

SWRCB Workshop March 2005

Issue #8

CDFG Comments

Issue 8

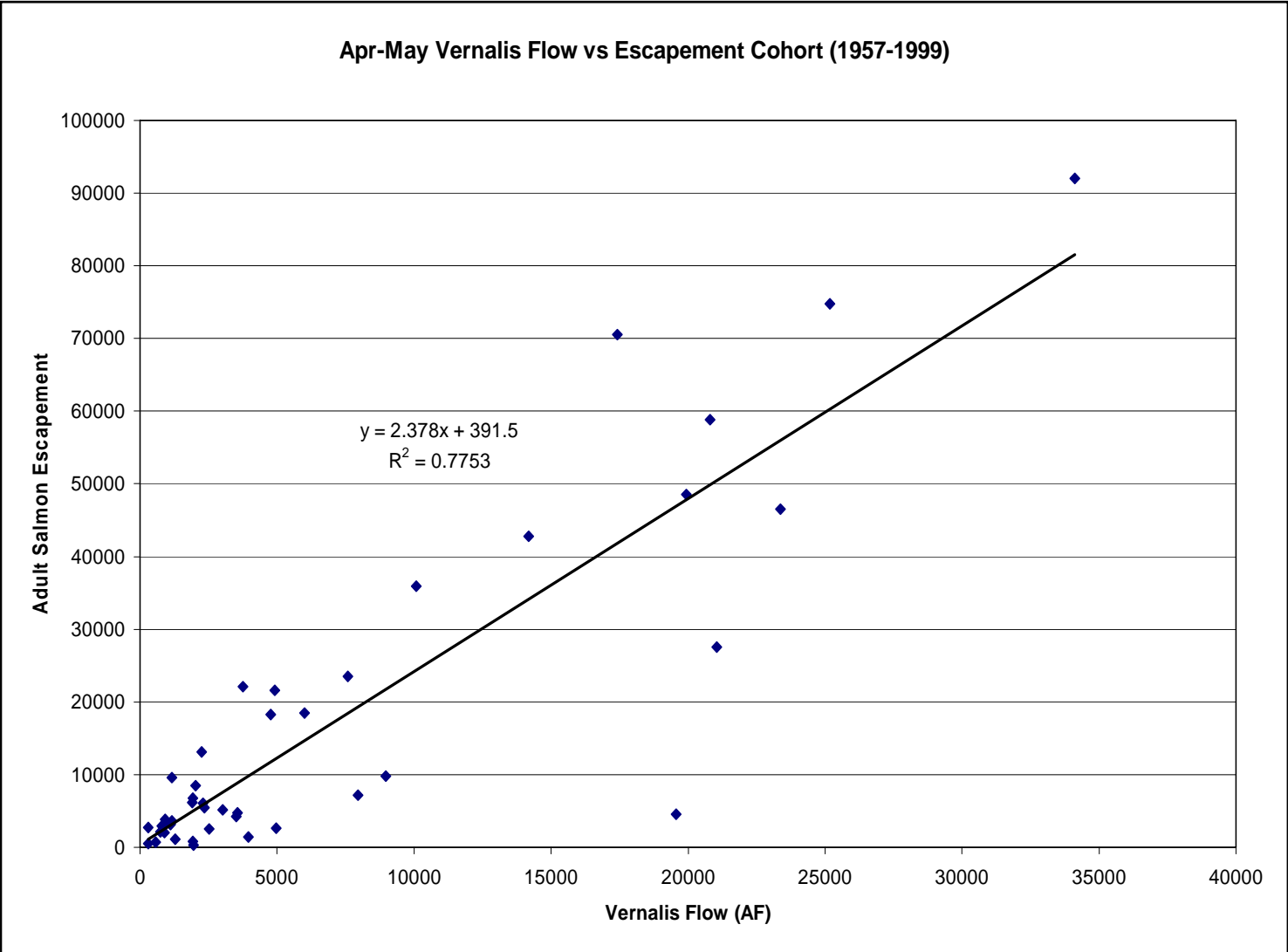
- Q1: Should the SWRCB amend Vernalis flow objectives 2/1-4/14 and 5/16-6/30?

