

**HILTON CREEK  
ENHANCEMENT**

**Appendix D**

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Hilton Creek provides the uppermost spawning habitat available to anadromous fish in the lower Santa Ynez basin. Although the habitat conditions in the creek appear to be conducive for steelhead spawning and rearing, fish productivity in Hilton Creek appears to be limited by intermittent flows and impediments to fish migration. Accordingly, it appears that Hilton Creek could support a much greater population of rainbow trout/steelhead. The objective of the actions proposed in this report is to enhance steelhead utilization of the creek by modifying impediments to upstream migration and improving spawning and rearing habitat. The proposed actions at Hilton Creek are consistent with the Santa Ynez River Technical Advisory Committee's (SYRTAC) habitat enhancement objectives in the tributaries of the Santa Ynez River.

In the following sections, information related to Hilton Creek characteristics is provided (Section 2), the proposed enhancement measures are discussed (Section 3) and the impacts of the enhancement measures are evaluated (Section 4). Implementation and management of the actions recommended in this appendix will be coordinated by the Adaptive Management Committee (see Section 5.7 of the Plan).

A description of Hilton Creek including location, habitat, water quality, and steelhead utilization is presented below. The information is based on data collected by the SYRTAC and anecdotal observations from long-time residents of the area. Please refer to *Appendix C - Tributaries of the Santa Ynez River Basin below Bradbury Dam*, for more detail on Hilton Creek habitat characteristics and fish utilization.

### **2.1 GENERAL LOCATION AND DESCRIPTION**

Hilton Creek is a small tributary located immediately downstream of Bradbury Dam. The creek has intermittent or no flow in its lower reaches (north of the Highway 154 Crossing) during the dry season. The estimated watershed is approximately 4 square miles, and approximately 2,980 feet of the creek is situated on U.S. Bureau of Reclamation (Reclamation) property, including the confluence with the Santa Ynez River. The lower reach of Hilton Creek is high gradient and well confined. The stream is shaded by riparian vegetation and the banks of the incised channel.

A cascade and bedrock chute, located approximately 1,380 feet upstream from the confluence with the river, are passage impediments for migrating steelhead. The cascade is approximately 6 feet high. A shallow pool (the “chute pool”) is at the base of the cascade. The bedrock chute immediately above it is about 140 feet long. Passage can be difficult here during high velocity flows due to the lack of deeper water and resting sites.

Upstream migrating steelhead are further impeded by a passage barrier at the Highway 154 road crossing. A culvert is located here, about 4,200 feet upstream from the confluence and about 1,200 upstream from the Reclamation property boundary. High water velocities during storms, shallow water depth in the culvert during low flows, and a concrete apron drop structure make this a complete passage barrier to migrating steelhead. Modification of the Highway 154 Culvert would provide passage to several additional miles of upstream spawning and rearing habitat.

### **2.2 HYDROLOGY**

Hilton Creek is primarily dependent upon runoff from local and regional rainstorms, and the flows within the creek are typically low and intermittent. However, during large storm events and years with high cumulative rainfall such as 1995 and 1998, flow in the creek can be very high, and the creek can transport a high bed load, suspended sediment, and debris. Based on field observations, it appears as if much of the larger boulders and debris found in the creek originate from stream bank failure both above and below the bedrock passage reach.

### **2.3 HABITAT DESCRIPTION**

Habitat surveys were conducted along the reach below the chute pool in 1995 and 1998, and between the Reclamation property boundary (approximately 2,980 feet upstream of the confluence) and the chute pool in 1998. No surveys have been conducted upstream of the Reclamation property boundary since access is limited as this section is situated on private property.

The results of the 1995 habitat survey classified the stream below the chute pool as 44% run, 27% riffle, 26% pool, and 3% cascade (SYRTAC 1997). Channel width averaged 9.3 feet, and maximum pool depth averaged 3 feet; and most pools appeared to have suitable spawning habitat at their tail end. The 1998 habitat survey classified the reach below the chute pool as 27% run, 58% riffle/cascade and 15% pool. The reduced pool and run habitat and increased riffle habitat within this section between 1995 and 1998 is due to the high flows experienced during the winter of 1998 which altered the lower portion of the channel and moved the confluence of Hilton Creek with the Santa Ynez River further downstream.

