

Historical CVP and SWP Salvage and OCAP Loss Estimates

Chinook Salmon, Steelhead Rainbow
Trout, and Striped Bass Project
Impacts in the southern Delta

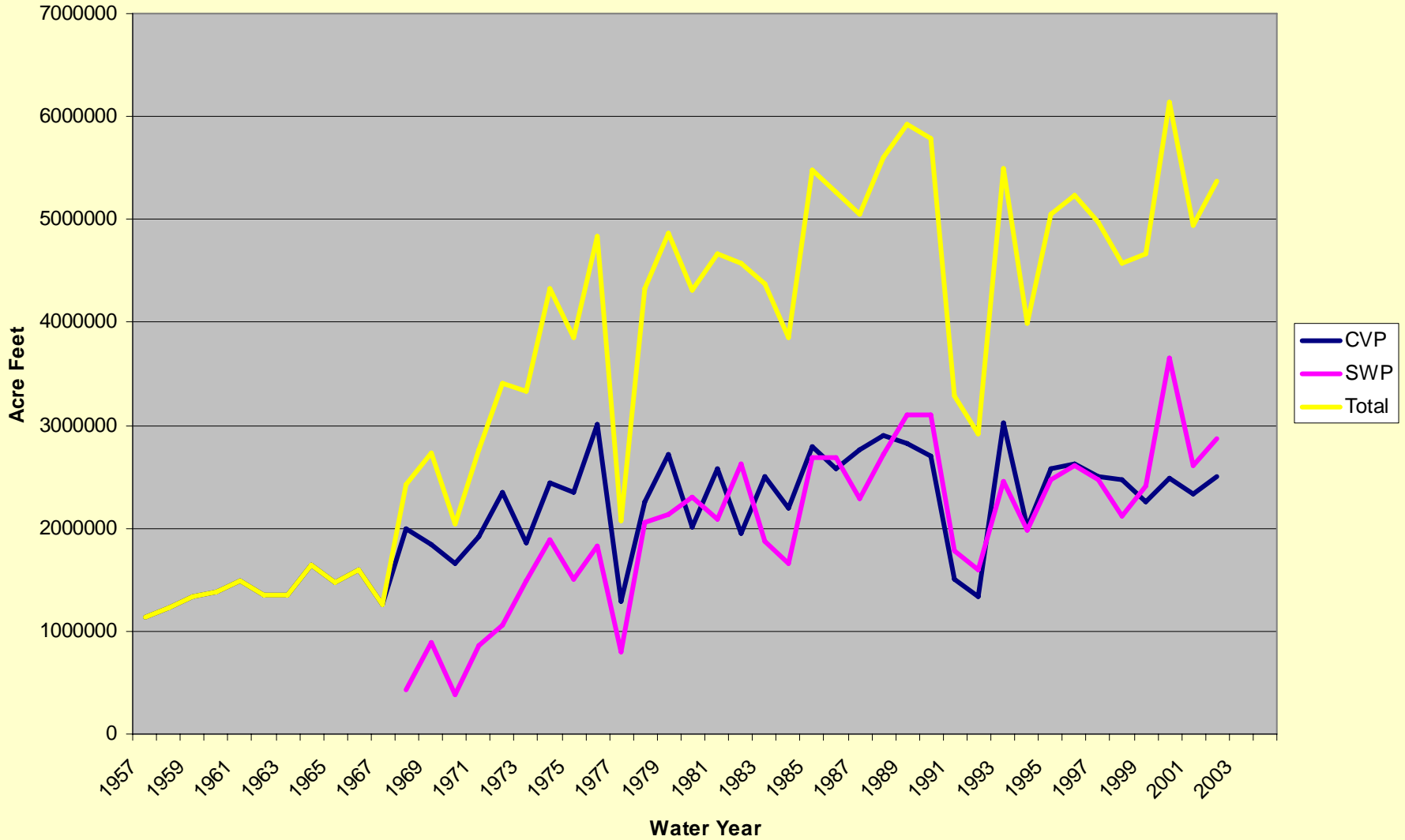
DeltaKeeper

prepared by
Dan B. Odenweller

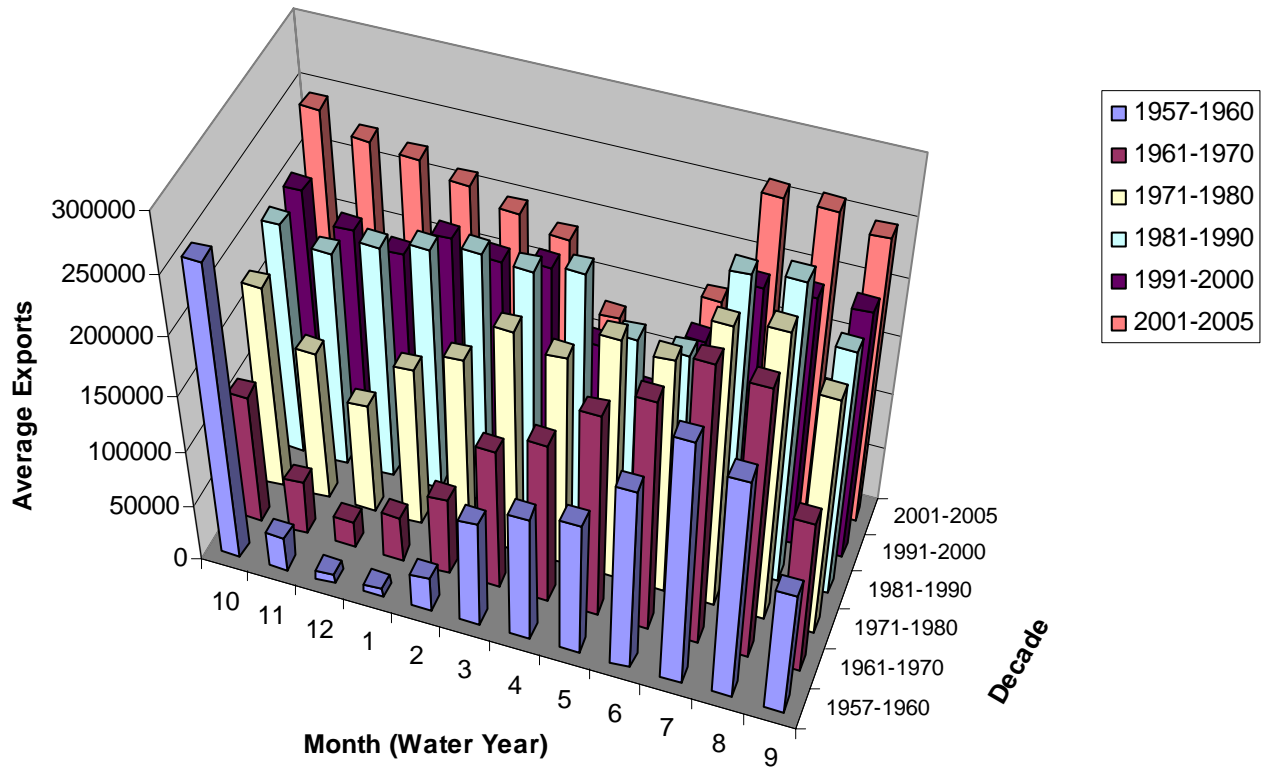
CVP and SWP Annual Exports

- CVP from 1957 to 2002 (Water Year)
- SWP from 1968 to 2002 (Water Year)
- 8500cfs Level of Operation could add up to 1 Million Acre/Feet of Additional Exports.