Question #1 Responses

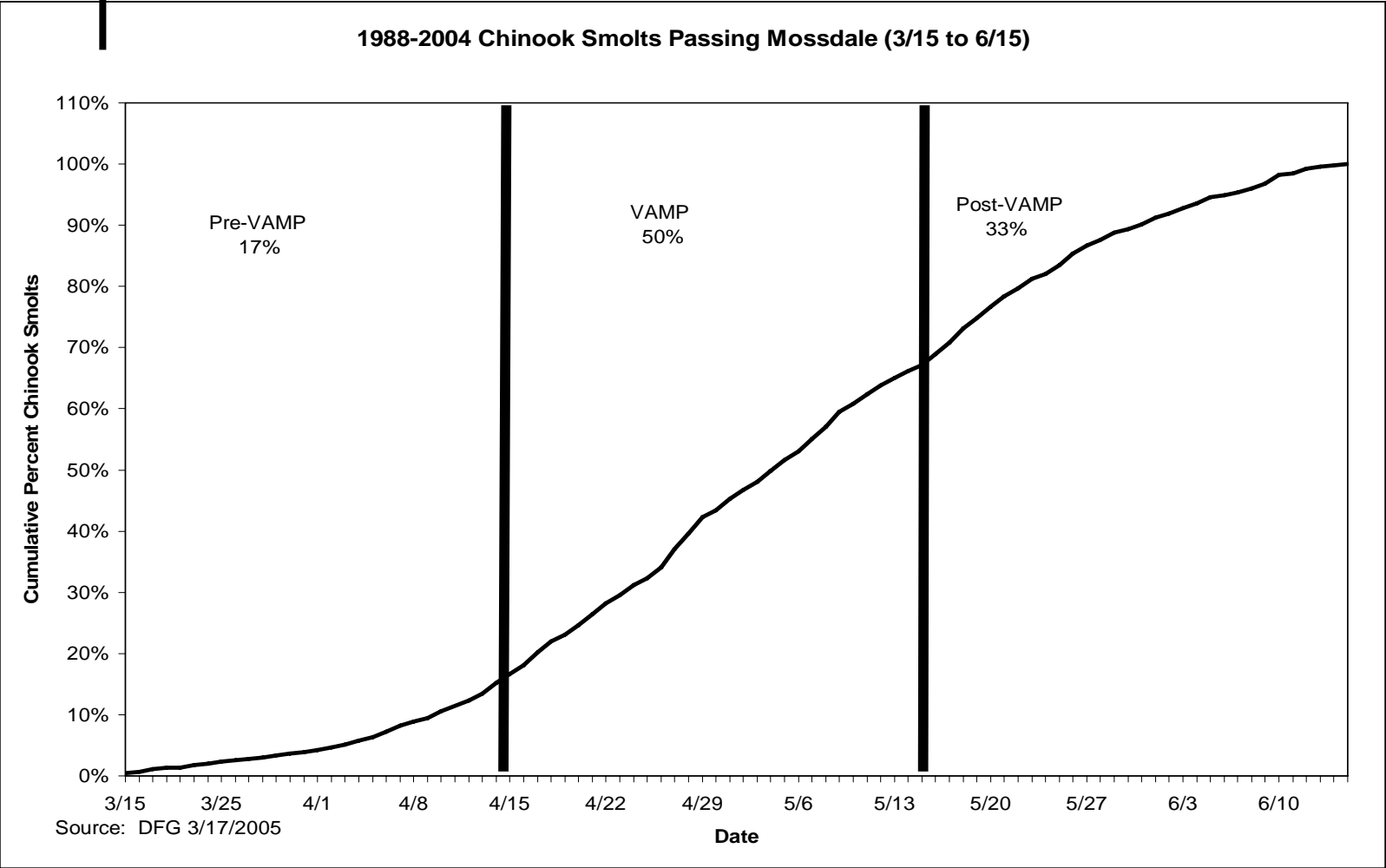
- 1. Adult Salmon Trend
- 2. Fraction of Smolts Afforded Protection
- 3. Target Flow & Production Potential
- 4. Window of Protection for Steelhead
- 5. VAMP Window & Water Temperatures
- 6. Fry Contribution to Escapement
- 7. Water Quality Objectives & Recovery
- 8. Study Integrity vs. Adaptive Management
- 9. SJR Basin-wide Model(s) Integration

