Table 1. EWA water used for pumping curtailments at SWP/CVP (taf) in Water Years 2001 – 2004.

	WY 2001	WY 2002	WY 2003	WY 2004	Total
Salmon and/or steelhead prior to 4/15	86	0	62	0	148
Salmonids and delta smelt prior to 4/15	137	67 (38)	59	0	263
VAMP mid-Apr – mid-May	43	45	32	20	140
Post-VAMP delta smelt and salmon	24	137	195	104	460
Total	290	249	348	124	1,011

Figure 1. Winter Run Chinook loss at SWP/CVP from 1993 - 2004

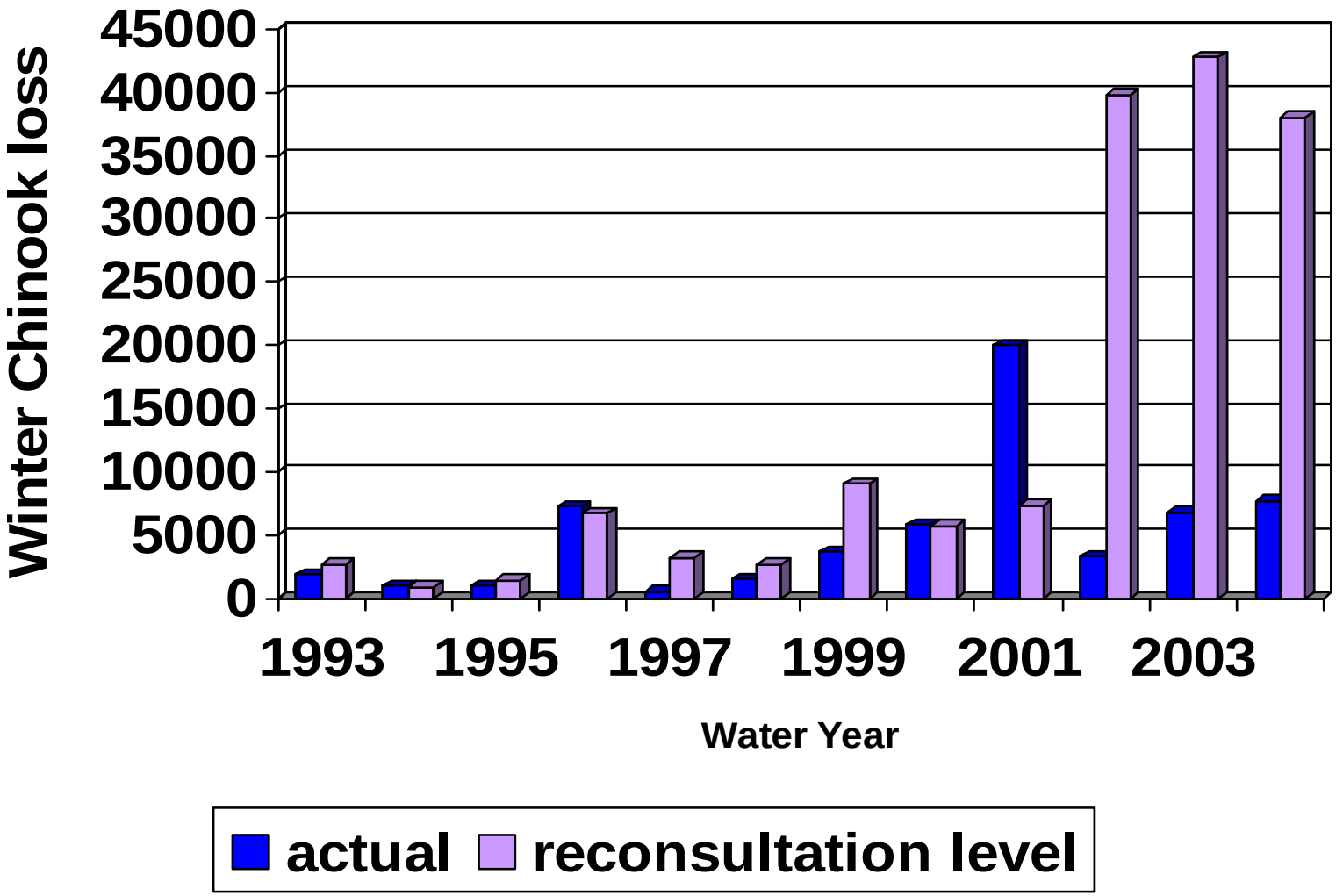


Table 2. Spring run Chinook Surrogate Loss at SWP/CVP
(re-consultation level = 1%)

Water Year	Nov. Release % Loss	Dec. Release % Loss	Jan. Release % Loss	Production Release % Loss
2001	0.11	0.27	0.36	0.39
2002	0.22	**0.90**	**0.73**	0.77
2003	0.28	**1.21**	**1.35**	3.29
2004	0.38	_	**1.36**	2.96

Figure 2. Number of unmarked, in-river-produced steelhead salvaged at SWP/CVP from 1998 -2004 compared to the reconsultation level in NOAA Fisheries OCAP Biological Opinion (2001 -2004).

