



1 Introduction

Actions associated with the Vernalis Adaptive Management Plan (VAMP) were implemented between May 1 and May 31, 2005 to protect juvenile Chinook salmon and evaluate the relationship between San Joaquin River flow and State Water Project (SWP) and federal Central Valley Project (CVP) water project exports, with the HORB installed, on the survival of marked juvenile Chinook salmon migrating through the Sacramento – San Joaquin Delta. Due to high river flows the HORB could not be installed for the 2005 VAMP period. The pulse flow period was postponed 15 days from previous years and in accordance with the SJRA the water districts attempted to maintain stable flow throughout the period. Studies conducted in 2005, represent the sixth year of the VAMP experiment. Results from previous VAMP experiments are available in San Joaquin River Agreement Technical Reports, for each respective year.  Similar experiments were conducted prior to the official implementation of VAMP with results available in South Delta Temporary Barriers Annual Reports (DWR 2001 and DWR 1998). This report will describe the experimental design of VAMP, the hydrologic planning and implementation, the additional water supply arrangements and deliveries, the Head of Old River Barrier (HORB) background, flow and seepage monitoring, Kodiak trawling in Old River, the salmon smolt survival investigation and complimentary studies related to VAMP. Conclusions and recommendations for future VAMP studies are also included.

EXPERIMENTAL DESIGN ELEMENTS

The VAMP experimental design measures salmon smolt survival through the Delta under six different combinations of flow and export rates.  The experimental design includes two mark-recapture studies performed each year during the mid-April to mid-May juvenile salmon outmigration period that provide estimates of salmon survival under each set of conditions. During 2005, a total of 400,000 juvenile Chinook salmon were made available from the Merced River Fish Facility (MRFF) annual production for the VAMP survival studies. Chinook salmon survival indices under the experimental conditions are calculated based on the number of marked salmon released and the number recaptured. Absolute survival estimates and combined differential recovery rates are also calculated and used to assess relationships between survival and San Joaquin River flow and CVP and SWP exports.

Due to high flows in the San Joaquin River the HORB was not installed for the 2005 VAMP. The 2005 VAMP experimental design included both multiple release locations (Durham Ferry, Dos Reis, and Jersey Point), and multiple recapture locations (Antioch, Chipps Island, SWP and CVP salvage operations, and in the ocean fisheries; Figure 1-1). Two releases were made during the 2005 VAMP study at Durham Ferry, Dos Reis, and Jersey Point. Due to no HORB during the pulse flow period the Dos Reis

release site was used in lieu of Mossdale to provide a better evaluation of smolt movement into the Old River. The use of data from multiple release and recapture locations allows for a more thorough evaluation of juvenile Chinook salmon survival as compared to recapture data from only one sampling location and/or one release location. The VAMP coded-wire tag (CWT) releases (Durham Ferry, Dos Reis, and Jersey Point) and recapture locations (Antioch and Chipps Island) are consistent with some previous years, providing a greater opportunity to assess salmon smolt survival over the range of Vernalis flows, SWP/CVP exports, and with and without the presence HORB. The recovery of marked fish at both Antioch and Chipps Island also improves the precision associated with the individual survival estimates, and improves confidence in detecting differences in salmon smolt survival as a function of Vernalis flows and SWP/CVP exports. Releases at Jersey Point serve as controls for recaptures at Antioch and Chipps Island, thereby allowing the calculation of survival estimates based on the ratio of survival indices from marked salmon recaptured from upstream (e.g., Durham Ferry and Dos Reis) and downstream (control release at Jersey Point) releases. The combined differential recovery rates are calculated in a similar manner after the number recovered from each trawl location is combined. The use of ratio estimates as part of the VAMP study design factors out the potential differential gear efficiency at Antioch and Chipps Island within and among years.

A quality assurance/quality control program has been used as a routine part of VAMP tests, and includes quantifying the number of marked fish successfully clipped and tagged. Coordination with the local landowner to curtail operation of an agricultural diversion pump located immediately downstream of Durham Ferry, coincident with the Durham Ferry release was continued in 2005. In addition, the 2005 VAMP program continued use of the net pen studies and

physiological testing to assess overall condition and health of marked fish used in VAMP experiments. Improvements were also made in 2005 relative to measuring flow in the San Joaquin River downstream of the confluence with Old River. The absence of the HORB in 2005 provided the opportunity to conduct Kodiak Trawls in both the San Joaquin River and Old River near the vicinity of the Head of Old River.

Figure 1-1
Sacramento – San Joaquin Estuary

