and Wymer are being used in the operation study is that these three water supply projects “do not kick in until such time as the Water Supply Available for Irrigation (WASI) indicates a proration level of less than 70 percent” [see the attachment *TWSA With Integrated Plan*. I used the *Interim Comprehensive Operating Plan* for the “Current Yakima Project column”]. This means this water supply is not included in TWSA and reported by the resource indicators (i.e. September 30 reservoir contents, etc.) in other water years.

I found it difficult to understand what was occurring in the 1993 and 1994 dry years when a major water supply project was eliminated. The question I assumed you were responding to is “what is the impact on the water supply benefits if the Integrated Plan moves forward and then a major water supply project is not implemented?” Consequently, the comparison I made was between the Integrated Plan and the adjusted scenario without a specific water supply project [see the attachment *IP Without Major Water Elements*]. I color coded this attachment because I also included your comparison of the Future Without Integrated Plan scenario and it was difficult to maintain some sanity when comparing scenarios.

I would appreciate you responding to the following questions concerning the September 30 Reservoir Contents for the 1993 and 1994 dry years so I would know if I have correctly interpreted what is occurring.

September 30 Reservoir Contents

1993 - - The Integrated Plan shows reservoir contents of 250,000 acre-feet; an increase of 210,000 acre-feet from the Future Without. This implies the inclusion of the dry-year irrigation storage which is used only when the proration level is less than 70 percent. Is this correct? In this case is it solely BLE and the Wymer 80,000 acre-feet of dry-year irrigation supply or does it include the inactive Kachess storage? (see the following question regarding the negative volume).

1994 (1) - - The Integrated Plan shows reservoir contents of -80,000 acre-feet. This implies BLE and the 80,000 acre-feet of Wymer dry-year irrigation storage are completely empty and 80,000 acre-feet has been withdrawn from the Kachess inactive storage. The “End of Month Storage Contents” graphs of September 23, shows this is the case. Is this correct?

1994 (2) - - The Integrated Plan without BLE shows reservoir storage contents of -120,000 acre-feet. Is this a further encroachment of the Kachess inactive storage?

1994 (3) - - The Integrated Plan without Kachess inactive storage shows the reservoir contents at 60,000 acre-feet; an increase of 140,000 acre-feet from the Integrated Plan contents of -80,000 acre-feet. Please explain where this stored water is if BLE and Wymer 80,000 acre-feet were both empty in the Integrated Plan [see 1994 (1)].

1994 (4) - - The Integrated Plan without Wymer shows reservoir contents at -140,000 acre-feet. Is this a further encroachment into the Kachess inactive storage?

Water Supply Project	Used in TWSA (acre-feet)	Used in Dry-Year (acre-feet)
Wymer	82,000	80,000
BLE	33,000	157,000
Subtotal	115,000	237,000
Kachess Inactive	-----	200,000
Total	115,000	437,000

Thank you,

Larry

Estimating TWSA for Title XII Target Flows and WSAI for Irrigation of the Current Yakima Project and with Addition of the Integrated Plan			
No.	Current Yakima Project	Yakima Project with Integrated Plan	Comments
1.	+ April 1 thru September 1 forecast of runoff	Same	
2.	+ August 1 thru September 30 projected runoff	Same	
3.	+ April 1 reservoir current storage contents	Same	
4.	+ Useable return flows upstream of Parker	Same	
5.		+ Groundwater Infiltration Projects	See “Modeling Approach”, page 4, 5 th bullet
6.		+ Wymer Instream Flow Account	See “Modeling Approach”, page 4, 5 th bullet
7.		+ Instream Conservation Benefits	See “Modeling Approach”, page 4, 5 th bullet
8.	TWSA (Total Water Supply Available)	TWSA (Total Water Supply Available)	Used to determine the level of Title XII target flows
9.	- YRBWEP new water acquisitions	Same	
10.	- September 30 anticipated carryover storage	Same	
11.	- Flow Passing Parker	Same	
12.	WSAI (Water Supply Available for Irrigation)	Same	This is the total supply available for irrigation entitlements
13.	Non-proratable irrigation entitlements	Same	
14.	Remaining WSAI	Same	
15.	Remaining WSAI/proratable entitlements	Same	
16.	Proration Level (%)	Same	If less than 70% then continue
17.		Current Yakima Project proratable supply for three participating entities	
18.		(+ Wymer Irrigation Account)	See “Modeling Approach”, page 3, item 3.5
19.		(+ Bumping Lake Expansion)	See “Modeling Approach”, page 4, item 3.9
20.		(+ Kachess Inactive Storage)	See “Modeling Approach”, page 3, item 3.7
21.		Total proratable drought supply for three participating entities	

Question regarding item 7 entry “Instream Conservation Benefits”: It appears most of the Enhanced Water Conservation measures are designated as “irrigation benefits” (see “Modeling Approach, page 2). Section 1205(a)(3)(B)(i) of Title XII states “The goal increases so that the instream target flows specified in the table in paragraph(1) increase by 50 cubic feet per second for each 27,000 acre-feet of reduced annual water diversion achieved through implementation of measures under the Basin Conservation Program”. Thus, why the entry of “instream conservation benefits”

