

Using Science vs Doing Science
or
Estuarine Habitat vs Salmon Passage
or
X2 vs VAMP

Flexibility in standard setting in the
San Francisco Bay/Delta

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Region 9

Estuarine Habitat Protection – X2



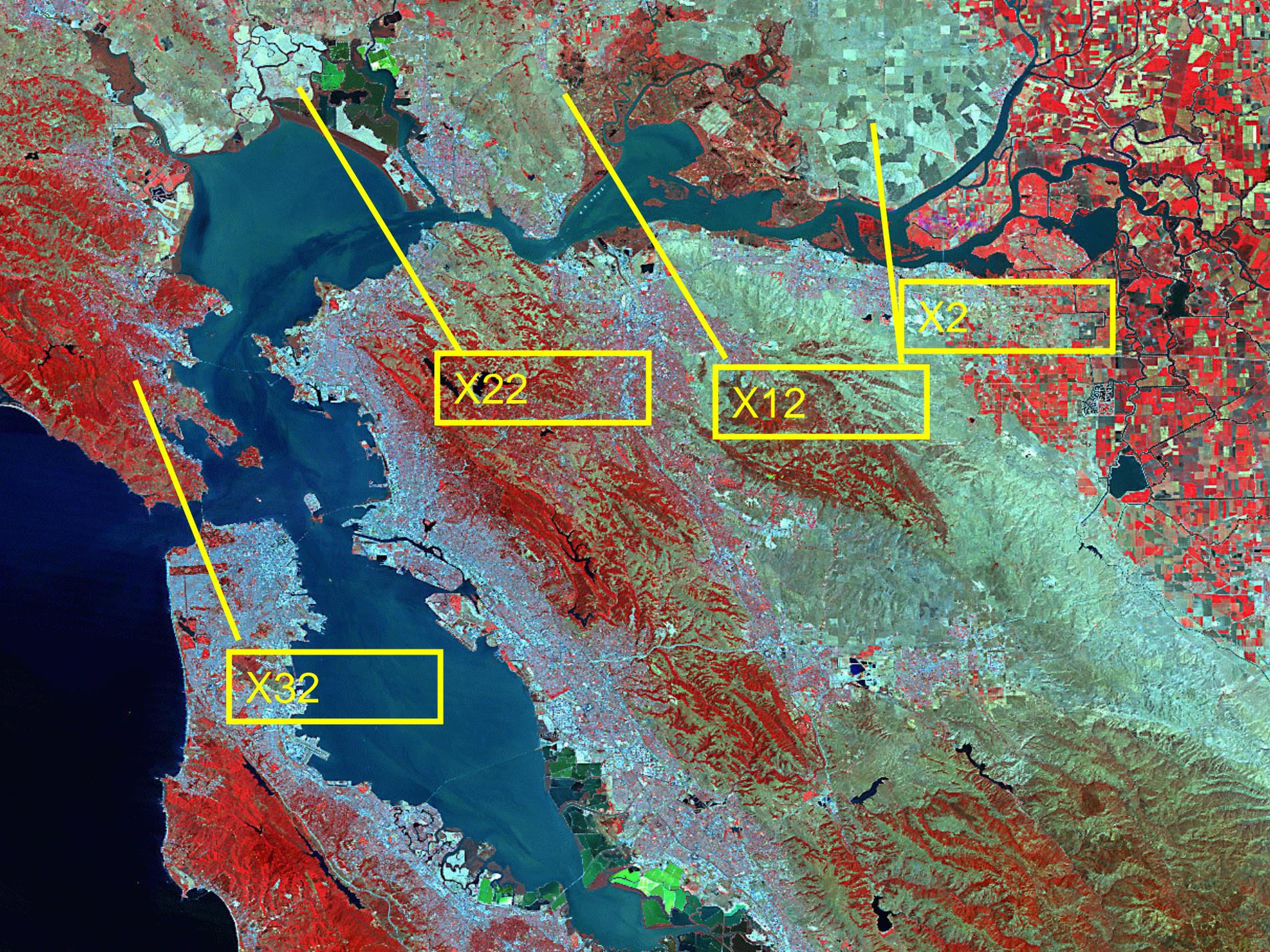
A few key factoids:

