

RECLAMATION

Managing Water in the West

Yakima River Basin Integrated Plan Water Accounting

Presented by:

Chris Lynch – Hydraulic Engineer, PE



U.S. Department of the Interior
Bureau of Reclamation

Yakima River Basin Water

- Use of Integrated Plan water
- Accounting issues
- Total Water Supply Available (TWSA) season
- Winter Refill and Target Flow season
- Example using 2001

Yakima River Basin Integrated Plan Storage

• IP storage projects	Added kaf
– Kachess Inactive Storage	200
– Wymer Dam and Reservoir	162 (82/80)
– Bumping Enlargement	156
– Cle Elum 3' Pool Raise	15

Fish Flows

- **Higher winter fish flow targets**
 - Keechelus: 120 cfs (+ 9 to 17 kaf)
 - Easton: 250 cfs (+ 7 to 20 kaf)
 - Cle Elum: 300 to 500 cfs (+ 30 to 127 kaf)
 - Tieton: 125 cfs (+ 10 to 32 kaf)
 - Bumping: 130 to 200 (+ 10 to 20 kaf)
- **Additional pulse flows volumes, Spring**
 - Bumping: 32 kaf
 - Keechelus: 2 to 6 kaf
 - Cle Elum: To be determined
- **Modified timing and sources for flows**

Accounting

- **Kachess Inactive Storage**
 - Insure that inactive storage use does not impact existing rights and obligations
 - Account for use and recovery of storage

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Accounting

- **Wymer Dam and Reservoir**
 - **Account for source of refill**
 - Unregulated flows
 - Upper reservoir releases
 - **Track usage purposes**
 - Modified streamflows
 - General TWSA
 - Improved supply to proratables

Accounting

- **Bumping Enlargement**
 - **Maintain historical benefits**
 - 34 kaf to TWSA
 - 34 kaf for flood control
 - Streamflows
 - **Track usage**
 - Modified streamflows
 - General TWSA
 - Improved supply to proratables

May 1, 2013 TWSA ESTIMATE

May 1 - September 30

Parameter*	+/-/=	Low	Adopted	High
May 1-Sep 30 Natural Flow at Parker est.	+	1039	1300	1552
Return Flow Estimate	+	310	335	350
May 1, Reservoir Content	+	958	958	958
TWSA	=	2307	2593	2860
SEP 30 EST RESERVOIR CONTENT	-	76	139	306
FLOW OVER SUNNYSIDE DAM	-	320	400	500
TWSA FOR IRRIGATION	=	1911	2054	2054
NONPRORATABLE ENTITLEMENT	-	909	909	909
REMAINING TWSA	=	1002	1145	1145
PRORATABLE ENTITLEMENT		1145	1145	1145
% RATIO= REMAINING TWSA/PRORATABLE ENTITLEMENT		87%	100%	100%
TITLE 12 FLOW REQUIREMENTS, cfs	May	300	400	500
Total Parker Target FLOW, cfs ***	111	411	511	611

*Values are in 1,000 ac-ft unless otherwise specified.

*** State & YRBWEP Trust, Acquisition, & Conservation additions to Title XII flow range from 98 to 119 cfs.

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Yakima Basin Seasons

Seasons	April-September	October-March
Identification	Total Water Supply Available (TWSA)	Winter Refill and Target Flows
	Integrated Plan (IP) Water Supply	IP Winter Refill and Target Flows

