Fish

Prior to the game, fishery biologists identified recurring circumstances in the Delta with adverse consequences for chinook salmon, delta smelt, steelhead, striped bass and splittail. Biologists used historical CVP and SWP fish salvage records to describe time periods in each year of the operations simulation when particular species were present in the Delta and would benefit from actions to reduce entrainment losses and otherwise improve their survival. A high, medium or low priority was designated for each of these species-specific time periods, based on current abundance and the severity of the adverse condition. In some circumstances, separate priorities were assigned for intervals within key periods to indicate the optimal timing for an action of limited duration. The priorities were used to streamline the biological decisions during the simulations.

The CVPIA AFRP flow matrices were used as a guide for decisions to augment flows downstream from CVP reservoirs.

During the game, biologists used available capacity as needed to increase flows in the upper Sacramento, lower American and Stanislaus rivers and to reduce the rate of water diversion for export from the southern Delta. River flow augmentation is presumed to increase habitat for spawning, rearing and migration. Export reductions are presumed to both reduce entrainment losses and improve flow-related habitat conditions and survival in the Delta.

In the simulations completed recently, biologists had water dedicated under CVPIA Sec. 3406(b)(2) and modification of the E:I limits as the means to support fishery protection actions. All facilities and other assets assumed to exist in the early (1A) and late (1B) Stage 1 simulations were operated to maximize water supply.

What did we learn from the game? Success in providing improved Delta fishery protection was defined in part as the ability to implement increased flows and/or export reductions during the high, medium and low priority time periods for key species and life stages.

In both early and late Stage 1, available assets always supported the export reductions during the 31-day VAMP period in April-May, providing good conditions for salmon smolts, steelhead, young delta smelt, splittail and striped bass during that time.

All other categories of fish actions in other time periods were accomplished to a substantially lesser degree. Because of asset limitations, many high priority periods were addressed by a action of less than desired intensity or duration and some were not addressed at all. Most medium priority problem periods were covered only partially or not at all. Lower priority needs were addressed only incidentally as a result of

overlap with a higher priority need. With the discretion available in these two simulations, there were substantial limits on the ability to carry out actions to aid yearling spring run salmon, delta smelt adults, winter run salmon, steelhead, young delta smelt, splittail, early and late-migrating fall run salmon smolts and striped bass in many years.

Evaluation of changes in entrainment was also evaluated. Some reduction in entrainment from the Water Quality Control Plan simulation was achieved through export reductions for most species in most but not all years.

Compared to early Stage 1, additional assets in late Stage 1 altered export patterns and application of fishery protection. Comparison of outcomes is still underway.

Providing protection in one period sometimes made conditions worse for fish at other time. Fish dependent on the Delta in the summer, such as striped bass, will fare worse due to consistently higher exports then.