- The estuary is shallow and turbid
- Productivity is low
- Strong influence of freshwater flow
- Heavily invaded, and not just by people

Select from the following Map Views

- Major Rivers
- State Projects
- Federal Projects
- Local Projects
- All Water Projects



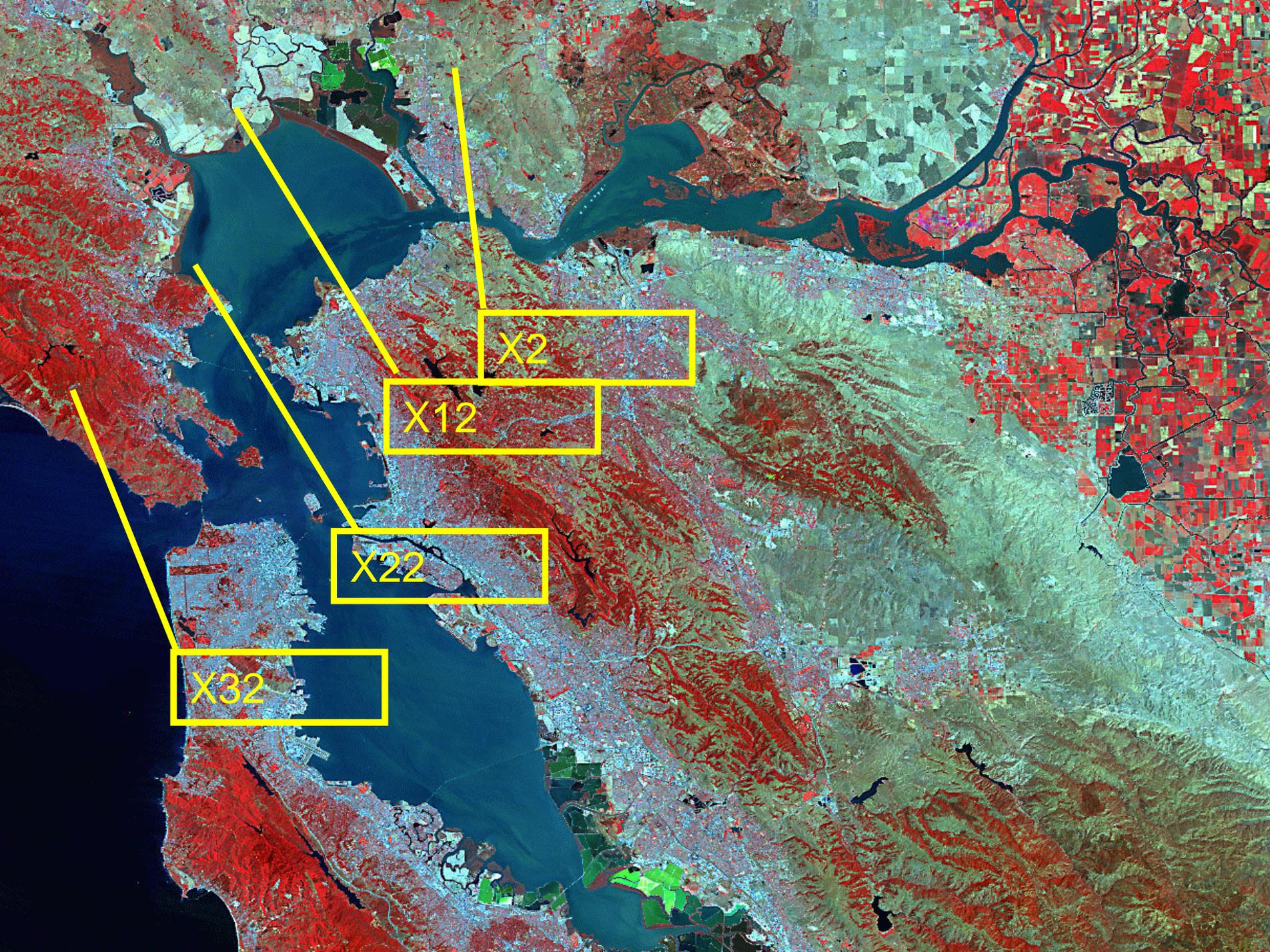