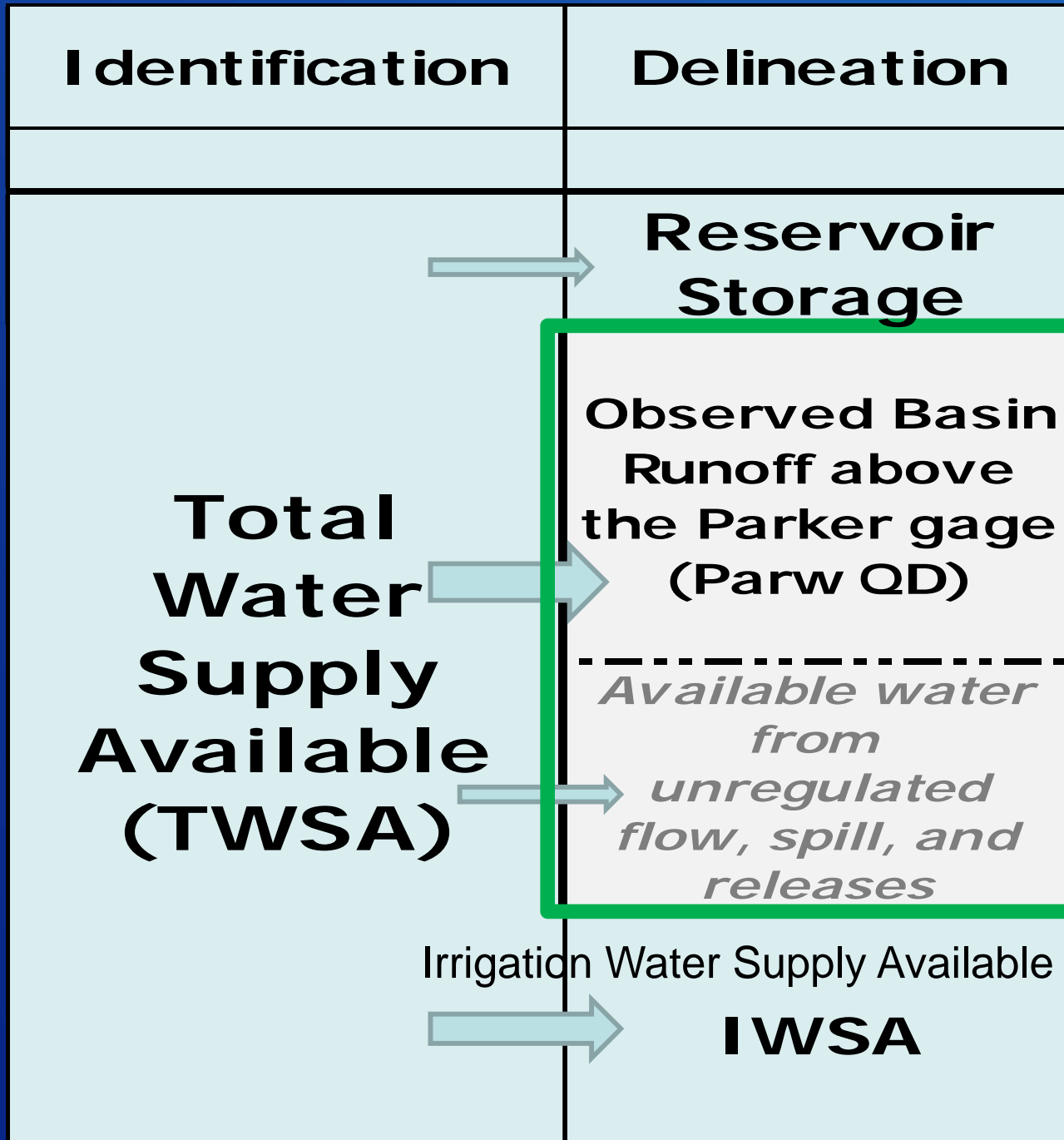
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Yakima Basin Water, Where It Comes From

Period	Sources	Identification
Apr-Sep	Apr 1, Reservoir Storage	Total Water Supply Available (TWSA)
	ReturnQ	
	Natural Basin Runoff above the Parker gage (Parw QU)	