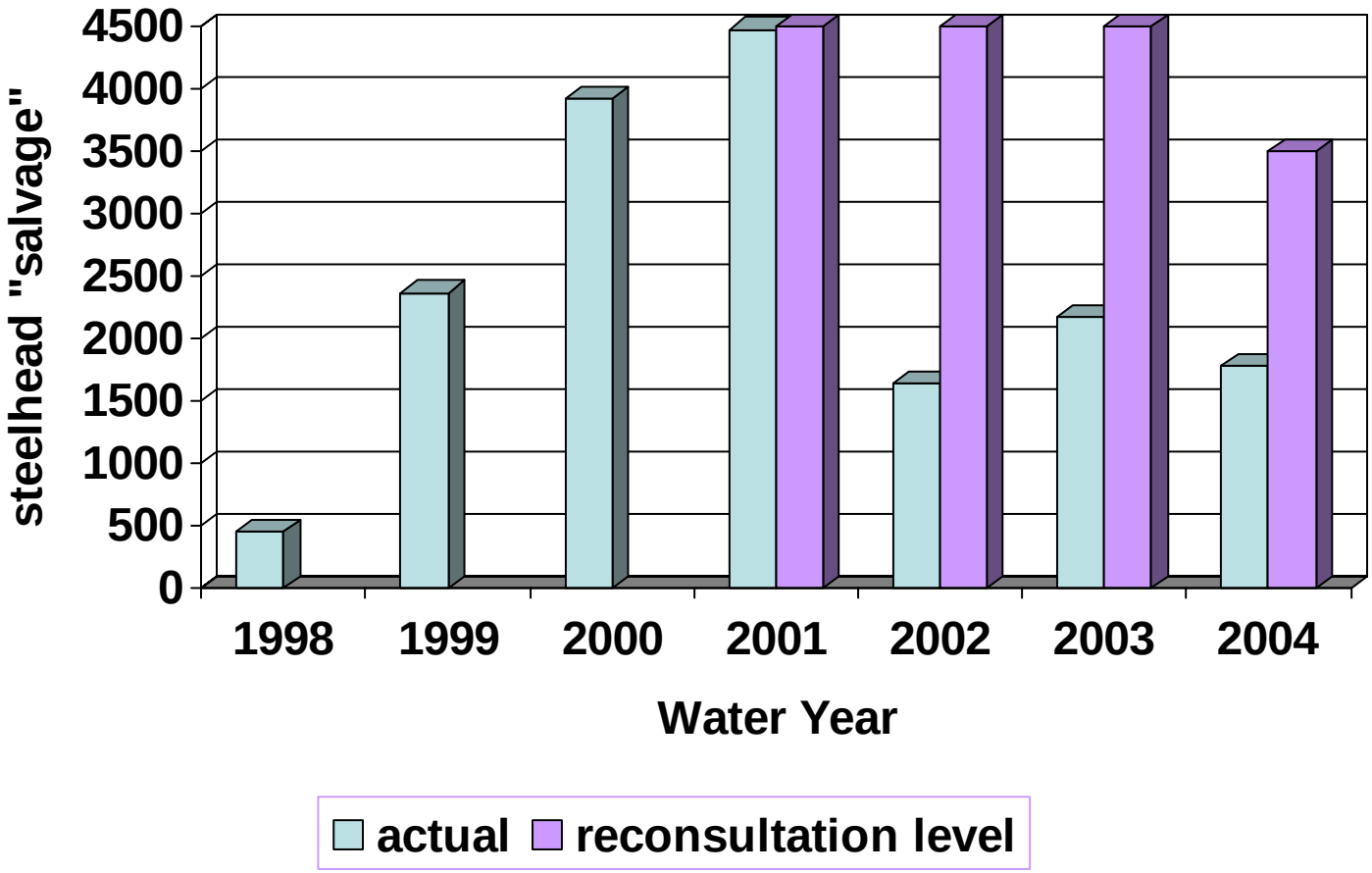