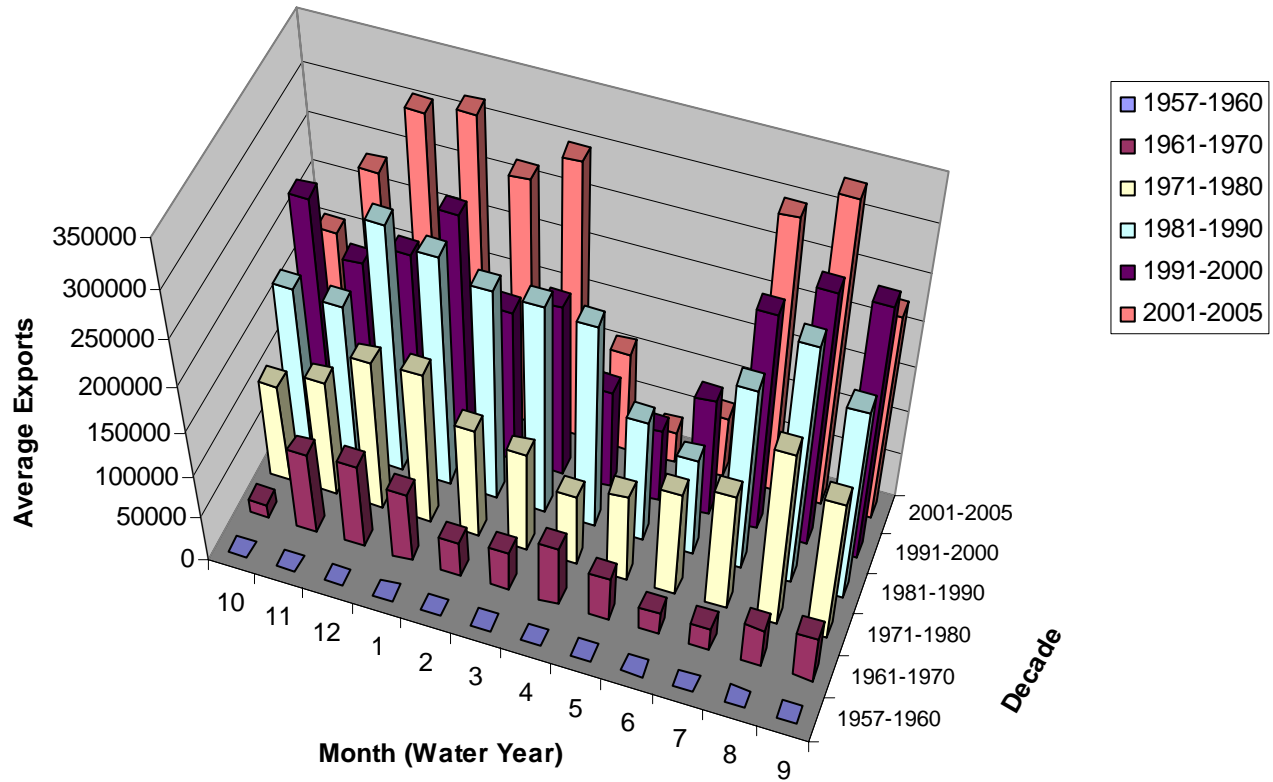
CVP and SWP Exports (1957-2002)



CVP Average Monthly Exports by Decade



SWP Average Monthly Exports by Decade



CHINOOK SALMON

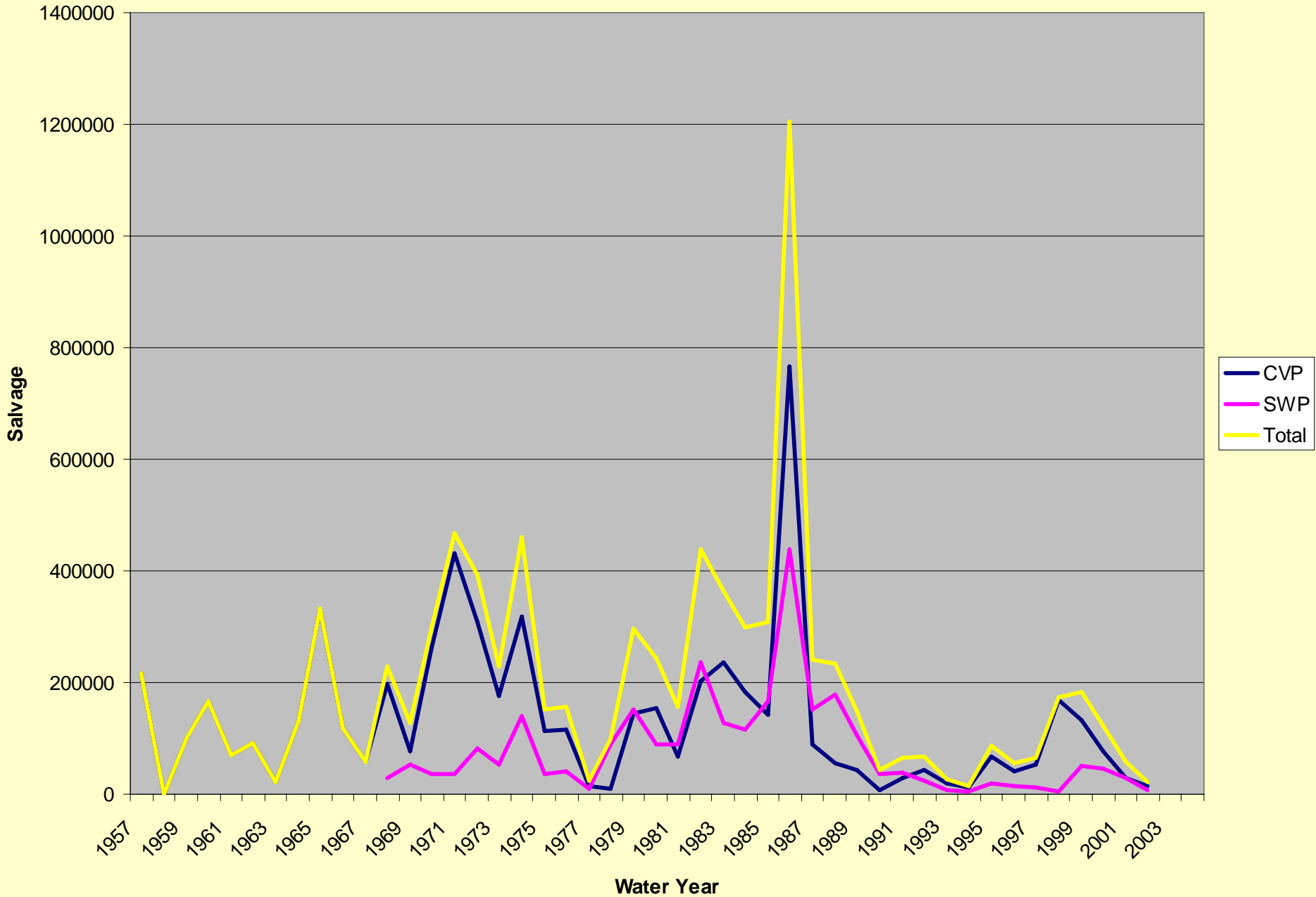
USBR (CVP)

- CVP data from 1957 to 2002 (Water Year)
- Note heavy CVP salvage in the 1957 to 1967 period (pre-SWP), but continuing to 1976 (1976-77 drought)