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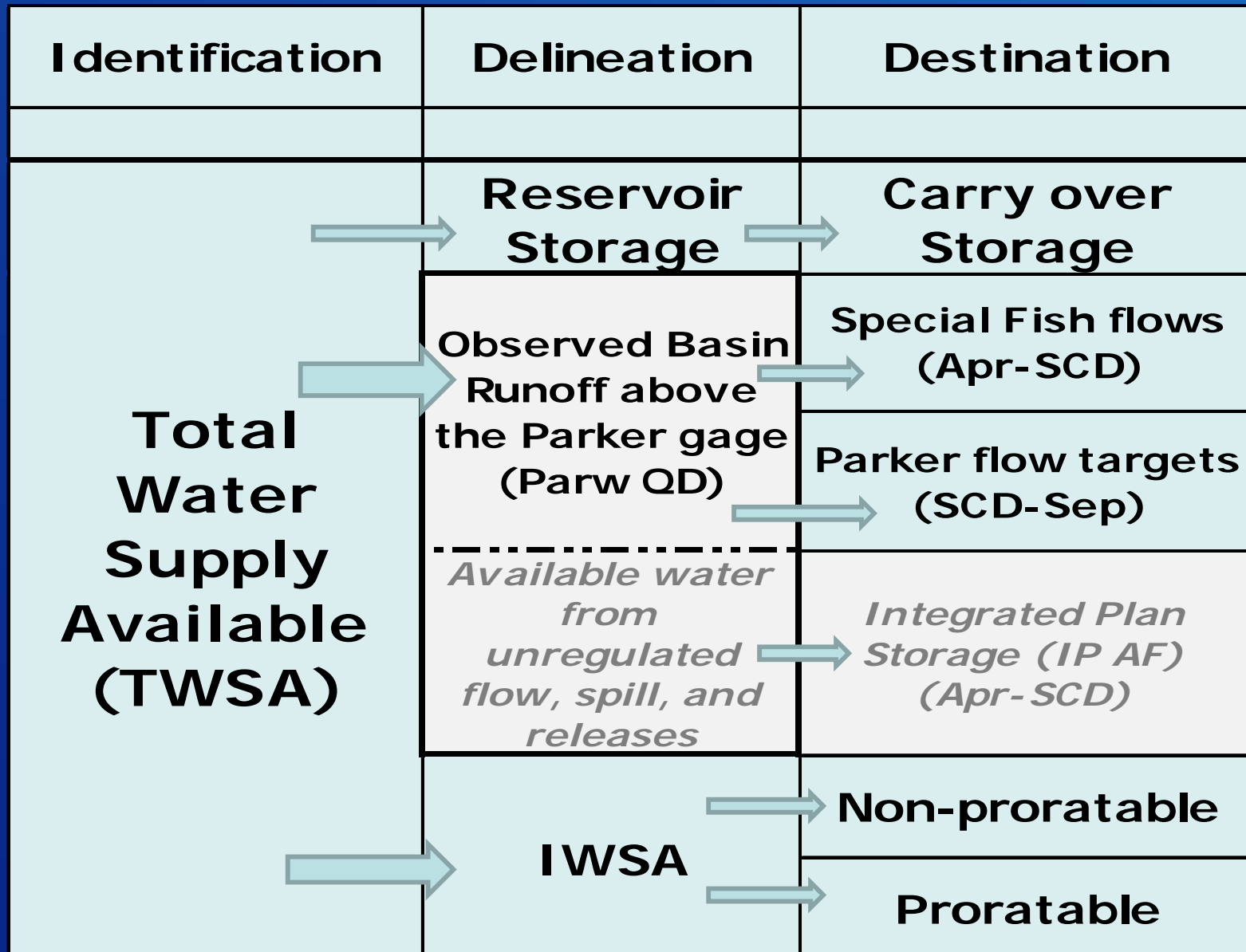
Yakima Basin Water, Where It Goes



Currently, all water in the green box is considered Parw QD (Water not stored or diverted.)

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Yakima Basin Water Destination



SCD - Storage Control Date

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Yakima Basin Irrigation Season Bucket

Period	Sources	Identification	Delineation	Destination
Apr-Sep	Apr 1, Reservoir Storage	Total Water Supply Available (TWSA)	Reservoir Storage	Carry over Storage
	ReturnQ			
	Natural Basin Runoff above the Parker gage (Parw QU)		Observed Basin Runoff above the Parker gage (Parw QD)	Special Fish flows (Apr-SCD)
				Parker flow targets (SCD-Sep)
			Available water from unregulated flow, spill, and releases	Integrated Plan Storage (IP AF) (Apr-SCD)
			IWSA	Non-proratable
			Proratable	





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Yakima Basin Water, Where It Comes From—Winter

Period	Sources	Identification
Oct-Mar	Oct 21, Reservoir Storage Carry over	Winter Refill and Target Flows
	Delayed ReturnQ	
	Natural Basin Runoff above the Parker gage (Parw QU)	
	IP Carryover	

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Yakima Basin Water, Where It Goes

Identification	Delineation
Winter Refill and Target Flows	 Stored Reservoir Inflow
	 Carryover
	 Unregulated flows and reservoir outflows
	 IP Storage

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Yakima Basin Water Destination

Identification	Delineation	Destination
Winter Refill and Target Flows	Stored Reservoir Inflow	Sys Storage
	Carryover	
	Unregulated Qs and Reservoir Outflows	Parw Spill & fish flows
		Diversions
		IP storage
	IP Storage	IP Fish Flows