Status of SJR Fall-run Chinook Salmon

- Declining trend with current Delta flow objectives
 - 1967-1991 Average = 18,211
 - 1992-2004 Average = 13,855
- Is the VAMP window sufficient to protect salmon beneficial use in the SJR?
- Is it time to re-consider the effectiveness of VAMP?



2. Window Too Narrow to Protect Salmon



Can Salmon Abundance in the SJR
be Increased by Extending the
Window of Protection?

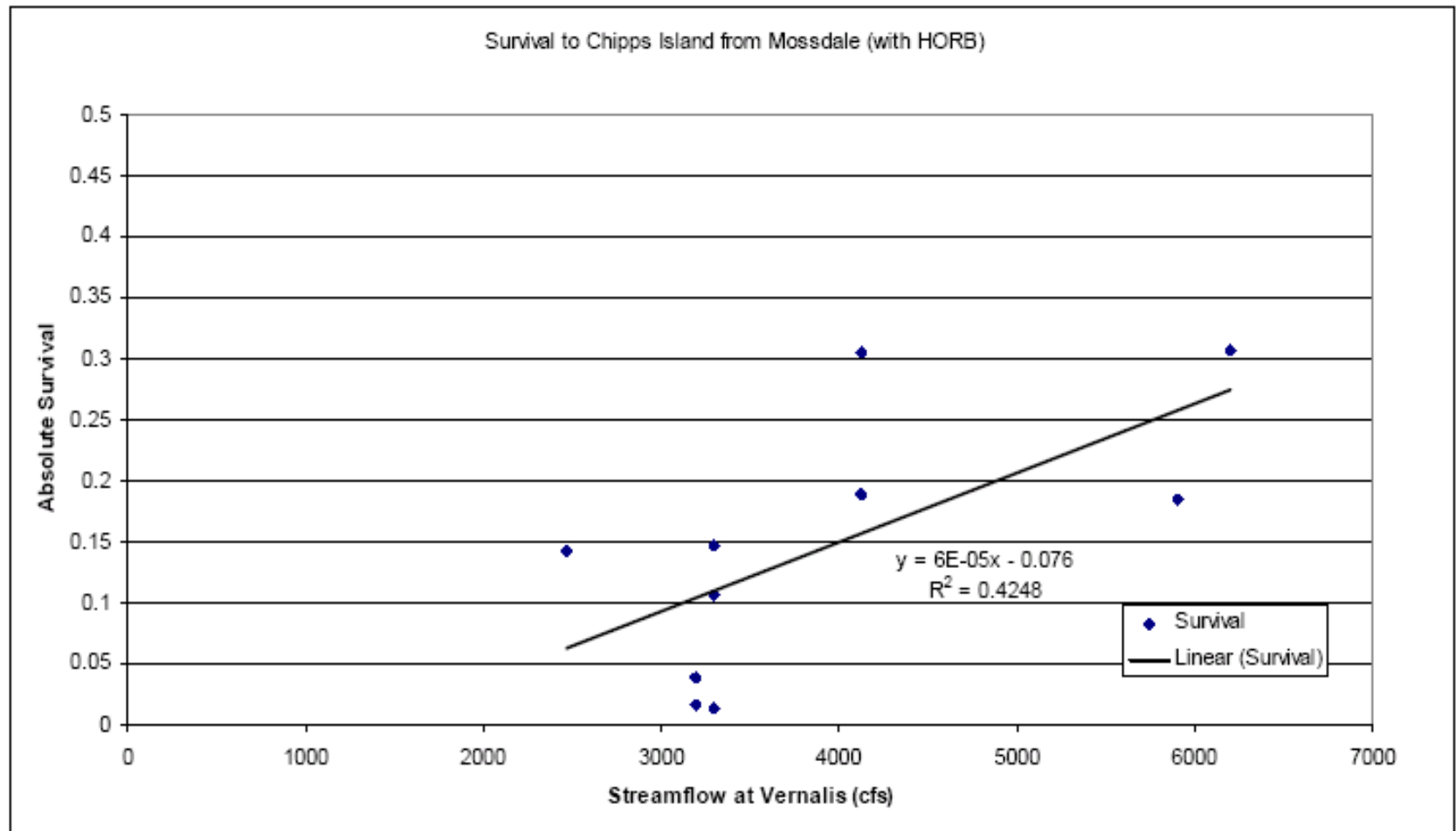
3. Hypothesis: Salmon Production in SJR Largely a Function of:

