Technical Tools and Information Used in Planning a Longer-Term EWA: Evaluating Environmental Water Needs for the Protection and Recovery of At-Risk Fish Species

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EWA Technical Panel Review
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Evaluating Environmental Water Needs for the Protection and Recovery of At-Risk Fish Species

- Goals for at-risk fish species
- Sizing of longer-term EWA – gaming, modeling, etc
- Measuring abundance and distribution
- Evaluating impacts
- Opportunities for adaptive management
- Identify critical science needs

What do we want to do for At-Risk Native Fish Species?

- ESA: avoid jeopardy and minimize incidental take; recover species
  - Delta Smelt Recovery Plan: restore to pre-decline levels
- CVPIA: assist with AFRP doubling goal for salmonids
- Calfed: protection and recovery

EWA: Protection and Recovery

- The EWA was created to provide additional protection for fish beyond the existing regulatory baseline
  - Augment streamflow & Delta outflow
  - Reduce export pumping
- At no uncompensated water cost

Regulatory Baseline

- 1995 Delta Water Quality Control Plan (SWRCB)
- 2004 Delta Smelt Biological Opinion (USFWS)
- 2004 Salmonid Biological Opinion (NMFS)
- Full Use of 800 TAF of CVPIA (b)(2) Water
- Implementation of VAMP releases
- Other Environmental Protections

Tasks and Technical Tools

1) Sizing longer-term EWA

2) Measuring abundance and distribution

3) Evaluating impacts of incidental take and progress toward species recovery

1) Gaming exercises, modeling, post-processing

2) Monitoring, field surveys, modeling

3) Best available science

Tasks and Technical Tools

4) Opportunities for Adaptive Management

5) Identify Critical Science Needs

4) VAMP and "Shoulders"

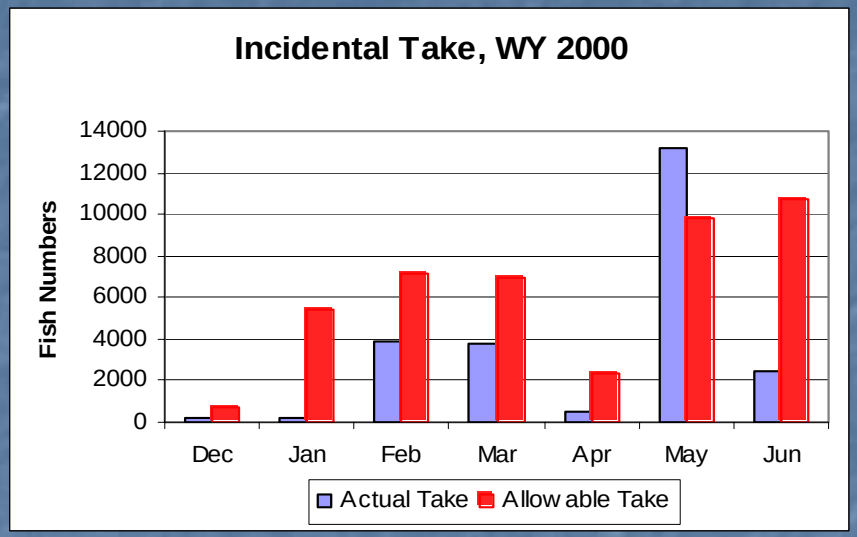
5) Annual technical review of EWA, working with CBDA Science Program

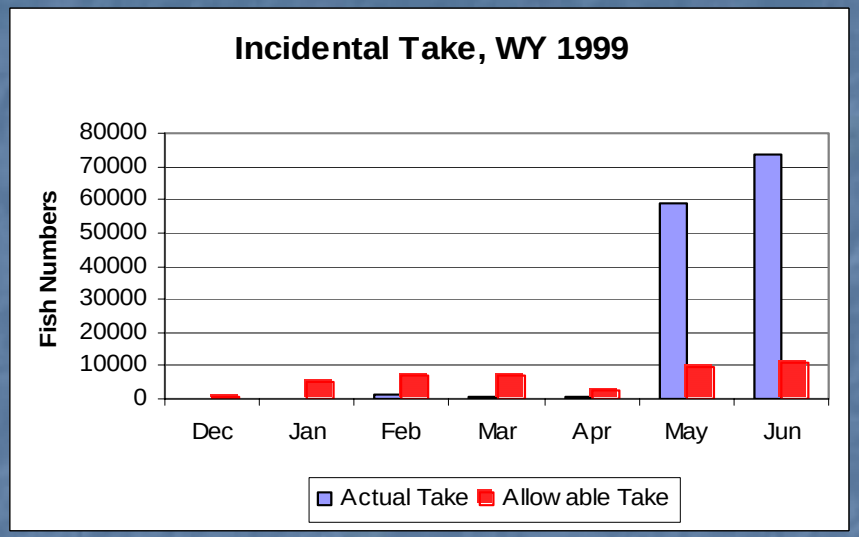
Task 1: Sizing LT EWA – Gaming Exercises, September 2003