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Yakima Basin Supply and Use

Period	Sources	Identification	Delineation	Destination
Apr-Sep	Apr 1, Reservoir Storage	Total Water Supply Available (TWSA)	Reservoir Storage	Carry over Storage
	ReturnQ			
	Natural Basin Runoff above the Parker gage (Parw QU)		Observed Basin Runoff above the Parker gage (Parw QD)	Special Fish flows (Apr-SCD)
				Parker flow targets (SCD-Sep)
			Available water from unregulated flow, spill, and releases	Potential Integrated Plan Storage (IP AF) (Apr-SCD)
			IWSA	Non-proratable
		Proratable		
Oct-Mar	Oct 21, Reservoir Storage Carry over	Winter Refill and Target Flows	Carryover	Reservoir Storage
			Stored Reservoir Inflow	
	Natural Basin Runoff above the Parker gage (Parw QU)		Unregulated flows and reservoir outflows	Parw Spill & fish flows
				Diversions
				Potential IP storage
	Delayed ReturnQ			Potential IP Fish Flows

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Yakima Basin Bucket, Including IP

Period	Sources	Identification	Delineation	Destination
Apr-Sep	Apr 1, Reservoir Storage	Total Water Supply Available (TWSA)	Reservoir Storage	Carry over Storage
	ReturnQ		Observed Basin Runoff above the Parker gage (Parw QD)	Special Fish flows (Apr-SCD)
	Natural Basin Runoff above the Parker gage (Parw QU)			Parker flow targets (SCD-Sep)
			Available water from unregulated flow, spill, and releases	Integrated Plan Storage (IP AF) (Apr-SCD)
				IWSA
			Available extra Runoff	IP Water Supply
	Water released from upper reservoirs	IP Irrigation	IP Purchaser	
	IP Storage	IP Fish Flows	IP Fish Flows	
Period	Sources	Identification	Delineation	Destination
Oct-Mar	Oct 21, Reservoir Storage Carry over	Winter Refill and Target Flows	Carryover	Sys Storage
	Delayed ReturnQ		Stored Reservoir Inflow	
	Natural Basin Runoff above the Parker gage (Parw QU)		Unregulated flows and reservoir outflows	Parw Spill & fish flows
				Diversions
			IP storage	
	IP Carryover		IP Storage	IP Fish Flows

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A Look at 2001 with IP Water

- Historical 2001 TWSA
- IP water accounting

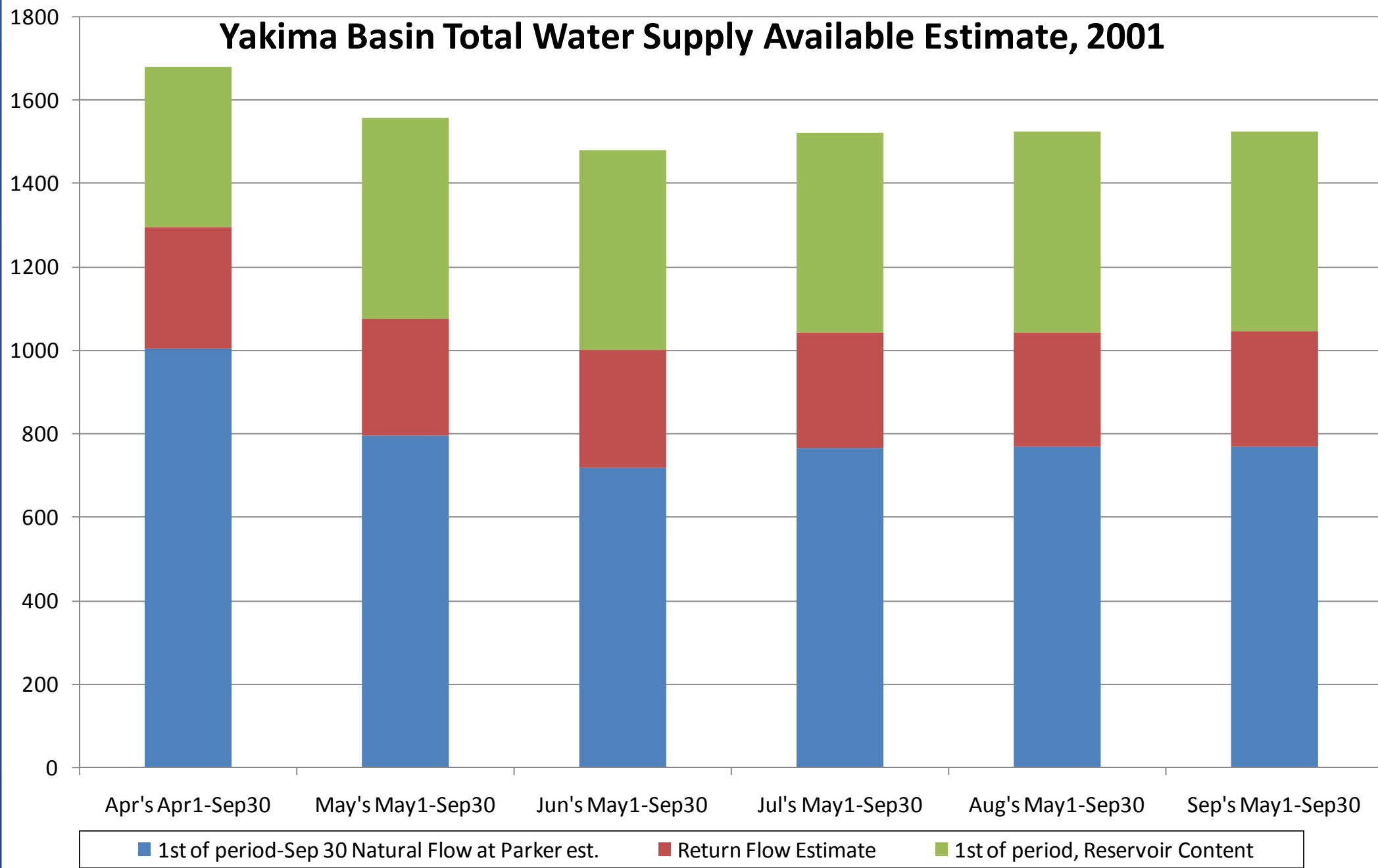
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2001 Total Water Supply Available