X2

X12

X22

X32



X2

X12

X22

X32

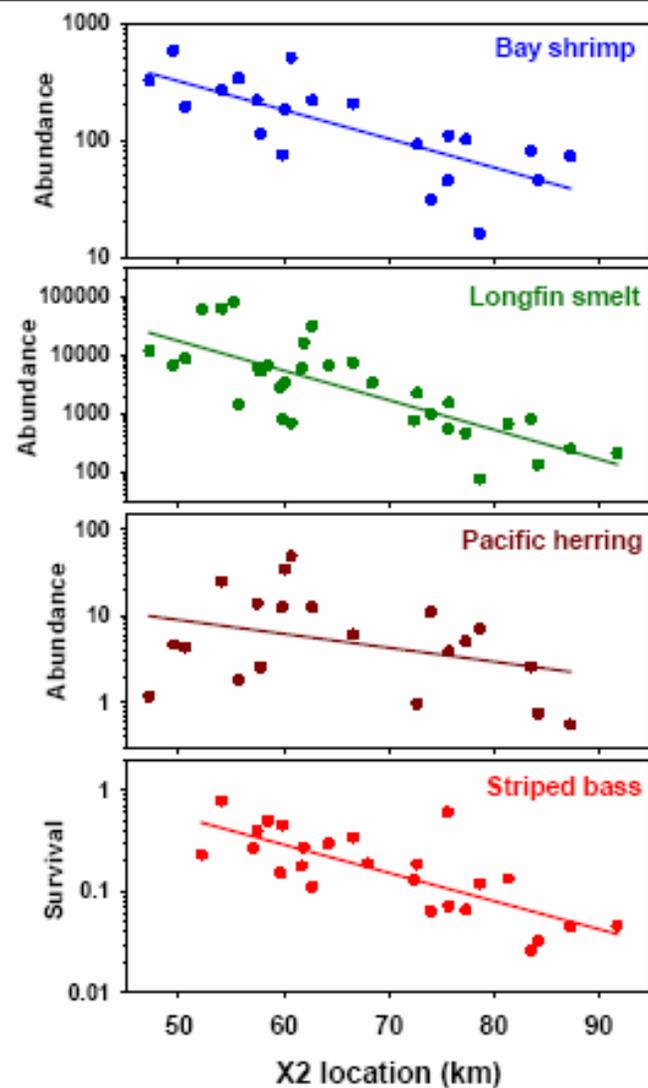
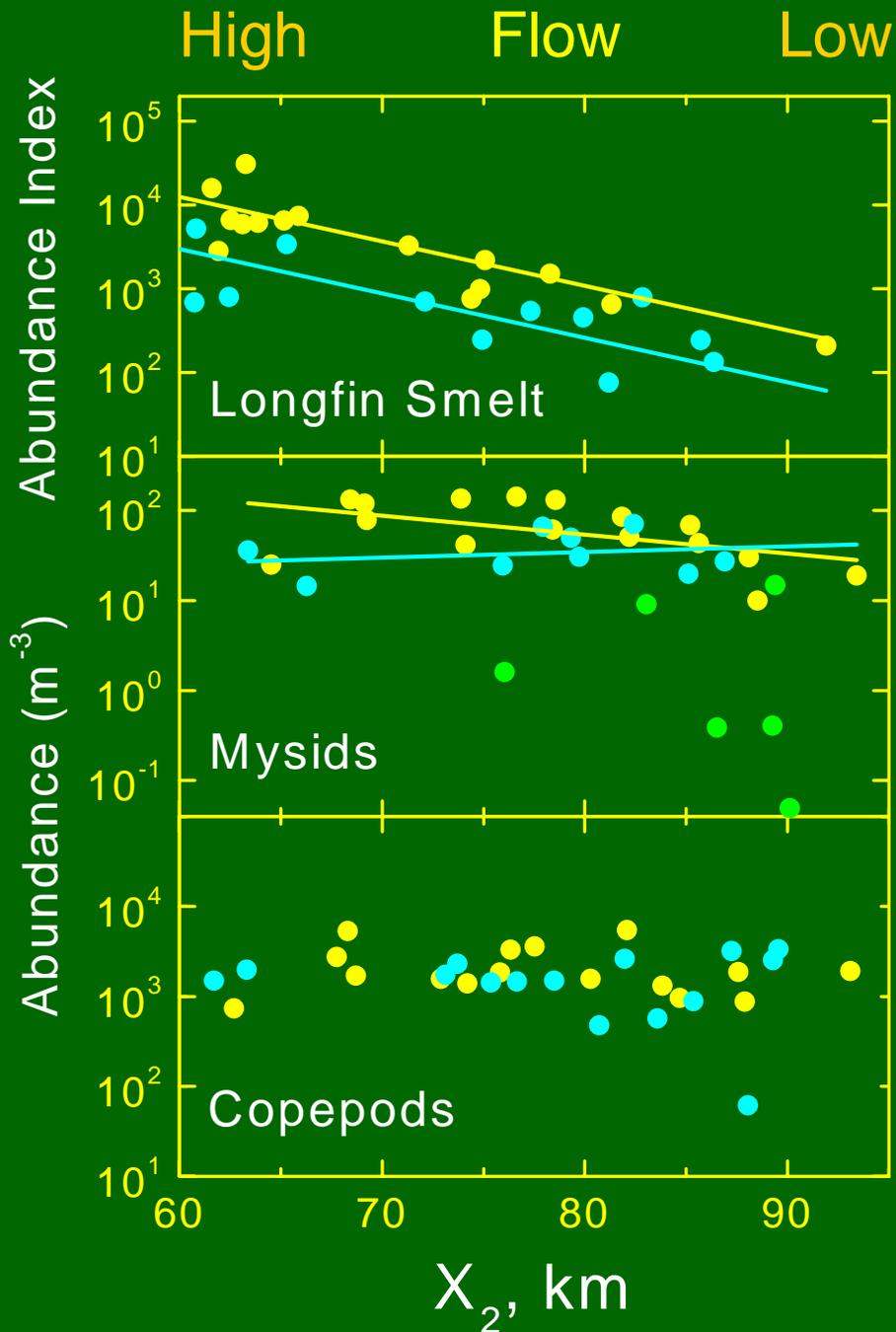