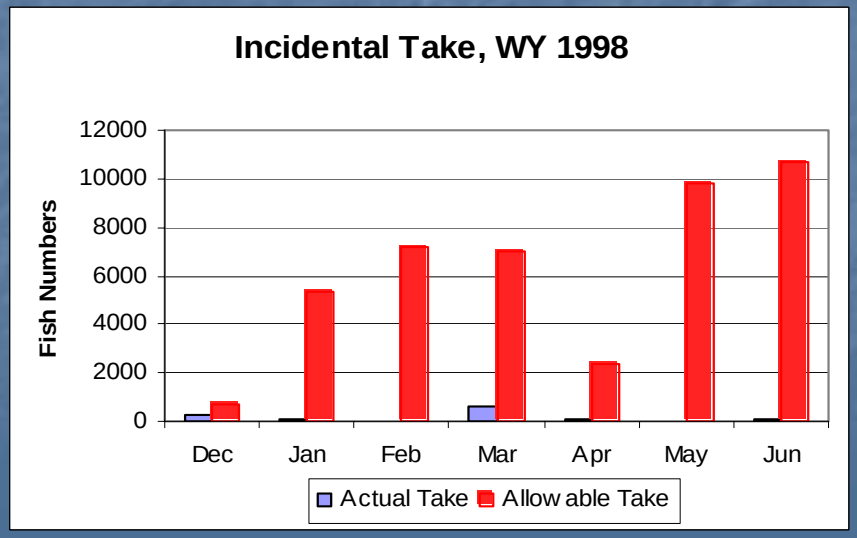
- Purpose: was to evaluate the adequacy of the EWA to meet biological needs in a future with 8500 cfs exports
- A simulation of how the Management Agencies (MAs) might have implemented EWA fish actions based on incidental take and a decision tree-type process

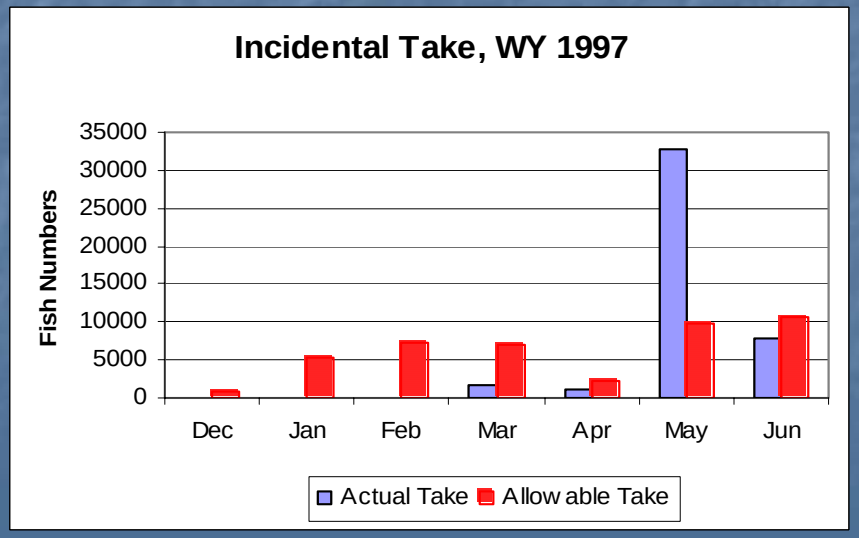
- How much EWA would be needed in the future?