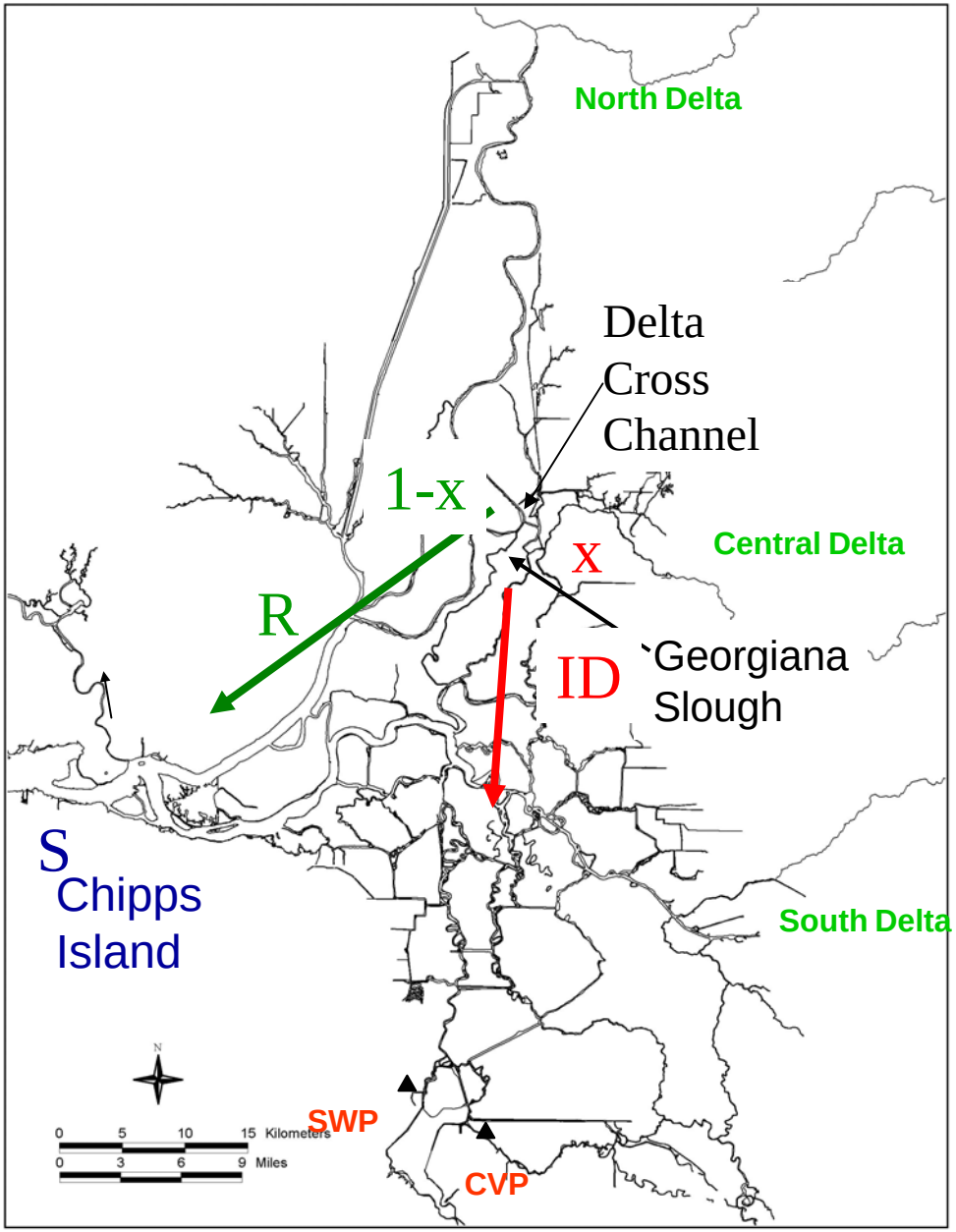


