

## **Southern Steelhead Resources Evaluation**

Identifying Promising Locations for Steelhead Restoration in Watersheds South of the Golden Gate

### APPENDIX

Gordon S. Becker  
Katherine M. Smetak  
David A. Asbury

Center for Ecosystem Management and Restoration

This appendix accompanies the Southern Steelhead Resources Evaluation<sup>1</sup>, in which rearing habitat related information was used to identify areas with high potential for steelhead production in watersheds south of the Golden Gate. The following narrative describes the basis for our estimates of stream miles of suitable rearing habitat in watersheds with reproducing *O. mykiss* populations.

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<sup>1</sup> Becker, G.S., K.M. Smetak, and D.A. Asbury. 2010. Southern Steelhead Resources Evaluation: Identifying Promising Locations for Steelhead Restoration in Watersheds South of the Golden Gate. Cartography by D.A. Asbury. Center for Ecosystem Management and Restoration. Oakland, CA.

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## **San Mateo County**

### **San Pedro Creek**

#### *San Pedro Creek*

During snorkel surveys conducted between May and September of 1989 in San Pedro Creek, high densities of *O. mykiss* were observed throughout the surveyed reaches. Fry numbers peaked during July surveys, in which 544 YOY, 347 age 1+, and 39 age 2+ *O. mykiss* were counted between the mouth and the Peralta Road Bridge and 541 YOY, 19 age 1+, and three age 2+ *O. mykiss* were counted in a reach extending 850 feet upstream from the Adobe Road Bridge (Sullivan 1990).

According to a 1997 USDS study, San Pedro Creek "...supports the most viable steelhead trout population in San Mateo County... Juvenile age class diversity indicates year-round juvenile use... Though difficult to estimate, the adult spawning run may average between 150-300 adults in recent times" (USFWS 1997 p.7).

In 2002, consultants collected 212 YOY and 17 age 1+ *O. mykiss* from a 6,634 foot reach of the lower mainstem and 225 YOY and 27 age 1+ *O. mykiss* from a 3,737 foot reach of the upper mainstem of San Pedro Creek (HES 2002). According to the report, "The mainstem provides the best conditions for rearing steelhead to smolt size and for supporting non-anadromous life histories, however, steelhead using the mainstem are more vulnerable to potential water quality degradation, siltation, sedimentation, and disturbance than those in the Middle Fork" (HES 2002, p. 1).

Partial migration barriers were identified at the Linda Mar Bridge, Oddstad Bridge, and Adobe Road Bridge culverts during the 2002 survey (HES 2002). According to the San Pedro Creek Watershed Coalition website, plans to modify the barriers are being developed. A project to improve fish passage and reduce streambank erosion at the Capistrano Road crossing was completed in 2005.

#### *Middle Fork San Pedro Creek*

In 2002, consultants collected 203 YOY and five age 1+ *O. mykiss* from a 4,816 foot reach of the Middle Fork San Pedro above the South Fork confluence and eight YOY and one age 1+ *O. mykiss* from a 411 foot reach of the upper Middle Fork (HES 2002). The survey report states, "Steelhead spawning in the Middle Fork have the potential to saturate the available habitat with fry and produce a surplus that would eventually take up residence in downstream reaches" (HES 2002, p. 42).

### **Denniston Creek**

#### *Denniston Creek*

A 1953 DFG stream survey notes that Denniston Creek has approximately "3 miles of fishable water" (DFG 1953).

Staff from DFG surveyed Denniston Creek from Highway 1 to approximately three miles upstream and observed "Numerous rainbow trout/steelhead" ranging from 4 to 6 inches in length in pool habitat "throughout the drainage" (DFG 1992). Two impassible barriers were noted, including a dam at approximately stream mile 1.2 and a culvert 0.5 miles upstream from the dam (DFG 1992).

In 2006 DFG staff observed 20 *O. mykiss* fry above the Highway 1 Bridge crossing in Denniston Creek and four age 1+ *O. mykiss* in pools located between Highway 1 and the impassible dam at stream mile 1.2 (DFG 2006).

A 2004 fish passage evaluation identified the Prospect Way crossing as a severe passage barrier and assigned it a high priority ranking for modification (Taylor 2004). A draft implementation plan for priority restoration projects in San Mateo County streams indicates that funding will be sought to improve fish passage at Prospect Way barrier (Fish Net 4C 2008).

## **Frenchman's Creek**

### *Frenchman's Creek*

In 2006, DFG staff conducted fish sampling immediately upstream and downstream of a flashboard dam on Frenchman's Creek near 840 Frenchman's Road. Sampling yielded 30 *O. mykiss* ranging from 20 to 194 mm FL in the 141.4 foot reach upstream of the dam and 14 *O. mykiss* ranging from 40 to 134 mm FL in the 114.4 foot reach downstream of the dam (Atkinson 2006).

A 2006 Coastal Conservancy recommendation regarding restoration work on Frenchman's Creek indicated that two miles of high quality rearing habitat existed upstream of a total passage barrier created by an earthen bridge and perched culvert at stream mile 2.0 (CCC 2006a). Barrier removal and stream restoration was recently completed at the site, providing steelhead access up to the natural limit of anadromy at a waterfall located approximately four miles from the mouth.

### *Locks Creek*

A DFG stream inventory from the 1960s characterizes the fishery resources of Locks Creek as "good," providing "winter flow and some steelhead spawning" (DFG ca 1965).

## **Pilarcitos Creek**

### *Pilarcitos Creek*

Consultants conducted habitat surveys downstream and upstream of Stone Dam in 2004. Stone Dam is located on San Francisco Public Utilities Commission (SFPUC) property and creates a total barrier to fish passage. During the 2004 survey rearing habitat in the reach extending from Stone Dam downstream 2.7 miles was observed to be "limited by substrate composition, pool abundance, and flow" (Entrix 2006, p. 4-3). A culvert at stream mile 10.7 was identified as a low-flow barrier. The survey report notes that during electrofishing surveys conducted in this reach in 1995 and 1996, *O. mykiss* density averaged 29 YOY and 14 age 1+ individuals per 100 feet of stream. Between the upper margin of Stone Dam Reservoir and Pilarcitos Dam, rearing habitat was noted to be "similar to or somewhat better in quality than that in the lower reach" (Entrix 2006, p. 3-2). A culvert at stream mile 7.1 was identified as a potential barrier at high flows. As part of the 2004 survey, fish sampling was conducted at three sites within the upper reach, yielding a total of 89 *O. mykiss*. Multiple age classes were observed.

A 2008 management plan for the Pilarcitos Creek watershed characterizes steelhead habitat conditions in the Pilarcitos Creek mainstem and tributaries. Rearing habitat in Pilarcitos Creek is characterized as "poor" to "poor-fair" in the reach between the mouth and Corinda Los Trancos

Creek, “fair” in the reach between Corinda Los Trancos Creek and Highway 92, “fair-good from Highway 92 to Stone Dam, and “fair” from Stone Dam to Pilarcitos Lake (PWA 2008). According to the report, CalTrans plans to modify a partial barrier on Pilarcitos Creek at the Highway 92 crossing. The report notes that a feasibility study for the installation of fish passage facilities at Stone Dam was conducted in 2006 (PWA 2008).

#### *Arroyo Leon Creek*

Researchers conducted fish sampling on the reservoirs of two seasonal dams on Arroyo Leon Creek in 2001. A total of 477 *O. mykiss* were caught in the basins of the two reservoirs, the majority of which were YOY and age 1+ (Smith 2001). Upstream of the upper reservoir, 50 YOY, 14 age 1+, and one age 2+ *O. mykiss* were captured. According to the survey report, “less than 35 smolts are likely to be produced from approximately 0.1 mile of sampled stream” (p. 4).

A 2008 management plan for the Pilarcitos Creek watershed notes that the seasonal reservoirs on Arroyo Leon Creek have not been operated since 2001 due to regulatory restrictions related to the negative impact the timing of closure at the reservoirs had on smolt passage. The report states, “... the two ponds on Arroyo Leon provided, and still potentially could provide, the only “good” or better rearing habitat for juvenile steelhead” (PWA 2008, p. 48). The report characterizes spawning and rearing habitat quality downstream and upstream of the reservoir sites as “poor-fair.” Two private culverts and the Higgins-Purisima Road crossing were identified as partial passage barriers.

#### *Mills Creek*

During a survey conducted in Mills Creek in 1996, consultants observed an average *O. mykiss* density of 31 YOY and 20 age 1+ per 100 feet of stream in 1.6 mile reach beginning 0.3 miles upstream of the Arroyo Leon confluence. At a sampling site further upstream, *O. mykiss* density was estimated to be to 12 YOY and three age 1+ per 100 feet of stream (PWA 1996, p. 44).

A 2008 management plan for the Pilarcitos Creek watershed characterizes rearing habitat in Mills Creek as “fair-good,” from the mouth upstream to a small dam (not a barrier) and “poor-fair” upstream from the dam. Flow and fine sediment are identified as limiting factors. An historical bridge that was modified in 1998 to improve adult passage was reported to create a partial passage barrier in 2007 due to channel down-cutting at the boulder weirs (PWA 2008, p. 45)

#### *Apanolio Creek*

During sampling conducted in Apanolio Creek in 1996 between stream mile 1.1 and the edge of BFI property 0.5 miles upstream, consultants estimated an average *O. mykiss* density of 29 YOY and 23 smolts per 100 feet of stream (PWA 1996).

A 2008 management plan for the Pilarcitos Creek watershed characterizes rearing habitat in Apanolio Creek as “fair” from the Pilarcitos Creek confluence up to the flashboard dam apron below the BFI property bound and “poor” from the flashboard dam apron upstream 1.1 miles (PWA 2008).

Multiple passage barriers have been identified on Apanolio Creek. According to the 2008 management plan for the Pilarcitos Creek watershed, the downstream-most barrier in Apanolio

Creek, a diversion dam, "...normally blocks adult access to all potential spawning and the best rearing habitat" (PWA 2008, p. 45).

#### *Albert Canyon Creek*

A 2008 management plan for the Pilarcitos Creek watershed notes that juvenile *O. mykiss* were observed in Albert Canyon Creek in 1998 and 1999 from the mouth to a boulder falls at stream mile 0.5 that creates the limit of anadromy. A relatively high density of juvenile steelhead was observed in 1998, a wet year, and a density of about two-thirds less was observed in 1999, an average rainfall year. The report states "the tributary is probably a very important spawning site that seeds much of the rearing habitat downstream in Pilarcitos Creek" (PWA 2008, p. 56).

### **Purisima Creek**

#### *Purisima Creek*

An undated DFG creek inventory states that Purisima Creek "is inaccessible to migratory fish due to a thirty foot waterfall at the Pacific Ocean (DFG ca 1994).

In 1995, staff from NMFS surveyed seven pools in the Purisima Redwoods Open Space Preserve and observed a total of 46 *O. mykiss*, 10 of which were age 1+. The surveyed reach extended upstream from a parking lot on Periosteoma Creek Road (NMFS 1996).

### **Lobitos Creek**

#### *Lobitos Creek*

Staff from DFG surveyed the lower 2.5 miles of Lobitos Creek in 1975 and observed a "scant" *O. mykiss* population throughout the surveyed reach with higher densities occurring downstream of Highway 1. The report notes "The stream appears to be underutilized by fish..." (DFG 1975).

An undated DFG creek inventory states "While the downstream portion of Lobitos flows through an agricultural terrace, the stream is fair condition and reportedly supports an annual steelhead run (DFG ca 1994).

In 2002 "low densities of [*O. mykiss*] fry" were observed in Lobitos Creek between the Highway 1 crossing and the lagoon (J. Nelson pers. comm.).

During a fish passage survey conducted in 2004, consultants observed "Several salmonids of approximately three inches in length" in Lobitos Creek downstream and upstream of the Verde Road crossing (Taylor 2004).

Staff from DFG conducted extensive habitat in Lobitos Creek in 2006 and multiple age classes of *O. mykiss* were observed. Staff from DFG indicate that *O. mykiss* in the creek likely have been stream reproducing since the 1920's (J. Nelson pers. comm.). A map produced by the Central Coast Watershed Studies Team (CCoWS) at California State University, Monterey Bay depicting the results of the DFG survey indicates that approximately 0.4 miles of stream was surveyed.

The Highway 1 crossing on Lobitos Creek has been identified as a total migration barrier. The Verde Road crossing located 1,200 feet upstream from Highway 1 is also reported to impede fish passage (Taylor 2004).

## **Tunitas Creek**

### *Tunitas Creek*

A DFG survey report from 1962 states “Tunitas Creek offers a good spawning and nursery area for steelhead in its lower 2 miles” (DFG 1962a).

NMFS staff reported observing two *O. mykiss* in the headwaters in October 1995 and “many more salmonids” in July 1995, when stream flow was considerably higher (NMFS 1996).

Extensive habitat typing was conducted by DFG staff in the Tunitas Creek watershed in 2006. The watershed’s *O. mykiss* population appeared to be low overall, with the greatest density of juveniles occurring in the upper creek reach (J. Nelson pers. comm.).

### *Dry Creek*

During a 1962 survey of Tunitas Creek, staff from DFG observed “good” spawning gravel in the lower 0.1 mile of Dry Creek and ten 1-inch *O. mykiss* “in the first few pools but none above.” The survey report notes “The tributary is apparently of minor value to spawning steelhead... No doubt this tributary dries up during the summer” (DFG 1962a).

Extensive habitat typing was conducted by DFG staff in the Tunitas Creek watershed in 2006. Low densities of *O. mykiss* were observed in the surveyed reach of Dry Creek (J. Nelson pers. comm.). A map produced by the Central Coast Watershed Studies Team (CCoWS) at California State University, Monterey Bay depicting the results of the DFG survey indicates that approximately 0.5 miles of stream contains suitable habitat.