Summary of Incidental Take of Delta Smelt at the SWP and CVP, 1997-2000

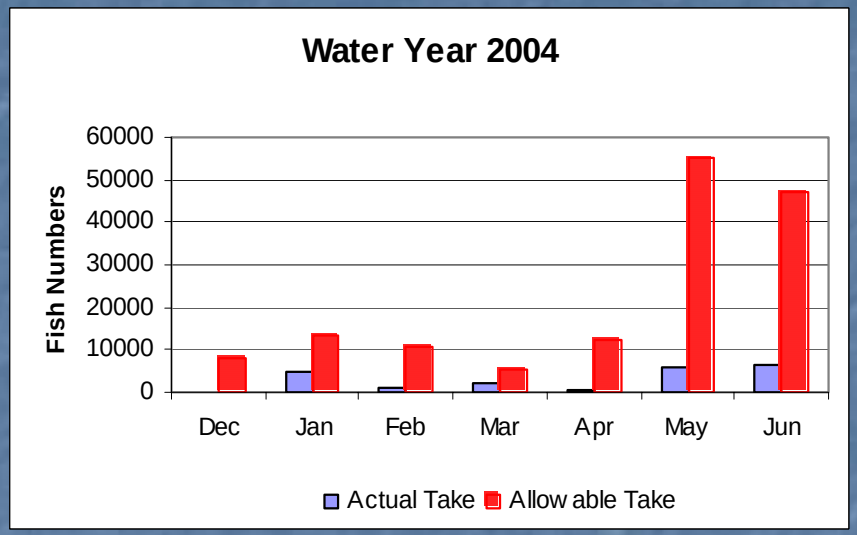


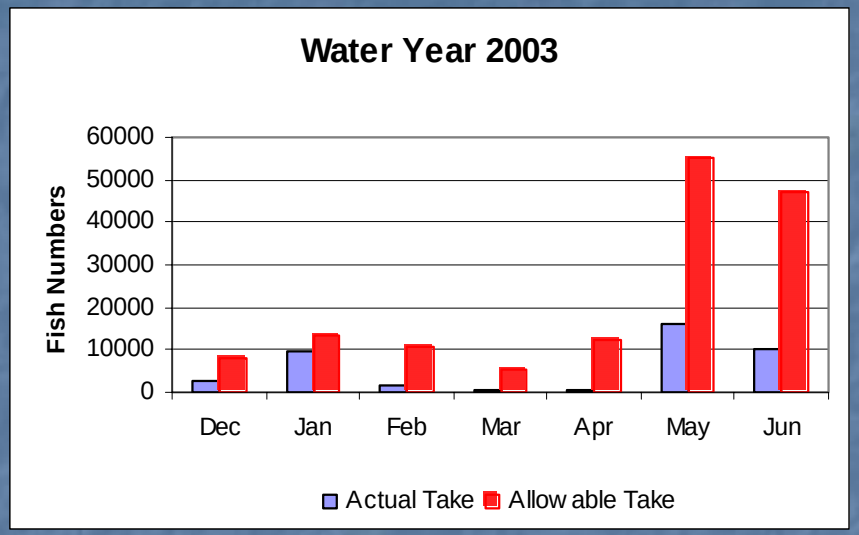


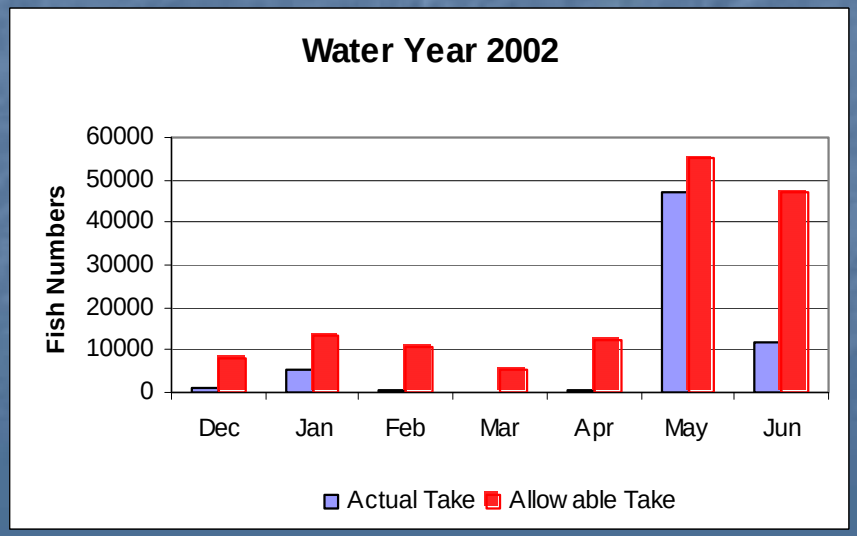


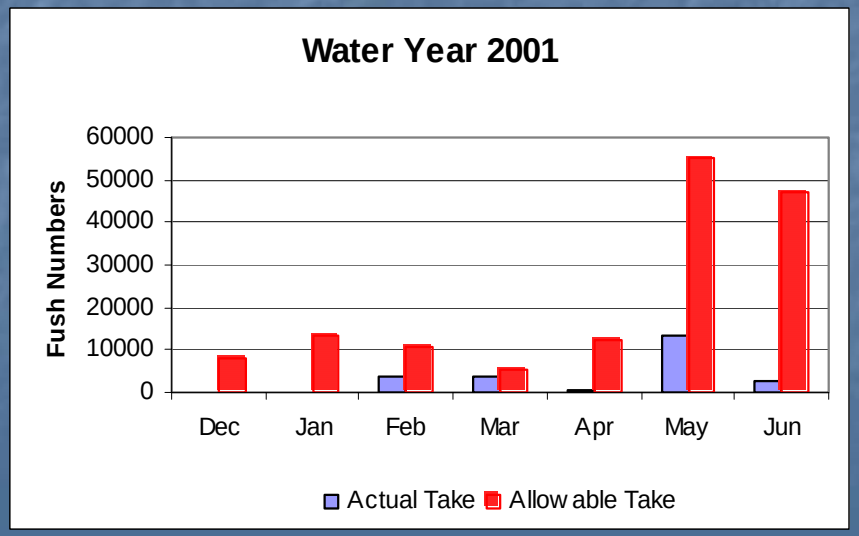