Figure 3. Delta salmon survival models 1 and 2 based on paired release experimental design



WR Delta survival between 2/1 and 3/31(model 1) and 11/15 and 4/15 (model 2)

(S) = ((1-x) * R) + (x * ID) * P

Where :

x = % water diverted

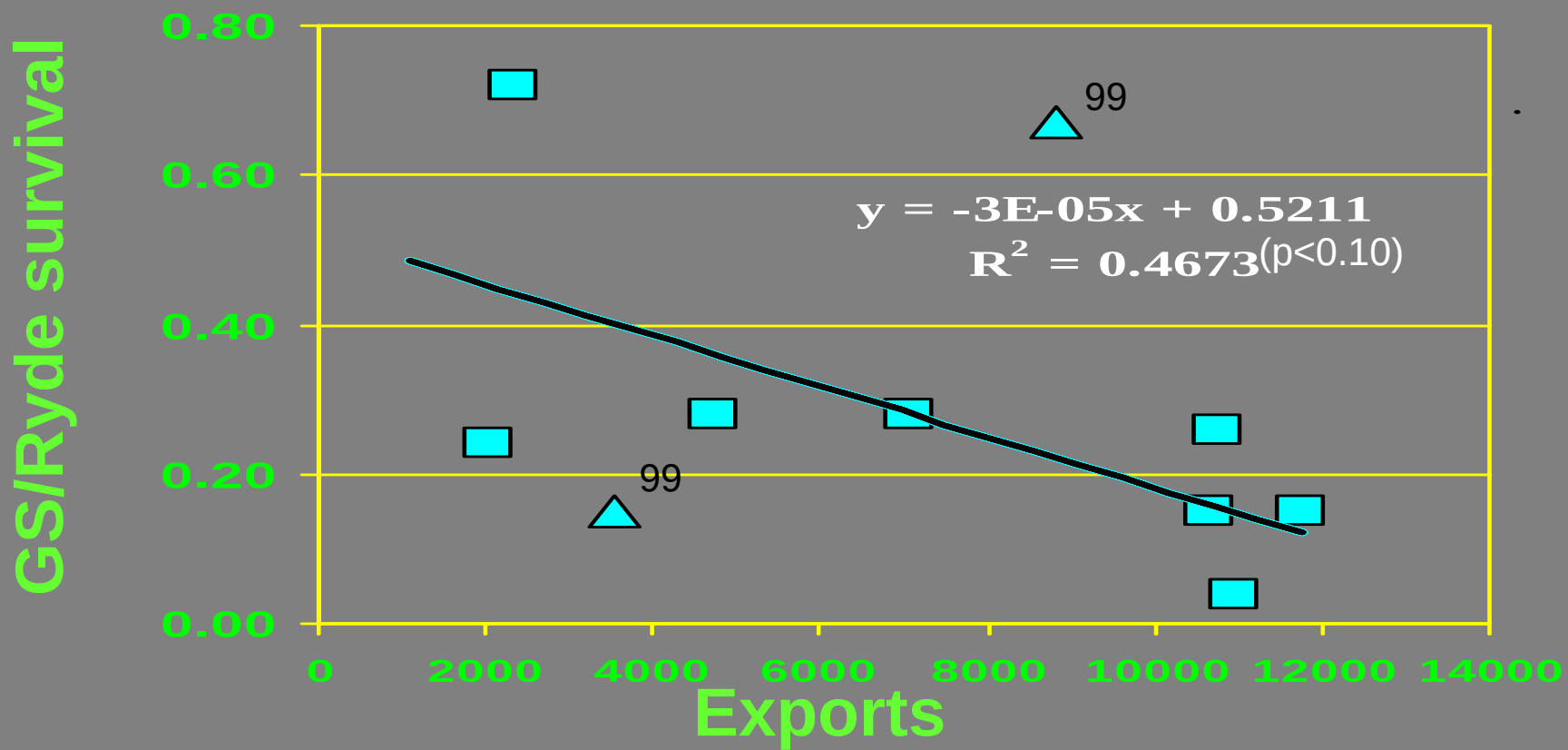
R = Ryde survival = (0.8)

ID= ((GS/Ryde survival ratio *(Ryde survival)))

P is the % of the population passing Sacramento +2day lag and GS/Ryde survival = 0.52 - 0.00003*exports (model 1) (newest relationship: 0.47-0.00003*exports) (model 2)

Estimate survival on daily basis with and without EWA export curtailments to estimate benefits