- Flow Magnitude
- Flow Duration
- Flow Frequency
- Simple Model



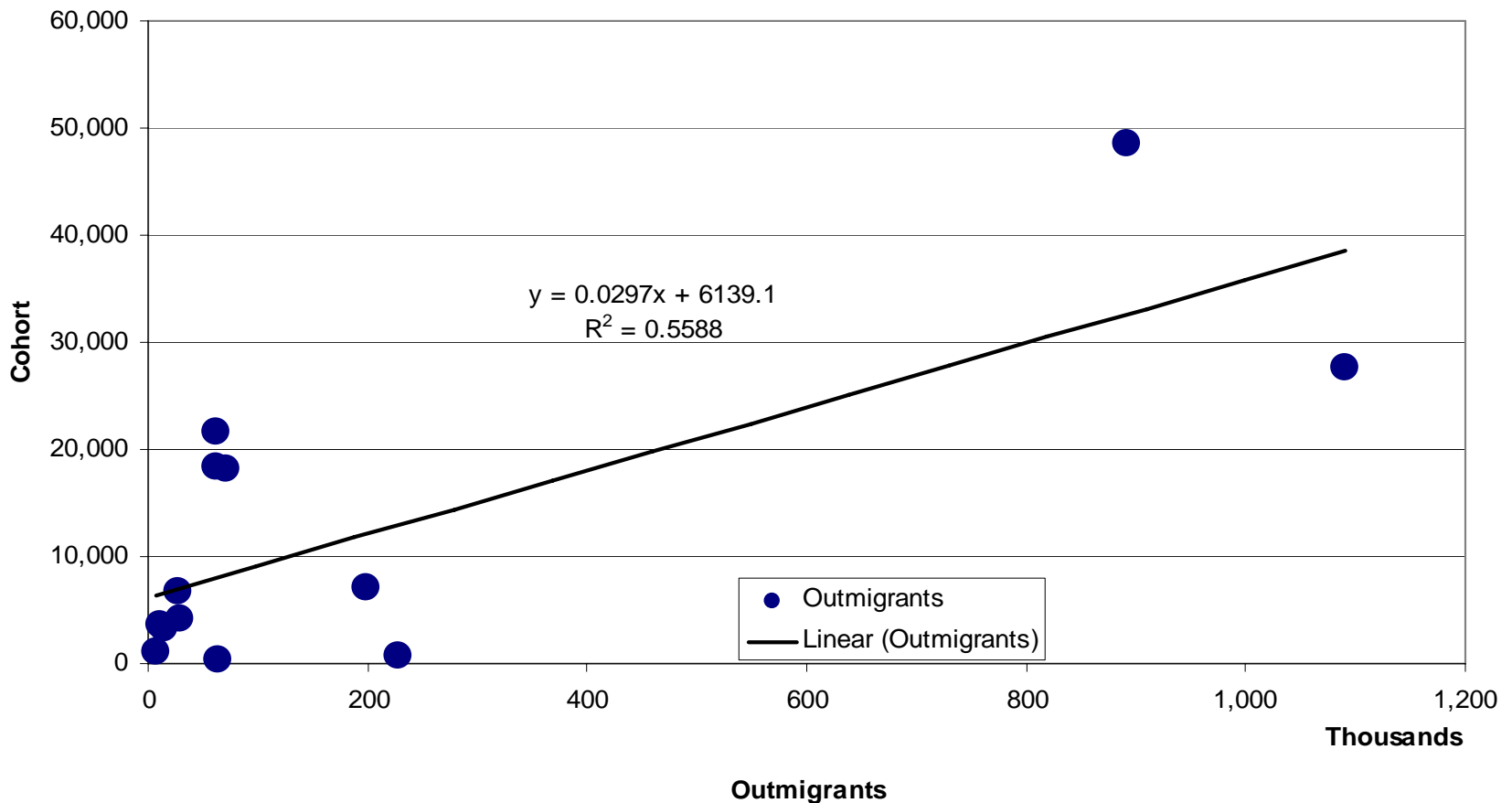
Mossdale to Chipp's Smolt Survival

Figure 4. Mossdale to Chipp's Island Flow vs. Survival Regression (y intercept < 0)



Cohort Production Estimate

Chippes Outmigrants Vs Cohort Production (1987-1999)



Flow Magnitude Results

Table 5. Comparison of Estimated Adult Salmon Escapement Increase with Flow Increase During the VAMP Period.

1988-2004 Estimated Adult Salmon Production Comparison without VAMP, with VAMP, and With Higher VAMP Minimum Vernalis Flow Targets (Apr. 15 thru May 15)					
Without VAMP Production Average	Vernalis Flow Targets				
	3200	4450	5700	7000	10000
3,526	4,100 (+14%)	4,826 (+27%)	5,597 (+37%)	6,425 (+45%)	8,589 (+59%)

Duration: Pre & Post

Table 10. Comparison of Estimated Increase in Salmon Escapement with Duration of the Delta Inflow Standard Extended to the Pre & Post-VAMP Time Periods.

1988-2004 Estimated Adult Salmon Production Comparison Post-VAMP Window (Apr. 1 thru Apr .14 & May 16 thru May 31)					