Summary of Incidental Take of Delta Smelt at the SWP and CVP, 2001-2004



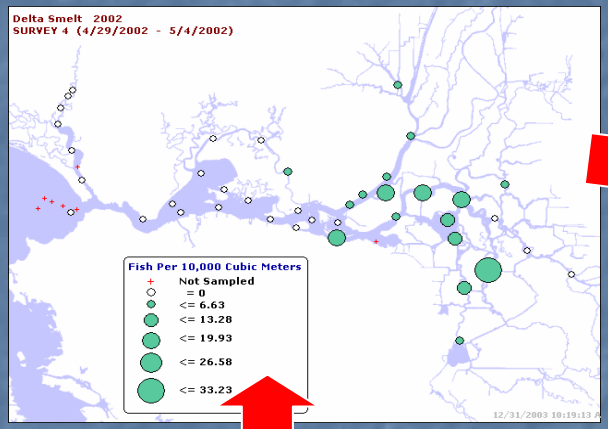


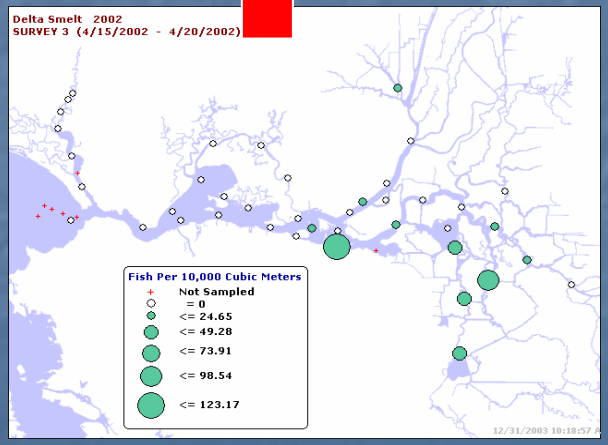




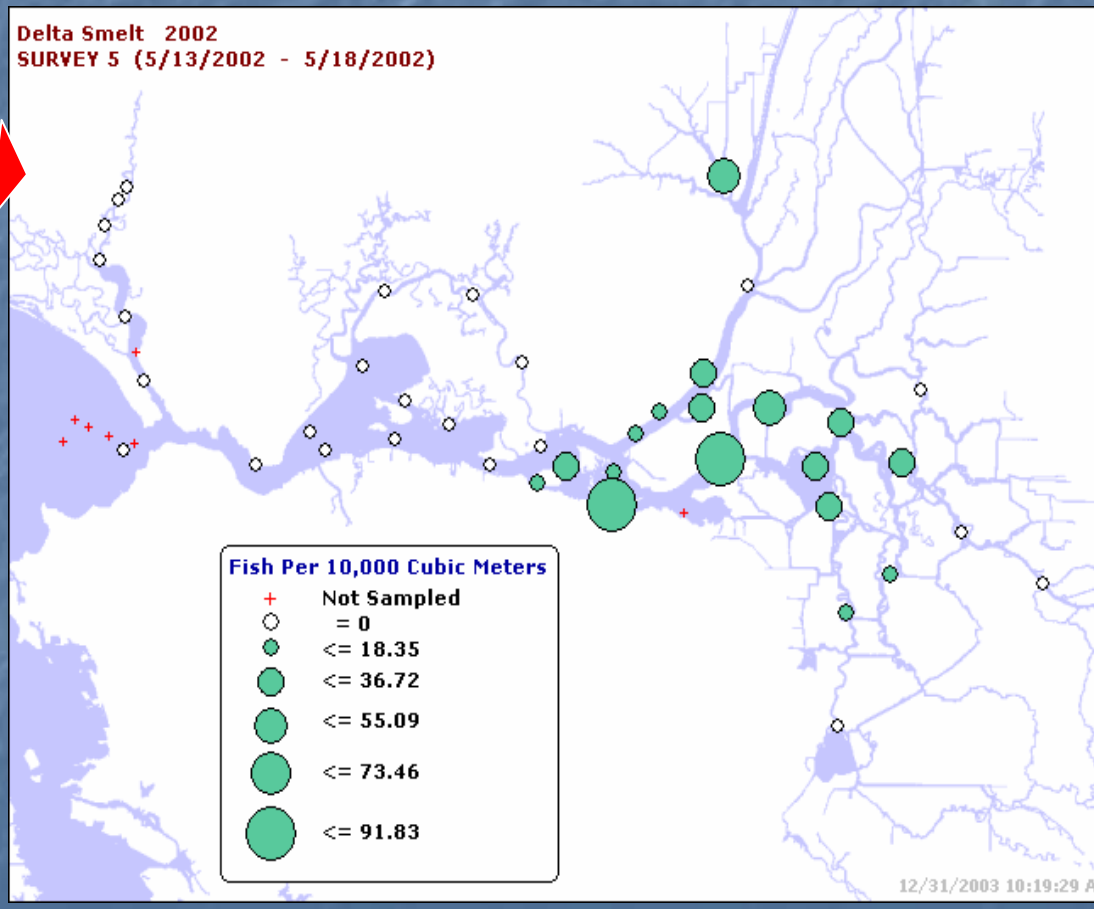
Plots from 2002 20-mm Survey

VAMP





Post-VAMP "Shoulder"



Task 1: Sizing LT EWA – Gaming Exercises (September 2003)