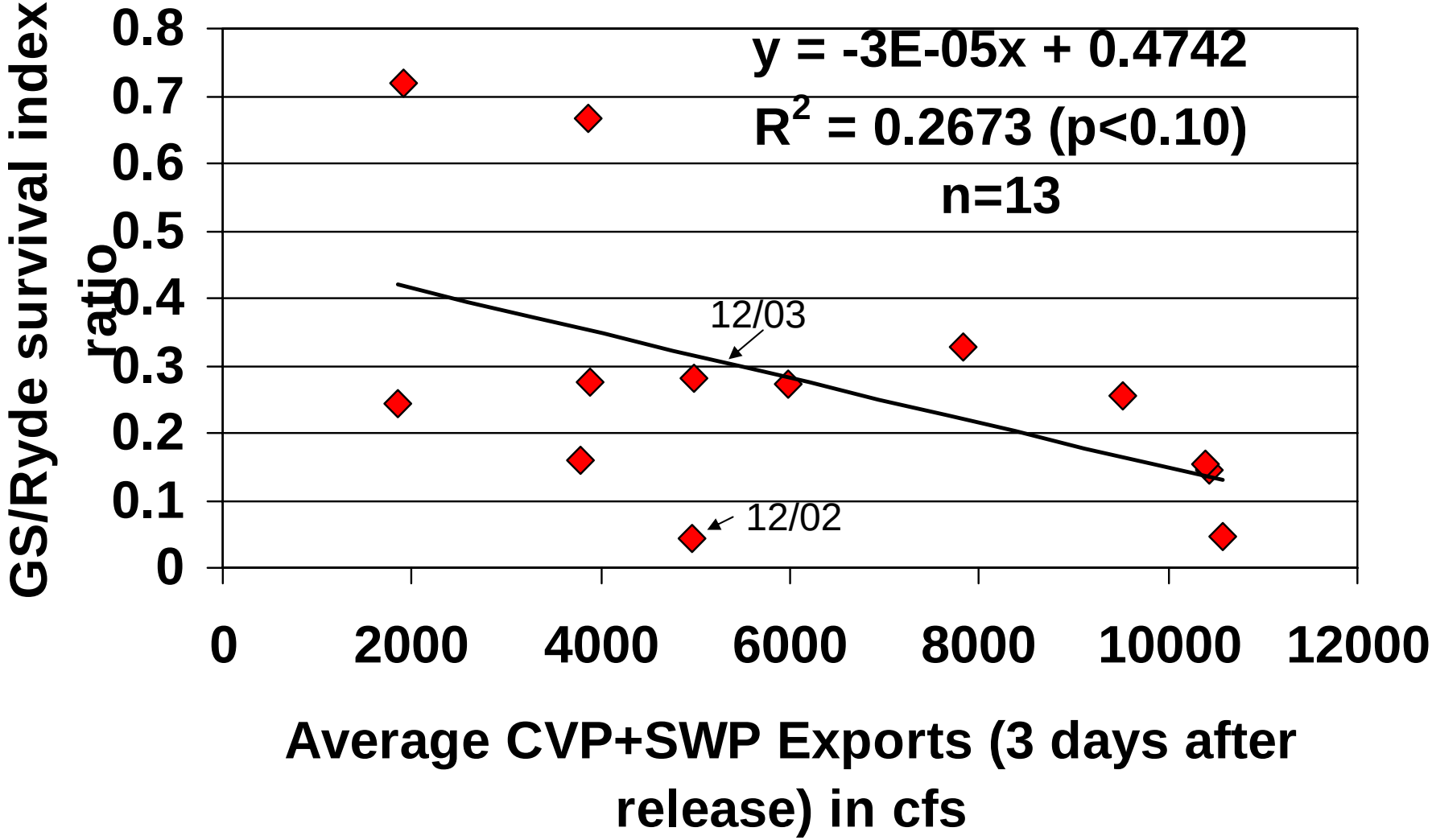
Figure 4. Survival v. export relationship for Model 1



1999 data point is not included in regression.

Ratio of survival for late fall yearlings released into Georgiana Slough relative to those released at Ryde versus mean daily combined CVP+SWP exports 17 days after release. Data from 1993-1998