Figure 9. Population abundance and survival of selected Bay fish and invertebrates species in relation to spring (February-May) inflows, expressed as X2 (location of the 2 ppt isohaline, km from the Golden Gate).

Flow effects on biota (same relative scale)



Longfin smelt had strongest flow relationship of any taxon

Total mysids had a relationship that disappeared

Copepod abundance was remarkably stable despite huge variations in flow



*Roe
Island*

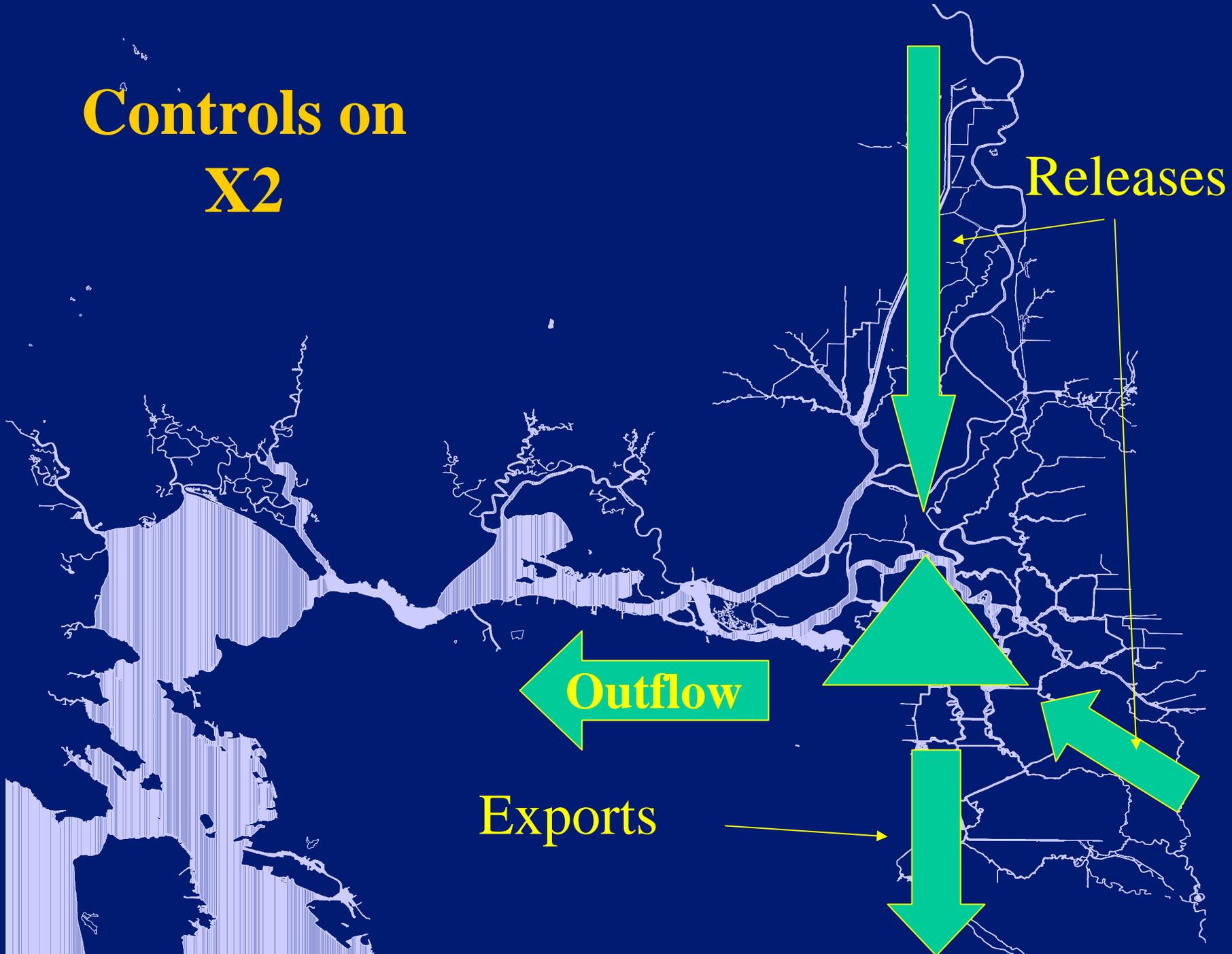
*Chippis
Island*

Collinsville

Mean number of Days with X2 west of Chipps Island (Feb-Jun)