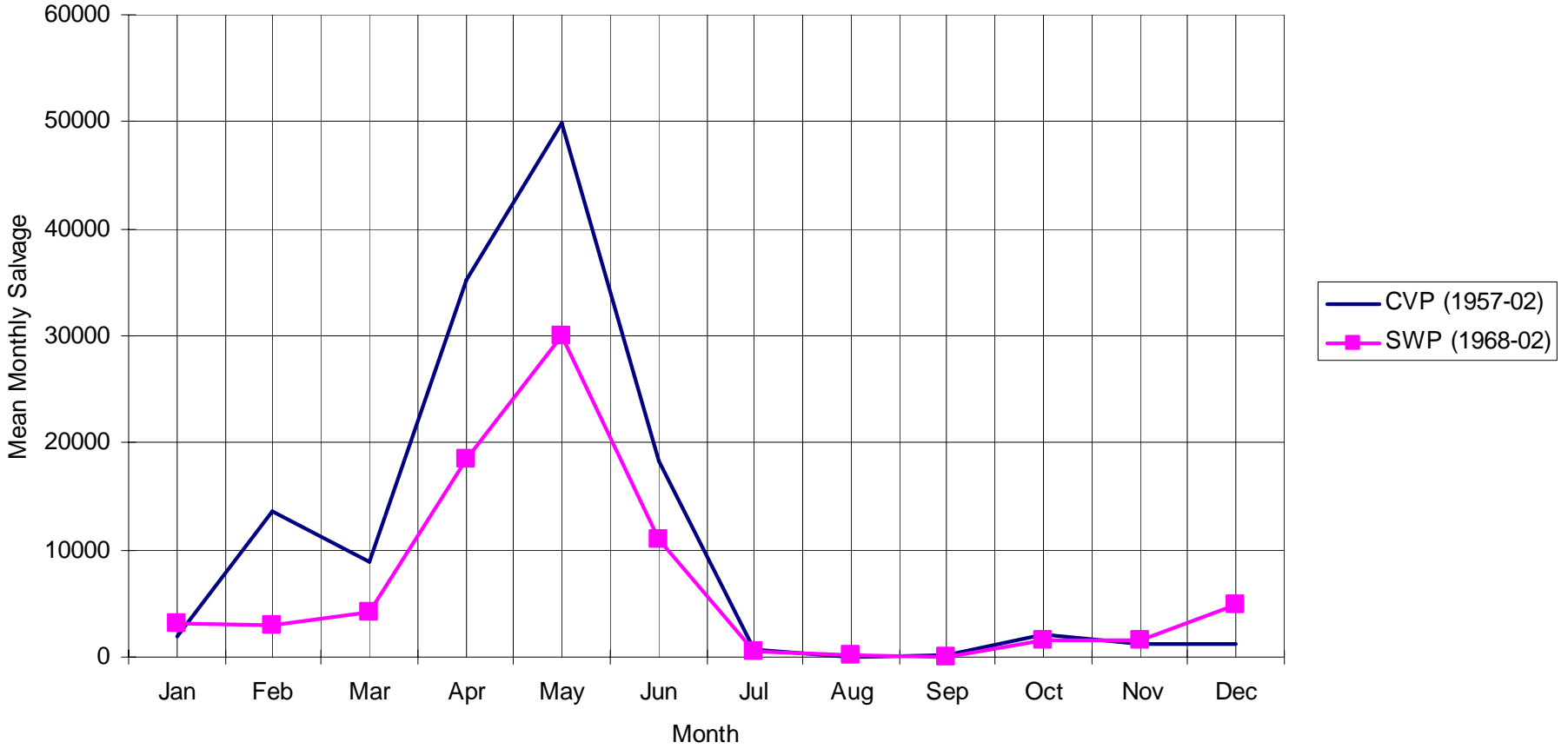
CDWR (SWP)

- SWP data from 1968 to 2002 (Water Year)
- Note the peak salvage in 1986, a wet year.

CS Salvage by Water Year



Chinook Salmon Monthly Mean Salvage
(CVP - 46 Years, SWP - 35 Years)



STEELHEAD RAINBOW TROUT

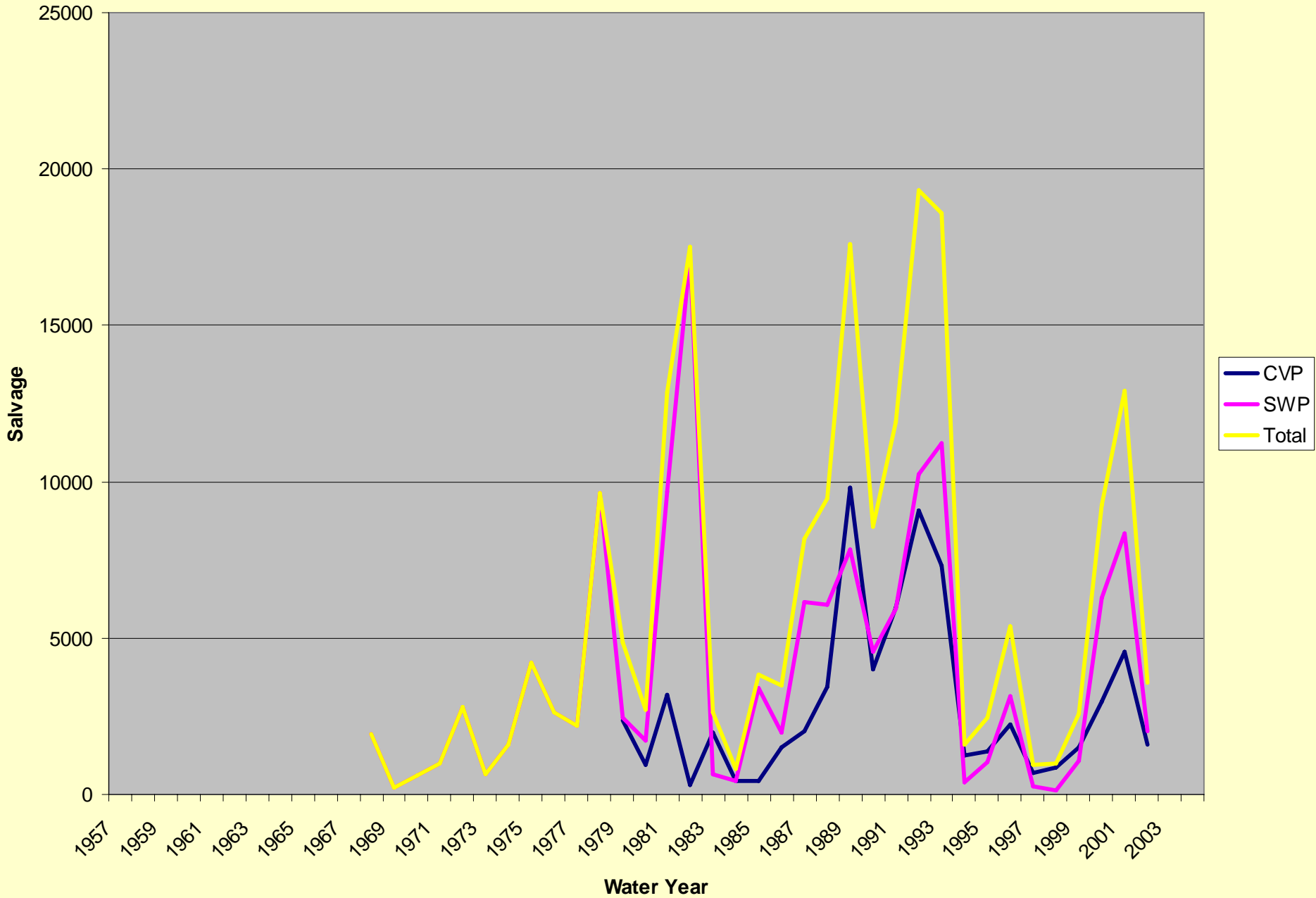
USBR (CVP)

- CVP data from 1979 to 2002 (Water Year)
- Identification prior to 1979 considered unreliable