Without Pre & Post- VAMP Window Protection Production Average	Vernalis Flow Targets				
	3200	4450	5700	7000	10000
1,906	2,245 (+15%)	2,581 (+26%)	2,972 (+36%)	3,385 (+44%)	4,302 (+56%)

Vernalis Target Frequency

■ Can Salmon Abundance Be Increased With a Change in Vernalis Minimum Flow Frequency?

■ Results:

- Historical: 7,252
- Altered: 10,279
- Increase: 29%

Table 12. 1988 to 2004 Delta Inflow Standard Target Flows Frequency of Occurrence

1988 to 2004 Delta Inflow Standard Target Flows Frequency of Occurrence					
Years	3200	4450	5700	7000	>10000
17	9 (53%)	2 (12%)	1 (6%)	3 (18%)	2 (12%)

Table 13. Altered 1988 to 2004 Delta Inflow Standard Target Flows Frequency of Occurrence

Altered 1988 to 2004 Delta Inflow Standard Target Flows Frequency of Occurrence					
Years	3200	4450	5700	7000	>10000
17	0 (0%)	2 (12%)	7 (41%)	6 (35%)	2 (12%)

Note: Frequency changes made by alternating Delta Inflow Standard Target Flows levels of 5700 and 7000. 4450 levels were chosen by taking the first year (1988) and the 10th year (1998). The >7,000 levels were left as they occurred (e.g., 1995 & 1998).