### *East Fork Tunitas Creek*

Staff from DFG surveyed East Fork Tunitas from the mouth upstream one mile to the headwaters in 1964 and observed “excellent” pools and shelter for rearing and a minimum of 50 *O. mykiss* per 100 feet of stream throughout the surveyed reach; the only age class observed was YOY. The survey report states “This stream is an important steelhead spawning and nursery tributary and a main source of summer and winter flow to Tunitas Creek (DFG 1964a).

Extensive habitat typing was conducted by DFG staff in the Tunitas Creek watershed in 2006. Low densities of *O. mykiss* were observed in the surveyed reach of East Fork Tunitas Creek (J. Nelson pers. comm.). A map produced by the Central Coast Watershed Studies Team (CCoWS) at California State University, Monterey Bay depicting the results of the DFG survey indicates that approximately 1.0 mile of stream in the East Fork of Tunitas Creek contains suitable habitat.

## San Gregorio Creek

### *San Gregorio Creek*

Staff from DFG surveyed San Gregorio Creek from 0.5 miles below the Old Stage Road Bridge to its headwaters at the confluence of Alpine and La Honda Creeks in 1985. Rearing habitat was characterized as “good” and the *O. mykiss* population “ranged from moderate to abundant” (DFG 1985a). The survey report notes “Additional water diversions should be considered very carefully to avoid reducing the water level of the creek below the minimal flow to sustain [sic] fish life” (DFG 1985a p.10).

A 1994 report states “A substantial portion of potential smolt production [in San Gregorio Creek] is in the relatively large lagoon...The contribution of the lagoon... to smolt production probably varies from providing a majority of smolts in good years to...almost none in drought years” (Smith 1994).

In 1995 NMFS staff captured 45 *O. mykiss*, 15 of which were age 1+, in San Gregorio Creek near mile marker 7.52 on Highway 84 (NMFS 1996).

Electrofishing surveys conducted in 1996 at 13 sites in San Gregorio Creek between stream miles 6.48 and 11.79 yielded a total of 368 *O. mykiss* ranging in total length from 42 to 245 mm (Unknown 1996). Low stream flow and “discolored, stagnant and contaminated” water was observed downstream from the Coyote Creek confluence (Unknown 1996, p.10).

### *Coyote Creek*

Staff from DFG surveyed Coyote Creek from the mouth to the headwaters in 1973. The survey report states, “Coyote Creek contributes intermittent flows during the winter season only. At the time of this survey, no visible surface water was observed. There was no evidence of fish life in the stream. Coyote Creek does not provide summer nursery habitat for salmonids” (DFG 1973a).

### *Clear Creek*

A 1973 survey report for Clear Creek states “There does not appear to be sufficient water to support fish life in this creek during the summer season. .. Clear Creek is not an important anadromous salmonid producing tributary for the San Gregorio Creek drainage. It does not provide salmonid summer nursery habitat, and offers minimal spawning habitat” (DFG 1973b).

### *El Corte de Madera Creek*

A 1962 letter states that El Corte Madera Creek “...has only fair spawning gravel, but its length and relatively permanent flow make it a fairly important steelhead spawning and nursery tributary to the San Gregorio Creek drainage” (DFG 1962b).

A stream inventory conducted in El Corte de Madera Creek in 1996 yielded seven *O. mykiss* ranging in length from 75 to 239 mm at stream mile 0.4, 31 *O. mykiss* ranging in length from 52 to 242 mm at stream mile 0.77, nine *O. mykiss* ranging in length from 64 to 163 mm at stream mile 1.11, and 31 *O. mykiss* ranging in length from 55 to 136 mm at stream mile 3.21 (Hickethier 1996 p.6). A bedrock sheet located at stream mile 4.6 was identified as the upstream limit of anadromy. No fish were observed above this point (Hickethier 1996).

### *Bogess Creek*

During a 1996 survey DFG staff captured a total of 510 *O. mykiss* ranging in total length from 38 to 255 mm in Bogess Creek between the mouth and stream mile 4.3 (Dunn 1996). A 60 foot long bedrock sheet at stream mile 5.04 was identified as the upstream limit of anadromy (Dunn 1996, p. 12). The Highway 84 culvert was identified as a partial passage barrier.

During fish sampling in 2007 DFG staff captured 10 YOY, 10 age 1+, and one age 2+ *O. mykiss* in Bogess Creek 3,635 feet upstream of the San Gregorio creek confluence and 116 YOY, 12 age 1+, and three age 2+ *O. mykiss* directly upstream of a boulder cascade located at stream mile 3.0 (DFG 2007).

### *Kingston Creek*

A 1985 DFG survey report states that Kingston Creek “provides fair spawning and good rearing habitat for salmonid fish. However, due to the large amount of barriers, both passable and impassable, it is unlikely that salmonids migrate into the creek. However, Kingston Creek does support a population of resident RT” (DFG 1985b).

### *Harrington Creek*

In 1997 DFG staff captured a total of 58 *O. mykiss* ranging in total length from 45 to 187 mm in Harrington Creek in the first 0.3 miles of stream (DFG 1996a).

In 2007 DFG staff captured 67 YOY and nine age 1+ *O. mykiss* in Harrington Creek 680 feet upstream from the San Gregorio Creek confluence and 75 YOY and six age 1+ *O. mykiss* at stream mile 1.9, above of a series of log jams and boulder cascades (DFG 2007).

A 2006 stream inventory report identifies a series of bedrock falls at stream mile 2.5 in Harrington Creek as the upstream limit of anadromy (CCC 2006b).

### *La Honda Creek*

During a stream survey in 1995 DFG staff captured a total of 503 YOY, 51 age 1+, and two age 2+ *O. mykiss* in La Honda Creek between stream miles 1.0 and 4.0 (DFG 1997a). Surveyors noted multiple partial barriers created by small cobble dams or artificial steps (DFG 1997a, p. 5).

In 2007 DFG staff captured 13 YOY, two age 1+, and two age 2+ *O. mykiss* in La Honda Creek at stream mile 3.45 and 36 YOY and seven age 1+ *O. mykiss* at stream mile 4.8 (DFG 2007).

According to a 2006 stream inventory report for La Honda Creek, “pool habitat is relatively abundant and deep with good cover in most areas” and the upstream limit of anadromy likely occurs at a bedrock cascade located at stream mile 5.4 (CCC 2006c).

### *Woodhams Creek*

A 12 foot high waterfall at the mouth of Woodhams Creek precludes access to steelhead (J. Nelson pers. comm.).

### *Langley Creek*

A 1996 stream inventory report for Langley Creek notes that 19 steelhead trout were captured at stream mile 0.3. Young-of-year “salmonids” were also observed in the upper stream. The survey report notes that a series of bedrock falls located 12,656 feet from the mouth create a total barrier to anadromy (McKernan and Ouradnik 1996).

### *Woodruff Creek*

Staff from DFG surveyed Woodruff Creek in 1964 and observed steelhead trout at an abundance ranging from 25 to 75 individuals per 100 feet of stream in the lower 1.5 miles of stream. The upper limit of anadromy was noted to occur at approximately stream mile 1.5 (DFG 1964b).

### *Alpine Creek*

In 1995 DFG staff captured a total of 469 YOY, 66 age 1+, and two age 2+ *O. mykiss* in Alpine Creek between the La Honda Creek confluence and stream mile 4.0 (DFG 1997b). According to the survey report, the upstream limit of anadromy likely occurs at a 12 foot high waterfall barrier located at stream mile 5.4 (DFG 1997b).

A 2004 stream crossing inventory identified the concrete apron and weirs downstream of the fish ladder in Alpine Creek at Pescadero Creek Road as a severe partial passage barrier and assigned it a high priority ranking for modification (Taylor 2004). Although funding was obtained to replace or modify the existing weirs, the project was not implemented due to conflict with the property owner. According San Mateo County’s 2008 implementation plan for FishNet 4C restoration goals, the funding obtained for the project may be used for restoration in other parts of the watershed (Fish Net 4C 2008).

### *Mindego Creek*

In 1996 DFG staff captured 40 *O. mykiss* ranging in total length from 52 to 225 mm in Mindego Creek at stream mile 0.29 and 38 *O. mykiss* ranging in total length from 44 to 187 mm at stream mile 0.7 (DFG 1996a, p. 6). The survey report recommended identifying and treating sediment sources and monitoring and maintaining the fish ladder at the dam located 0.58 miles upstream from the confluence with Alpine Creek (DFG 1996a, p. 8). A nine foot waterfall located at approximately stream mile 2.65 was identified as a likely barrier to anadromous fish and a seven foot waterfall located at approximately stream mile 2.9 was identified as the probable upstream limit of anadromy (DFG 1996a, p. 10).

Staff from NMFS observed multiple year classes of *O. mykiss* in Mindego Creek in 2006 (B. Spence pers. comm.).

### *Rodgers Gulch*

Consultants observed a single three-inch salmonid in Rodgers Gulch Creek near the Alpine Road crossing in 2004 while conducting a barrier survey (Taylor 2004).

## **Pomponio Creek**

### *Pomponio Creek*

During a stream survey conducted in Pomponio Creek in 2000, DFG staff captured YOY and age 1+ *O. mykiss* between stream mile 0.5 and a 15 foot high waterfall located at stream mile 2.3 that was identified as a total barrier to anadromy. The survey report notes “adequate” steelhead spawning and rearing habitat downstream of the waterfall (DFG 2000).

## **Pescadero Creek**

### *Pescadero Creek*

In 1995 DFG staff captured a total of 444 *O. mykiss* ranging in total length from 58 to 261 mm from five sampling sites in Pescadero Creek between the USGS gage at stream mile 4.6 to the Wurr Road crossing at stream mile 9.65 (DFG 1996b).

A 2004 assessment prepared for the Pescadero-Butano Creek watershed found optimal salmonid habitat in the Pescadero Creek mainstem, with the highest quality habitat in the mid and upper creek upstream of Loma Mar. The survey report states “With the exception of Pescadero Creek itself and Pescadero Marsh, the lower part of the Pescadero Creek Basin, including the Bradley Creek and McCormick Creek basins, is currently of minor importance to the fishery...Pescadero Creek below Loma Mar provides moderate quality spawning and rearing habitat, and is important as a migration corridor (ESA 2004, p. 2-16).

### *Butano Creek*

A 1996 memo concerning habitat limitations notes “lack of channel integrity” in Butano Creek from stream mile 0.4 through 0.8 resulting from high silt deposition, lack of riparian vegetation, and lack of instream flow due to water diversions (DFG 1996c, p. 14).

A 1997 letter from staff at the San Mateo County RCD states that Butano Creek supports a steelhead population (Schroeder 1997).

A 2004 assessment prepared for the Pescadero-Butano Creek watershed assigned low habitat rating scores to Butano Creek, with the exception of the reach between Cloverdale Road and Butano Falls, which received a “good” habitat rating (ESA 2004, p. 2-16). The report states, “Much of Butano Creek’s fishery is in only fair condition at best, but may be expected to improve gradually over time with the much-improved land management practices now in place in the upper watershed...” (ESA 2004 p. 2-16). “Embeddedness, sediment deposition, and lack of epifaunal substrate tend to be the predominant problems in ...the entire Butano Creek watershed (ESA 2004, p. 8-8).

Staff from NMFS observed multiple age classes of *O. mykiss* in Butano Creek in 2006 (B. Spence pers. comm.) and local residents have observed adult steelhead up to the base of Butano Falls in recent years (M. Stoecker pers. comm.).

### *Little Butano Creek*

A natural falls at stream mile 0.15 in Little Butano Creek likely precludes steelhead access (DFG 1962c), but the stream supports a resident *O. mykiss* population.

In 1995, NMFS staff observed 20 YOY and four age 1+ *O. mykiss* in Little Butano Creek upstream of the ranger's house in Butano State Park (NMFS 1996).

A 2004 assessment prepared for the Pescadero-Butano Creek watershed found "optimal" salmonid habitat in Little Butano Creek and placed priority on conserving and improving habitat in this tributary (ESA 2004).

#### *South Fork Butano*

Staff from DFG surveyed South Fork Butano Creek in 1964 and observed multiple *O. mykiss* year classes (DFG 1964c).

#### *Bradley Creek*

In 1997 DFG staff observed multiple age classes of *O. mykiss* in Bradley Creek in eight sample reaches located between the Stage Road Bridge crossing north of the cemetery and the Stage Road Bridge crossing over an E-W unnamed stream north of Chandler Gulch. The survey report notes that YOY *O. mykiss* were generally abundant at the survey sites (SWRCB 1997).

A fish passage evaluation conducted for San Mateo County streams in 2004 assigns a high priority ranking for modification of concrete culverts at several Stage Road crossings on Bradley Creek and noted the presence of "numerous juvenile steelhead" during multiple visits to the creek in 2002 (Taylor 2004, App. B).

#### *Shaw Gulch*

A reservoir on Shaw Gulch creates a total barrier to anadromy. A 1998 document noted that a resident *O. mykiss* population and good-quality rearing habitat occurred upstream of the reservoir. The document noted that Shaw Gulch Creek does not maintain connectivity to Bradley Creek in all years, but that in wet years the reach between the Bradley Creek confluence and the reservoir could provide habitat for steelhead (SWRCB 1998).

#### *Bradley Creek tributary (Tahana Gulch)*

A 2004 fish passage report notes that Tahana Gulch Creek "seems like a good fish stream" (Taylor 2004).

#### *Honsinger Creek*

In 2005 fish sampling was conducted in Honsinger Creek downstream and upstream of a perched culvert at the TomKat Ranch access road located approximately one mile upstream from the Pescadero Creek confluence. A total of 106 *O. mykiss* were captured at four sampling sites downstream of the culvert and a total of 171 *O. mykiss* were captured at four sampling sites upstream of the culvert (HES 2005, p. 4). "Catch rates of steelhead/rainbow trout ranged from 9 to 31 per 100 feet of stream length sampled and averaged 18. Catch of smolt sized [*O. mykiss*]... averaged 5.4 per 100 feet upstream of the culvert and 2.7 downstream" (HES 2005, p. 4). The report indicates that the culvert will soon be replaced by a bridge and states, "the future health of [*O. mykiss*] populations is most sensitive to fine sediments (silt and sand) entering the stream from the

surrounding watershed lands and reductions in summer flow levels from direct diversion or change in watershed runoff characteristics...” (HES 2005, p. 5).