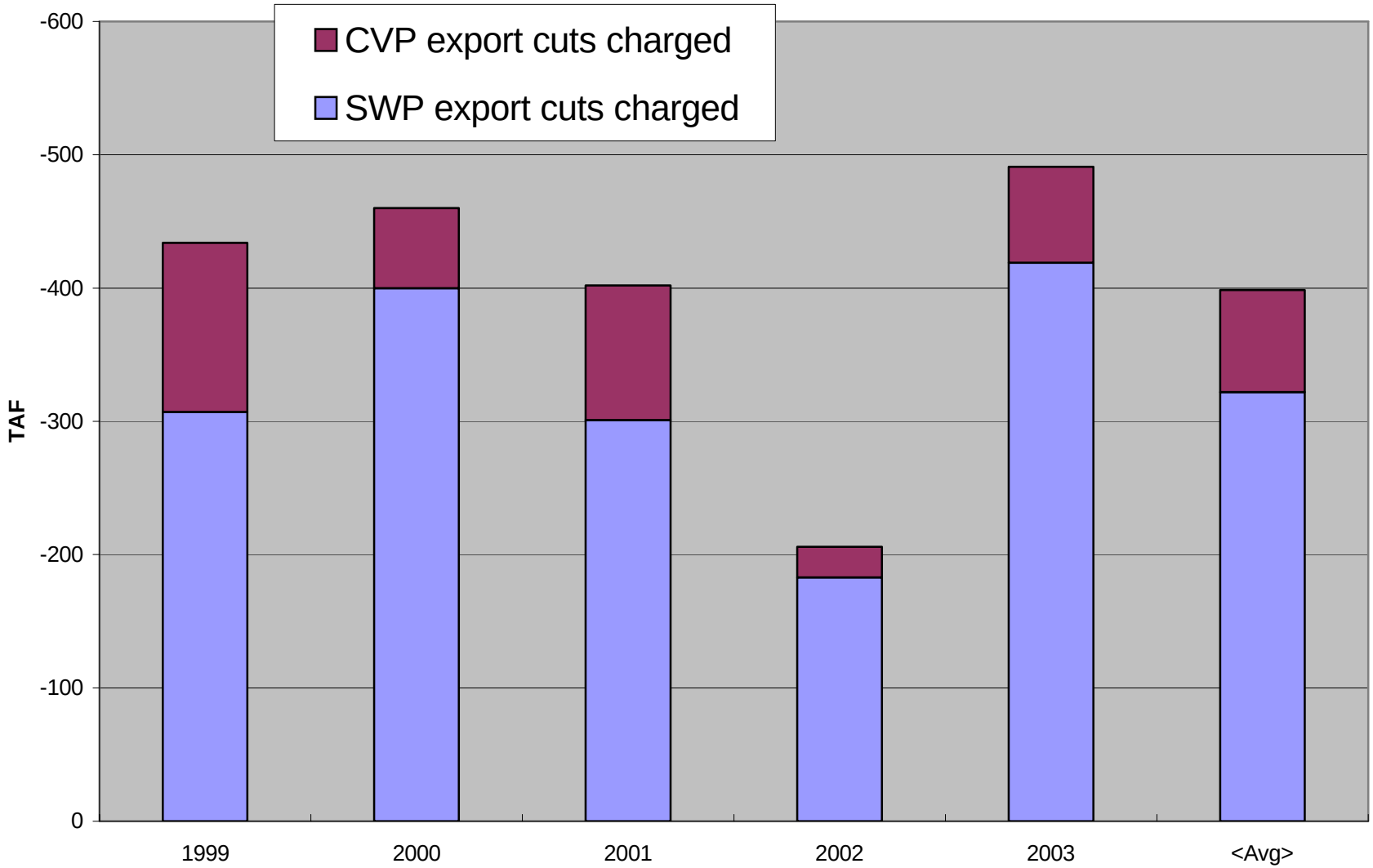
- Started with historical operations data (1999-2003)
- Used an interactive model with a daily and weekly timestep
- i.e., "Hypothetical EWA Operations" for 1999-2003
- Included EWA agencies and interested stakeholders