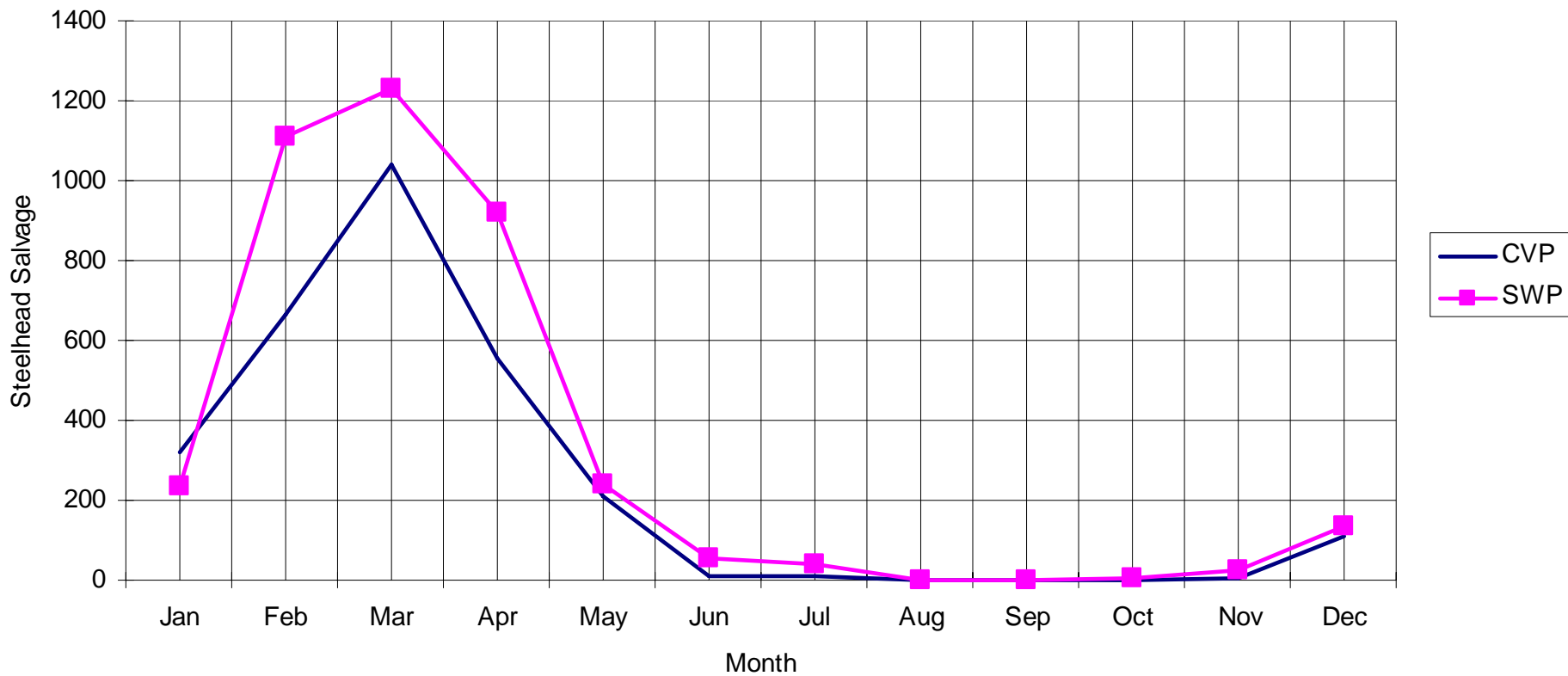
CDWR (SWP)

- SWP data from 1968 to 2002 (Water Year)
- Note the peak in 1982.

STH Salvage by Water Year



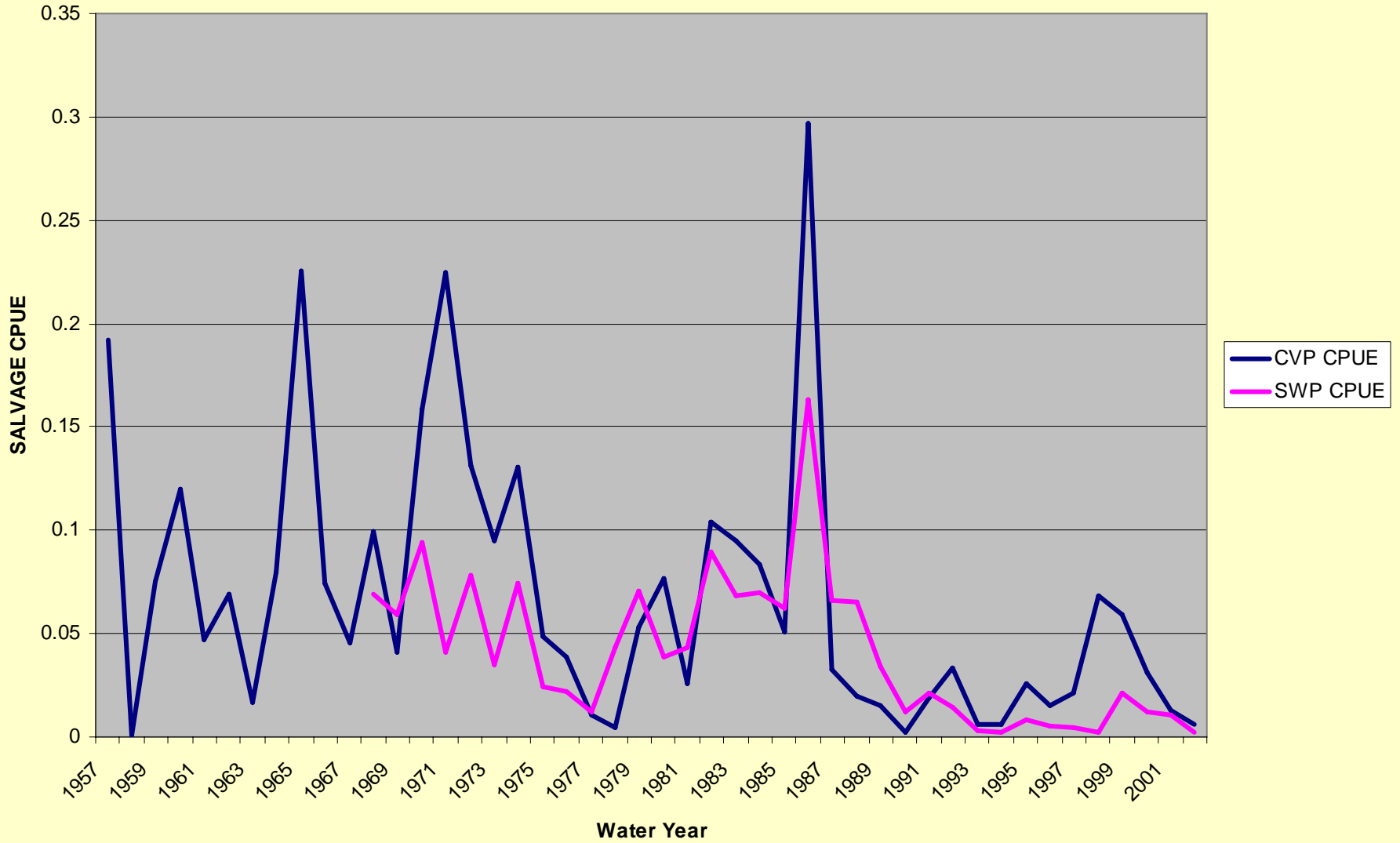
Monthly Mean Steelhead Salvage
(CVP 1979-02 - SWP 1968-02)