A 2004 stream crossing inventory identified the culvert at Pescadero Creek Road crossing on Honsinger Creek as a partial passage barrier (Taylor 2004).

#### *Weeks Creek*

A 1993 DFG water rights protest memorandum states the following in regard to *O. mykiss* habitat in Weeks Creek: “The construction of the onstream reservoirs has resulted in several barriers to the migration of fish, especially the steelhead which are historically known to occur upstream of the Mazzanti property. These barriers must be removed to allow steelhead migration up and downstream” (DFG 1993).

DFG staff surveyed Weeks Creek in 1994 from the creek mouth upstream 1.25 miles. Several YOY and two age 1+ *O. mykiss* were observed between the confluence with Pescadero Creek and the Pescadero Road culvert crossing, which creates a total passage barrier. No fish were observed upstream of the culvert. The DFG survey report states “Weeks Creek could support summer rearing of steelhead, especially because of cool water temperatures in pools in the reaches above [the Lemon Hill property reservoir], if barriers were removed” (DFG 1994a).

A 2004 stream crossing inventory identifies the dam at the Lemon Hill property as a total passage barrier, and characterizes habitat quality upstream of the dam as “marginal to poor” (Taylor 2004).

#### *McCormick Creek*

During a stream crossing inventory in 2004 several juvenile *O. mykiss* were observed in McCormick Creek downstream of the Pescadero Creek Road crossing (Taylor 2004). The Pescadero Creek Road crossing was identified as a partial passage barrier with an estimated 8,100 feet of potential habitat located upstream. Migration barriers identified downstream of the crossing included a defunct dam located 300 feet downstream of the Pescadero Creek Road crossing (Taylor 2004).

#### *Hoffman Creek*

A 2004 fish passage report describes Hoffman Creek as “Steep—Deemed not fish bearing” (Taylor 2004).

#### *Tarwater Creek*

Staff from DFG observed *O. mykiss* in Tarwater Creek in 1995, 2000, and 2001 (J. Nelson pers. comm.).

A 2004 assessment prepared for the Pescadero-Butano Creek watershed found “optimal” habitat in Tarwater Creek. The report states, “Tributaries such as Tarwater...in particular provide high quality salmonid habitat and thus require special attention in regards to conservation and restoration (ESA 2004, p. 5).

### *Peters Creek*

Staff from DFG surveyed Peters Creek in 1962 and found *O. mykiss* “abundant throughout all areas of the stream” (DFG 1962d).

In 1995 DFG staff captured a total of 1,275 *O. mykiss* ranging in total length from 36 to 99 mm and 155 *O. mykiss* ranging in total length from 100 to 255 mm in Peters Creek at six sampling stations located between the Pescadero Creek confluence and the Lambert Creek confluence (DFG 1996d).

A 2004 assessment prepared for the Pescadero-Butano Creek watershed found “optimal” habitat in Peters Creek (ESA 2004).

### *Evans Creek*

In 1995 DFG staff captured 31 *O. mykiss* ranging in total length from 41 to 96mm in Evans Creek upstream of the Portola State Park Road culvert (DFG 1997c). The culvert was identified as a total barrier to anadromy. The report recommends replacing the culvert to allow fish passage and conducting further habitat surveys above the dam at stream mile 0.40 when Evans Creek is accessible to steelhead.

### *Bear Creek*

Staff from DFG surveyed Bear Creek in 1995 and noted lack of suitable steelhead habitat and “overall poor condition” in the majority of the stream. A small number of *O. mykiss* were observed near the mouth (DFG 1997g).

### *Lambert Creek*

Staff from DFG observed YOY and age 1+ *O. mykiss* in the lower portion of Lambert Creek in 1995 (J. Nelson pers. comm.).

A 2004 assessment prepared for the Pescadero-Butano Creek watershed notes that Lambert Creek contains high quality habitat and requires “special attention in regards to conservation and restoration” (ESA 2004, p. 8-14).

### *Fall Creek*

A natural rock barrier in Fall Creek located approximately 300 yards from the mouth creates a total barrier to anadromy (J. Nelson pers. comm.). A 1962 DFG survey report notes that Fall Creek provides “important” spawning habitat for steelhead in the accessible reach (DFG 1962e).

### *Slate Creek*

In 1995 DFG staff captured a total of 167 *O. mykiss* ranging in total length from 38 to 97 mm and 29 *O. mykiss* ranging in total length from 104 to 244 mm in Slate Creek between the Pescadero Creek confluence and a waterfall located at stream mile 1.24 that was identified as the upstream limit of anadromy (DFG 1997d).

A 2004 assessment prepared for the Pescadero-Butano Creek watershed found “optimal” habitat in Slate Creek (ESA 2004).

### *Oil Creek*

In 1995 DFG staff captured a total of 495 *O. mykiss* ranging in total length from 42 to 99 mm and 135 *O. mykiss* ranging in total length from 100 to 214 mm in Oil Creek at 11 sampling stations located between the Pescadero Creek confluence and stream mile 3.9 (DFG 1997e).

A 2004 assessment prepared for the Pescadero-Butano Creek watershed found “optimal” habitat in Oil Creek and notes that the tributary requires “special attention in regards to conservation and restoration” (ESA 2004, p. 8-14).

### *Little Boulder Creek*

A 2004 assessment prepared for the Pescadero-Butano Creek watershed assigned a habitat rating of ten (of maximum of 14) to Little Boulder Creek. The assessment gave moderate priority to improving habitat in the creek (ESA 2004, p. 8-15).

### *Waterman Creek*

A 2004 assessment prepared for the Pescadero Creek watershed notes “Waterman Creek is still recovering from severe past disturbance, including culverting of its lower reach and filling of its channel. A major stream restoration project, sponsored by the California Department of Fish and Game, has restored this reach, and provided some spawning and rearing habitat, though as yet of limited quality” (ESA 2004).

Staff from DFG noted in 2008 that a defunct dam at stream mile 0.5 on Waterman Creek creates a barrier to anadromy (J. Nelson pers. comm).

## **Gazos Creek**

### *Gazos Creek*

A 1994 DFG survey report states “Gazos creek has sufficient spawning and rearing habitat to sustain runs of both coho salmon and steelhead trout” (DFG 1994b).

A 2003 fishery assessment prepared for the Gazos Creek watershed reports that YOY *O. mykiss* densities in Gazos Creek were observed to be consistently low downstream of Old Woman’s Creek during surveys conducted by Dr. Jerry Smith between 1998 and 2001. Densities of YOY *O. mykiss* were observed to increase upstream to the South Fork confluence, with the highest density observed in the upper reaches (Alley 2003, pp. 8-9). Fine sediment originating from Old Woman’s Creek was believed to limit YOY *O. mykiss* production (Alley 2003, p. 8).

As part of a long term study of the Gazos Creek fishery, Dr. Jerry Smith conducted fish sampling in Gazos Creek in 2006 from the mouth to the bedrock chute upstream of the Middle Fork confluence, yielding an average density of 19 YOY and five juvenile *O. mykiss* per 100 feet of stream. The survey report states “Steelhead YOY density was the lowest... since expanded sampling began in 1998, and was lower than all previous results at 7 of 8 sites. Two large logjams, which probably restricted adult access, and redd destruction by late storms may be responsible for the low densities

(Smith 2007, p.1). “Yearling abundance in 2006 was similar to that of recent years, so the large storms did not apparently result in lower over-winter survival (Smith 2007, p. 8).”

On the Gazos Creek mainstem, a bedrock chute located just upstream of the Middle Fork confluence on the North Fork creates a barrier to upstream passage in most years, though adult steelhead are able to pass under “optimal” conditions. The upstream limit of anadromy occurs at a large chute located approximately 6.9 miles from Highway 1 (Alley 2003, p. 37).

#### *Old Womans Creek*

In 1994 DFG staff observed *O. mykiss* in Old Womans Creek throughout a 0.7 mile reach downstream of a culvert that created a barrier at the time of the survey but has since blown out. The report states that Old Woman Creek “offers marginal and limited spawning and rearing habitat” (DFG 1994b). Dr. Jerry Smith suggests that Old Womans Creek has “limited value” to the fishery due to high levels of fine sediment (Alley 2003, p. 27).

### **Whitehouse Creek**

#### *Whitehouse Creek*

Staff from DFG surveyed Whitehouse Creek in 1988 from the mouth to the headwaters. The survey report states, “The instream habitat of Whitehouse Creek rates good to excellent for salmonid fish production provided adequate summer flows are available. Spawning and rearing habitat substrate is suitable... The observations of numerous juvenile salmonids and the four adult steelhead, indicate that instream habitat in Whitehouse Creek is suitable for salmonid fishes” (DFG 1988).

DFG staff conducted a habitat survey on 3.9 miles of Whitehouse Creek in May 1997. Between the ocean and Highway 1 three *O. mykiss* fry were observed. Between stream mile 1.7 and a perched culvert at stream mile 3.0, juvenile *O. mykiss* were “abundant.” No fish were observed upstream of the perched culvert, which was identified as a total barrier to anadromy (DFG 1997f). The concrete apron below Highway 1 was identified as a partial passage barrier. An impassible concrete dam filled with sediment was located approximately 600 feet above the perched culvert. The natural upstream limit of anadromy was believed to occur at a series of boulders and bedrock cascades starting 900 feet upstream of the dam.

### **Año Nuevo Creek**

#### *Año Nuevo Creek*

In 1995 DFG staff captured 99 *O. mykiss* ranging in total length from 45 to 97 mm and 20 *O. mykiss* ranging in total length from 100 to 212 mm in Año Nuevo Creek between the mouth and a 25 foot high diversion dam at stream mile 0.78 (DFG 1996e). The Highway 1 Bridge was identified as a partial passage barrier and the diversion dam as a total barrier to fish passage. The survey report recommended surveying habitat resources upstream of the dam (DFG 1996e, p. 8).

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## Santa Cruz County

### Waddell Creek

#### *Waddell Creek*

As part of a long term study of the Waddell Creek fishery, Dr. Jerry Smith conducted fish sampling in Waddell Creek in August of 1997 and captured total of 614 YOY and 53 age 1+ *O. mykiss* at five sampling stations located between Highway 1 and 3.1 miles upstream (Smith 1997a). Sampling conducted in 2006 at the same sampling stations yielded a total of 46 YOY and 14 age 1+ *O. mykiss* (Smith 2007a). The survey report states, “The Waddell Creek main stem... had very low steelhead densities ...and overall watershed density was low... apparently due to the 8<sup>th</sup> consecutive year of fish kills on the East Fork and main stem...the kills appear to come from toxic pollution from the Last Chance Creek watershed” (p.1).

#### *West Waddell Creek*

In 2004 researchers captured a total of 317 YOY and 28 age 1+ *O. mykiss* in West Waddell Creek at four sampling stations located between Highway 1 and 5.25 miles upstream (Smith 2004).

In 2006 38 YOY and four age 1+ *O. mykiss* were captured at stream mile 3.3 and 81 YOY and three age 1+ *O. mykiss* were captured at stream mile 3.9 in West Waddell Creek (Smith 2007a). According to the survey report, West Waddell Creek has been providing the majority of steelhead rearing habitat in the Waddell Creek watershed since 1999 due fish kills on the East Fork and mainstem (p.13).

#### *West Waddell tributary (Buck Creek)*

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use the reach of Buck Creek extending from the mouth upstream 300 feet (County of Santa Cruz 2004).

#### *Henry Creek*

In 2002 researchers collected 21 YOY and one age 1+ *O. mykiss* in Henry Creek at stream mile 0.2 (Smith 2004, p. 15).

A 1997 DFG survey report identifies the upstream limit of anadromy in Henry Creek as a 75 foot high cascade and bedrock cliff located 4,060 feet upstream from the West Waddell Creek confluence (DFG 1997a).

#### *Henry Creek tributary*

The unnamed Henry Creek tributary was inventoried by DFG staff in 1997. The survey report notes the presence of *O. mykiss* in the downstream 190 feet of stream, below a debris accumulation. The survey ended at a thirteen foot high waterfall located 549 feet upstream from the Henry Creek confluence (DFG 1997a).

### *Berry Creek*

A draft aquatic inventory report for Big Basin Redwoods State Park prepared in 2000 identified Berry Creek as one of three major perennial tributaries to West Waddell Creek. The report notes that a 40 foot waterfall in Berry Creek located approximately 100 yards from the West Waddell Creek confluence limits spawning habitat for anadromous fish to areas near the mouth of Berry Creek. A resident *O. mykiss* population was noted to occur upstream from the falls (DPR 2000).

### *Kelly Creek*

A draft aquatic inventory report for Big Basin Redwoods State Park prepared in 2000 notes that Kelly Creek is a perennial stream that supports steelhead in the lower reach (DPR 2000). The report describes Kelly Creek as "...steep, with exposed bedrock and plunge pools which limit access and spawning habitat for anadromous fish to areas near the mouth..." (DPR 2000, p. AQ-10).

### *East Waddell Creek*

During a survey conducted in East Waddell Creek in 2006, researchers collected 35 YOY and one age 1+ *O. mykiss* at stream mile 0.5 (downstream from Last Chance Creek), and 96 YOY and six age 1+ *O. mykiss* at stream mile 0.8 (upstream from Last Chance Creek) (Smith 2007a). The low *O. mykiss* density observed downstream of Last Chance Creek was consistent with fish kills that occurred on the East Fork and mainstem for eight consecutive years prior to sampling in 2006. The report indicates that the high steelhead density observed upstream of Last Chance Creek suggests that the fish kills result from toxic pollution coming from the Last Chance Creek watershed (Smith 2007a, p. 2).

The upstream limit of anadromy in the East Fork is believed to occur at a 30 foot high waterfall located at stream mile 1.3. "Abundant" resident *O. mykiss* have been observed upstream of the waterfall (DPR 2000, p. AQ-26).