Compounding Escapement With Flow Increase Results

Table 15. Compounding Annual Escapement Increases

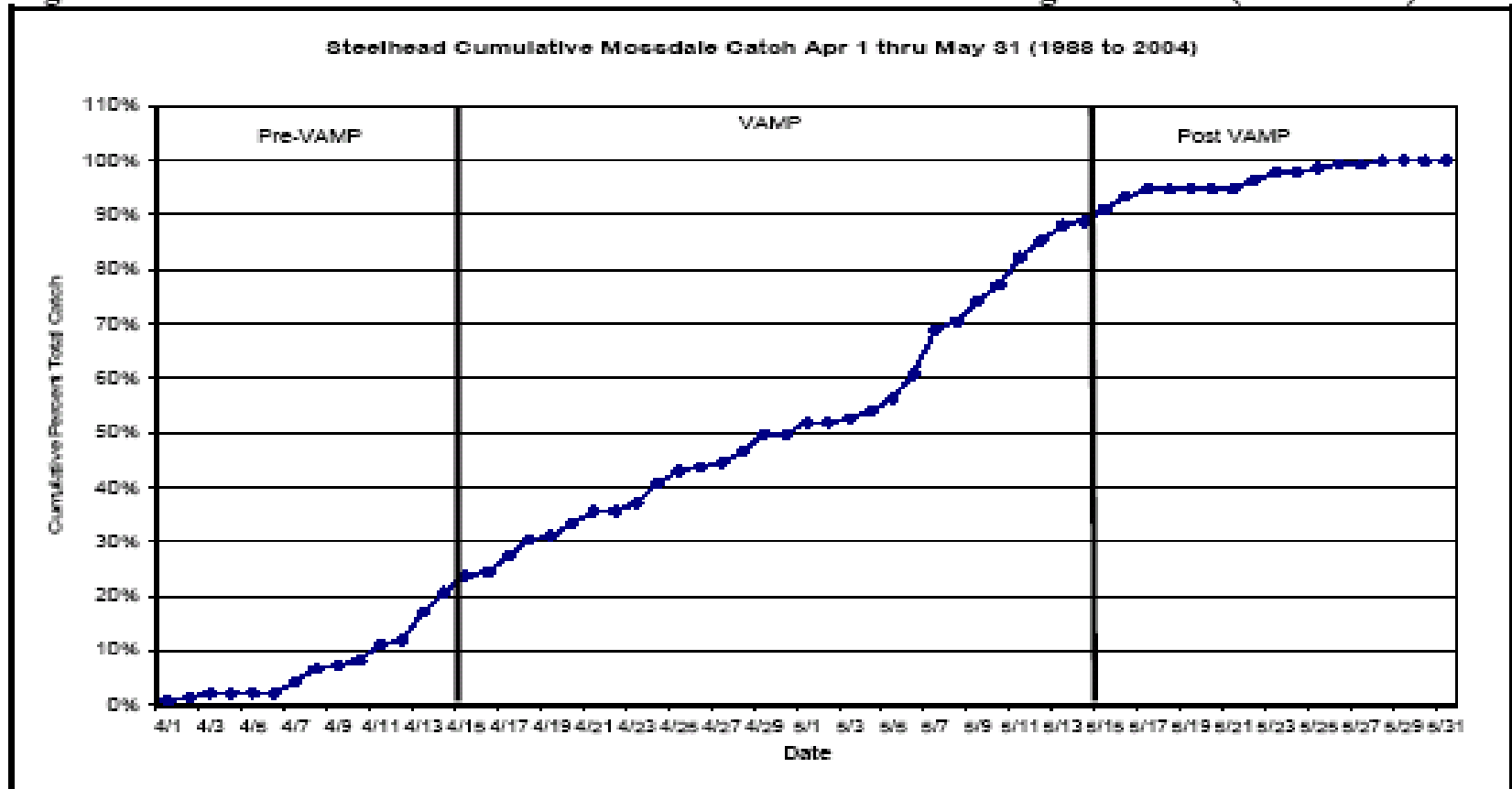
1988-2004 Estimated Accumulated Adult Salmon Production Comparison with Increased VAMP Window Target Flows					
No Vernalis Target Overlay on Historical Record	Vernalis Flow Targets Added to Historical Flow Years				
	3200	4450	5700	7000	10000
11,414	12,506 (+9%)	13,777 (+18%)	15,967 (+29%)	19,412 (+41%)	31,840 (+64%)