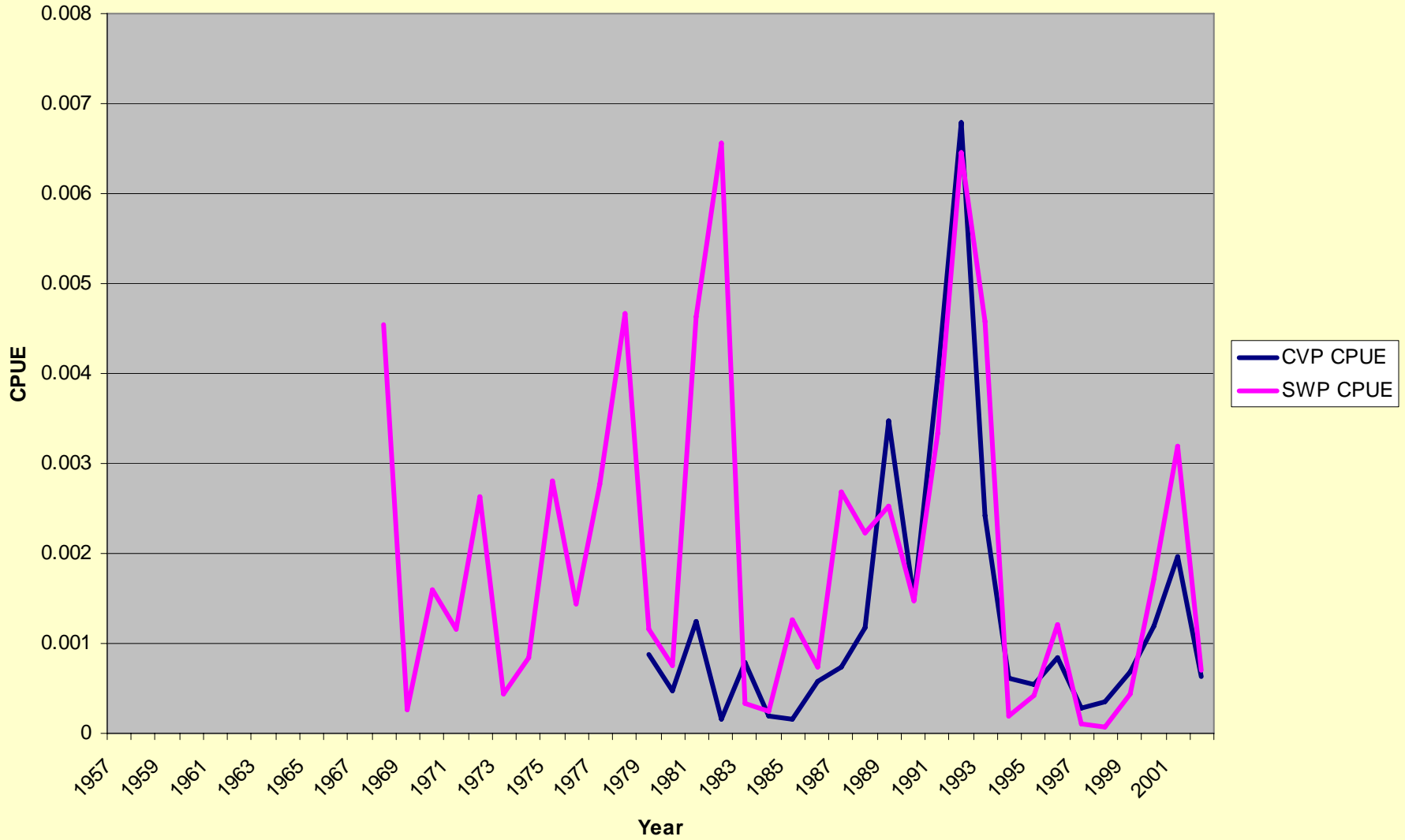
CS and STH Catch per Unit Effort (Salvage per Acre Foot)

- Data is on a Water Year Basis
- Expressed as Fish per Acre-Foot

Chinook Salmon Salvage CPUE



Steelhead CPUE



Chinook Salmon OCAP Loss per Unit Effort (OCAP Incidental Take per Acre Foot)

- Again, on a Water Year Basis
- Expressed as Fish per Acre Foot

USBR (CVP)

- CVP - All Years Calculated with 0.15 Pre-screen Loss
- CVP - All Years Calculated with 0.25 Screen Loss

CDWR (CVP)

- SWP - 1968 to 1971 Calculated with 0.15 Pre-screen Loss
- SWP - 1972 to Date Calculated with 0.75 Pre-Screen Loss
- SWP - All Years Calculated with 0.25 Screen Loss

THE DIRECT LOSS CALCULATION MODEL

Methodology taken directly from the OCAP Biological Assessment and Biological Opinion.

CVP assumes a *0.15 Pre-Screen Loss* and a *0.25 Screen Loss* factor for all years.

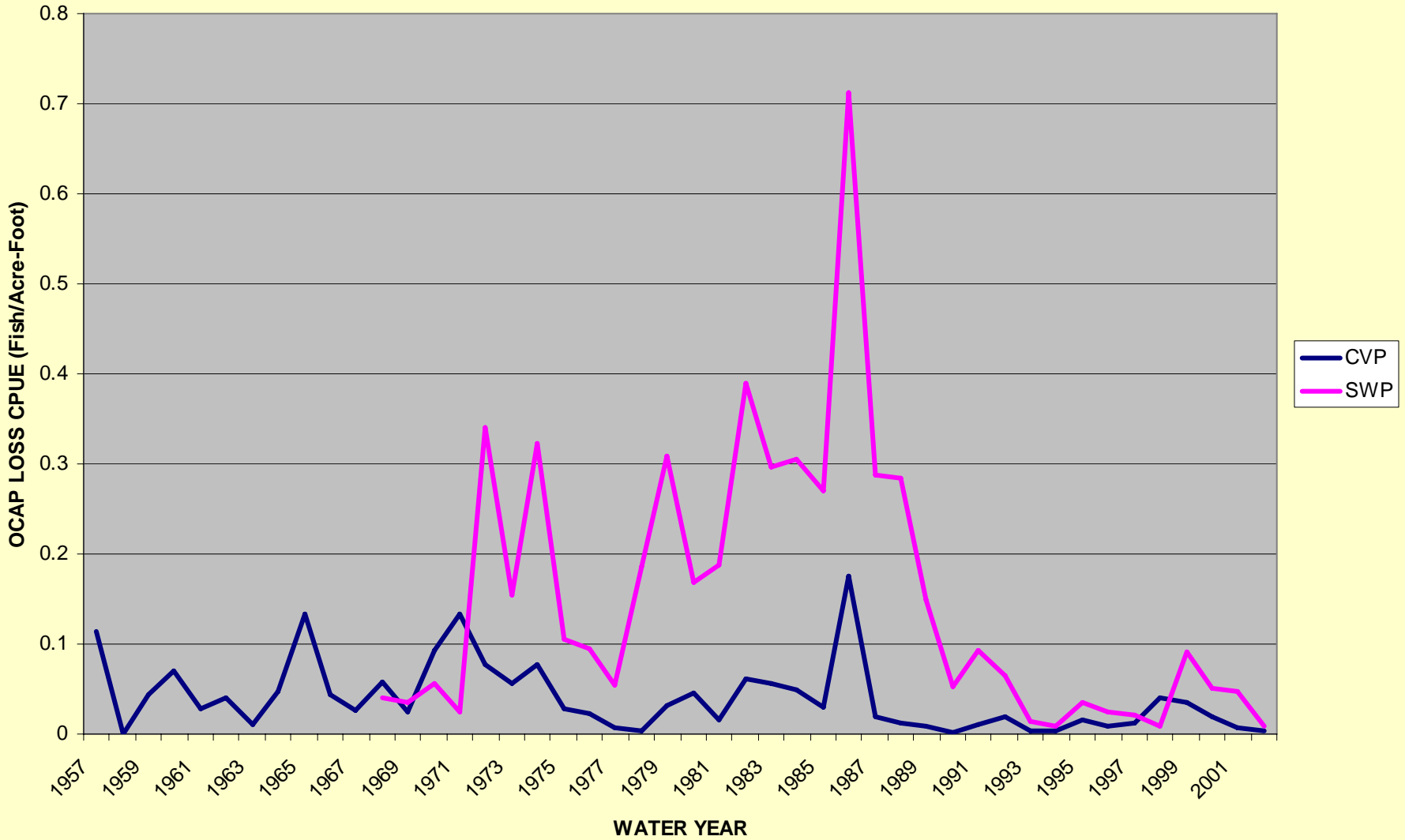
SWP assumes a *0.15 Pre-Screen Loss* and a *0.25 Screen Loss* factor for 1968 to 1971 (no CCFB); and

then assumes a *0.75 Pre-Screen Loss* factor for 1972 to present, to account for CCFB losses.