### *Last Chance*

Staff from DFG conducted a "spot check" of Last Chance Creek in spring 2006 and observed multiple *O. mykiss* year classes (K. Atkinson pers. comm.). A 15-18 foot high waterfall near stream mile 0.1 creates a total barrier to anadromy. A resident *O. mykiss* population occurs upstream from the falls (J. Nelson pers. comm.).

### *Opal Creek*

A draft aquatic inventory report for Big Basin Redwoods State Park prepared in 2000 states that *O. mykiss* "...are relatively abundant (four age classes have been observed) in Opal Creek to a point at least half a mile upstream from "Barnes Kiosk"; this upper area is used by Opal Creek trout for spawning" (DPR 2000, p. AQ-27).

### *Blooms Creek*

A draft aquatic inventory report for Big Basin Redwoods State Park prepared in 2000 states that resident *O. mykiss* are present throughout Blooms Creek (DPR 2000, p. AQ-27). Upper Blooms Creek was noted to be periodically contaminated by sewage leaks in the vicinity of the campground (DPR 2000, p. AQ-13).

### *Sempervirens Creek*

A draft aquatic inventory report for Big Basin Redwoods State Park prepared in 2000 notes that *O. mykiss* have been found to successfully reproduce at the inlet of the Sempervirens Reservoir and are “normally distributed throughout Sempervirens Creek with the greatest numbers occurring below Sempervirens Falls” (DPR 2000, p. AQ-26).

### *Union Creek*

A draft aquatic inventory report for Big Basin Redwoods State Park prepared in 2000 notes the presence of *O. mykiss* “...in the lower and middle reaches of Union Creek, but apparently not above the maintenance-area road crossing” (DPR 2000, p. AQ-27). Upper Blooms Creek is periodically contaminated via sewage leaks in the vicinity of the campground (DPR 2000, p. AQ-13).

## **Scott Creek**

### *Scott Creek*

A long-term coho and steelhead distribution and abundance study conducted between 1992 and the present indicates the consistent presence of *O. mykiss* in Scott Creek. As part of this study, researchers sampled Scott Creek in 2006 and collected a total of 508 YOY and 88 age 1+ *O. mykiss* at seven sampling stations located between Highway 1 and 5.85 miles upstream (Smith 2007a, p.18).

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that Scott Creek is accessible to steelhead from the mouth upstream 42,960 feet to a natural waterfall barrier, above which a resident *O. mykiss* population occurs. The map cites a 1997 CDFG survey as the source of information (County of Santa Cruz 2004).

### *Scott tributary 1 (Quesaria Creek)*

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use a portion of the unnamed Scott Creek tributary ( County of Santa Cruz 2004).

A fish passage assessment of Santa Cruz County streams prepared in 2004 notes that a concrete culvert barrier at the Swanton Road crossing on Quesaria Creek was replaced with an arch culvert in Fall of 2003, opening access to 3,200 feet of upstream habitat (Taylor 2004, p. 45). According to the FishNet 4C website “Since the culvert was replaced with an open bottomed arch by Santa Cruz County Public Works, juvenile fish have been able to access upstream habitat for rearing and spawning.”

### *Little Creek*

In 1992 DFG staff observed YOY and age 1+ *O. mykiss* in Little Creek throughout a survey reach extending from the Scott Creek confluence upstream 1.75 miles (DFG 1992).

A 1993 DFG report states, “Little Creek provides approximately 2 miles of spawning and rearing habitat for steelhead” (DFG 1993a, p. 1).

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use the portion of Little Creek downstream from the confluence of the headwater forks and notes that a natural bedrock cascade barrier occurs 6,501 feet upstream from the Scott Creek confluence. A 1997 CDFG survey is cited as the source of information (County of Santa Cruz 2004).

#### *Big Creek*

A 1958 DFG survey for Big Creek states that the lower 2.5 miles of Big Creek “appears to be a fair spawning and nursery area” for *O. mykiss*, noting that barrier falls occurs both at stream mile 2.5 and at a point further downstream that was located on private property and not surveyed (DFG 1958).

Fish sampling was conducted annually in two reaches of Big Creek from 2001 through 2004 as part of a long term study of salmonid resources of the Scott Creek watershed. In a sample reach located downstream from the hatchery, YOY *O. mykiss* density was estimated to be 56.1 individuals per 100 feet of stream in 2001 and 59.2 individuals per 100 feet of stream in 2002. In a sample reach located above Swanton Rd, YOY *O. mykiss* density was estimated to be 91.3 individuals per 100 feet in 2001, 61.7 individuals per 100 feet in 2002, 52.7 individuals per 100 feet in 2003, and 32.8 individuals per 100 feet in 2004 (Smith 2004).

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that Big Creek is accessible to steelhead from the Scott Creek confluence upstream 8,715 feet to a bedrock falls, above which a resident *O. mykiss* population occurs. The map cites a 1997 CDFG survey as the source of information (County of Santa Cruz 2004).

A report prepared in 2007 as a continuation of the long term study of the Scott Creek watershed states “As in several recent years densities were particularly low on Scott Creek downstream of Big Creek and in Big Creek. This is apparently due to storm flows and sandy substrate that results in poor redd survival in Big Creek and Scott Creek downstream of Big Creek” (Smith 2007a, p. 8).

#### *Boyer Creek*

Boyer Creek enters Big Creek upstream of the limit of anadromy on Big Creek. A dam on Boyer Creek forms Boyer Lake, and an impassible barrier falls is located 0.25 miles downstream from the dam (DFG 1953).

#### *Mill Creek*

In 1993 DFG staff observed “abundant” YOY and age 1+ *O. mykiss* in Mill Creek throughout a survey reach that extended from the Scott Creek confluence upstream 2.4 miles (DFG 1993a). The survey report concludes, “Mill Creek provides excellent spawning and rearing habitat for both coho salmon and steelhead” (DFG 1993a, p. 4).

Sampling was conducted annually between 2001 and 2004 in Mill Creek below the Swanton Road crossing as part of a long term study of salmonid resources of the Scott Creek watershed. Density of YOY *O. mykiss* in Mill Creek was estimated to be 55 individuals per 100 feet of stream in 2001, 42.4 individuals per 100 feet in 2002, and 63.4 individuals per 100 feet in 2003. Sampling at the site in 2004 yielded 32 YOY and seven age 1+ *O. mykiss* (Smith 2004). A natural falls at stream mile 2.6 creates a barrier to anadromy.

### *Scott tributary 2 (Bettencourt Gulch)*

According to staff from DFG, Bettencourt Gulch “is used for spawning and minor rearing” (J. Nelson pers. comm.). A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use the portion of Bettencourt Gulch downstream from a bedrock cascade located at approximately stream mile 0.75 (County of Santa Cruz 2004).

## **Molino Creek**

### *Molino Creek*

A survey of stream conditions within Coast Dairies Property was conducted in 2001. A short reach of Molino Creek upstream of Highway 1 was found to contain suitable rearing habitat and “approximately 10 salmonids” were observed. The survey report states, “Although the stream length and watershed size of Molino Creek are relatively small compared to other coastal streams in the region..., the stream does provide limited habitat for anadromous salmonids and appears to contain no impassable barriers downstream of potential spawning and rearing sites” (ESA 2001, p. 3.3-13)

## **Ferrari Creek**

### *Ferrari Creek*

A survey of stream conditions within Coast Dairies Property was conducted in 2001. Multiple passage barriers were noted on Ferrari Creek, but yearling and juvenile salmonids were observed in reaches below and above Highway 1 and sections of suitable rearing habitat occurred up to the headwaters (ESA 2001). The survey report states “With respect to the geomorphologic and biotic conditions of the stream, Ferrari Creek appears to provide adequate habitat for a small salmonid population. Clearly the primarily limiting factor on this creek is the presence of difficult-to-pass and/or impassable migration barriers...” (ESA 2001, p. 3.3-15).

## **San Vicente Creek**

### *San Vicente Creek*

In 1995 DFG staff captured a total of 228 *O. mykiss* ranging in total length from 53 to 269 mm in San Vicente Creek (DFG 1996a).

In 1998 DFG staff conducted fish sampling in the lower 2.4 miles of San Vicente Creek and captured 245 YOY *O. mykiss* ranging in total length from 51 to 100 mm, 112 age 1+ *O. mykiss* ranging in total length from 101 to 156 mm, and seven age 2+ *O. mykiss* ranging in total length from 160 to 357 mm (Nelson 1998).

A survey of stream conditions within Coast Dairies Property was conducted in 2001. Between 500 to 700 recently emerged YOY *O. mykiss* were observed in San Vicente Creek in a reach extending approximately 0.6 miles upstream of Highway 1, and an off channel reservoir within the reach contained an additional 500 YOY *O. mykiss*. Yearling and YOY *O. mykiss* were observed throughout the next mile upstream (ESA 2001).

A 2002 resource protection plan states “San Vicente Creek...supports a healthy steelhead run, and overall has the best salmonid habitat on the [Coast Dairies] Property” (Elliot 2002).

A 2003 smolt out-migration study of San Vicente Creek identifies the defunct mining tunnel at stream mile 3.4 on San Vicente Creek as a total barrier to fish passage (ESA 2003).

#### *Mill Creek*

In 1996 DFG staff captured 33 *O. mykiss* ranging in total length from 53 to 140 mm at stream mile 0.26 and 14 *O. mykiss* ranging in total length from 72 to 258 mm at stream mile 0.46 in Mill Creek (Fisher 1996).

A 2003 smolt out-migration study of San Vicente Creek identifies water diversion dams at stream miles 0.5 and 0.75 on Mill Creek as total barriers to fish passage (ESA 2003).

### **Liddell Creek**

#### *Liddell Creek*

During a 2001 survey of stream conditions within Coast Dairies Property an estimated 50 yearling salmonids were observed in Liddell Creek in a reach extending approximately 1.1 miles upstream from Highway 1. Several yearlings and one YOY salmonid were observed upstream to approximately 0.7 miles upstream of the East Branch confluence (ESA 2001). The concrete culvert across the beach and under the Highway 1/railroad crossing was found to prevent access to migrating salmonids under most flow conditions, but the survey report noted that a project to improve fish passage at this site would likely be implemented (ESA 2001, p. 3.3-18).

A resource protection plan states that mining operations on the upper part of the Liddell Creek watershed on the Coast Dairies property “have a profound effect on Liddell Creek Watershed’s hydrology, water quality, and aquatic and terrestrial biology” (Elliot 2002).

#### *West Liddell Creek*

During a 2001 survey of stream conditions within Coast Dairies Property, several *O. mykiss* yearlings were observed in West Liddell Creek between the Liddell Creek confluence and a sediment pond located approximately two miles upstream. The culvert at the sediment pond was identified as a total passage barrier (ESA 2001). The survey report states, “...options for improving sediment containment should be a high priority for this watershed. Another significant limiting factor appears to be the unlimited water rights the City of Santa Cruz holds...” (ESA 2001, p. 3.3-21).

A fish passage assessment of Santa Cruz County streams prepared in 2004 identified the Bonny Doon Road culvert crossings at post miles 0.69 and 0.94 on West Liddell Creek as total passage barriers and assigned them high priority ranking for modification. According to the report, approximately 1.8 miles of good quality habitat exists upstream of the first barrier (Taylor 2004).

#### *East Branch Liddell Creek*

During a 2001 survey of stream conditions within Coast Dairies Property, a “few” yearling salmonids were observed in the lower portion of East Branch Liddell Creek in a reach that extended

upstream approximately 1.2 miles from the mainstem confluence (ESA 2001, p. 3.3-20). The report notes that a large amount of fine sediment has been deposited in the East Branch due to quarry-related sediment ponds (ESA 2001, p. 3.3-20).

## **Yellow Bank Creek**

### *Yellow Bank Creek*

A 2001 survey of stream conditions within Coast Dairies Property identified the outlets of two reservoirs located within the 0.5 miles upstream of Highway 1 on Yellow Bank Creek as total migration barriers. The report noted that the mouth of Yellow Bank Creek was dry at the time of the survey. Approximately 1.2 miles of stream immediately above the reservoir barriers was noted to contain spawning and rearing habitat and salmonids believed to be resident *O. mykiss* were observed. Significant fine sediment deposition due to road failures impaired the remainder of the stream (ESA 2001).

## **Laguna Creek**

### *Laguna Creek*

A 2001 survey of stream conditions within Coast Dairies Property found “very good” quality rearing habitat in Laguna Creek downstream and upstream of the Highway 1 culvert, and “Approximately 20 yearling salmonids” were observed downstream from the Y Creek confluence (ESA 2001). The survey report notes that when the sandbar forms at Laguna Creek Marsh, the lagoon that forms provides habitat for out-migrating salmonids.

A memo from DFG staff states, “The limiting factor at Laguna Creek lagoon is lack of water due to upstream diversions. Diverting less water upstream would provide habitat... In addition, keeping the sandbar in place would increase lagoon water volumes as well as improve water quality (DFG 2006).

### *Laguna tributary (Y Creek)*

During a 2001 survey of stream conditions within Coast Dairies Property, 30 YOY salmonids were observed in Y Creek near the Laguna Creek confluence. A boulder falls near the confluence of Y and Laguna creeks was identified as a “formidable barrier to salmonid migration” (ESA 2001, p. 3.3-23). The survey report states, “Although there appears to be adequate habitat for a small steelhead population, all fish observations occurred near the creek’s confluence with Laguna Creek” (ESA 2001, p. 3.3-25).

## **Majors Creek**

### *Majors Creek*

In 2001 DPR staff conducted fish sampling in Majors Creek downstream of the Highway 1 culvert, yielding an estimated 211 *O. mykiss* per mile of stream. Young-of-year and age 1+ *O. mykiss* were observed. Fish sampling was not conducted in the upper portion of Majors Creek, however survey staff estimated an *O. mykiss* density of 48 individuals per mile of stream upstream of Highway 1 based on observations from the streamside (DPR 2001). An estimated 0.75 miles of Majors Creek is accessible to steelhead. According to the survey report, “Majors Creek has the most unimpeded

access from the ocean to potential steelhead spawning and rearing areas but the shortest length of stream accessible to steelhead since the stream becomes quite steep and potentially impassible a short distance upstream of Highway 1” (DPR 2001, p. 35).