Figure 5. Survival index v. exports relationship used for model 2



Georgiana Slough/Ryde survival ratio versus exports, 1993-2003

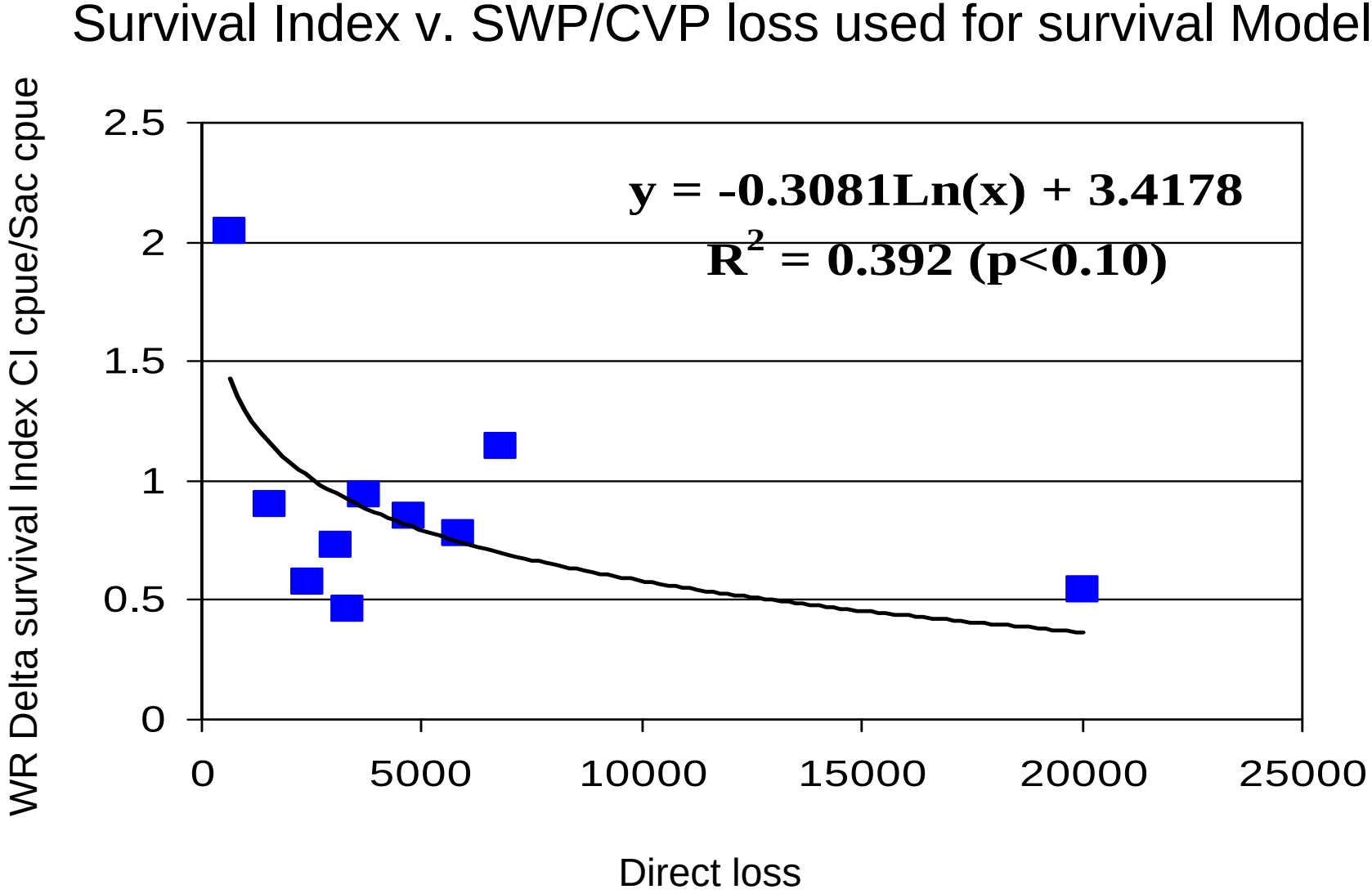


Figure 6. Survival of winter run between Sacramento and Chipps Island (based on FF curves) versus direct loss (Delta curves) at the CVP+SWP, 1993-1994 through 2002-2003. Relationship used for salmon survival model 3.

Figure 7. Relationship of survival and Delta environmental factors that are the basis for survival Model 4

Winter run Chinook Salmon Integrated Modeling Framework Model Version 1.2 (Cramer et al., 2004)
Delta portion of model from Newman (2003)

$$\text{Survival} = 0.65+0.86*\log_e(\text{Flow}) - 0.81*\text{River Temp.} - 0.32*\text{Exports} +0.378*\text{Turbidity} + 0.35 * \text{Salinity} - 0.75*\text{Gate Position}$$

Where:

Flow = Mean flow in cfs at Freeport
River Temp = Mean temperature in degrees F at Freeport (used 58°F)
Export flow = Combined export flow at CVP and SWP
Turbidity = in fromazine turbidity units near Courtland (used default value of 8)
Salinity = measured by conductivity, µmho/cm at Collinsville (estimated on relationship with flow: $y= 102{,}003*e^{(-0.0002*x)}$)
Gate Position - 1 = open, 0 = closed or fraction thereof
Survival = Logistic transform of proportion surviving to Chipps Island

Table 3. Change in winter run (size) Chinook salmon survival metrics with EWA actions, 2001-2004.

	Model	1	2	3	4
2000-2001 6 WR actions (233 TAF) -22 TAF State Gain Dec-Apr	Base	0.69	0.66	0.28	0.82
	EWA	0.70	0.69	0.36	0.84
	Difference	0.01	0.03	0.08	0.02
2001-2002 No targeted WR actions 1 targeted to SR in Jan (66 TAF), 38 TAF used in March -76 TAF Relaxation of E/I in Feb	Base	0.71	0.676	0.90	0.872
	EWA	0.69	0.675	0.92	0.873
	Difference	-0.02	-0.001	0.02	0.001
2002-2003 3 SR actions Dec-Jan (121 TAF) -60 TAF E/I relaxation, debt repayment and State Gain in March	Base	0.68	0.68	0.69	0.908
	EWA	0.68	0.68	0.70	0.911
	Difference	0.00	0.00	0.01	0.003
2003-2004 No actions Dec 1 – Apr 14					