Integrated Plan Without Major Water Supply Elements												
Resource Indicator	Future Without IP	Integrated Plan		Without BLE			Without Kachess Inactive + K-K			Without Wymer		
	Indicator	Indicator	Change from FW/OIP	Indicator	Change from FW/OIP	Change from IP	Indicator	Change from FW/OIP	Change from IP	Indicator	Change from FW/OIP	Change from IP
Average for Period 1981-2005 (million acre-feet)												
April I TWSA	2.83	3.01	+0.13	2.96	+0.13	-0.05	3.00	+0.18	-0.01	2.88	+0.05	-0.13
Apr-Sept Parker	0.59	0.59	+0.01	0.60	+0.01	+0.01	0.60	+0.01	+0.01	0.64	+0.05	+0.05
Diversions	1.63	1.69	+0.06	1.69	----	-----	1.69	+0.06	----	1.60	-0.08	-0.09
Sept 30 Contents	0.29	0.57	+0.28	0.43	-0.16	-0.14	0.59	+0.30	+0.02	0.35	+0.06	-0.22
Proration												
1993 Dry Year (million acre-feet)												
April I TWSA	2.07	2.23	+0.16	2.19	+0.12	-0.04	2.27	+0.20	+0.04	2.12	+0.05	-0.01
Apr-Sept Parker	0.30	0.30	----	0.30	----	----	0.30	----	----	0.30	----	----
Diversions	1.48	1.55	+0.07	1.56	+0.08	+0.01	1.56	+0.08	+0.01	1.52	-0.04	-0.23
Sept 30 Contents	0.04	0.25	+0.21	0.12	+0.08	-0.13	0.27	+0.23	+0.13	0.00	-0.04	-0.25
Proration	62%	70%	+8%	70%	+8%	----	70%	+8%	----	70%	+8%	----
1994 Dry-Year (million acre-feet)												
April I TWSA	1.75	2.20	+0.45	2.09	+0.34	-0.11	1.97	+0.22	-0.23	1.88	+0.13	0.32
Apr-Sept Parker	0.26	0.24	-0.02	0.24	-0.02	----	0.24	----	----	0.24	-0.02	----
Diversions	1.28	1.53	+0.25	1.48	+0.20	-0.05	1.42	+0.14	-0.11	1.33	+0.05	-0.21
Sept 30 Contents	0.04	-0.08	-0.12	-0.12	-0.16	-0.04	0.06	+0.02	+0.14	-0.14	-0.18	-0.06
Proration	35%	70%	+35%	68%	+33%	-2%	52%	+17%	-18%	48%	+13%	-22%

November 3, 2010

Steve,

Thank you very much for responding to my questions of November 1 regarding the “September 30 Reservoir Contents”. After reviewing what you provided I have a better understanding of the operations and the information being presented. Reviewing what you sent I do have some suggestions for your consideration which may facilitate other readers in their interpretation of the information.

The top part of the attached table summarizes the reservoir capacities by (1) those which are used in determining TWSA, and (2) those that are used only when the irrigation proration level is less than 70 percent. This illustrates how storage is used in the system operation studies.

The bottom part of the table shows how the September 30 reservoir contents might be shown in the “resource indicator” table using the foregoing designations of storage for TWSA and storage for dry-year irrigation use only. It might be desirable to show the volume of water remaining in the inactive contents as a “+” rather than the volume withdrawn as a “-“.

Please note this is comparison of the Integrated Plan and the Integrated Plan with a major water supply project deleted. I have filled in the columns using the 1994 storage content information you provided in your e-mail. I did not show Easton as a separate entry in the top part of the table but it is included in the content numbers.

While the foregoing does provide the information on September 30 reservoir contents it does not provide the information to answer “why”. For instance, “why in 1994 does without BLE result in a proration level of 68% (-2%) in comparison to when Wymer is deleted the proration level is 48% (-22%)?”

Further, it appears the Wymer Instream Flow Account provides no instream flow benefits during April-September and actually results in less flow than the Future without Integrated Plan.

Larry

Reservoir	Reservoir Capacity and Use in System Operations						
	TWSA	Integrated Plan Dry-Year Irrigation		Total			
	Active	Active	Inactive				
	(1,000 acre-feet)						
Keechekus	157.8			157.8			
Kachess	239.0		200.0	439.0			
Cle Elum	436.8			436.9			
Rimrock	198.0			109.0			
Bumping Lake	33.7	156.3		190.0			
Subtotal	1,065.4						
Wymer	82.0	80.0		162.0			
Total	1,147.4	236.3	200.0	1,583.7			
<i>Cle Elum 3 foot rise. Specific for flushing flows. How handle? By footnote?</i>							
Water Year 1994							
	Integrated Plan	Without BLE		Without Kachess Inactive and K-K		Without Wymer	
	Indicator	Indicator	Change	Indicator	Change	Indicator	Change
	(thousand acre-feet)						
Sept. 30 Contents							
TWSA	70.0	36.0	-34.0	56.0	-14.0	37.0	-33.0
Integrated Plan Dry-Year Irrigation	52.0	45.0	-7.0	-----	-52.0	23.0	-29.0
Total	122.0	81.0	-41.0	56.0	-66.0	60.0	-62.0
Proration Level	70%	68%	-2%	52%	-18%	48%	-22%