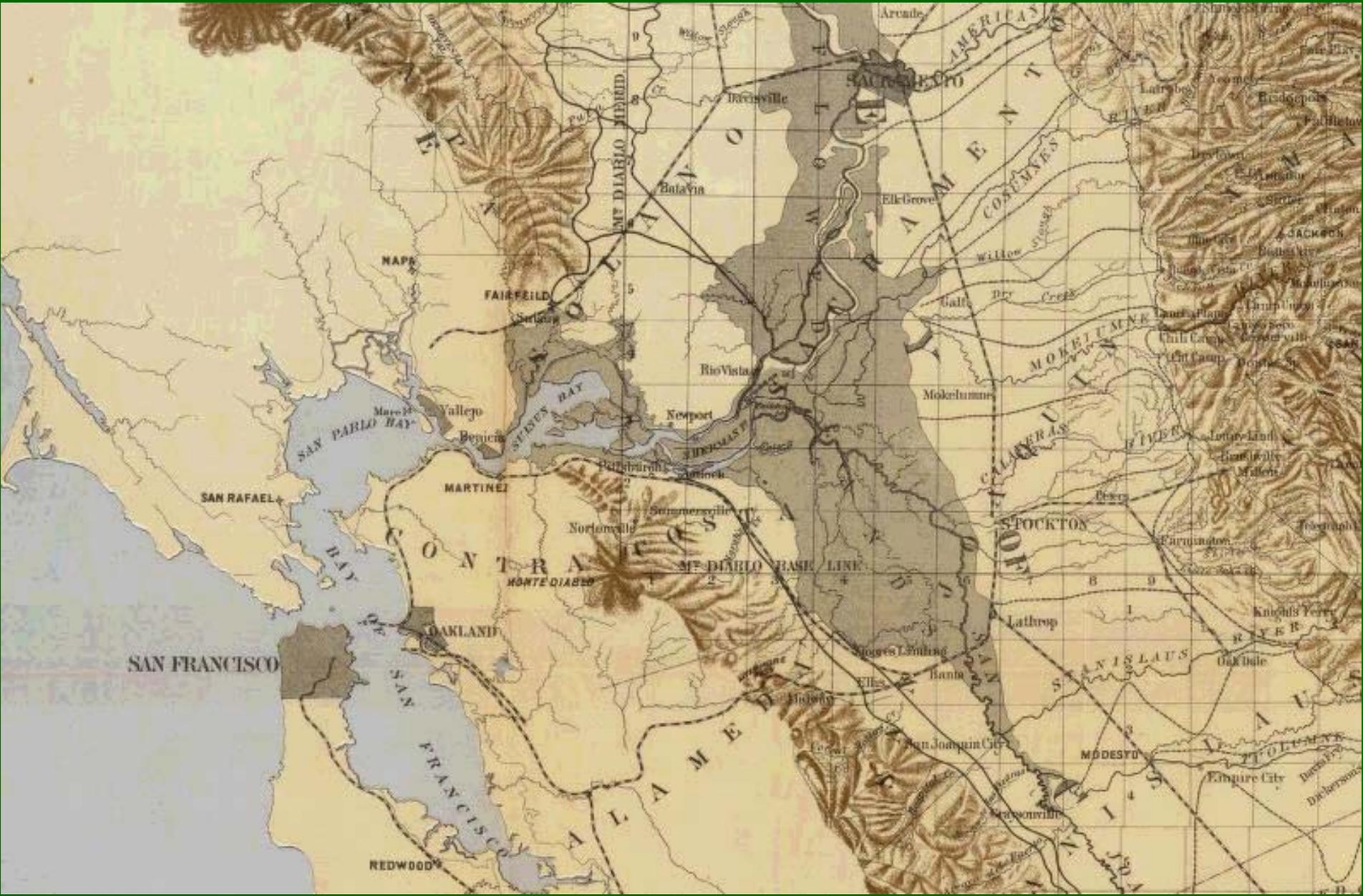
	Critical	Dry	Below Normal	Above Normal	Wet
1930-39	108	133	150		150
1940-49		131	148	151	150
1950-59		129	126	145	150
1960-75		96	99	131	145
1976-90	7	45	117	147	129