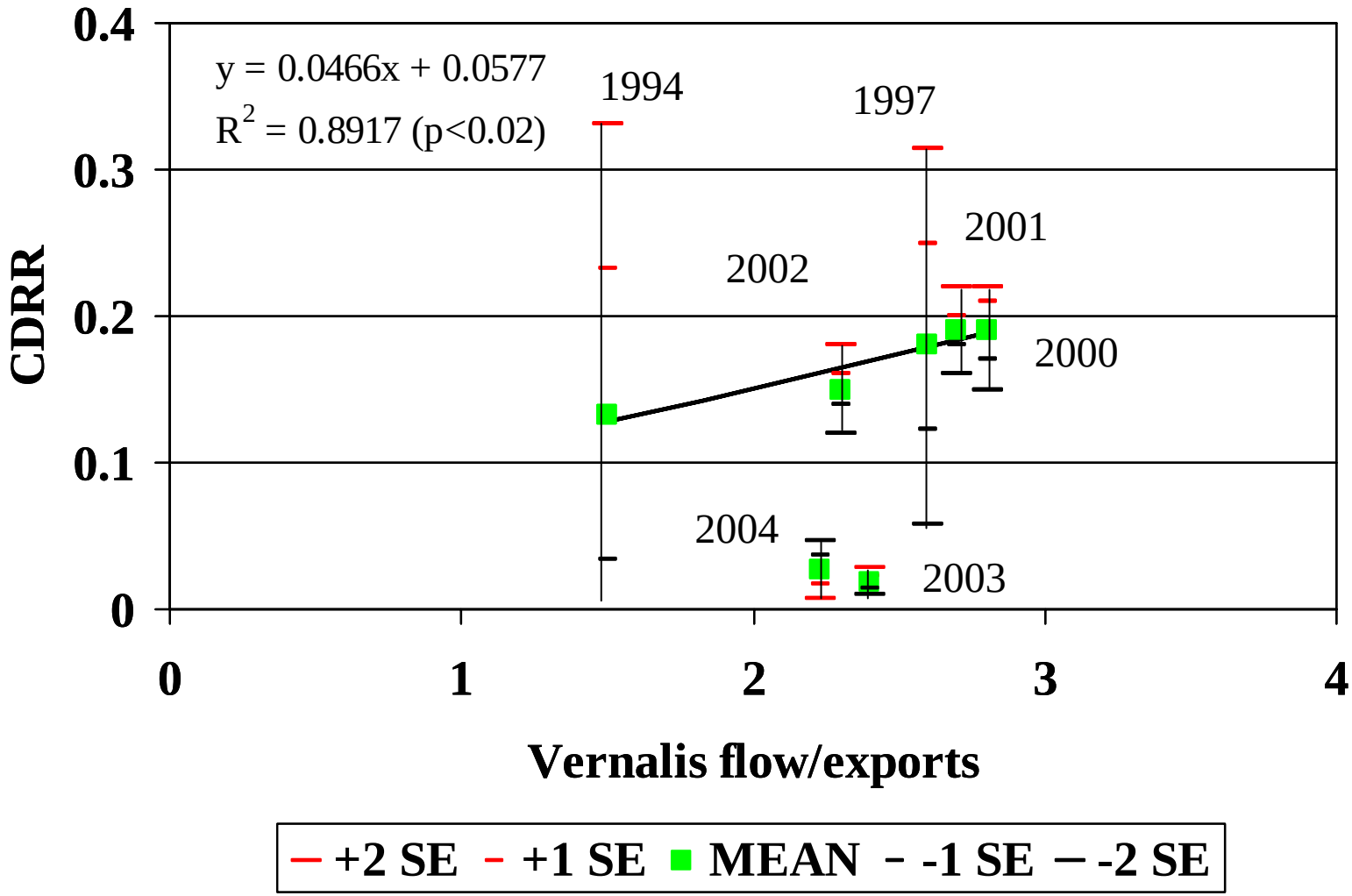


Figure 8. Combined Differential Recovery Rate (CDRR) and (+/- 1 and 2 Standard Errors) from Durham Ferry and Mossdale to Jersey Point with the HORB in place, versus inflow at Vernalis / exports, 1994, 1997 and 2000-2003. Regression line without 2003 and 2004 data.