TWSA Conditions as presented in 2001.	Apr1- Sep30	May1- Sep30	May1- Sep30	May1- Sep30	May1- Sep30	May1- Sep30	Observed
	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01	May-01
1st of period-Sep 30 Natural Flow at Parker est.	1004	796	720	767	769	770	798
Return Flow Estimate	290	280	280	275	275	275	280
1st of period, Reservoir Content	384	481	481	481	481	481	481
TWSA	1679	1557	1481	1523	1525	1526	1559
SEP 30 EST RESERVOIR CONTENT	76	76	76	76	76	76	108
FLOW OVER SUNNYSIDE DAM	180	164	162	148	148	148	155
TWSA FOR IRRIGATION	1423	1317	1243	1299	1301	1302	1297
NONPRORATABLE ENTITLEMENT	1070	909	909	909	879	879	909
REMAINING TWSA	353	408	334	390	422	423	388
PRORATABLE ENTITLEMENT	1239	1145	1145	1145	1145	1145	1145
% RATIO= REMAINING TWSA/PRORATABLE ENTITLEMENT	28%	36%	29%	34%	37%	37%	34%
TITLE 12 FLOW REQUIREMENTS, cfs	300	300	300	300	300	300	300
Total flow target	300	300	300	300	300	300	302

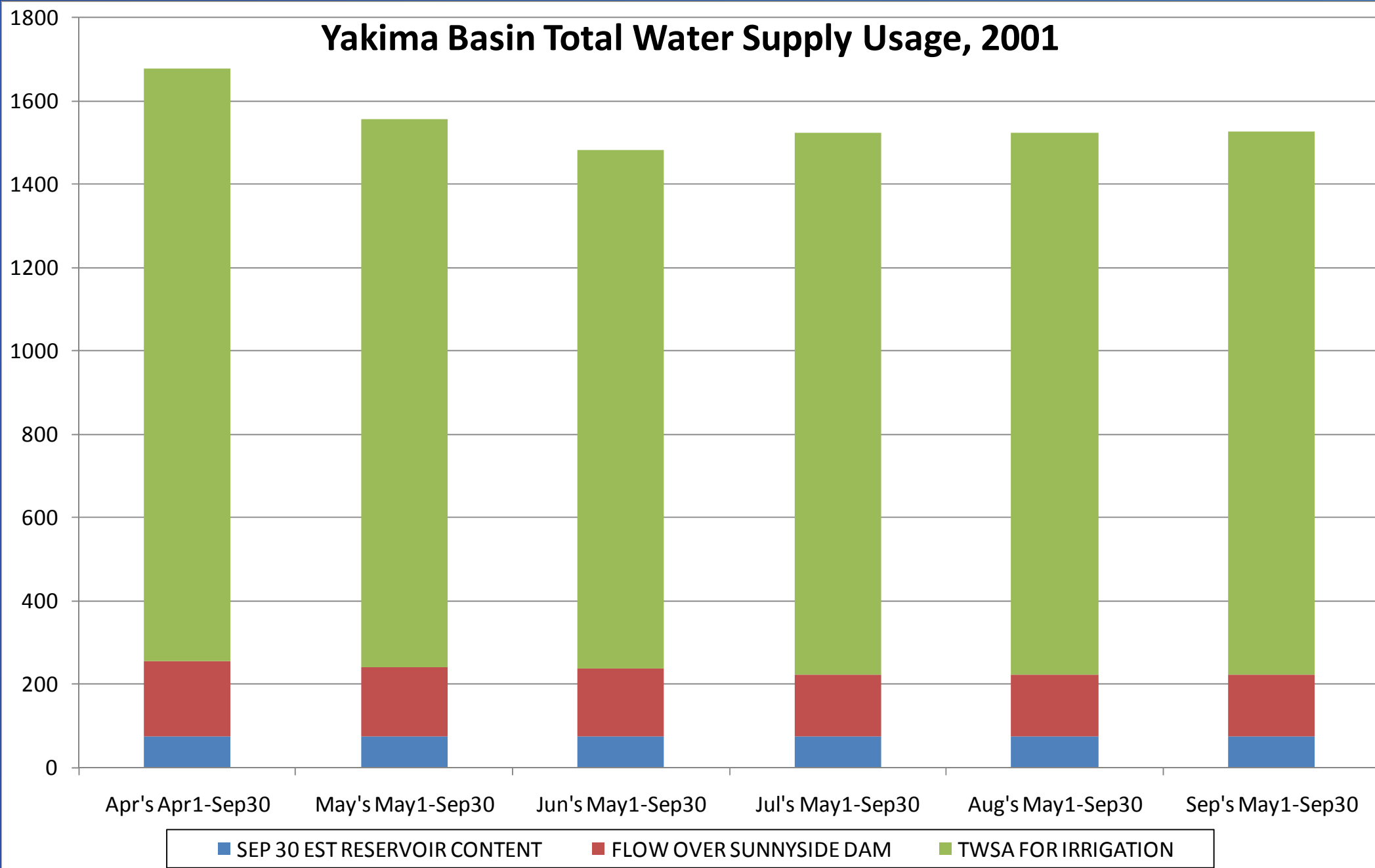
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Yakima Basin Total Water Supply Available Estimate, 2001



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Yakima Basin Total Water Supply Usage, 2001