Controls on X2



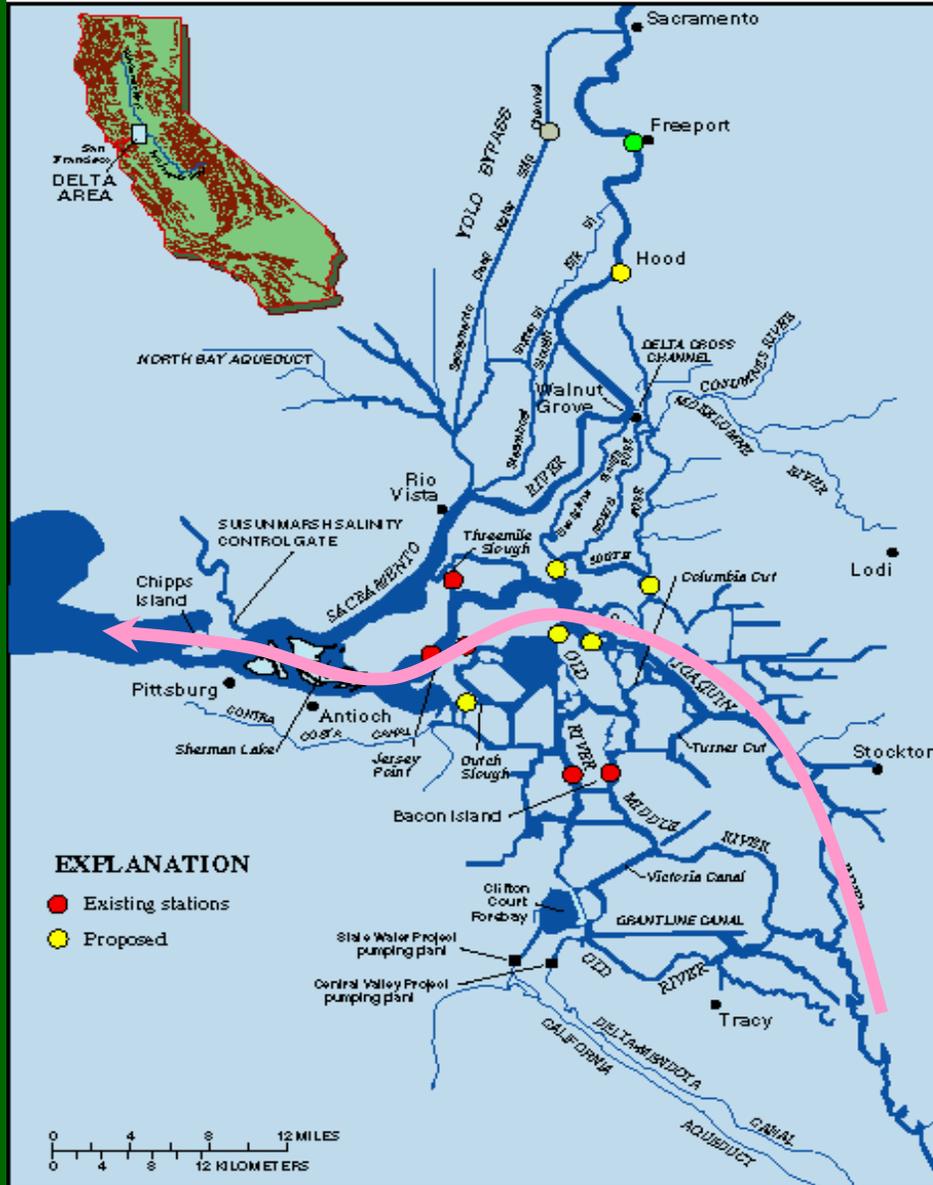
Setting the Regulation – meeting the cost

- Inflow on 8 Rivers in previous month
- Sets number of days for X2 west of each location
 - More days further west when wet
- Cheaper to increase releases
- More precise to reduce exports



SACRAMENTO-SAN JOAQUIN DELTA

VAMP



Vernalis Adaptive Management Program

VAMP

- 12 year study on delta survival of San Joaquin salmon; 5 years done
- 5 experimental flow/export combinations
- Midwater trawl, Kodiak trawl and adult ocean captures supply data



