Chapter 7

7 Conclusions and Recommendations

The 2005 VAMP was implemented without the installation of the HORB due to high flow conditions described in Chapter 2. The start of the VAMP pulse flow period was delayed until May 1, with a resulting average flow between May 1 and May 31 of 10,390 cfs and average exports of 2,986 cfs. Flow monitoring was conducted in the San Joaquin River and in the Old River both at locations downstream of the Head of Old River. New Kodiak trawling was conducted in Old River in 2005, and compared with the regularly conducted sampling on the San Joaquin River at Mossdale. Estimates of juvenile Chinook salmon smolt survival were calculated based upon recoveries of CWT juvenile salmon produced in the MRFF and released at Durham Ferry, Dos Reis, and Jersey Point. Marked salmon were recaptured in sampling at Mossdale, in Old River, at the SWP and CVP fish facilities, and at Antioch and Chipps Island. Based upon the data and experience gained during the VAMP 2005 investigations, conclusions and recommendations have been developed, and summarized in Table 7-1. The conclusions and recommendations include both technical and policy/management issues that will affect the implementation of future VAMP operations and investigations.

Smolt survival in 2005 was low, as it was in 2003 and 2004. Although there were greater flows in 2005 which should have improved survival, the HORB was not installed. Survival in 2005 was in the range observed previously without a HORB. The relationship of salmon survival to San Joaquin River flow has shown that survival increases as flows increase, with the HORB in place. These relationships are statistically significant using both the trawl and ocean recovery information. The relationships are more variable comparing survival to flow without the HORB. However, the trend of increasing survival as flows increase is apparent using both sets of recovery information though relationships are not statistically significant. Relationships of flow to adult escapement 2 1/2 years later, indicates these relationships are likely real and that survival is improved as flows increase.

The role of exports has been difficult to identify given that the two VAMP targets to identify the relationship have not yet been obtained. The role of exports will not be established until at least two VAMP targets of 7,000 cfs flow with a HORB are obtained so that survival can be measured with exports at 1,500 and 3,000 cfs. The VAMP program provides increased flows (compared to without VAMP flows) and likely increases the survival of unmarked juvenile salmon migrating through the Delta during the VAMP period.

Table 7-1
Summary of VAMP 2005 Conclusions and Recommendations

CONCLUSIONS	RECOMMENDATIONS FOR 2006
Observed ungaged flows (accretions, depletions) between upstream measurement points and Vernalis varied significantly from those forecasted resulting in differences in forecasted and required supplemental flows.	Hydrology committee to refine estimates of ungaged flow and develop a management scheme to accommodate variability.
The flow data collected in 2005 at San Joaquin River near Lathrop and the Old River at Head provided useful information on the flow split at the Head of Old River.	The 2005 flow data should be compared against DWR-DSM2 modeling results. Continue to calibrate the stage and flow monitoring at the San Joaquin River near Lathrop station.
DWR treated the Clifton Court Forebay with the aquatic herbicide Komeen, known to be toxic to salmon, one day following the Durham Ferry release of test fish. This could have affected the survival of this group.	DWR and USBR should coordinate operation and maintenance activities at the SWP and CVP export facilities with the VAMP Biology and Hydrology Groups.
Short-term survival (48-hours post-transport) was high (99.9%) indicating that handling, transport, and release likely had no affect on short-term smolt survival.	Continue short-term survival studies and fish condition inspections.
Physiological studies provided useful information on fish health and condition. Fish pathologists concluded that fish were infected with PKD and while recoveries at Chipps Island many not be affected, there are implications for long-term survival.	Recommend continued health and disease monitoring to compare within and between year trends. Begin discussions on how to reduce PKD in San Joaquin basin juvenile salmon.
A sampling of fish were held at the CA/NV Fish Health Center for post-release health evaluation, swim performance testing, saltwater adaptation testing.	Recommend continued post-release evaluation in future years.
The number of CWT salmon from Durham Ferry releases recovered at the SWP and CVP salvage facilities were greater then prior years likely due to no HORB. Few Dos Reis fish were recovered at the SWP and CVP salvage facilities.	Continue salvage monitoring to document direct losses at SWP/CVP export facilities.
VAMP has been designed to adaptively change within a few weeks, the VAMP test period each year.	Continue to identify opportunities when it would be beneficial to delay the VAMP period to stabilize VAMP test conditions and to increase protection for juvenile Chinook salmon outmigrating from the San Joaquin basin.
Survival from Durham Ferry and Dos Reis in 2005 was low and similar to some prior years when the HORB was not installed.	Continue to measure survival when there is no HORB to compare to past years and to better understand the role of flow on survival without the HORB in place. Install the HORB when flows are 7,000 cfs or less to improve survival through the Delta. The VAMP tests should be continued.
Further evaluation of survival rate versus export rate is needed. The VAMP is limited by data at the target conditions of 7,000 cfs flow with a HORB with exports at 1,500 or 3,000 cfs.	Evaluate the possibility of amending the San Joaquin River Agreement to achieve needed test conditions of 7,000 cfs flow with a HORB at exports of 1,500 or 3,000 cfs. Prescribing target conditions will allow the most critical data to be obtained quickly so that the role of exports can be identified in the most efficient manner.
Mossdale Kodiak trawl is an important component in determining distribution of juvenile salmon out migration from the San Joaquin basin.	Maintain the Mossdale Kodiak trawl at existing effort throughout year.
Some complimentary studies to evaluate mechanisms affecting survival of fish from tributaries and across the Delta were conducted.	Encourage an expansion of complementary studies to provide additional information on factors and mechanisms affecting salmon survival.