Habitat surveys in 1998 between the Reclamation property boundary and the chute pool (1,553 feet total) documented 61% riffle/cascade, 34% run, and 5% pool (S. Engblom, pers. comm., 1999). The 300-foot reach immediately above the bedrock chute was classified as consecutive run/riffle habitat with little or no canopy cover. The habitat conditions above this open reach up to the Highway 154 Culvert (about 2,400 feet total) and beyond were classified as good to excellent with a mature riparian corridor and canopy.

### **2.4 WATER QUALITY**

The results of previous surveys indicate that the water quality in Hilton Creek is suitable for rainbow trout/steelhead. During these surveys, the water temperatures, dissolved oxygen concentrations, and turbidity were within acceptable ranges for steelhead habitat.

Water temperatures are monitored in the lower reach (about 250 feet upstream of the confluence) and the middle reach (in a pool downstream of the Spawning Pool, about 1,000 feet upstream of the confluence). In 1998, monitoring began at the Reclamation property boundary (2,980 feet upstream of the confluence). Thermograph data, coupled with observations throughout the year, indicate that water temperatures, while not preferred, are generally suitable for steelhead rearing through the entire year. Summer water temperatures at the chute pool (1,380 feet upstream of the confluence) are substantially lower than temperatures measured further downstream. Water temperatures in the chute pool may be suitable through at least August, although the pool would be physically isolated from other areas of potential habitat during a portion of the year unless flows were supplemented. Seasonal patterns in surface flows and the persistence of pools vary annually depending on precipitation and runoff within the watershed. Dissolved oxygen concentrations are within the normal tolerances for rainbow trout/steelhead when water is flowing in the creek (>5 mg/l). However, the pool water quality can diminish to near anoxic conditions when flows become intermittent.

Channel disturbance and water quality problems appear minimal. Hilton Creek clears rapidly after storm events, usually within a few days after rains have ceased.

## **2.5 RAINBOW TROUT/STEELHEAD UTILIZATION**

In general, steelhead are known to migrate to the uppermost accessible reaches in a river seeking spawning habitat. Adults migrating up the Santa Ynez River are blocked by Bradbury Dam and must find spawning habitat downstream of the dam. Hilton Creek currently provides the most upstream spawning habitat available to anadromous fish in the lower Santa Ynez basin.

Hilton Creek is inhabited by rainbow trout/steelhead between the confluence with the mainstem and the chute pool, and prickly sculpin to approximately 800 feet upstream of the mainstem. Sculpin are not present in the upper portions of the creek, and introduced warmwater species, such as bass, bullhead or sunfish, are not found in Hilton Creek.

Spawning is generally limited to a 400-foot section situated immediately below the chute pool. No spawning or young-of-the-year have been observed between the cascade and the Reclamation property boundary. However, anecdotal reports indicate that trout were historically present in upper Hilton Creek above the Highway 154 Culvert. It is possible that the 1955 Refugio fire, which burned 84,700 acres, decimated the trout population in the upper reach.

Adult rainbow trout/steelhead have been documented migrating into Hilton Creek in all years that observations have been made, but the numbers were low in years with low winter runoff. Adults migrating into Hilton Creek are often large and could be anadromous steelhead from the ocean (particularly in wet years) (SYRTAC 1997, 1998, 2000e), rainbow trout that escaped from Lake Cachuma during spill events, or fish that are resident in the river, its tributaries, or the lagoon.

Young steelhead remain in freshwater for a year or more and, therefore, young-of-the-year cannot complete rearing in lower Hilton Creek under natural conditions because the stream goes dry during the summer (SYRTAC 1997, 1998, 2000e). The fish are either stranded within the creek or must enter the mainstem where they are exposed to predatory bass and catfish. Fish rescue operations were conducted in 1995 and 1998 to move young-of-the-year from the drying stream to better habitat. Many young-of-the-year and all adults were found near the pool area just below the cascade. The remainder of the young-of-the-year were found in the lower reach of the creek. Some young-of-the-year that were not captured in the 1998 fish rescue operations did over-summer successfully in the Spawning Pool.

Hilton Creek provides the most upstream spawning habitat for steelhead in the lower Santa Ynez River. SYRTAC studies have documented migration, spawning activity and successful reproduction (SYRTAC 1996, 1997, 1998, 2000e). However, when flows become intermittent, fry usually perish in isolated pools or move downstream into the mainstem of the Santa Ynez River and are more vulnerable to predation.