## **Baldwin Creek**

### *Baldwin Creek*

Baldwin Creek is diverted into two agricultural impoundments in its downstream portion. During a 2001 stream survey DPR staff observed YOY and age 1+ *O. mykiss* in Baldwin Creek from upstream of the impoundments to a cascade falls that was identified as the upstream limit of anadromy. Average *O. mykiss* density in the surveyed reach was estimated to be 61.5 individuals per mile of stream (DPR 2001). An estimated 1.25 miles of Baldwin Creek is accessible to steelhead. “Steelhead passage is likely impaired, if not severely constrained, due to the hydrologic modifications at the lowest end of Baldwin Creek” (DPR 2001).

According to a report summarizing results of a survey conducted in the Baldwin Creek wetlands states “The diversion of Baldwin Creek into Rancho Gordola Impoundment #1, apparently an exercise of riparian water rights, probably results in downstream-migrating steelhead smolts being subject to intense predation by largemouth bass in the lentic environment” (DPR 2002).

## **Wilder (Medor) Creek**

### *Wilder (Medor) Creek*

During a stream survey conducted in 2001 DPR staff observed an average density of 1,070 YOY and 178 age 1+ *O. mykiss* in Wilder Creek between the lagoon and the natural barrier falls located approximately 0.4 miles downstream of the Cave Gulch confluence (DPR 2001). A resident *O. mykiss* population was observed upstream of the barrier falls. The surveyed area within the anadromous section of stream included a reach of re-contoured stream where a dam was removed in 2002. The survey report states, “Trout, particularly young-of-year, became increasingly more common in upstream areas with a maximum of at least 500 young-of-year observed in the re-contoured section above the dam removal site” (DPR 2001, p. 20). The removal of the dam added “approximately 1 mile of good quality stream habitat for potential use by steelhead” (DPR 2001, p. 25). Wilder Creek was estimated to contain two miles of stream accessible to steelhead. Survey staff noted that a concrete road crossing just downstream of the dam removal site that may limit passage during low flows.

### *Peasley Gulch*

During a stream survey conducted in 2001, DPR staff observed an estimated *O. mykiss* density of 148 individuals per mile of stream in Peasley Gulch between the Wilder Creek confluence and a debris jam located 0.25 miles upstream, and an estimated 23 individuals per mile of stream from the debris jam upstream 0.25 miles (DPR 2001, p. 5). According to the survey report, Peasley Gulch “...appears to provide good conditions for steelhead spawning and young-of-year production” (DPR 2001, p. 27).

## San Lorenzo River

### *San Lorenzo River*

The San Lorenzo River mainstem was sampled in 2002 as part of a continuing study of steelhead populations in the San Lorenzo River watershed. An average of 40.64 YOY and 9.38 age 1+ *O. mykiss* per 100 feet of stream were observed between Water Street and stream mile 26.73 (Allen 2003). The survey report states, “Although greatly diminished from historical levels, steelhead numbers have remained relatively stable in the San Lorenzo River Watershed during the past 15 years” (Allen 2003, p. 2).

A 2004 fisheries Enhancement Plan for the San Lorenzo River states that in 2001, an estimated 30,500 YOY and 5,000 yearling *O. mykiss* were produced in the San Lorenzo River (Alley 2004 ES-5). The plan divides the San Lorenzo River into “two functional regimes based on spawning, rearing, and smolt production,” with the portion of the mainstem downstream of the Boulder Creek confluence producing “a substantial portion of the watershed’s smolt-sized juveniles that are mostly fast growing...YOY fish” and the upper portion of the river and its tributaries producing small, slower growing YOY juveniles and some yearling fish that have required two growing season[s] to reach smolt size” (Alley 2004, p. ES-3).

The upstream limit of anadromy in the San Lorenzo River occurs at a steep rock falls within Castle Rock State Park (DPR 1996).

The 2004 Enhancement Plan notes passage barriers in the San Lorenzo River at Erwin Way, Fern Road, Camp Campbell, the Highway 9 Bridge, and the Felton Diversion Dam (Alley 2004, p. 71).

### *Branciforte Creek*

A study of the concrete flood control channel on Branciforte Creek was conducted by DFG staff in 2001. The survey report states “Although the concrete channel is providing little to no habitat for spawning and rearing, it is essential that the channel be maintained for optimal adult and juvenile salmonid passage. In addition to the 10.5 miles of salmonid spawning and rearing habitat in Branciforte Creek above the concrete channel, an additional 8 miles are available in the three major tributaries to Branciforte Creek” (DFG 2002a, p. 4).

Branciforte Creek was sampled in 2002 as part of a continuing study of steelhead populations in the San Lorenzo River watershed. Researchers estimated an average density of 39.8 YOY and 10.7 age 1+ *O. mykiss* per 100 feet of stream in Branciforte Creek (Allen 2003, p. 32).

According to a 2004 fisheries enhancement plan for the San Lorenzo River watershed, an estimated 11,700 YOY and 2,000 yearling *O. mykiss* were produced in Branciforte Creek in 2001 (Alley 2004, p. ES-5). The enhancement plan states that Branciforte Creek is an important producer of YOY and yearling steelhead (Alley 2004, p. 19) and has “high habitat value” (Alley 2004, p. 83).

The 2004 enhancement plan found several low-flow barriers on Branciforte Creek, including a rock and concrete wall at Happy Valley Estates, a flashboard dam just downstream of Vine Hill Road, and a concrete structure below the flashboard dam. A 15 foot high Denil ladder over a 10 foot high dam and a flashboard dam abutment lacking an adequate pool/weir ladder were identified as barriers that “need maintenance to allow passage” (Alley 2004, p. 71).

### *Carbonera Creek*

Carbonera Creek was sampled in 2002 as part of a continuing study of steelhead populations in the San Lorenzo River watershed. Researchers estimated an average density of 8.7 YOY and 13.85 age 1+ *O. mykiss* per 100 feet of stream in Carbonera Creek between the Branciforte Creek confluence and Moose Lodge Falls. Densities increased upstream of a road crossing at stream mile 1.38 (Allen 2003). Moose Lodge Falls was identified as the upstream limit of anadromy (Allen 2003, p. 33). The survey report states that Carbonera Creek was one of the San Lorenzo Creek tributaries with the lowest *O. mykiss* density estimates and notes that densities have been “consistently low...since 2000” (Allen 2003, p. 31).

According to a 2004 fisheries enhancement plan for the San Lorenzo River watershed, an estimated 4,100 YOY and 1,200 yearling *O. mykiss* were produced in Carbonera Creek in 2001 (Alley 2004 ES-5). The plan states, “Carbonera Creek is a good producer of yearlings despite its limited summer streamflow” (p.19). Groundwater basins are reported to provide “a significant source of summer baseflow” to Carbonera Creek. It is noted that the use of groundwater via well pumping is a significant source of flow reduction within the San Lorenzo River watershed (p. ES-11).

### *Branciforte tributary (Glen Canyon)*

Staff from DFG surveyed Glen Canyon in 1956 and observed “scarce” rainbow trout fingerlings. The survey report notes “poor” quality spawning areas (DFG 1956).

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use the portion of Glen Canyon Creek downstream from Redwood Creek (County of Santa Cruz 2004).

### *Glen Canyon tributary (Redwood)*

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use the portion of Redwood Creek downstream from a natural barrier (County of Santa Cruz 2004).

Staff from NMFS surveyed Redwood Creek in 2006 and observed YOY and age 1+ *O. mykiss* in “low numbers” (B. Spence pers. comm.).

### *Granite Creek*

A 1957 DFG survey characterizes Granite Creek as an “important spawning and nursery area” (DFG 1957).

Fish sampling conducted in Granite Creek in 1996 yielded 12 *O. mykiss* ranging in total length from 60 to 90 mm at stream mile 0.85 and four *O. mykiss* ranging in total length from 95 to 189 mm at stream mile 1.4 (Unknown 1996a p.6).

A fish passage assessment of Santa Cruz County streams prepared in 2004 identified the concrete box culvert at the Granite Road crossing on Granite Creek as a migration barrier for steelhead of all age classes. It received a “moderate priority” ranking for modifications due to three potential

passage barriers located downstream on private property that had not been assessed. According to the report, approximately 5,000 feet of suitable habitat exists upstream of the Granite Road barrier (Taylor 2004).

#### *Crystal Creek*

Staff from DFG surveyed Crystal Creek from the mouth to 1.5 miles upstream in 1956. No migration barriers were observed in the surveyed reach and the stream went dry 1.5 miles from the mouth. The survey report notes that rainbow trout fingerlings were “common in the lower section” (DFG 1956).

During a 1996 survey of Crystal Creek, DFG staff captured four *O. mykiss* ranging in total length from 59 to 167 mm at stream mile 0.24 and ten *O. mykiss* ranging in total length from 51 to 310 mm at stream mile 0.63 (DFG 1996b, p. 6). No fish were observed past a debris jam located 6,689 feet upstream of the Branciforte Creek confluence (DFG 1996b, p. 13).

#### *Tie Gulch Creek*

In 2002, DFG staff examined the Branciforte Drive culvert near the mouth of Tie Gulch Creek and observed “numerous fry...upstream from the road crossing” (J. Nelson pers. comm.). A fish passage assessment of Santa Cruz County streams prepared in 2004 assigned the culvert at the Branciforte Drive crossing a “moderate priority” ranking for modification and recommended assessing habitat quality upstream (Taylor 2004).

#### *San Lorenzo River tributary 1 (Powder Mill Creek)*

A steelhead and coho salmon distribution map was prepared by Santa Cruz County in 2004. The map indicates that steelhead use a short reach of lower Powder Mill Creek (County of Santa Cruz 2004).

#### *San Lorenzo River tributary 2 (Eagle Creek)*

A 2002 report on steelhead densities within the San Lorenzo River watershed states that Eagle Creek is “known to contain steelhead from past sampling and observation...” (Alley 2002, p. 38).

A steelhead and coho salmon distribution map was prepared by Santa Cruz County in 2004. The map indicates that steelhead use a short reach of Eagle Creek (County of Santa Cruz 2004).

#### *Gold Gulch Creek*

A 2002 consultant’s report on steelhead densities within the San Lorenzo River watershed includes Gold Gulch in a list of streams “likely to provide steelhead access and perennial habitat” (Alley 2002, p. 38).

NMFS staff observed multiple age classes of *O. mykiss* in Gold Gulch Creek in 2006 (B. Spence pers. comm.).

A fish passage assessment of Santa Cruz County streams prepared in 2004 assigned the culvert at the Brookside Way crossing on Gold Gulch Creek a “high priority” ranking for modification.

Approximately 3,700 feet of good quality habitat was noted to occur above the barrier (Taylor 2004, p. 49). A memo from the Santa Cruz County Department of Public Works dated June 8, 2008 indicates that funding has been secured and a bid from contractors would be accepted to implement the Gold Gulch culvert replacement project at Brookside Way (SCDPW 2008).

#### *Shingle Mill Creek*

A steelhead and coho salmon distribution map was prepared by Santa Cruz County in 2004. The map indicates that steelhead use the lower 0.7 miles of Shingle Mill Creek (County of Santa Cruz 2004).

A fish passage assessment of Santa Cruz County streams prepared in 2004 identified the Redwood Drive culvert crossing on Shingle Mill Creek as a total passage barrier but assigned it a “low priority” ranking for modification due to lack of suitable habitat upstream (Taylor 2004).

#### *Zayante Creek*

Zayante Creek was sampled from the San Lorenzo River confluence to the Mt. Charlie Gulch confluence in 2002 as part of a continuing study of steelhead populations in the San Lorenzo River watershed. Survey staff estimated an average density of 96.5 YOY and 12.8 age 1+ *O. mykiss* per 100 feet of stream in Zayante Creek (Allen 2003, p. 32). The survey report states that YOY steelhead density in the San Lorenzo River watershed was “...higher in 2002 than in the last several years...densities were especially high in Zayante Creek” (Allen 2003, p. 31).

According to a 2004 fisheries enhancement plan for the San Lorenzo River, an estimated 15,100 YOY and 3,500 yearlings were produced in Zayante Creek in 2001 (Alley 2004, p. ES-5). The plan states, “Regarding juvenile steelhead production in the tributaries, Zayante Creek is usually the most productive in terms of YOY’s and smolt-sized fish...It is the largest tributary and is capable of producing YOY’s of smolt size because of its higher streamflow” (p.19). A flashboard dam abutment on Zayante Creek near the confluence with Bean Creek was identified as a low flow passage barrier (Alley 2004, p. 71.).

A 2007 consultant’s report notes “Steelhead estimates in Zayante Creek stopped at the Mt. Charlie Gulch confluence in past years, although steelhead habitat exists above in Zayante Creek and Mt. Charlie Gulch in many years” (Alley 2007, p. 35).

#### *Bean Creek*

Bean Creek was sampled from the Zayante Creek confluence to stream mile 5.45 in 2002 as part of a continuing study of steelhead populations in the San Lorenzo River watershed. Survey staff estimated an average density of 64.6 YOY and 29.5 age 1+ *O. mykiss* per 100 feet of stream in Bean Creek (Allen 2003, p. 32).

A 2004 fisheries enhancement plan for the San Lorenzo River identified Bean Creek as an “important producer of YOY’s and yearlings” (Alley 2004, p. 19). In 2001, an estimated 8,300 YOY and 3,000 yearling *O. mykiss* were produced (Alley 2004, p. ES-5).

### *Lockhart Gulch*

A 2002 consultant's report on steelhead densities within the San Lorenzo River watershed includes Lockhart in a list of tributaries "known to contain steelhead from past sampling and observation" (Alley 2002, p. 38).