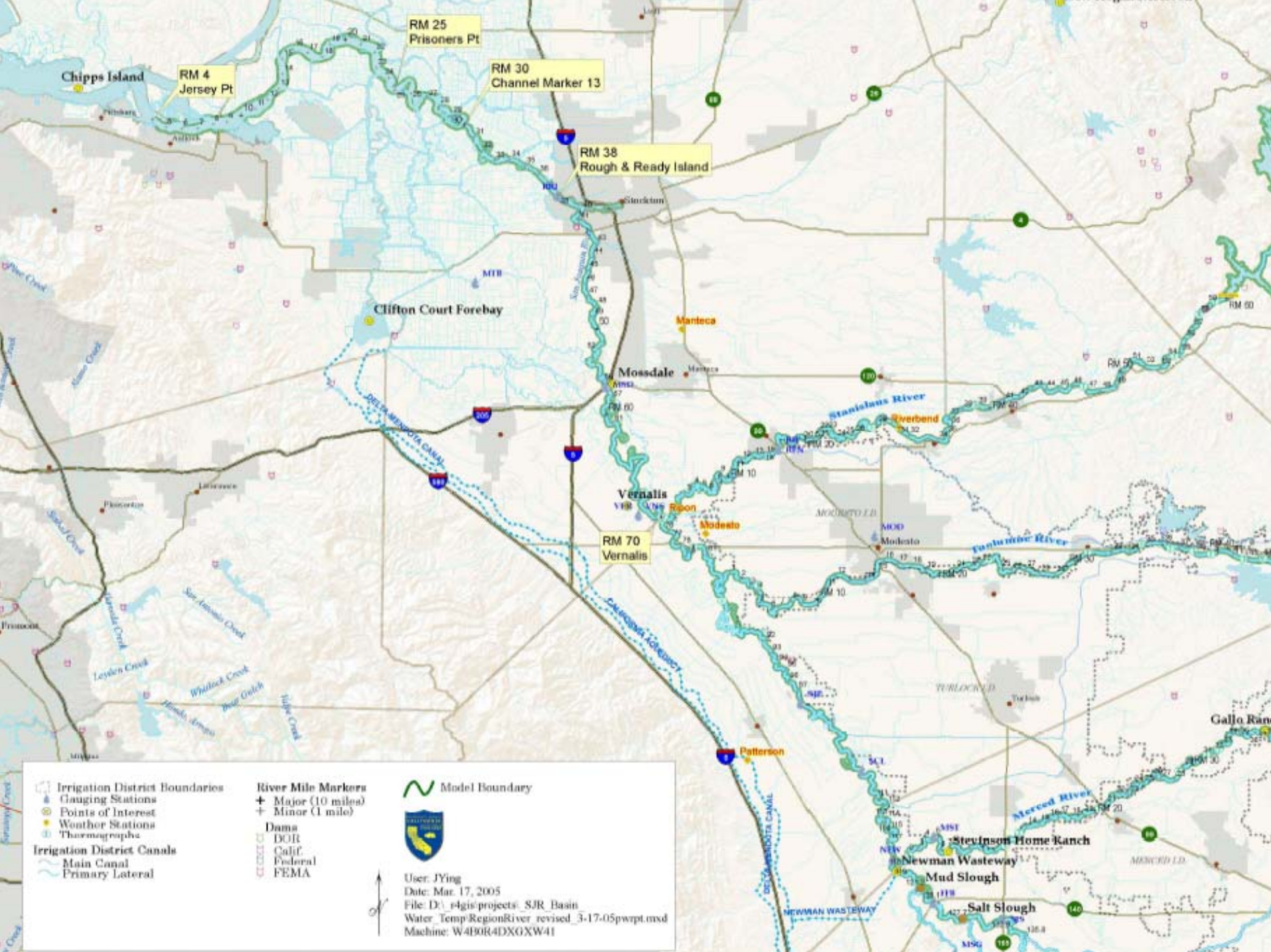
Take Home Message:

- Higher VAMP Target = >Adult Salmon
- Longer VAMP Period = >Adult Salmon
- Duration & Magnitude = >Adult Salmon
- Fewer 3200 Targets = >Adult Salmon

Steelhead

Figure 9. Cumulative Percent Steelhead Rainbow Trout Passing Mossdale (1988-2004).





