California Resources Agency Action Matrix (draft November 22, 2006)

Timing	Experiment	Triggers	Scientific Uncertainty[1]	Action	Evidence	Response Variable(s)	Detection[2]	Time to Detection[3]	Ongoing Studies
Late Spring	VAMP (larvae)	Existing VAMP protocol determines experimental conditions	Low	VAMP with no South Delta Barriers	Hatch date distributions from FMWT in recent years largely encompassed by VAMP period	Otolith-based hatch dates from FMWT fish	medium	1 year	FMWT & Otoliths
Winter/Early Spring	X_2 and O&M R Flows (larvae)	If on March 1st X_2 14 day running average is east of 65 km, then take action when ripe females found in SKT and/or Delta water temperatures reach ≥12°C	Medium-high	O&M R flow at zero or positive for at least 2 weeks prior to VAMP (the longer provided the more likely to see a response)	• Larger larvae in 20MM survey 4 • Ripe smelt months in advance of most FMWT survivors	1. Otolith hatchdates from FMWT fish 2. Higher FMWT Index 3. Increased number and/or proportion of larger larvae by 20 mm survey 4 4. Larger fish in FMWT	1. Medium 2. Low 3. Medium 4. Low	1. 1 year 2. 5 years 3. 2-5 year 4. 5 year	1. FMWT & Otoliths 2. FMWT 3. 20MM 4. FMWT
	Winter O&M River Flows (adults)	Take action if flows are less than -3500cfs	High	Maintain O&M River flows greater than -3500cfsJanuary and February	Relationship between O&M River flows and adult salvage	Salvage decrease in line with salvage vs. flow regression analysis Effect on population contingent on subsequent conditions affecting survival	High	1 year	O&M River flow monitoring Fish facilities sampling
Summer	Daytime operations of Clifton Court Radial Gates (food web enhancement)	Take action when water temperatures ≥24°C	High	Operate Clifton Court Radial Gates only during the day	• Pseudodiaptomus forbesi epicenter in central Delta • Delta smelt-P. forbesi distribution overlap	1. Higher plankton abundance in Suisun/west Delta; increased P. forbesi co-occurrence with smelt 2. Higher ratio of *P. forbesi* nauplii to adults 3. Better glycogen scores from TNS and/or FMWT smelt	1. Low 2. Low 3. Low	1 and 2. 1 year; if a new *P. forbesi* flux experiment initiated 3. 5 years	FMWT, TNS, Histopathology Neomysis/ Zooplankton survey, 20mmSurvey Zoopl data
Summer-Fall	Summer-fall X_2 positions (Juveniles)	Take action if October-April precipitation has been above-normal If below-normal or drier water year type, no added summer-fall X_2 action	High	$X_2 \leq 80$ km during May-December	• Fall hydro change • Fall X_2 (salinity) change • Fall Environmental Quality Index change	1. Measures of EQ index 2. Broader fish distribution 3. Higher TNS index in following year 4. Improved health of smelt in fall (histopathology) 5. Reduced adult entrainment following year 6. Improved fall-summer stock-recruit relationship	1. High 2. High 3. Low 4. Low 5. Low 6. Low	1. 1 year 2. 2-5 years 3. years 4. 5 years 5. Unknown 6. 5 years	FMWT, Histopathology and other summaries of IEP monitoring datasets
Summer	Summer Yolo Bypass connectivity (Food web enhancement)	No trigger necessary	Very High	Explore ways to add Yolo Bypass flow into Cache Slough during summer	• Yolo bypass generates primary productivity • Net flows move upstream at Cache Slough	Net flow in Cache Slough and *P. forbesi* flux down Cache Slough	Low	Unknown	Requires initiation of a zooplankton flux study in Cache Slough and adjacent areas

[1] Scientific Uncertainty – indicates the confidence that the proposed Action will have a demonstrable population benefit.
[2] Detection – confidence in our ability to detect change in response variable
[3] Time to Detection – Rough estimate of time required to see action affect on response variable. Note: although many of the response variables could show a response in the first year, one year's worth of data (positive or negative) is not sufficient to test the effectiveness of the action.