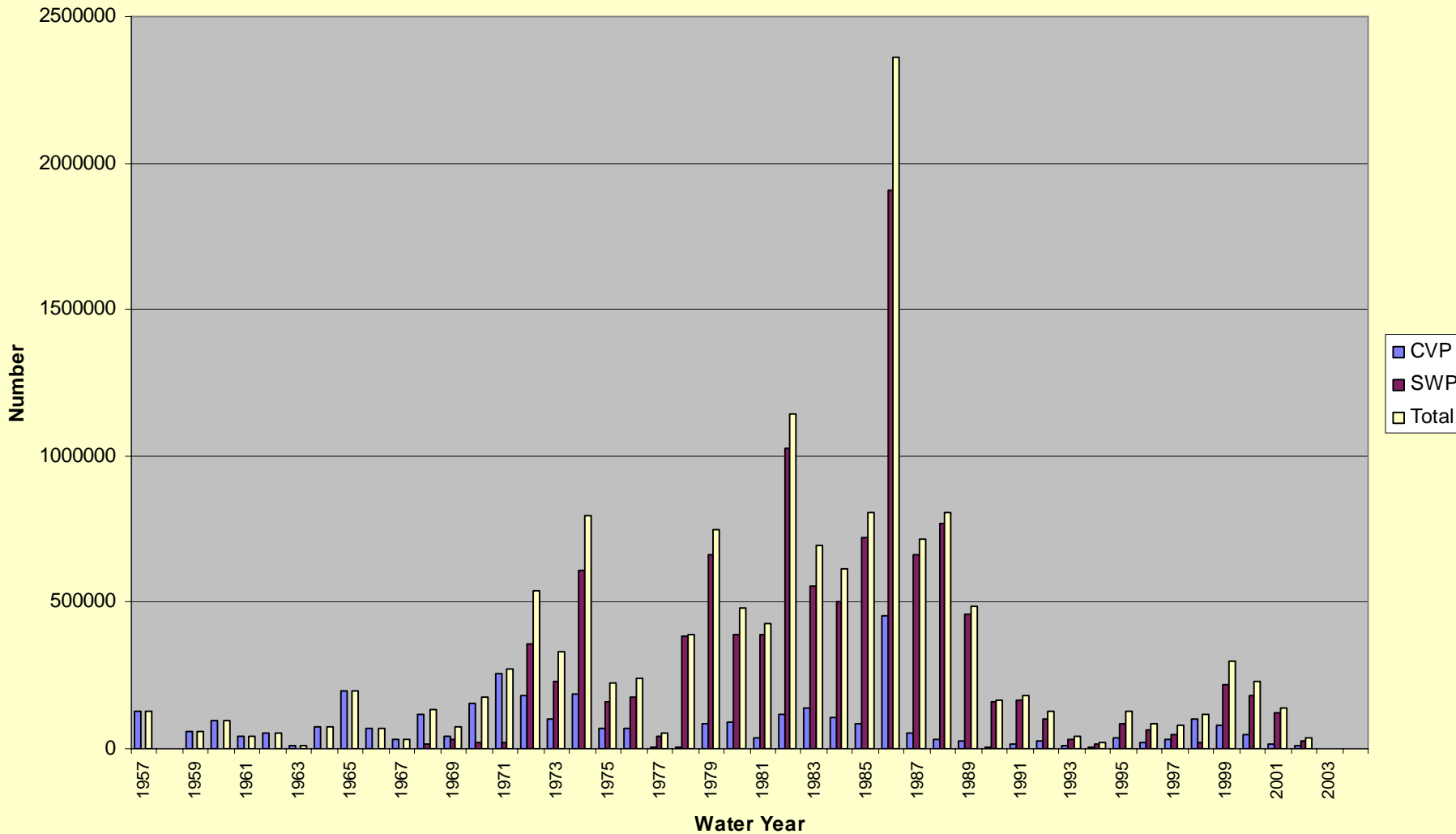
Direct Loss Calculation in the south Delta - 2002/2003

		CVP -TFPF (USBR)				SWP - JES Delta FPF (DWR)				GRAND TOTAL LOSS
		Unmarked	Marked	Loss Unmarked	Loss Marked	Unmarked	Marked	Loss Unmarked	Loss Marked	
Count										
Count Duration										
Count Interval										
Expanded Count		10000	0			10000	0			
Screen Loss		0.250		3333	0	0.250		3333	0	6667
Arrive at Screens		13333	0			13333	0			
Pre Screen Loss		0.150		2353	0	0.750		40000	0	42353
Arrive at Facility		15686	0			53333	0			
CHT&R Loss		0.020		200	0	0.020		200	0	400
Released Alive		9800	0			9800	0			
Loss Total				5886	0			43533	0	49420
Loss (OCAP Incidental Take)					5886				43533	49420
Salvage					10000				10000	20000
Take (Arrive at the Facilities)					15686				53333	69020

Chinook Salmon OCAP Loss



Calculated CS OCAP Loss (CVP-SWP)



The Striped Bass Dilemma

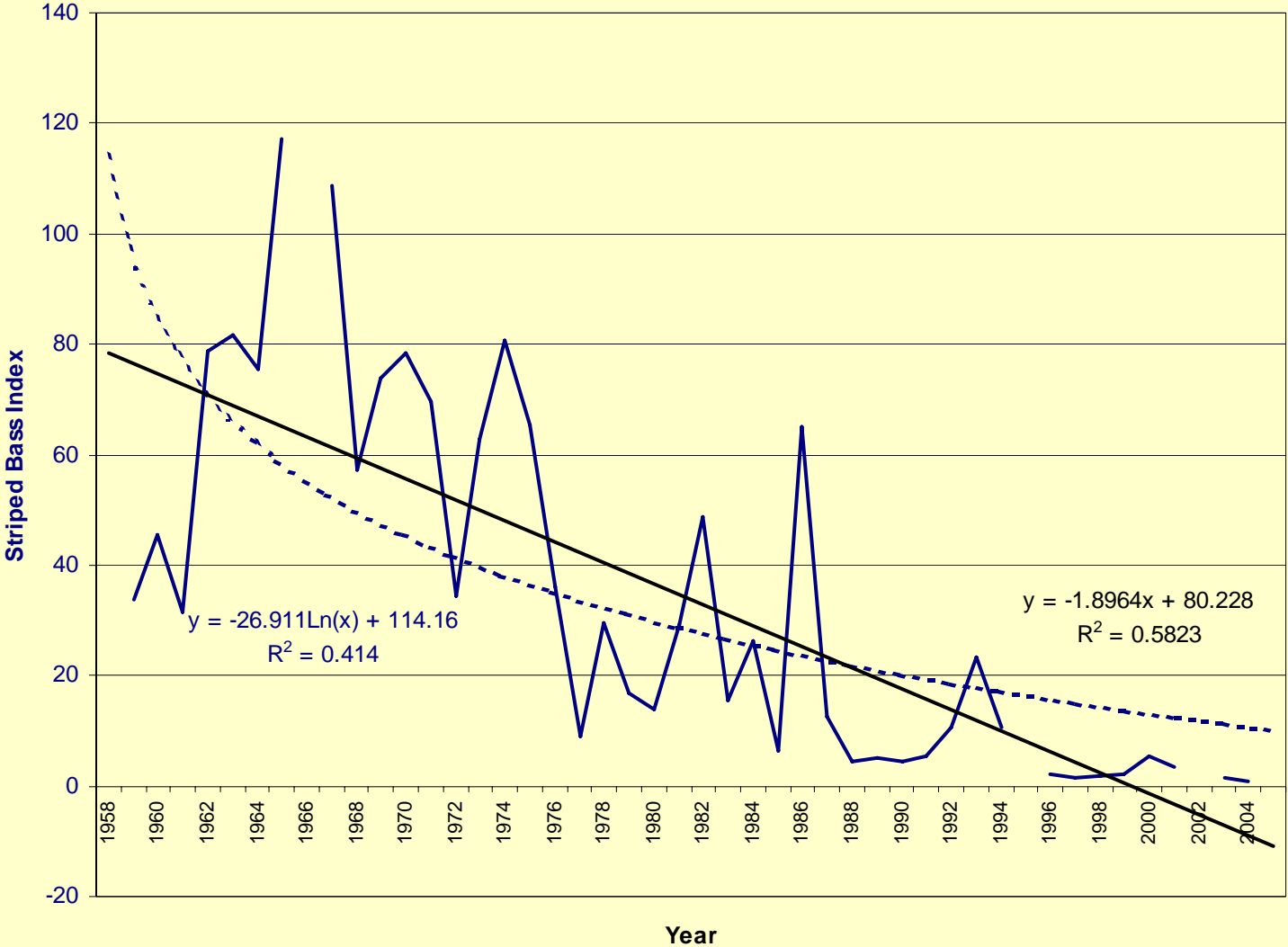
- The indicator species for the Estuary in SWRCB D1379 and D 1485.
- Specifically targeted for “doubling” in the CVPIA (PL 102-575). To date, no consideration for striped bass, or for sturgeon, American shad, steelhead, and other anadromous fishes as required by statute.
- Economically important commercial (until 1935) and sport fish, introduced into the Estuary in 1879 from the East coast.