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TWSA Conditions with additional IP storage.	May1-Sep30	May1-Sep30
	May 2001	Aug 2001
1st of month-Sep 30 Natural Flow at Parker est.	796	769
Return Flow Estimate (improved)	300	295
1st of month, Reservoir Content	421	421
IP TWSA Storage Adjustment	60	60
TWSA	1577	1545
1st of month, IP Additional Storage	22	22
TWSwIP	1599	1567
SEP 30 EST RESERVOIR CONTENT	76	76
Original estimate of flow past Parker	164	148
Added flow past Parker for fish targets and pulses (estimated)	38	38
TWSA FOR IRRIGATION	1320	1304
NONPRORATABLE ENTITLEMENT	909	879
REMAINING TWSA	411	425
PRORATABLE ENTITLEMENT	1145	1145
% RATIO= REMAINING TWSA/PRORATABLE ENTITLEMENT	36%	37%
TITLE 12 FLOW REQUIREMENTS, cfs	300	300
Total flow target	422	428
Additional dedicated water (Kac)	436	436
Additional water per user (3 users)	145	145
<i>RID prorated entitlements</i>	315	315
<i>Percent received</i>	70%	70%
<i>KRD prorated entitlements</i>	309	309
<i>Percent received</i>	70%	70%
<i>WIP prorated entitlements</i>	319	319
<i>Percent received</i>	70%	70%
Used IP storage	321	310
Carry over IP storage	115	126
<i>WIP non-prorated entitlements</i>	218	218
<i>Percent received</i>	82%	82.2%

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