Head of Old River Barrier

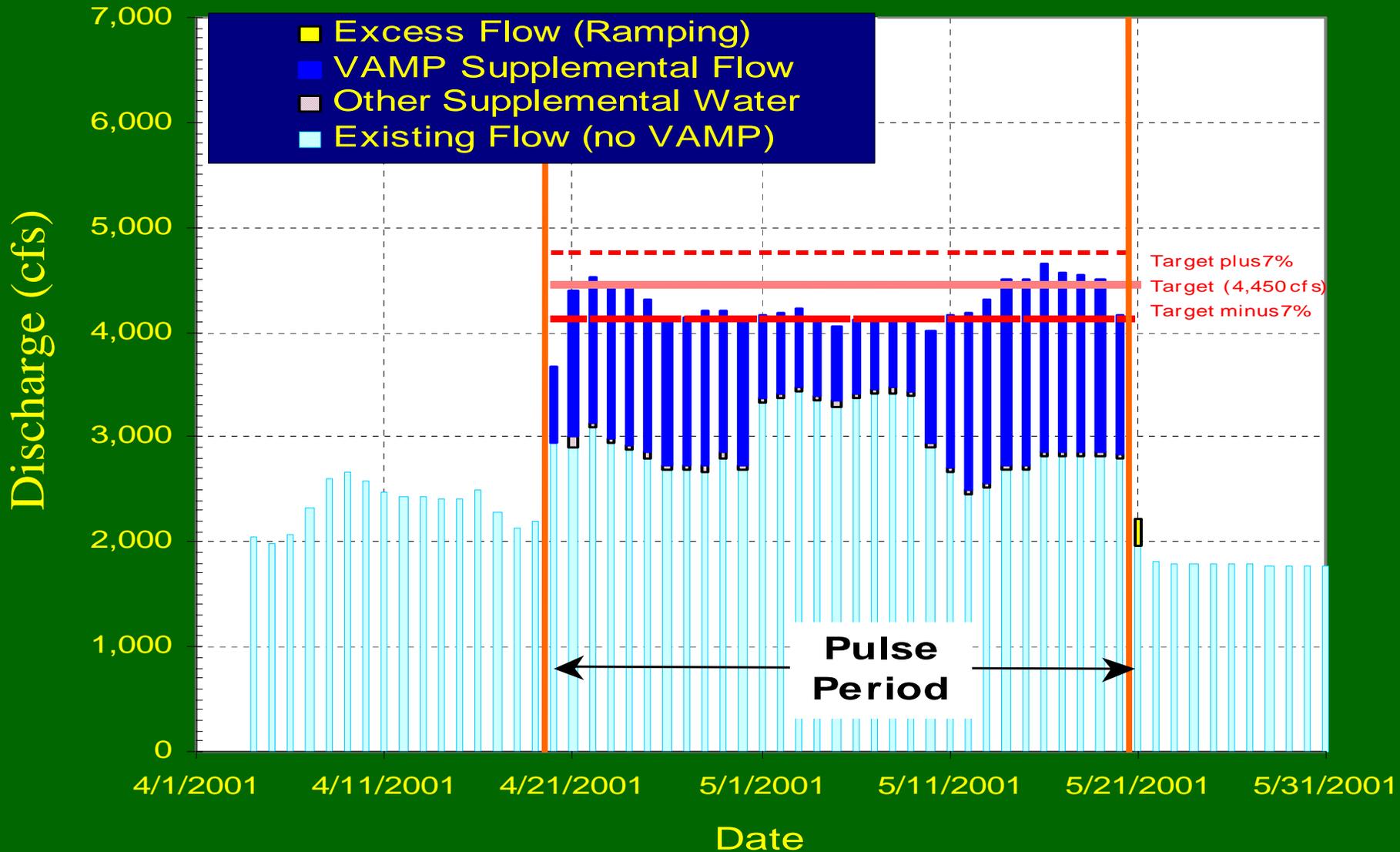
VAMP Target conditions

Flow at Vernalis (cfs)

	3200	4450	5700	7000
Exports (cfs)				
1500	A	B		C
2250			D	
3200				E

Actual VAMP flows

San Joaquin River near Vernalis



VAMP Conditions (so far)

Flow at Vernalis

		3200	4450	5700	7000
Exports	1500	2002 2003 2004	2001		C
	2250			2000	
	3200				E

Management Implications

- Actual adaptive management
- Protective of salmon and estuarine species
- Short-term support
- Long-term implications