- Irrigation District Boundaries
- Gauging Stations
- Points of Interest
- Weather Stations
- Thermographs
- Irrigation District Canals**
- Main Canal
- Primary Lateral

- River Mile Markers**
- Major (10 miles)
- Minor (1 mile)
- Dams**
- BOR
- Calif.
- Federal
- FEMA



User: JYing
 Date: Mar. 17, 2005
 File: D:_r4gis\projects_SJR_Basin
 Water Temp\RegionRiver revised_3-17-05pwpt.mxd
 Machine: W4B0R4DXGXW41

Flow Objective for Fry?

- Fry??:
 - Contribution to escapement unknown
 - Fry migrate in large #'s in wet years
 - Wet years linked to tremendous adult escapements
 - Wet years also produce tremendous smolt abundance
 - Dissolved oxygen problematic at SDWSH in some years during Jan/Feb time frame
 - Exports not curtailed when fry out-migrating
- DFG's Management Focus on Smolts
 - Return as adults in all years
 - Strong correlation between smolt production and adult escapement
- DFG would support VAMP-like Experiments for Fry if:
 - Comes in addition to, rather than at expense of, smolt beneficial use protection

Water Quality Objectives & Salmonid Population Recovery

- CDFG recognizes Salmonid life history is complex and uncertainty exists regarding influence of environmental variables
- The status of Salmonids in the SJR, the uncertainty of which variable most influences recovery, and questions regarding VAMP's effectiveness towards accomplishing recovery goals suggests the need to re-evaluate the flow objectives and perhaps involve an independent peer review process that assesses:
 - 1. Current scientific knowledge re: salmonid abundance
 - 2. Develop complex population prediction models
 - 3. Identify key areas of uncertainty
 - 4. Evaluate if & how South Delta Standards can be changed to adequately protect SJR salmonid beneficial uses

SJR Model Integration

- CDFG is aware that several SJR basin-wide models are currently in varying stages of development
 - Water Operations Model (CALSIM)
 - Water Quality Model (CALSIM)
 - Water Temperature (CALFED)
 - Fall-run Chinook Salmon? (CALFED Science Program PSP)
- Models integrated to ensure solution is multi-goal oriented

VAMP Study Integrity vs. Adaptability

- First 5 Years focus on Study Integrity
- Salmon abundance continues to decline
- Time to look at “Adaptability”
- Independent Peer Review Process Could help the SWRCB & VAMP Parties:

Issue #8 Q:1 Recommendations

- 1. Keep VAMP but consider expanding window & increasing minimum flow level for SJR salmonids
- 2. Emphasize VAMP's Adaptive Management spirit to increase level of salmonid resource beneficial use protection intended in the '95 WQCP Plan
- 3. VAMP parties develop a plan to refine VAMP to increase duration, frequency, and magnitude of Vernalis flow levels to better protect SJR salmonids out-migrating thru the South Delta
- 4. Re-evaluate VAMP & Steelhead
- 5. SWRCB challenge VAMP parties to accelerate a permanent HORB to allow for >10,000 flows at Vernalis to occur as part of VAMP

Issue 8

Q2: Should the SWRCB change the methods for determining SJR flow objectives that are determined by reference to Delta flow objectives?

Question 2: Flow objective methodology

- Seen no analysis indicating whether methodology should be changed
- Migration conditions for salmon and steelhead are poor
- Spring SJR flow at Vernalis is a small fraction of natural flow
- Seasonal flow pattern had been greatly modified

Flow objective methodology

- No specific recommendation for changing the methodology
- If the Vernalis flow objective were to be de-coupled from X2 location, then DFG recommends for each water year type using the higher flow objectives (right hand column) in Table 3 in the 1995 WQCP to better protect the beneficial use of the lower SJR for anadromous fish