The Striped Bass Index

- Data collected by DFG since 1958, with a few exceptions.
- Decline has been continuous, “goals” were:
 - SBI = 120 “Historical Levels” - circa D 1379
 - SBI = 65 “Recent Historical Levels” - circa D 1485
 - SBI = >10 “Post 1976-77 Drought Levels” - circa D 1681
 - SBI = <10 Since 1995, coincident with CalFed actions described earlier in the workshops, for WRCS and DS.
- How is this Public Trust Resource (or Beneficial Use) receiving “due process” under the present scheme?

Striped Bass Index (Linear Plot)

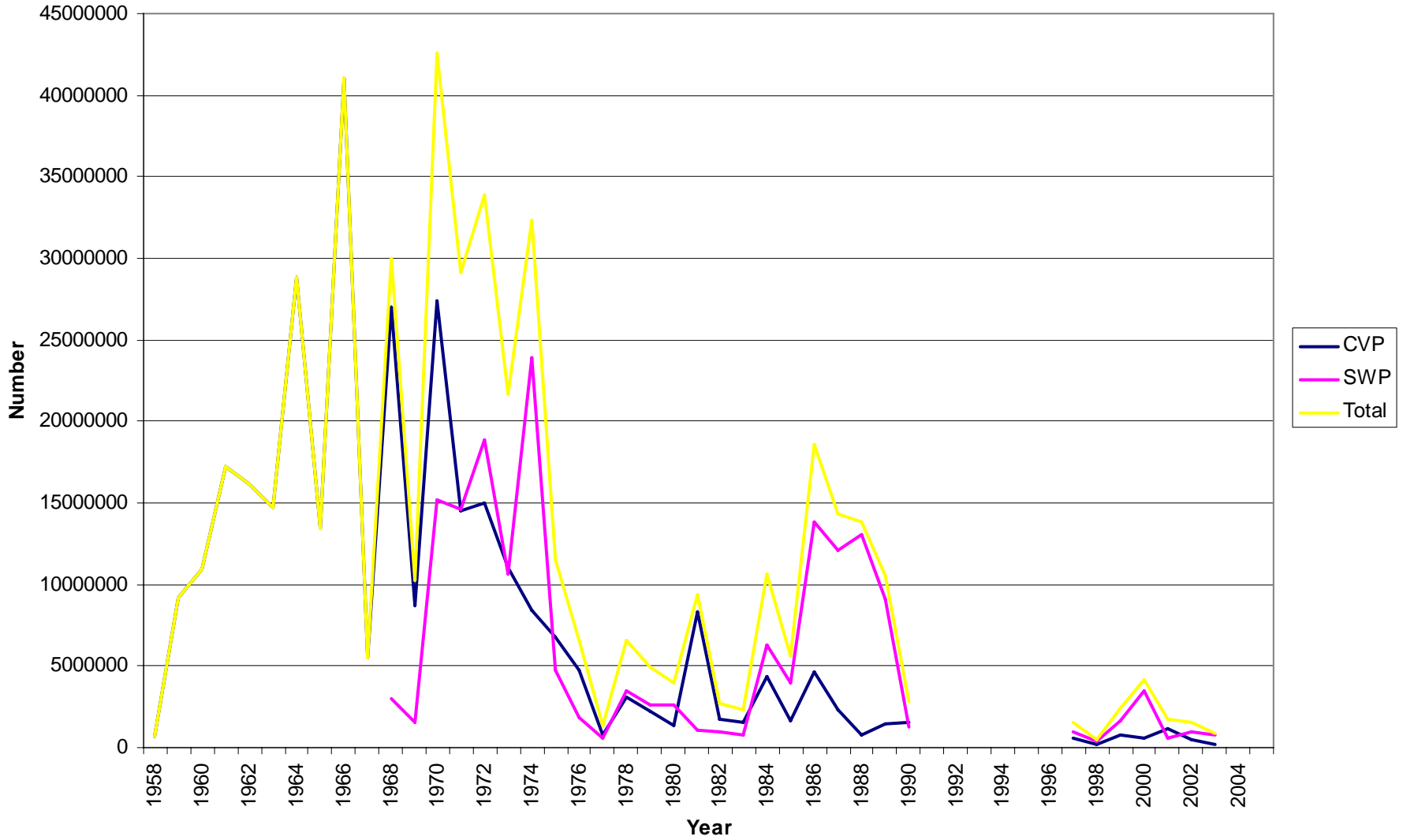
- SB YOY
- - - Log. (SB YOY)
- Linear (SB YOY)



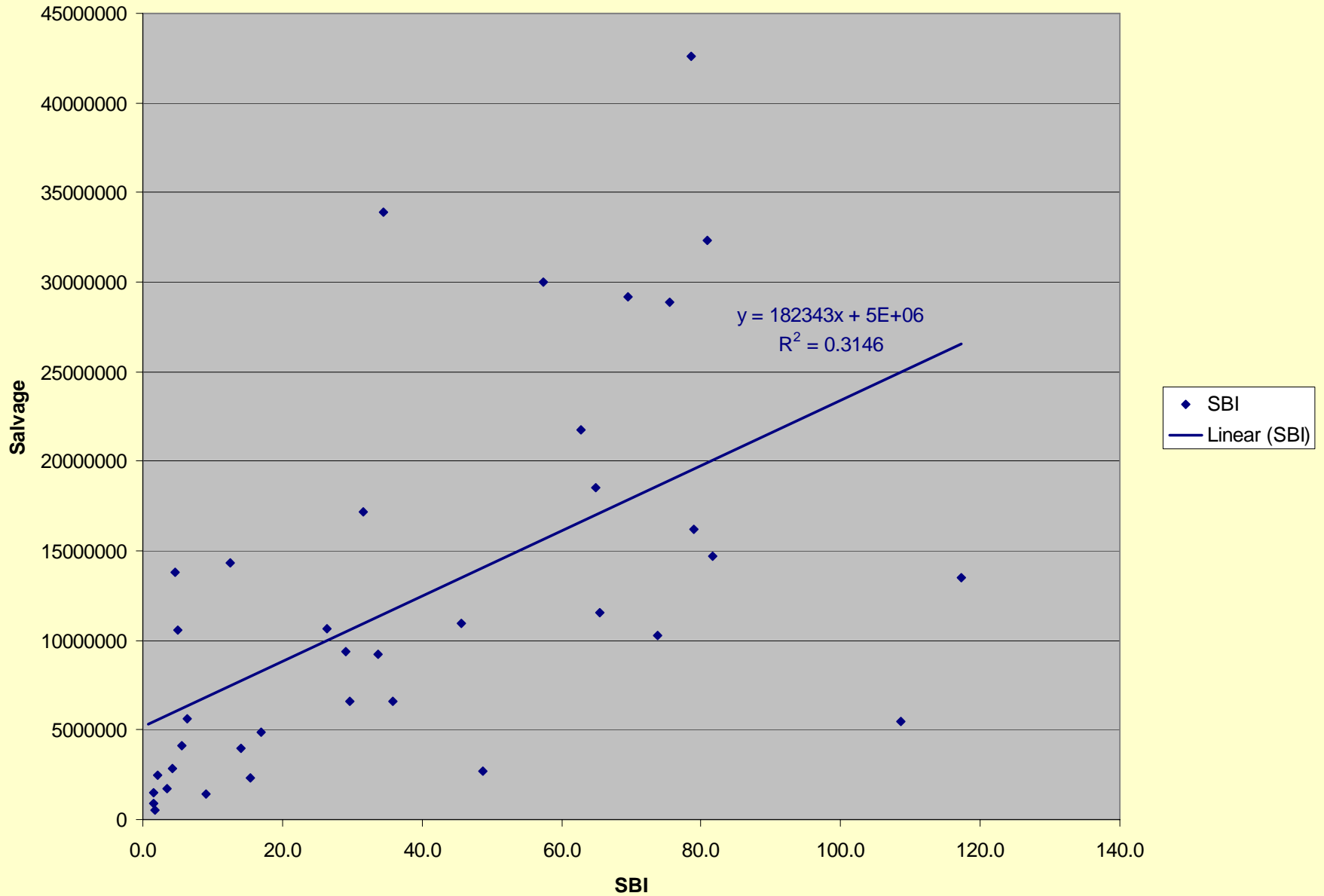
Striped Bass South Delta Salvage

- CVP and SWP fish protective facilities have recorded fish salvage since they began operations.
- Striped bass were one of the key species which the fish facilities were developed for.
- CVP records 1958 to date (1991-1996 gap is in my data set).
- SWP records 1968 to date (1991-1996 gap is in my data set).