A steelhead and coho salmon distribution map prepared by Santa Cruz County in 2004 indicates that steelhead use the section of Lockhart Gulch located downstream from a barrier formed by a perched culvert (County of Santa Cruz 2004).

### *Ruins Creek*

A 2002 consultant's report on steelhead densities within the San Lorenzo River watershed includes Ruins Creek in a list of streams "likely to provide steelhead access and perennial habitat" (Alley 2002, p. 38).

A steelhead and coho salmon distribution map was prepared by Santa Cruz County in 2004. The map indicates steelhead use of a short reach of lower Ruins Creek but notes that the extent of steelhead distribution is unknown (County of Santa Cruz 2004).

### *Mackenzie Creek*

A 2002 report on steelhead densities within the San Lorenzo River watershed includes Mackenzie Creek in a list of streams "likely to provide steelhead access and perennial habitat" (Alley 2002, p. 38).

A steelhead and coho salmon distribution map was prepared by Santa Cruz County in 2004. The map indicates steelhead use of the majority of Mackenzie Creek's length (County of Santa Cruz 2004).

### *Lompico Creek*

During a 1997 survey of Lompico Creek, survey staff collected a total of 83 YOY, 22 age 1+, and 37 age 2+ *O. mykiss* from 16 sampling stations located between the Zayante Creek confluence and 18,101 feet upstream (Unknown 1997).

NMFS staff observed multiple age classes of *O. mykiss* in Lompico Creek in 2006 (B. Spence pers. comm.).

A fish passage assessment of Santa Cruz County streams prepared in 2004 identified the culverts at the Lompico Road crossings on Lompico Creek near post miles 0.50 and 2.0 as barriers to all steelhead life stages and assigned them high priority rankings for modification. Approximately 3.7 miles of stream habitat was estimated to exist upstream of the first barrier. The report indicated that modification of the barrier at 0.50 was in progress and that funding was available to modify the barrier at post mile 2.0 (Taylor 2004). According to the Fish Net 4C website, the Lompico Watershed Conservancy recently completed modifications to a fish migration barrier on Lompico Creek at the Old Lompico Pool.

*Mountain Charlie Gulch (East Branch Zayante)*

Mountain Charlie Gulch Creek was surveyed in 2004 from the Zayante Creek confluence to a point 1.25 miles upstream near the City property boundary as part of a pilot steelhead habitat and abundance survey. An estimated density of 110 YOY and eight age 1+ and older *O. mykiss* per 100 feet of stream was observed in Mountain Charlie Gulch Creek (HES 2005). The habitat survey results indicated that the reach contained “good steelhead rearing habitat.”

*Zayante tributary*

Staff from NMFS sampled the unnamed tributary to Zayante Creek in 2006 and observed multiple *O. mykiss* year classes (B. Spence pers. comm.)

*Bull Creek*

Staff from DFG surveyed Bull Creek for barriers in 1980 and did not observe fish, and a landowner stated he had never seen salmonids in the stream (DFG 1980). At the time of the survey Bull Creek did not have hydrologic connectivity to the San Lorenzo River.

*Fall Creek*

Fall Creek was sampled in 2002 as part of a continuing study of steelhead populations in the San Lorenzo River watershed. An estimated density of 43.7 YOY and 10.3 age 1+ *O. mykiss* per 100 feet of stream was observed between the San Lorenzo confluence and a bedrock falls barrier at stream mile 1.58 (Allen 2003).

According to a 2004 fisheries enhancement plan for the San Lorenzo River, an estimated 3,900 YOY and 1,000 yearling *O. mykiss* were produced in Fall Creek in 2001. The plan identifies Fall Creek as an “undoubtedly important” source of YOY steelhead to the mainstem San Lorenzo River, and states that between 1998 and 2002, juvenile steelhead density in Fall Creek “remained fairly stable with some year to year fluctuation reflective of annual fluctuations in streamflow, habitat quality, and storm conditions that occurred each of those years” (Alley 2004, p. ES-4). A concrete weir fish ladder at a diversion dam on Fall Creek was described as requiring “continuous maintenance” to allow upstream passage (Alley 2004, p. 71).

*Bennett Creek*

A DFG report from 1980 states “Bennett Creek is impassible to upstream migrating fish” (DFG 1980).

*South Fork Fall*

A DFG report from 1980 states “South Fork Fall Creek is impassible to upstream migrating fish” (DFG 1980).

*Newell Creek*

Newell Creek was sampled in 2002 as part of a continuing study of steelhead populations in the San Lorenzo River watershed. During this survey, researchers observed an estimated density of 18.4

YOY and 13.6 age 1+ *O. mykiss* per 100 feet of stream in Newell Creek between the San Lorenzo River confluence and a bedrock falls barrier at stream mile 1.04 (Allen 2003, p. 32).

According to a 2004 fisheries enhancement plan for the San Lorenzo River, an estimated 2000 YOY and 300 yearling *O. mykiss* were produced in Newell Creek in 2001 (Alley 2004, p. ES-5). The enhancement plan notes that productivity is low in Newell Creek “because of its relatively short steelhead reach” (Alley 2004, p. 19). Loch Lomond dam on Newell Creek creates a total barrier to steelhead migration, and according to the enhancement plan, “...there would be little benefit in transporting adults above and providing smolt passage down past the dam...the cost...would be considerable and more wisely spent on other restoration projects or re-routing of releases from the reservoir into other drainages with water retrieval further downstream” (Alley 2004, p. 51).

#### *Love Creek*

A 2002 consultant’s report states that Love Creek is “known to contain steelhead from past sampling and observation...” (Alley 2002, p. 38). A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use the majority of Love Creek (County of Santa Cruz 2004).

#### *Smith Creek*

A DFG report from 1980 states, “Smith Creek, as of 1/8 mile upstream of the confluence with Love Creek, is continuously choked with downed trees and boulders which have created numerous waterfalls. At a point approximately 1/4 mile upstream from the confluence with Love Creek, Smith Creek has been dammed to form a reservoir...There is no possible upstream migration of fish on Smith Creek after the first 1/8 of a mile” (DFG 1980).

#### *Fritch Creek*

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use over one half the length of Fritch Creek (County of Santa Cruz 2004).

#### *Marshall Creek (Hubbard Gulch)*

Staff from DFG surveyed Marshall Creek in 1980 and observed *O. mykiss* fry “in good numbers” between the mouth and the first Hubbard Gulch Road Crossing (DFG 1980).

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use approximately 0.25 miles of Marshall Creek (County of Santa Cruz 2004).

#### *Alba Creek*

Alba Creek appears to be inaccessible to steelhead due to high gradient (DFG 1980; County of Santa Cruz 2004).

#### *Clear Creek*

A 2002 consultant’s report states that Clear Creek is “known to contain steelhead from past sampling and observation...” (Alley 2002, p. 38). A steelhead and coho salmon distribution map

produced by Santa Cruz County in 2004 indicates that steelhead use a short section of the lower reach of Clear Creek (County of Santa Cruz 2004).

#### *Boulder Creek*

Researchers sampled two reaches of Boulder Creek in 2002 as part of a continuing study of steelhead populations in the San Lorenzo River watershed. During this survey, average *O. mykiss* density in Boulder Creek was estimated to be 50.55 YOY and 5.6 age 1+ individuals per 100 feet of stream in the lower two miles of stream and 13.0 YOY and 4.6 age 1+ individuals per 100 feet of stream between stream miles 2.0 and 3.46 (Allen 2003). The survey report noted that juvenile densities had been “consistently low” in the upper sample reach since 2000 and characterized habitat quality in the upper reach as “poor” (Allen 2003, p. 31).

According to a 2004 fisheries enhancement plan for the San Lorenzo River, an estimated 7,900 YOY and 2,900 yearling *O. mykiss* were produced in Boulder Creek in 2001 (Alley 2004, p. ES-5). Boulder Creek is noted to be an “important producer of YOY’s and yearlings” though “spawning success and overwintering by juveniles in Boulder Creek are vulnerable to high stormflows...” (Alley 2004, p. 19). The report identifies the upstream limit of anadromy in Boulder Creek as a bedrock chute located upstream from the Hare Creek confluence (Alley 2004, p. 71).

#### *Foreman Creek*

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that Foreman Creek is inaccessible to steelhead due to high gradient (County of Santa Cruz 2004).

#### *Bracken Brae Creek*

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that Bracken Brae Creek is inaccessible to steelhead due to a bedrock drop at the confluence of Boulder Creek (County of Santa Cruz 2004).

#### *Jamison Creek*

A 2002 consultant’s report states that Jamison Creek is “known to contain steelhead from past sampling and observation...” (Alley 2002, p. 38). A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use less than half the length of Jamison Creek (County of Santa Cruz 2004).

#### *Hare Creek*

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use the reach of Hare Creek located downstream from the dam at stream mile 0.4 (County of Santa Cruz 2004).

A 2004 barrier survey notes that the Hare Way crossing on Hare Creek, located approximately 250 from the confluence with Boulder Creek, is impassible to all age classes of steelhead (Taylor 2004).

### *Bear Creek*

Staff from DFG surveyed Bear Creek in 1980 and found “abundant” *O. mykiss* fry in portions of Bear Creek downstream from the Shear Creek confluence (DFG 1980).

Bear Creek was sampled in 2002 from the San Lorenzo River confluence to stream mile 4.69 as part of a continuing study of steelhead populations in the San Lorenzo River watershed. During this survey, researchers observed an estimated average density of 62.45 YOY and 12.3 age 1+ *O. mykiss* per 100 feet of stream in Bear Creek (Allen 2003, p. 32). The survey report notes YOY density estimates in Bear Creek were higher in 2002 than in the four years prior.

According to a 2004 fisheries enhancement plan for the San Lorenzo River, an estimated 13,000 YOY and 2,900 yearling *O. mykiss* were produced in Bear Creek in 2001 (Alley 2004, p. ES-5). The report identifies Bear Creek as an “important producer of YOY’s and yearlings.”

### *Deer Creek*

Staff from DFG surveyed Deer Creek in 1980 and observed “abundant” salmonid fry and individuals measuring 4 to 12 inches in length between in the lower two miles of stream downstream from a waterfall and “a diminishing number of Salmonids” upstream from the falls (DFG 1980).

### *Two Bar Creek*

A 1966 DFG survey report for Two Bar Creek notes “this tributary contains approximately 2 to 3 miles of spawning and nursery area to the San Lorenzo River” (DFG 1966a).

Staff from DFG surveyed Two Bar Creek in 1980 and observed “common” *O. mykiss* fry in the lower mile of stream (DFG 1980).

### *Kings Creek*

Kings Creek was sampled in 2002 from the San Lorenzo River confluence to a bedrock and boulder cascade located at stream mile 3.73 as part of a continuing study of steelhead populations in the San Lorenzo River watershed. During this survey, researchers observed an estimated average density of 26.3 YOY and 3.4 age 1+ *O. mykiss* per 100 feet of stream in Kings Creek (Allen 2003, p. 32).

A 2004 fisheries enhancement plan for the San Lorenzo River identifies a bedrock falls located near the confluence with the first tributary upstream from Logan Creek as the upstream limit of anadromy (Alley 2004, p. 71). According to the plan, an estimated 3,400 YOY and 1,300 yearling *O. mykiss* were produced in Kings Creek in 2001. The plan states that compared to the other San Lorenzo River tributaries, “Kings Creek is relatively unproductive...because of high sediment impacts and relatively low spring and summer flow” (Alley 2004, p. 19).

### *Logan Creek*

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use approximately 0.5 miles of Logan Creek (County of Santa Cruz 2004).

## Soquel Creek

### *Soquel Creek*

Fish sampling was conducted in Soquel Creek in 1996 at 16 sites between the mouth and 96,713 feet upstream, yielding a total of 180 *O. mykiss* ranging in total length from 47 to 245 mm (Parks 1996).

A 2003 fisheries assessment of the Soquel Creek watershed states that that long-term monitoring data indicate that *O. mykiss* “remain viable and self-sustaining” in Soquel Creek (Alley 2003, p. 4). According to the report, the portion of the lower mainstem between the Soquel Creek lagoon and the Moore’s Gulch confluence has been observed to function as habitat for “low densities of relatively fast growing juvenile steelhead” (Alley 2003, p. 6). Juvenile steelhead density is reported to increase in the mainstem reach between the Moore’s Gulch confluence and the Hinckley Creek confluence in the east branch of Soquel Creek, and the highest YOY densities occur in the section of the east branch of Soquel Creek that flows through the Soquel Demonstration State Forest; this reach is considered the “primary spawning grounds for steelhead” (Alley 2003, p. 8).

During a 2006 survey conducted within the Soquel Demonstration State Forest, CDF and NMFS staff collected a total of 858 YOY, 202 age 1+ and 11 age 2+ *O. mykiss* from four sampling stations in Soquel Creek between Longridge Crossing Road and 0.75 miles upstream of Ashbury Gulch (CDF 2006).

Sampling conducted in the Soquel Creek Lagoon in the fall of 2006 yielded 992 juvenile *O. mykiss*, the “sixth highest [juvenile population] in 14 years of estimates...[with] the “fastest growth rate in the last 9 years” (Alley 2006, p. 11).

### *Bates Creek*

In 1996 DFG staff conducted fish sampling in Bates Creek at six sampling stations between the Soquel Creek confluence and the dam at the Grover Gulch confluence, capturing a total of 82 *O. mykiss* ranging in total length from 47 to 232 mm (DFG 1996c).

A 2003 fisheries assessment of the Soquel Creek watershed states that Bates Creek is “likely an important source of young-of-the-year steelhead at present” (Alley 2003). Prescott Dam, a concrete dam at the Grover Gulch confluence, was identified as a total passage barrier. Two natural barriers, a bedrock chute located 2,600 feet above Main Street and a bedrock falls located 3,100 feet above Main Street, were noted to be passable under certain flow conditions. A salmonid population believed to be resident rainbow trout was reported to occur above the first bedrock chute. The report states, “Modification of the natural passage impediments...is warranted because of the habitat value upstream and the potential of Bates Creek to better seed the lower mainstem with young-of-the-year fish” (Alley 2003, p. 41).