Task 1: Sizing LT EWA-Gaming Assumptions

- Assumed that "salvage" was a reasonable estimator of concern and indicator of entrainment
- EWA purchase targets:
  - Wetter Years 250 TAF
  - Dry Years 230 TAF
  - Critical Years 210 TAF
- The unmet needs will be addressed with operational assets, exchanges, debt management, spilling debt, and other tools
- Future higher exports (up to 8500 cfs) and Intertie

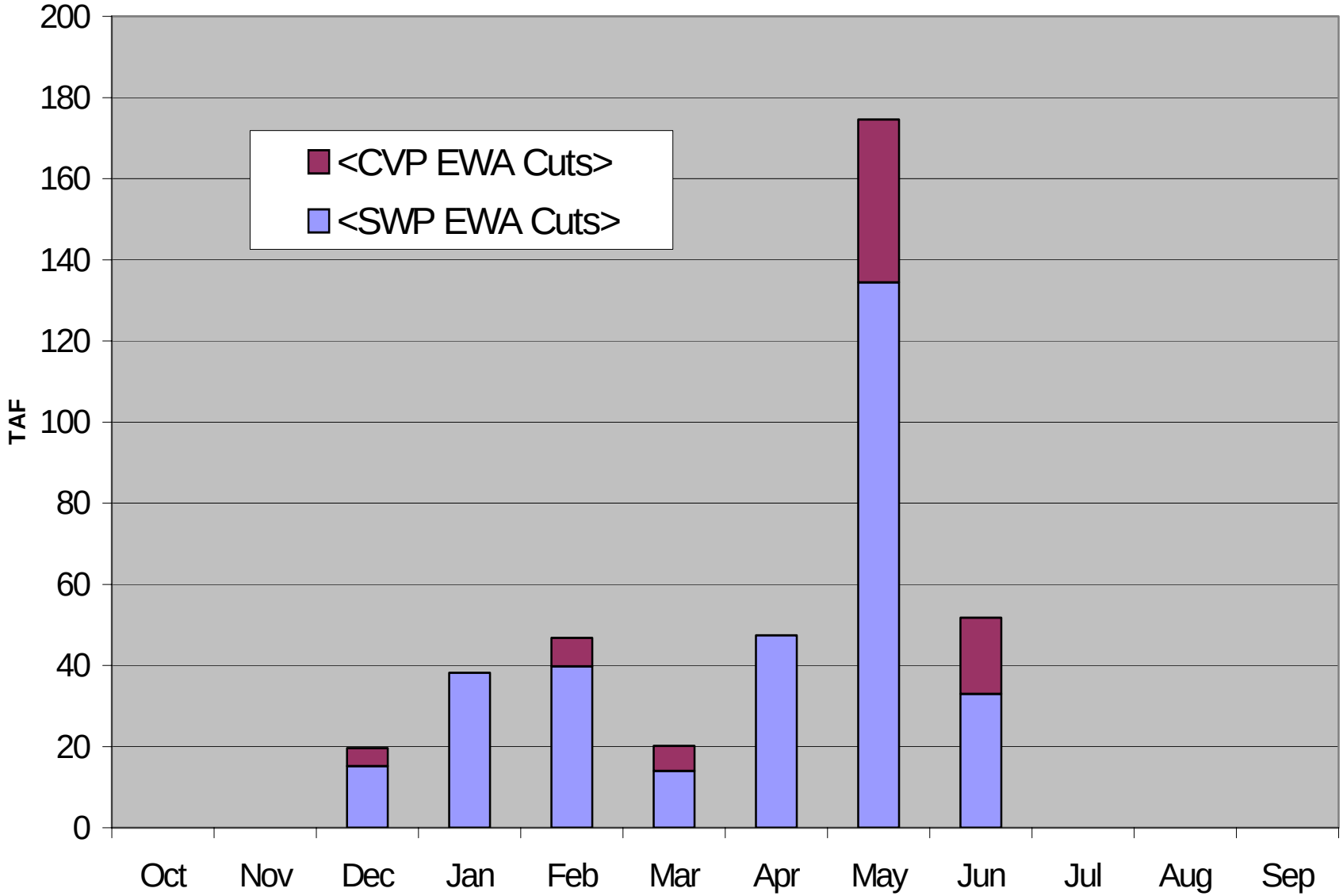
Gaming-EWA Total Charged Export Cuts

Scenario: Capital reduces annual purchase costs



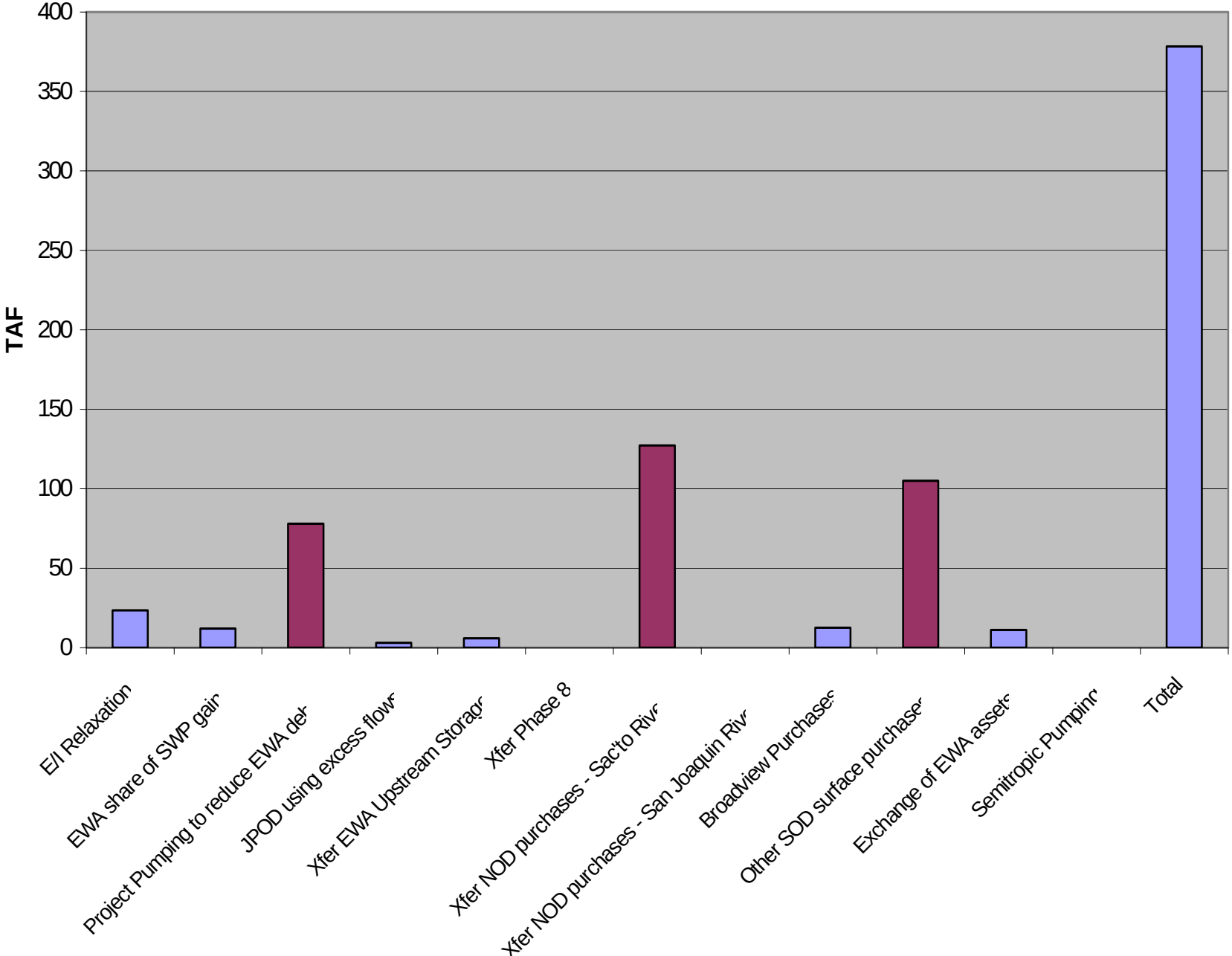
Scenario: Capital reduces annual purchase costs

Gaming-Monthly Average EWA Cuts By Project (1999-2003)