Striped Bass Salvage



SBI vs. SB Salvage (CVP+SWP)

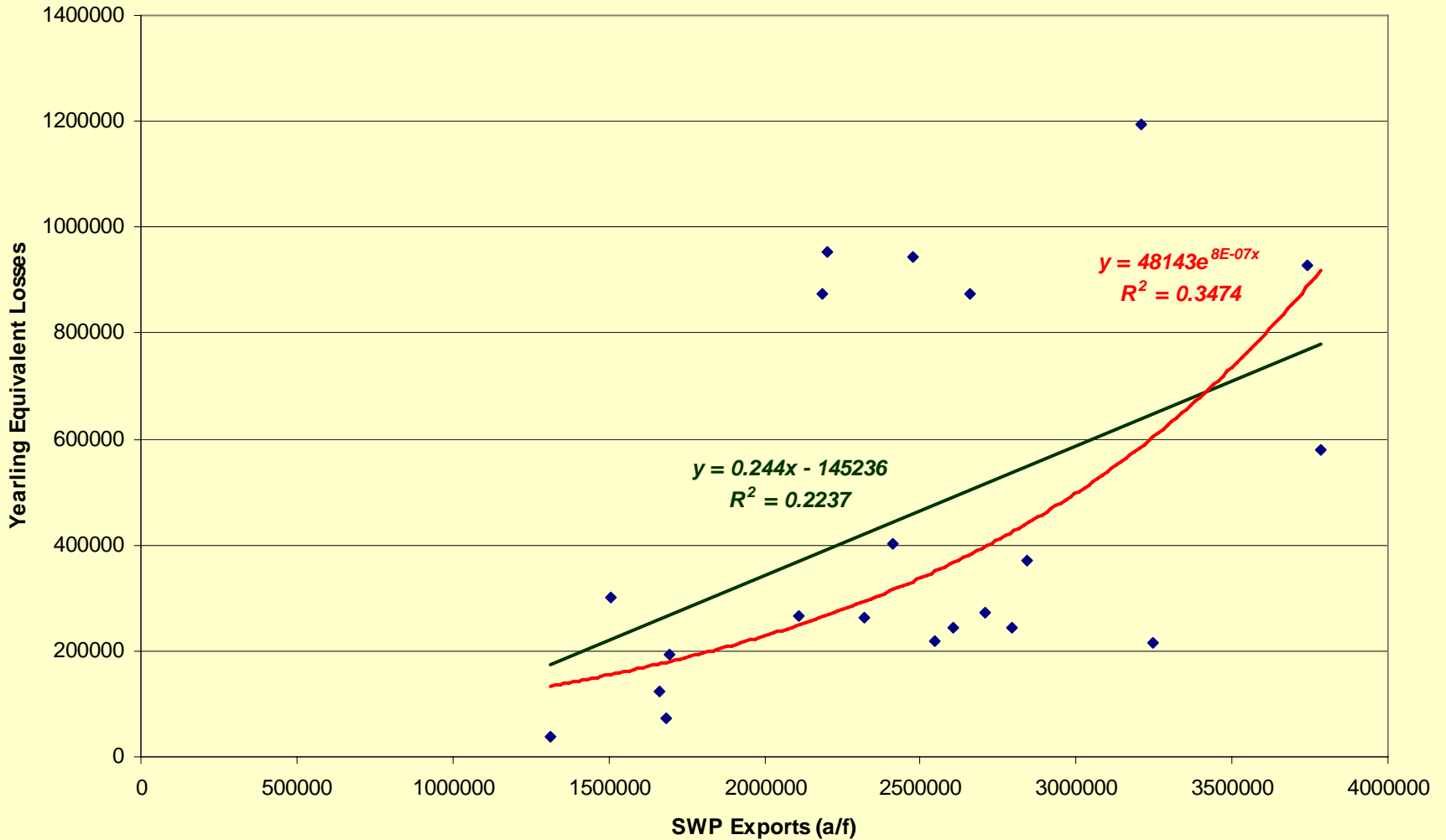


The SWP Mitigation Calculation (4-Pumps)

- Standard methodology used by CDFG to calculate the number of “yearling equivalents” owed.
- Losses normalized to address each life stage on a common basis.
- For striped bass, a management decision to use mean of years monitored in place of an annual survey (beginning in 1996), has generated cost savings - and a loss of priceless information.

>20mm SB Yearling Equivalentents

- ◆ >20mm SB YIng
- Linear (>20mm SB YIng)
- Expon. (>20mm SB YIng)



STRIPED BASS YEARLING EQUIVALENTS (DFG Data)

Year	Striped Bass			Period	Five Year Mean			SWP Exports
	<20mm	>20mm	Total Loss		<20mm	>20mm	Total Loss	
1982		244347	244347					2608221
1983		37680	37680					1313480
1984		873853	873853					2183912
1985	65177	370976	436153					2841667
1986	35315	944061	979376	82-86	50246	494183	544429	2474509
1987	41726	954958	996684	83-87	47406	636306	683712	2199682
1988	59625	874055	933680	84-88	50481	803581	854062	2658149
1989	56306	579003	635309	85-89	51630	744611	796241	3783410
1990	7717	401353	409070	86-90	40138	750686	790824	2411339
1991	15117	192765	207882	87-91	36098	600427	636525	1697754
1992	13452	299687	313139	88-92	30443	469373	499816	1507919
1993	25766	1194011	1219777	89-93	23672	533364	557036	3210811
1994	2253	122656	124909	90-94	12861	442094	454955	1661674
1995	3256	265225	268481	91-95	11969	414869	426838	2112423
1996	29610	214213	243823	92-96	14867	419158	434025	3243980
1997	29610	219225	248835	93-97	18099	403066	421165	2548876
1998	29610	71980	101590	94-98	18868	178660	197528	1687404
1999	29610	271436	301046	95-99	24339	208416	232755	2707517
2000	29610	928501	958111	96-00	29610	340671	370281	3739773
2001	29610	262459	292069	97-01	29610	350320	379930	2318733
2002	29610	243270	272880	98-02	29610	355129	384739	2792185
2003	29610	173492	203102	99-03	29610	375432	405042	
2004				00-04				
2005				01-05				

Handling and Trucking Losses

- Studies of the production process by Raquel (1989).
- Losses varied by species, size, and water temperature:

	Net
– Chinook Salmon =	2%
– Steelhead Rainbow Trout =	0%
– Striped Bass =	1 - 84%
– American Shad =	0 - 100%
– Threadfin Shad =	0 - 66%
– White Catfish =	0 - 75%

(Smaller sizes and higher water temperatures = higher losses)

CVP-SWP South Delta Fish Facilities

- CVP (USBR) facility dates from 1957, the SWP (DWR) facility dates from 1967.
- Neither facility was designed to meet current protection goals. Research program and upgraded facilities part of the “Delta Accord,” and “CalFed ROD.”
- Water users now argue that these “assurances” cost too much, but there has been no economic analysis of the cost vs. the benefits of export level increases.

- DeltaKeeper and CSPA are not prepared to agree to additional increases in exports until these concerns are resolved.



The End

Image by Virginia Afentoulis