### *Grover Gulch Creek*

Grover Gulch Creek enters Bates Creek upstream of Prescott Dam. A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that resident *O. mykiss* use approximately 0.7 miles of Grover Gulch Creek (County of Santa Cruz 2004).

#### *Soquel Creek tributary (Laurel Glen, Moores Gulch)*

During a survey conducted in 1996 in the Soquel Creek tributary, DFG staff captured a total of 27 *O. mykiss* ranging in total length from 40 to 199 mm from three sampling stations located between the Soquel Creek confluence and 400 feet above the Nicasio Road crossing (DFG 1996d).

#### *West Branch Soquel Creek*

Staff from DFG conducted fish sampling in West Branch Soquel Creek in 1996 and captured a total of 269 *O. mykiss* ranging in total length from 54 to 221 mm from 11 sampling stations located between stream miles 0.20 and 6.74 (DFG 1996e).

A 2003 fisheries assessment of the Soquel Creek watershed notes that juvenile steelhead densities in the portion of West Branch Soquel Creek downstream of Hester Creek were generally low during sampling in 2002, and identifies Hester Creek as a “major” sediment source to the West Branch. The report states “The upper West Branch above Hester Creek has the highest enhancement potential for steelhead by improving spawning access” (Alley 2003, p. 9). According to the assessment, in most years, Girl Scout Falls II on West Branch Soquel Creek, located 10,800 feet upstream of the Hester Creek confluence, creates an impassible barrier to steelhead. Under high flow conditions, steelhead have access to habitat upstream of the falls. A relatively high density of YOY salmonids was observed in West Branch Soquel Creek upstream from Girl Scout Falls II in 2002. The life history form was not certain (Alley 2003, p. 44). The Laurel Mill Dam located 30,400 feet upstream from the Hester Creek confluence creates a total passage barrier.

#### *Hester Creek*

Staff from DFG sampled Hester Creek in 1996 and captured 21 *O. mykiss* ranging in total length from 50 to 88 mm at stream mile 0.3 and three *O. mykiss* measuring 133, 144, and 199 mm in length at stream mile 1.57. No *O. mykiss* were observed at the sampling stations located at stream miles 2.39 and 3.48 (DFG 1996f, p. 6).

A 2003 fisheries assessment of the Soquel Creek watershed states “Hester Creek may be expected to produce few yearlings and low densities of young-of-the-year juveniles” (Alley 2003, p. 43). Hester Creek is noted to be a major source of sediment to the west branch of Soquel Creek. According to the assessment, a series of bedrock falls and wood clusters located 4,000 feet from the mouth creates the upper limit of anadromy.

#### *Laurel Creek*

Laurel Creek enters West Branch Soquel Creek upstream of Girl Scout Falls II. A 1963 DFG survey report notes that Laurel Creek supports a resident *O. mykiss* population (DFG 1963a).

#### *Burns Creek*

Burns Creek enters West Branch Soquel Creek upstream of Girl Scout Falls II. Staff from DFG observed multiple year classes of *O. mykiss* in Burns Creek in 1963 and concluded that the population was resident, finding “...no evidence of steelhead or salmon utilization” (DFG 1963b).

### *Hinckley Creek*

During a survey conducted in Hinckley Creek in 1996, DFG staff captured a total of 75 *O. mykiss* ranging in total length from 41 to 199 mm from three sampling stations located in the lower 0.67 miles of stream (DFG 1996).

A 2003 fisheries assessment of the Soquel Creek watershed states that cool water inputs from Hinckley Creek are of “primary importance” to the east branch of Soquel Creek during the summer months (Alley 2003, p. 43). The report notes the presence of one mile of good quality steelhead habitat in Hinckley Creek located below a major logjam barrier.

### *Amaya Creek*

A stream inventory of Amaya Creek was conducted in 1996. Electrofishing was conducted at two sites. At stream mile 0.19, 81 *O. mykiss* ranging in total length from 43 to 185 mm were captured. At stream mile 1.43, 16 *O. mykiss* ranging in total length from 65 to 193 mm were captured (Unknown 1996b).

In 2006 CDF and NMFS staff conducted fish sampling in one reach of Amaya Creek within the Soquel Demonstration State Forest and captured a total of 94 *O. mykiss* ranging in total length from 53 to 162 mm (CDF 2006).

A 2003 draft fisheries assessment of Soquel Creek notes that Amaya Creek is an important provider of cool water to East Branch Soquel Creek during summer. The report states, “the lower reaches of Amaya Creek were likely productive for juvenile steelhead due to the good cover in pools. And spawning substrate was better quality than other tributaries” (Alley 2003, p. 43).

In 2002, active landslides on Amaya Creek were noted at 326 and 858 feet from the confluence with Soquel Creek. “Substantial wood clustering” was noted at the base of a large active landslide at 4,011 feet from the east branch confluence. In 2002, logjams formed barriers to fish migration in Amaya Creek at stream mile 0.5 and 1.1 (Alley 2003, p. 79).

## **Aptos Creek**

### *Aptos Creek*

In 1997 DFG staff collected a total of 204 YOY, 62 age 1+, and 16 age 2+ *O. mykiss* from Aptos Creek between stream miles 0.82 and 6.61 (DFG 1997b).

In 2001 DFG staff collected 119 YOY, 110 age 1+, 11 age 2+, and one age 3+ *O. mykiss* from Aptos Creek between the Highway 1 Bridge and the Mill Pond Trail Bridge at stream mile 5.36 (DFG 2002b).

A habitat assessment prepared in 2001 notes that numerous debris jams upstream of the Bridge Creek confluence likely create total passage barriers. A cascade falls located between two large debris jams was identified as a migration barrier under most flow conditions (HES 2003).

### *Valencia Creek*

During a habitat assessment conducted in the Aptos Creek watershed in 2001, multiple age classes of *O. mykiss* were observed in Valencia Creek between the Aptos Creek confluence and 1.7 miles upstream of Valencia Road (HES 2003). Severe passage impediments identified at the Valencia Road and Soquel Drive crossings during the assessment have since been modified to improve fish passage. The retrofit of the Valencia Road culvert was completed in August 2006 and construction of a fish ladder at the Soquel Drive crossing was completed in December 2007.

### *Trout Creek Gulch*

Consultants surveyed Trout Creek Gulch from the Valencia Creek confluence to the road crossing 1.3 miles upstream in 2001 and did not observe *O. mykiss*. The survey report states, “Trout Creek...had very low flow during the habitat survey and the channel was dry in some areas....Access to Trout Creek is limited by the three lower culverts in Valencia Creek; however even if access was not a problem, sediment conditions would still preclude use by steelhead or coho” (HES 2003, p. 51).

### *Bridge Creek*

Staff from DFG surveyed Bridge Creek in 1998. A total of 25 *O. mykiss* YOY were captured from two pools located approximately 100 and 235 feet upstream from the confluence with Aptos Creek (DFG 1998).

A habitat assessment of the Aptos Creek watershed was conducted in 2001. Density of *O. mykiss* in Bridge Creek was estimated to be 0.91 YOY and 0.15 age 1+ individuals per 100 feet of stream for a reach extending 1.2 miles upstream from the Aptos Creek confluence (HES 2003). Juvenile production was believed to be impacted by sedimentation. A large debris accumulation located at stream mile 0.72 was believed to create a total migration barrier for steelhead of all age classes. The report states, “Much of Bridge Creek...may be inaccessible to anadromous fish at most times” (HES 2003, p. 9).

## **Pajaro River**

### *Pajaro River*

“The Pajaro River serves as a migration pathway for steelhead, but because of low and warm summer streamflows and substrate dominated by sand or silt it provides almost no potential rearing habitat for steelhead” (Smith 2002, p. 1).

### *Corralitos (Salsipuedes) Creek*

Consultants surveyed Corralitos Creek in 1981 and found “good” to “very good” rearing habitat areas between the Rider Creek confluence and 0.3 miles upstream of the Eureka Gulch confluence. Rearing habitat downstream from Rider Creek and downstream from the Watsonville diversion dam was characterized as “poor” to “below average (HSA 1982).

Electrofishing surveys were conducted in Corralitos Creek upstream of the Watsonville diversion dam in 1994. A total of 2,207 YOY, 301 age 1+, and 21 age 2+ *O. mykiss* were captured between the dam and the Rider Creek confluence and a total of 5,463 YOY, 1,960 age 1+, and 78 age 2+ *O.*

*mykiss* were captured between the Rider Creek confluence and 0.3 miles above the Eureka Gulch confluence (Alley 1994, p. 58).

In a 2007 report, Dr. Jerry Smith noted that good quality habitat in Corralitos Creek extended from the Watsonville diversion dam to the Shingle Mill Gulch confluence (Smith 2007c).

A migration barrier survey prepared in 2004 identified a concrete box culvert at the Eureka Canyon Road crossing on Corralitos Creek as a passage barrier to all age classes of steelhead and ranked it as “high priority” for modification (Taylor 2004, p. 50). Funding was secured and permits were granted for a culvert retrofit project at Eureka Canyon Road in 2008.

#### *Casserly Creek*

In a 1997 letter, Dr. Jerry Smith reported observing multiple *O. mykiss* age classes and smolts in Casserly Creek. He noted “outmigration from Casserly is difficult; by 3 May flows in the lower part of the creek were already too low to permit outmigration” (Smith 1997b).

In a 2007 report, Smith notes the presence of multiple *O. mykiss* age classes from College Lake to the Banks Canyon/Gaffey Creek confluence and states, “..steelhead continuously use Casserly Creek” (Smith 2007c, p. 14).

#### *Green Valley Creek*

Consultants surveyed Green Valley Creek between College Lake and Hazel Dell Road in 1981 and found no suitable rearing habitat (HSA 1982).

A 2003 draft environmental impact report notes that although no man-made barriers occur in Green Valley Creek, low streamflow in spring likely bars smolt outmigration. The report states “...size structure of fish in spring 1997 and lack of smolted fish may indicate that a major portion of the "rainbow trout" in the perennial portion of the stream are resident, rather than migratory steelhead in many years” (USBR 2003, Appendix G, p. 4).

#### *Browns Creek*

A 1966 DFG survey of Browns Creek states, “From 2.5 miles from mouth upstream to Gamecock Canyon (3 miles) is a steelhead spawning and nursery area. Summer trout fishery...exists” (DFG 1966b).

Consultants surveyed Browns Valley Creek in 1981 and found “below average” rearing habitat upstream of a diversion dam (HSA 1982).

In an assessment of the Pajaro River prepared in 2007, Dr. Jerry Smith noted that good over-wintering habitat exists in the lower 0.5 miles of Browns Creek, but this section dries in the summer. Smith found good quality habitat in Browns Valley Creek between 0.5 mile upstream of the mouth and a diversion dam. “Despite the low summer stream flows, rearing habitat in this...reach is quite good because of numerous fairly complex...pools” (Smith 2007c, p. 10).

Some rearing habitat also exists upstream to Gamecock Canyon, but shallower pools and heavy shading that limit food production in the reach “results in relatively small YOY and yearling steelhead compared to further downstream” (Smith 2007c, p. 12).

#### *Ramsey Gulch*

DFG staff conducted a survey of Ramsey Gulch in 2003. Numerous steelhead fry were observed within the anadromous portion of the stream, which was reported to be “relatively short with approximately 4,780 feet available for spawning and rearing” (DFG 2003). Rearing habitat within the anadromous reach was characterized as “high quality” and noted to be “relatively abundant” (DFG 2003). The upstream limit of anadromy occurs at a boulder cascade located at 4,780 feet upstream from the confluence with Browns Valley Creek.

#### *Gamecock Canyon Creek*

“Stream flows [in Gamecock Canyon Creek] are very low and pools mostly small and shallow. Fish are relatively small and yearlings scarce” (Smith 2007c, p. 12).

#### *Rider Creek*

“Rider Creek... has no potential habitat for steelhead...” (Smith 2007c, p. 8).

#### *Eureka Gulch*

Eureka Gulch Creek has “barriers and poor substrate which prevent...use for steelhead rearing” (Alley 1983).

#### *Shingle Mill Gulch*

During a 1994 survey of Shingle Mill Gulch researchers collected a total of 270 YOY, 172 age 1+, and 17 age 2+ *O. mykiss* from a sampling station located at stream mile 0.3 (Alley 1994, p. 58).

A migration barrier assessment prepared in 2004 identified the culverts at the Eureka Canyon Road crossings on Shingle Mill Gulch near post miles 4.8 and 5.24 as significant passage barriers and assigned them “high priority” rankings for modification. Approximately 5,400 feet of “potential good quality habitat” was noted to occur upstream of the first culvert (Taylor 2004).

Funding was secured in 2008 for the retrofit of the culvert at post mile 4.8 and the replacement of the culvert at post mile 5.24 at the Eureka Canyon Road crossings on Shingle Mill Gulch. A letter from the Santa Cruz County Directors of the Health Services Agency and Department of Public Works dated November, 2007 states that the culvert restoration projects will “...improve fish passage and prevent an estimated 130 cubic yards of sediment from entering Shingle Mill Gulch” (SCHSA 2007). A Coastal Conservancy staff recommendation letter regarding the Shingle Mill Gulch barrier removals states “...surveys conducted by DFG and the County’s fish biologist indicate that not only is there significant rearing habitat above these culverts, but that there is also 'headwater' spawning habitat above the PM 5.24 culvert” (CCC 2008).

#### *Rattlesnake Gulch Creek*

A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that steelhead use a short portion of the lower reach of Rattlesnake Gulch Creek (County of Santa Cruz 2004).

“Summer stream flow [in Rattlesnake Gulch Creek] is quite low, spawning habitat is scarce and pool development is somewhat limited ... a series of boulder falls ... restricts adult access above mile 0.5” (Smith 2007c, p. 10).

