

MUSINGS ON DIVERSION EFFECTS OF DELTA FISHERY RESOURCES

There seems to be a generation gap in perceptions of the significance of diversion effects between those who witnessed changes during the 1960s and 1970s and those who have become involved in the issue more recently. My perception is that by the late 1970s there was a consensus among the agencies and stakeholders that increasing diversions had caused major impacts on fish, although many questions remained about causes. The close correlation among flow, percent of flow exported and dilution of pollutants contributed to the uncertainty as to causes. Essentially the three were so closely correlated there was no chance sort out relative impacts. We had tried experiments to change the relationship between flow and percent diverted, but it was difficult to make enough change to cause measurable differences, given the limitations in operational flexibility. (Incidentally, economic considerations resulted in the only experiments being designed to increase exports above the "usual" levels, thus temporarily increasing impacts.)

There is much less consensus now, and many seem to be emphasizing uncertainties and potential causes other than the water projects. To some extent that is certainly justified by the fact that some key relationships have not held up over time, and by changes such as new exotic species causing some fundamental changes in the estuary.

We talk about running better studies and experiments to learn more. That has much merit, but I wonder if some earlier observations have just been forgotten. The most dramatic I am aware of is the accidental "experiment" run in 1977. We simply ran out of water that year, so there was little to pump. I went back to resurrect records and easily found records for the SWP but not the CVP. My recollection is they were very similar. (I am sure CVP records could be found with a bit more work, although the CVP folks were not distinguishing delta smelt from longfin smelt at the time.) As the following table shows, the SWP pumped at mean monthly rates of less than 400 cfs for 5 months from June - October of 1977. When it started raining in mid-December pumping increased rapidly and extraordinary amounts of young striped bass and Delta smelt showed up over the next couple of months. The numbers of both were far larger than midwinter numbers in the preceding or succeeding years, and my recollection is that both were unusual in relation to any other years. The numbers were large also in relation to our expectation from population sampling.

Why? The hypothesis which made the most sense at the time is that the low export rates allowed substantial populations to build up in the Delta and then be quickly drawn to the pumps when export rates increased dramatically. The large numbers persisted for more than a month, indicating that ramping pumping rates within reasonable limits is not likely to do much. (Given the extremely critical situation, I have no doubt that any ramping of pumping would have been considered unreasonable.)

One has to wonder if the "experiment" doesn't also say something about water quality impacts. Certainly dilution had to be relatively low, so toxic impacts on the population likely would have

relatively great if that had been a significant limiting factor.

Overall it seems to be a strong indication that pumping at typical summer export rates makes the Delta an unsuitable habitat for a striped bass and delta smelt nursery area. Does anyone want to take bet on what would happen if we repeated the "experiment"?

PUMPING RATES AND DELTA SMELT AND STRIPED BASS SALVAGE BY SWP IN 1976, 1977 AND 1978

	1976			1977			1978		
	SWP Pumping-00's cfs	Delta smelt 000's	striped Bass 000's	SWP Pumping-00's cfs	Delta Smelt 000's	Striped Bass 000's	SWP Pumping-00's cfs	Delta Smelt 000's	Striped Bass 000's
May	6	102	16	11	3	0	9	4	1
June	3	277	717	3	3	53	33	36	633
July	3	371	639	3	43	367	34	1	1,115
Aug	21	68	156	2	6	12	40	2	307
Sept	35	1	13	2	18	1	35	0	18
Oct	14	0	2	1	3	0	20	0	173
Nov	16	0	32	9	0	22	22	0	171
Dec	10	0	20	22	55	63	27	1	172
Jan	33	7	58	60	134	590	13	0	34
Feb	19	2	10	61	54	306	16	1	8