

**United States Fish and Wildlife Service**  
**Statement before the State Water Resources Control Board**  
**Review of 1995 Delta Water Quality Control Plan**  
**Topic #8: San Joaquin River at Airport Way Bridge, Vernalis Flow**  
**Objectives: February – April 14 and May 16 - June**  
**March 21, 2005**

This statement from U.S. Fish and Wildlife Service is to supplement the statement from U.S. Department of the Interior and provide information regarding the biological benefits and needs related to the Vernalis flow standard. A decade ago, the State Water Resources Control Board (SWRCB) adopted the Delta Water Quality Control Plan (1995 WQCP), which included several flow standards to protect beneficial uses of river and Delta waters by the State's fishery resources. The San Joaquin River at Vernalis flow standard applies to the February – April 14 and May 16 – June period and is primarily intended to maintain sufficient net downstream flow in the lower San Joaquin River to benefit fishery resources. This flow standard benefits juvenile fall-run Chinook salmon, and federally listed adult steelhead during their downstream migration, and federally listed adult delta smelt during spawning, as well as the larval and the juvenile delta smelt.

**Background**

The primary purpose of the 1995 WQCP's San Joaquin River at Vernalis flow standard is to provide sufficient net downstream flow in the lower San Joaquin River to benefit juvenile fall-run Chinook salmon, and federally listed adult steelhead during their downstream migration, and federally listed adult delta smelt during spawning, as well as the larval and the juvenile delta smelt. The current flow objectives identified in Table 3 of the 1995 WQCP and Water Right Decision 1641 (D-1641) require Reclamation to meet the following minimum flows at Vernalis. Required flows are dependent on month and year-type.

San Joaquin River at Airport Way Bridge, Vernalis	C-10 (RSAN112)	Flow rate	Minimum monthly average [12] flow rate (cfs) [13]	W,AN BN,D C	Fed-Apr 14 and May 16-Jun	2,130 or 3,420 1,420 or 2,280 710 or 1,140
				W	Apr 15-	7,330 or 8,620
				AN	May 15 [14]	5,730 or 7,020
				BN		4,620 or 5,480
				D		4,020 or 4,880
				C		3,110 or 3,540
				All	Ord	1,000 [15]

**Biological Basis**

While the Vernalis flow standard helps provide for the needs of salmonids, the Service has a legal responsibility for protecting the delta smelt, which has been listed as threatened under both the Federal and State Endangered Species Act. The Vernalis flow objectives are incorporated into Reclamation's new OCAP project description and

associated Biological Assessment and the Service's OCAP Biological Opinion. Over the last 20 years, the delta smelt population has experienced a significant decline in numbers, and since 1982, has remained at extremely low levels. The Service remains concerned that the delta smelt population is at risk of extinction. Recent population abundance indices confirm that the species has not sustained any significant signs of recovery (FWS 5-Year Review, March 2004). This analysis therefore focuses primarily on delta smelt.

Delta smelt exhibited the lowest fall mid-water trawl numbers ever in 2004. The only new information concerning the delta smelt's population size and extinction probability indicates that the population is at risk of falling below an effective population size and therefore in danger of becoming extinct (Service's 2005 biological opinion, pg.121). The Vernalis flow objectives provide an important source of fresh water to the ecosystem and provide environmental cues that otherwise might not be there. Given the status of the delta smelt population, any weakening of the Vernalis flow objectives is not advisable. Minimum flow objectives that help protect habitat upon which listed delta smelt depend is essential to achieving species recovery.

The Vernalis flow standard is based upon historical placement of the two parts per thousand isohaline (X2) and the historic relative contribution or proportion of flow provided by the San Joaquin River, which averaged roughly 20% (DWR and Reclamation modeling for the 1994 Biological Assessment, incorporated by reference in the Service's March 6, 1995 Biological Opinion). The numeric value of the Vernalis standard has been set at 10, 20 and 30 percent (for different year types) of the Delta outflow requirements of 7,100 cfs or 11,400 cfs that are used as flow surrogates for the placement of X2 at Collinsville and Chippis Island. The Vernalis flow standard is not intended to provide transport flows, but a water quality benefit, improve directional cues for migrating salmonids and delta smelt and to support Delta habitat.

Prior to the implementation of D-1641, the mechanisms regulating freshwater flow in the Bay/Delta did not provide adequate protection to delta smelt (Moyle et al, 1992). The number of days of reverse flows in the lower San Joaquin River has increased with increasing exports, increasing the likelihood of displacement or entrainment of delta smelt. The combined effects of habitat restriction and entrainment during spawning and larval dispersal have likely contributed to declines in abundance of delta smelt (Moyle et al, 1992, Sweetnam and Stevens 1993, Bennett and Moyle 1996). Intermediate flows (4,940-15,000 cfs) on the San Joaquin River in late winter may provide attractive conditions for adult delta smelt moving upstream to spawn (Nobriga et al. 1996). Maintenance of flows through spring result in favorable delta smelt spawning and juvenile rearing conditions in the south and central Delta (Nobriga et al, 2000). Dispersal of young increases as flows increase. As flows decrease, losses at the State Water Project (SWP)/Central Valley Project (CVP) increase. Predation may increase at lower flows as turbidity decreases. High flows increase habitat availability as they contribute to seasonal creation of shallow-water habitat, which is important for spawning and rearing (Stevens and Miller, 1983; IEP, undated). Nutrients increase with flow, potentially increasing food production (Stevens and Miller, 1983).

Water management practices may have a significant impact on fish assemblages in the Delta, with non-native fishes dominating areas where habitat is highly disturbed (Feyrer and Healey, 2002). Higher outflow and more turbid conditions seem to favor native fishes over non-native species (which tend to be associated with warmer water or lower flows) (Feyrer 2004, Feyrer and Healey, 2003). Native species abundance peaks early in the season, in February and March when flows are highest and temperatures are cool (Feyrer 2004). Higher flows and cooler temperatures may be more important to native fish recruitment than direct interactions (Feyrer, 2004).

The February through June Vernalis flow objectives also provide benefits to juvenile fall-run Chinook salmon and federally listed steelhead during their downstream migration. In our presentation to the SWRCB in October and November 2004 regarding the Anadromous Fish Restoration Program (AFRP) doubling goals, the Service provided data from the upper Sacramento River indicating that the natural production of steelhead has continued to decline compared to the 1967-1991 baseline average. Also, the natural production of San Joaquin basin Chinook salmon is approximately 75% of the baseline average, and the natural production of fall-run Chinook salmon in each of the San Joaquin tributaries are well below the AFRP doubling goals. Furthermore, in-river escapement of adult Chinook salmon into the San Joaquin tributaries is associated with spring outflow in both the San Joaquin River at Vernalis and each of the San Joaquin tributaries. In summary, biological resources are continuing to decline; the biological needs of the delta smelt and Chinook salmon are justified; and even though the Vernalis flow objective may not address all the delta smelt and salmonid needs, the objective does provide a minimum flow standard and some level of protection. The Service will provide a compact disk (CD) to the SWRCB with additional biological information and references.