Scenario: High SOD Purchases

Gaming-EWA Average Asset Acquisition



EWA Gaming Results
September 4, 5, & 8, 2003

	Year	Allocations		Begin. Balance	Fish Actions (-)			Variable (+)		(-) June Debt	Purchases (+)			Carry-Over	Exchanges	Fall Variable
		SWP	CVP		SWP	CVP	Total	E/I	Spill		UOD	SOD	Total			
1999	Wet	100	75	0	307	127	434	0	35	399	60 (75)	175	235 (247)	-100 SL -36 Orov.	-30	15
2000	Wet/ AN	100	75	-85 SL -36 Orov.	400	60	460	40	168 + 36 Orov.	340	90 (112)	160	250 (272)	-90		20
2001	Dry	45	49	-70	301	101	402	10	165	296	256 (320)	0	230 + 30 (320)	-70	+30	25
	Actual	39	50	0	290	0	290	55*	0	235	88 (105)	231	319 (336)	+84		
2002	Dry	70	70	-45	183	23	206	30	0	221	140 (175)	90	230 (265)	0	+9	
	Actual	70	70	+84	208	72	280	19*	0	161	145 (173)	97	214 (270)	+37		
2003	AN	90	85	0	419	72	491	37	37	417	90 (112)	160	250 (272)	-100	-67	
	Actual	90	75	+37	322	26	348	76*	0	272	70 (84)	145	201 (229)	-25		

* All Variable Assests
( ) Total Purchases – includes water needed for carriage losses

EWA Straw Proposal Purchases in SOD Equivalents:
210 TAF Criteria, 230 TAF Dry, 250 TAF BN, AN, Wet

9/11/03

Task 1:LTEWA Operations Modeling

- Purpose: to develop an operational EWA for the longer term
- Based on gaming results; simulated how the MAs might have implemented EWA fish actions over an historical 73-yr period, with 8500 cfs exports (i.e., future conditions)
- Fish actions were balanced with the quantity of EWA assets available to implement them
- Used CALSIM2 Model (1922-1994) with a monthly timestep

Task 1: EWA Operations Modeling

Key Questions:

- What is the "right" amount of EWA fish actions for the longer term?
- How frequently will there be debt?
- What would the debt magnitude be?
- What about back-to-back high-cost years?
- What is the effect of debt spilling?

Task 1: EWA Operations Modeling

EWA Fish Actions

Dec-Mar	50 TAF/mo. placeholder
4/15-5/15	VAMP exports
Apr-May	VAMP "shoulders"
June	Export ramping

Task 1:LTEWA Operations Modeling

Banks Summary

Year-Type	Dec-Mar	April Shoulder	VAMP	May Shoulder	June Ramping	Total EWA Actions
Wet	200	10	113	116	46	485
Above Normal	200	46	101	130	45	523
Below Normal	150	47	82	109	39	427
Dry	100	66	30	58	31	285
Critical	100	24	10	25	5	164

Task 1: Post-Processing Spreadsheet Tool Assumptions

The costs of LT EWA fish actions depend on hydrology: 250-490 TAF of assets needed

EWA purchases	210-250 TAF
EWA operational assets	0-80 TAF
EWA pumps upstream releases	0-30 TAF
EWA spills debt	variable

Evaluating Environmental Water Needs for At-Risk Fish Species

- Sizing of longer-term EWA will continue to be evaluated
- Task 1: gaming, modeling, etc gave us a starting size for a longer-term EWA
- Tasks 2-4: we will continue to evaluate and "fine-tune" the longer-term EWA

Task 2: Measuring Abundance and Distribution

- Monitoring includes:
  - Delta smelt – Spring Kodiak Trawl, 20-mm Survey, Summer Tow-Net Survey, Fall Mid-Water Trawl, Fish Salvage Facilities
  - Salmonids – Beach seining, Chipps Island Trawl, Sacramento Mid-Water Trawl, Sacramento Kodiak Trawl, Mossdale Trawl, Rotary Screw Trapping, Fish Salvage Facilities

Task 3: Evaluating Impacts of Incidental Take and Progress Toward Recovery

- Does SWP/CVP loss affect salmon survival, or does survival effect loss?
- Is "salvage" a good estimator for the incidental take of delta smelt? Is the (unquantified) take of larval smelt ≤20mm critical to species recovery?
- Best available science

Task 4: Identify Opportunities for Adaptive Management

- Timing of fish actions
  - Prior to triggering reconsultation?
  - A "pre-" vs. a "post-" VAMP shoulder?
- Extent of fish actions
  - What is the most appropriate endpoint?
- Use of operational tools
  - Harmful to some life stages?
- "Detectability" of EWA actions
  - Too small to be significant?
- Continuous improvement to decision processes

Task 5: Identify Critical Science Needs

- Salmonids
  - Genetics, through-Delta survival, DCC ops, life-history models
- Delta Smelt
  - Population, life-history modeling, density dependence, predation, "indirect" effects, S.D. barrier ops, location and timing of spawning, role of shallow water habitat, role of larvae ≤20 mm

Conclusion and Next Steps

- Discussion on the appropriate size of the longer-term EWA is on-going
- We are working towards the protection and recovery of at-risk native fish
- EWA is one of many tools