Table 4. Effect of VAMP flow and export conditions on the Delta survival of San Joaquin River basin juvenile salmon

	Without VAMP				With VAMP				Estimated	Percent migrating	
Year	Flow	Exports	Ratio	Survival	Flow	Exports	Ratio	Survival	Actual survival	VAMP	Post-VAMP Shoulder
2000	4815	4815	1.00	0.10	5869	2155	2.72	0.18	0.19	31	27
2001	2920	2920	1.00	0.10	4220	1420	2.97	0.20	0.19	58	17
2002	2757	2757	1.00	0.10	3300	1430	2.31	0.17	0.15	66	18
2003	2290	2290	1.00	0.10	3235	1446	2.24	0.16	0.02	76	8
2004	2088	2088	1.00	0.10	3155	1331	2.37	0.17	0.03	72	10
		Mean		0.10				0.18			

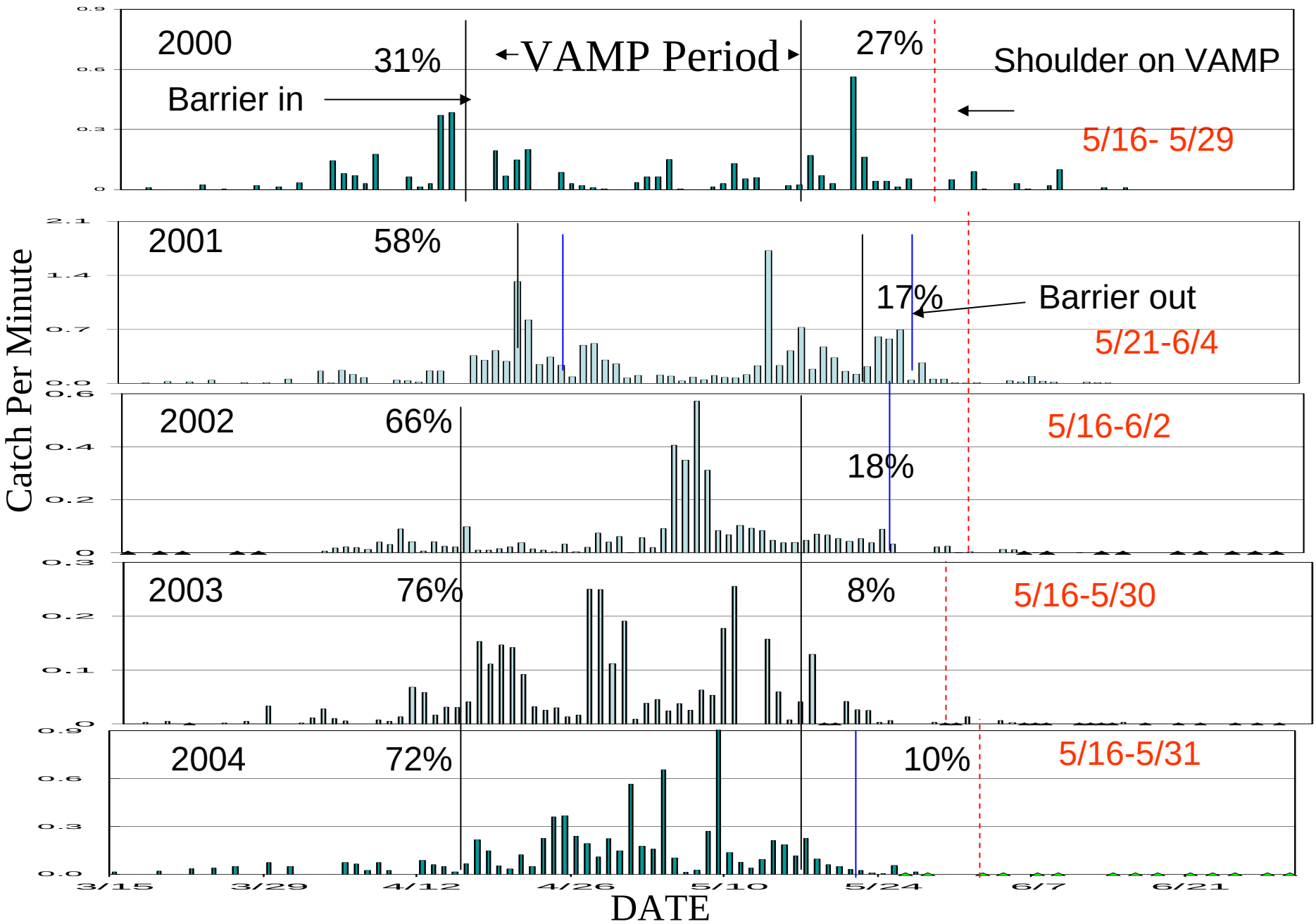


Figure 9: Catch per minute of all unmarked juvenile Chinook in the Mossdale Kodiak trawl between March 15 and June 30. The barrier was in at the start of the VAMP period except in 2001 when the VAMP started later and the barrier went in a few days later. It was taken out at the end of the VAMP period in 2000 and 2003 and on the date indicated by the blue line in 2001, 2002 and 2004.