

1989 Dry Year

Concern	Tools	System Status		Priority	
		Historic	1A Baseline WQCP	Action	Evaluation
Yearling salmon migrants Oct-Jan	• Increase inflow/outflow	Outflow falling from 20-30 kcfs to <5000	Outflow falling from 20-30 kcfs to <5000	A	<ul style="list-style-type: none"> <li>• One week in Dec 10-50/TAF</li> <li>• Two weeks in Jan 10-50/TAF</li> <li>• Peaks following outflow peaks of 20-30 kcfs.</li> </ul>
	• Reduce export	10000	10>>5		
	• Close DCC	Open	Closed		
Winter run survival Dec-Mar	• Increase inflow/outflow	Outflow pulse of 40-70 kcfs.	Outflow pulse of 40-70 kcfs.	A	<ul style="list-style-type: none"> <li>• Relatively high numbers in March 10-50/TAF</li> </ul>
	• Reduce export	10,000	12,000		
	• Close DCC	Open	Closed		
Delta Smelt Adults Jan-Mar	• Reduce export	10,000	8000-10,000	B	<ul style="list-style-type: none"> <li>• Mid December through 1<sup>st</sup> week of Jan salvage pulse following outflow pulse under high export 10-50/TAF</li> <li>• Poor FMWT index</li> </ul>
	• Increase outflow	Falling from 20,000 to 5000	Falling from 20,000 to 5000		
Steelhead Feb-May	• Reduce export	10,000	12,000	B	<ul style="list-style-type: none"> <li>• March-mid April 10-50/TAF, coincides with outflow pulse</li> </ul>
X2 Feb - June	• Increase inflow			OK	
	• Reduce export				
Salmon Fry Feb-Mar	• Reduce exports	10,000	5000 February 10000 March	B	<ul style="list-style-type: none"> <li>• Small pulse (10/TAF) in March with outflow pulse to 70 kcfs. See chart above.</li> </ul>
DS Young Apr-Jul	• Increase outflow	Declining		A/B	<ul style="list-style-type: none"> <li>• A - Mid June - mid July 100+/TAF coincident with export peak &gt;10,000 cfs.</li> <li>• B - April - mid May &lt;100/TAF</li> </ul>
	• Reduce exports	2000-10,000	2000-6000		
San Joaquin smolts Apr-Jun	• Reduce exports	2000-10,000	2000-6000	A/B	<ul style="list-style-type: none"> <li>• A - Mid April - mid May 100-1000/TAF</li> <li>• B - early April</li> <li>• B - Late May 100/TAF</li> </ul>
	• Increase SJ flow	5000-10,000 outflow			
	• Close HOR				
Striped Bass Young	• Increase outflow			B	<ul style="list-style-type: none"> <li>• mid May to mid July 10,000+/TAF</li> </ul>
	• Increase Sac flow				
	• Reduce exports	4000>>>10,000			
Splittail May-Jul				OK	Low salvage

1989 Gearing

- Old Game IA
- Historic 5968
- D1485 5745
- WQCP 5289 (450 total - split between CVP/SWP 225 b(2) WQCP impact.
- DWRSIM WQCP (440 CVP; 290 SWP) Delivered 5.1 MAF
- No Folsom b(2) cost because of new flood control curve.
- No Shasta b(2) cost.
- Net 575 (800-225) net b(2) budget for year.

Action 1: cut exports for 1<sup>st</sup> week of Dec to 5000. Cost 12  
 Note could have relaxed E/I in Nov but chose to not do it because it was first pulse of flow of the water year - ERP action to allow this pulse to outflow.  
 Action 2: cut 1<sup>st</sup> two weeks in Jan to 5000. Cost 107  
 Action 3: relax E/I in second and third week of Dec. EWA benefit = 30  
 Action 4: cut March exports to 5000 - split cost with WQ (TOC reduction). Total Cost 240 b(2) = 120 (balance 330)  
 Action 5: cut exports in 1<sup>st</sup> two weeks of April to 5000.  
 Action 6: 1500 VAMP (midApr-midMay)  
 Action 7: Cut Sac River inflow by 2000 by backup 1000 cfs into Shasta and 1000 cfs into Folsom in May - water supply adjustment to low VAMP exports - can re-release in summer to water supply benefit.  
 Action 8: Cut last two weeks of May exports to 3000 cfs. Cost: actions 5, 6, & 8 =  
 Action 9: Release 2000 cfs for a month in June and July for exports + 120 TAF  
 Total hit was 500 TAF beyond water quality control plan. (800 TAF cost for b(2)).

New 1B-89

- Initial conditions: low storages to start off year.
- Upstream b(2): cost of 60 TAF
- WQCP cost to b(2) was 415 TAF.
- 325 TAF left for Delta export actions - all used.
- Purchased 60 TAF demand shifting with MWD. (Feb-Mar) - not in the model case for this or last.
- 400 TAF lower exports under DAILY OPS than DWRSIM.
- Delta Island storage added 100 TAF to exports and reduced outflow by 100 TAF.
- 5% reduction in deliveries + 100 from Delta Island storage + 60 from demand shifting keeps San Luis above low point.

October	No Actions
November	B(2) Actions: Raise Stanislaus to 300 cfs
December	B(2) Actions: 1. Raise Stanislaus to 300 cfs. 2. last week of December limit exports to 5000 cfs.

<b>January</b>	<b>B(2) Actions:</b> 1. Raise Stanislaus to 300 cfs, 2. first three weeks hold exports at 5000 cfs to protect salmon and smelt.
<b>February</b>	<b>B(2) Actions:</b> Raise Stanislaus to 300 cfs
<b>March</b>	<b>B(2) Actions:</b> Raise Stanislaus to 300 cfs. <b>EWA Actions:</b> Relax E/I first week – 100 TAF, then restrict exports to 10,000 cfs the last th weeks.
<b>April</b>	<b>EWA suggestions:</b> Restrict exports to 10,000 cfs the first two weeks.
<b>May</b>	No Actions.
<b>June</b>	<b>B(2) Actions:</b> export restriction to 3000 cfs for first two weeks.
<b>July</b>	<b>Supply Actions:</b> fill Delta Island storage (note not included in modeling). Gained 100 TAF pumped to San Luis in early August.
<b>August</b>	No Actions.
<b>September</b>	No Actions.

**Summary of Year:**

- Exports: 5.2 MAF (Historic 6.0 MAF)
- Deliveries: 5.0 MAF (Historic 6.1 MAF)
- Storage: New Melones down 45 TAF.
- Outflow: 7.2 MAF (Historic 6.6 MAF)

**Performance of Assets:**

- Expanded Banks used sparingly in winter (Jan) – essential in maintaining San Luis
- Shasta expansion 290 TAF had no benefit.
- Delta Island storage – partially refilled and emptied for 100 TAF.
- Groundwater storage recharged in fall and winter, then discharged to benefit San Luis in spring-summer.

**EWA suggestions:**

- Short on winter run and smelt protection in March and early April. (300 TAF)
- Export reductions needed in July to protect smelt young. (300-600 TAF)