#### *Diablo Gulch Creek*

Diablo Gulch Creek enters Corralitos Creek upstream of the limit of anadromy. A steelhead and coho salmon distribution map produced by Santa Cruz County in 2004 indicates that Diablo Gulch Creek supports a resident *O. mykiss* population (County of Santa Cruz 2004).

#### *Coward Creek*

A 1983 consultant’s report describes Coward Creek as follows: “Water temperatures and lack of pool development [in the lower section of the stream] would severely limit steelhead rearing even if summer flows were present...The upper section of the stream ...has summer flow but spawning substrate is very poor. Pools are shallow and rearing habitat is also poor (no fish were seen in 1982)” (Alley 1983, p. 228).

#### *Pescadero Creek*

In a recent survey, staff from DFG observed *O. mykiss* YOY and age 1+ in Pescadero Creek upstream to about stream mile 4.0 (J. Nelson pers. comm.). Habitat appeared to be in relatively good condition although some excess sedimentation was occurring due to cattle access to the riverine/riparian area.

#### *San Benito River*

A 2007 report indicates that the mainstem San Benito River provides no rearing habitat, but notes, “Steelhead have occasionally entered tributaries of the San Benito River in recent wet years (1995-1998)” (Smith 2007d, p. 6).

#### *San Juan Canyon*

In a 1965 letter, DFG states that San Juan Canyon Creek has “steelhead runs when there is a series of wet winters” (DFG 1965). In 1993 DFG staff stated, “This stream is one of the higher quality stream corridors that I have observed in San Benito County because of the cleaner gravel substrate, the existence of water flow, and the healthy riparian vegetation” (DFG 1993b).

#### *Bird Creek*

In 2004 Bird Creek was sampled from the point where the creek enters Hollister Hills State Vehicular Recreation Area near Bathtub Rocks downstream four miles to where the creek exits the Park at the lower Park boundary. Three *O. mykiss* measuring 94, 116, and 117 mm FL were collected downstream from a driveway bridge crossing located at Cienega Road. The survey report states,

“The permanent segment of Bird Creek that supports coldwater native species... is best described as the section downstream from the Cienega Road bridge to the lower Park boundary (a distance of slightly less than one mile)” (DPR 2004). The stream reach within the Recreation Area was characterized as “pristine aquatic habitat, whereas at the downstream Park boundary, stream bank erosion and lack of riparian vegetation due to cattle grazing was “very pronounced” (DPR 2004).

Habitat in Bird Creek was characterized in a 2007 steelhead distribution report for the upper Pajaro River. The report states, “Summer water temperatures are probably sufficiently high within the [San Benito] watershed to preclude significant successful steelhead rearing, except possibly for Bird Creek” (Smith 2007d, p. 6). Rearing habitat for Bird Creek was rated poor to fair, indicating an *O. mykiss* density of 2 to 16 smolt-sized fish per 100 feet of stream (Smith 2007d).

#### *Tres Pinos Creek*

*Oncorhynchus mykiss* was not observed in Tres Pinos Creek during sampling conducted between 1972 and 1974 (Smith 1974).

A 2007 report indicates that Tres Pinos Creek provides no rearing habitat (Smith 2007d).

#### *Pescadero Creek*

A 2007 report indicates that Pescadero Creek provides no rearing habitat (Smith 2007d).

#### *Picacho Creek*

A 2007 report indicates that Picacho Creek provides no rearing habitat (Smith 2007d).

#### *Uvas (Carnadero) Creek*

A 2007 steelhead distribution report for the Pajaro River watershed states “summer releases from Uvas Reservoir... provide rearing habitat for steelhead, despite high water temperatures by late summer in much of the stream” (Smith 2007d, p. 7). The report notes, however, “The export of part of Uvas Reservoir storage to Llagas Creek reduces the potential summer streamflows in Uvas Creek and...the downstream extent of potential steelhead rearing” (Smith 2007d, p. 8). In addition “substantial erosion from new vineyards and homes in the Little Arthur watershed has apparently degraded conditions...in Uvas Creek downstream of the tributary” (Smith 2007d, p. 8).

Resident *O. mykiss* occur upstream from Uvas Reservoir. Staff from DFG surveyed Uvas Creek from the inlet of the reservoir to the headwaters in 1960 and found “excellent trout habitat” but noted that summer streamflows were limiting to survival (DFG 1960).

Smith (2007) notes “The upper potential natural limit of steelhead access in Uvas Creek...is not known” (Smith 2007d, p. 9).

#### *Tar Creek*

A steelhead distribution report prepared in 2007 states, “[Tar Creek] provides spawning and rearing in most years, but the small size of the stream, low streamflows, dense shading, and shallow pools probably limit young-of-year steelhead density and growth rate” (Smith 2007d, p. 7). According to

the report, the reach of Tar Creek between the mouth and a bridge located two miles upstream from Highway 101 provides no rearing habitat, and the reach from the bridge upstream to a concrete dam provides “below average” rearing habitat (Smith 2007d).

#### *Tick Creek*

Tick Creek appears on a DFG list of streams with historical steelhead populations (DFG ca 1990). The basis for inclusion is not known.

#### *Bodfish Creek*

A 1967 DFG survey report for Bodfish Creek states that the stream “Provides important nursery and spawning areas for Pajaro River steelhead run. Two tributaries of Bodfish provide spawning and nursery areas also...Juvenile RT-SH were found in all areas of streams and tributaries to barriers” (DFG 1967).

A 2002 draft steelhead distribution report states that Bodfish Creek “support[s] spawning and rearing habitat by steelhead...and is presently the most important steelhead tributary to Uvas Creek” (Smith 2002). The 2007 version of the report notes that three to four miles of perennial habitat in Bodfish Creek is accessible to steelhead”(Smith 2007d). The report characterizes rearing habitat downstream of Whitehurst Road as “poor-fair” and rearing habitat upstream of Whitehurst Road as “fair-very good,” noting “Sedimentation from increased homesite development near and downstream of Whitehurst Road have apparently significantly degraded juvenile steelhead rearing habitat”(Smith 2007d).

An impassable boulder falls is located approximately 0.75 miles upstream from the Sprig Lake tributary confluence. A resident rainbow trout population that appears to be of a native strain is present upstream from the barrier falls (Smith 2007d).

#### *Bodfish tributary 1 (Granite, Renz Gulch)*

Staff from DFG surveyed Granite Creek in 1967 as part of a survey of Bodfish Creek. From the context of the report, it appears that Granite Creek was surveyed from the confluence of Bodfish Creek to the first tributary upstream and the survey continued into the unnamed tributary up to a barrier falls. The survey report notes “Juvenile RT-SH were found in all areas of streams and tributaries to barriers” (DFG 1967).

#### *Renz Gulch (Granite) tributary*

Staff from DFG surveyed Granite Creek in 1967 as part of a survey of Bodfish Creek. From the context of the report, it appears that Granite Creek was surveyed from the confluence of Bodfish Creek to the first tributary upstream and the survey continued into the unnamed tributary up to a barrier falls. The survey report notes “Juvenile RT-SH were found in all areas of streams and tributaries to barriers” (DFG 1967).

#### *Blackhawk Canyon Creek*

In a 2002 draft steelhead distribution report for the Pajaro River watershed, Dr. Jerry Smith indicates that lower 0.5 miles of Blackhawk Canyon Creek are available for steelhead use (Smith

2002, p. 17). In a 2007 update to the report, Smith states, “In all years that steelhead are able to access Bodfish Creek, they apparently spawn in Blackhawk Canyon Creek” (Smith 2007d). During sampling over several years, “hundreds” of YOY steelhead have been observed, whereas very few yearlings have been present in Blackhawk Canyon Creek, indicating that the creek is not used for rearing. Emergent steelhead fry “...actively move downstream in response to competition or food, despite the perennial nature of the stream” (Smith 2007d, p. 11).

#### *Bodfish tributary 2*

This unnamed creek enters Bodfish Creek in the headwaters upstream of the limit of anadromy.

A 1967 DFG stream survey noted the presence of *O. mykiss* in this tributary and indicated that it provided “spawning and nursery areas” (DFG 1967).

A 2007 report states, “Several miles of potential steelhead habitat in the [Bodfish Creek] headwaters are blocked to steelhead use by impassable boulder falls” (Smith 2007d, p. 10).

#### *Little Arthur Creek*

A 2007 steelhead distribution report for the Pajaro River watershed states “The majority of spring and summer streamflow in Uvas/Carnadero Creek is regulated by Uvas Reservoir, but two tributaries with perennial headwater reaches enter Uvas Creek downstream of the reservoir, Bodfish and Little Arthur creeks. All three streams support spawning and rearing by steelhead”

The report notes that within the Pickels reservoir on Little Arthur Creek, rearing habitat is “potentially fair-very good” (Smith 2007d). In addition “substantial erosion from new vineyards and homes in the Little Arthur watershed has apparently degraded conditions in the tributary and in Uvas Creek downstream of the tributary.

A ladder that was installed at Pickels Dam will allow steelhead passage upstream of the dam, and resident rainbow trout populations occurring upstream of the dam are believed likely to be replaced by steelhead (Smith 2007d).

#### *Uvas tributary*

Staff from DFG observed “many steelhead juveniles... up to about 4 inches” in 1983 in the unnamed creek that enters Uvas Creek approximately ¼ mile downstream from Uvas Dam (DFG 1983).

#### *Croy Creek*

In a 1997 letter, Dr. Jerry Smith reported observing multiple *O. mykiss* year classes in Croy Creek (Smith 1997b).

In a 2007 steelhead distribution report, Smith states, “The upper potential natural limit of steelhead access in Uvas Creek and several small tributaries, including Croy Creek, is not known” (Smith 2007d, p. 9).

### *Llagas Creek*

A 2007 steelhead distribution report evaluates steelhead habitat in Llagas Creek downstream and upstream of the Chasbro Dam. The report states, “There is little potential for substantially improving steelhead success in Llagas Creek...low stream flows and warm water temperatures preclude much steelhead rearing downstream of Watsonville Road (Smith 2007d). The Llagas Creek headwaters support a resident *O. mykiss* population.

### *Machado Creek*

A 2007 report states, “The Llagas Creek watershed is drier than that of Uvas Creek, and none of the tributaries of Llagas Creek have perennial flow” (Smith 2007d).

A 1973 report states, “In wet years, steelhead will also spawn in small tributary streams such as the one which parallels Sycamore Avenue; they did so in 1973. However, these tributary streams dry up early and strand the steelhead fry” (Smith 1973). The creek being described is assumed to be Machado Creek.

### *Tequisquita Slough*

Tequisquita Slough appears on a DFG list of streams with historical steelhead populations (DFG ca 1990). Several tributaries to Tequisquita Slough appear to have had historical *O. mykiss* occurrence.

### *Santa Ana Creek*

A 2007 report states that Santa Ana Creek is “apparently too dry to support stream fishes” (Smith 2007d, p. 20).

### *Arroyo de las Viboras Creek*

A 2007 report states that Arroyo de las Viboras Creek is “apparently too dry to support stream fishes” (Smith 2007d, p. 20).

### *Sulfur Creek*

Sulfur Creek is tributary to Arroyo de las Viboras Creek. A 2007 report states that Arroyo de las Viboras Creek is “apparently too dry to support stream fishes” (Smith 2007d, p. 20).

### *Arroyo dos Picachos Creek*

A 2007 steelhead distribution report rates rearing habitat in Arroyo dos Picachos Creek as “good-very good,” from 0.2 miles below the Lone Tree Road crossing upstream 3 miles, (Smith 2007d, p. 32). The report states, “Arroyo Dos Picachos has a healthy population of resident rainbow trout...Steelhead...may still use it in wet years” (Smith 2007d, p. 20).

### *Lone Tree Creek*

A 1938 letter to DFG indicated that steelhead accessed Lone Tree Creek in some years and described the stream as “excellent” for trout (Garcia 1938).

#### *Pacheco Creek*

A 2007 steelhead distribution report states, “Late spring releases from North Fork Pacheco Reservoir are now more likely to restrict emigration than are conditions in the lowermost reach of [Pacheco Creek]...Even with good summer reservoir releases, conditions are rarely suitable for significant juvenile steelhead rearing much further downstream than the CDF fire station” (Smith 2007d, p. 21).

#### *Harper Canyon Creek*

A 1973 memo documents the historical presence of *O. mykiss* in Harper Canyon Creek (DFG 1973).

#### *Cedar Creek*

A 1975 report notes that Cedar Creek provides “good, cool-water nursery areas” in wet years (Smith 1975).

A 2007 report describes rearing habitat in Cedar Creek as “poor to fair” upstream of Hagerman Canyon. The report notes that Cedar Creek has “mostly intermittent flows in summer, but [was] used by steelhead in the early 1970’s” (Smith 2007d, p. 22).

#### *North Fork Pacheco Creek*

A 2007 report indicates that North Fork Pacheco Creek can contain “very good” rearing habitat downstream of the North Fork Dam depending on releases from the reservoir (Smith 2007d).

#### *East Fork Pacheco Creek*

East Fork Pacheco Creek enters North Fork Pacheco Creek upstream from the North Fork Reservoir. A 2007 report indicates that East Fork Pacheco Creek contains “poor to fair” rearing habitat in the 0.5 miles downstream from a barrier falls (Smith 2007d).

#### *South Fork Pacheco*

A 2007 report describes rearing habitat in South Fork Pacheco Creek as “none to below average” in the lower 2.5 miles and “poor”/ unknown from 2.5 miles upstream. The report notes that South Fork Pacheco Creek has “mostly intermittent flows in summer, but [was] used by steelhead in the early 1970’s” (Smith 2007d, p. 22).

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## Monterey County

### Salinas River

#### *Salinas River*

“The mainstem Salinas River is a migration corridor for adult steelhead migrating upstream from the ocean to tributary spawning areas. Spawning and rearing habitats are located in tributary streams” (NMFS 2007, p. 40).

#### *Gabilan Creek*

In 2000 DFG staff conducted a stream inventory of Gabilan Creek from the Cienega del Gabilan Ranch property line upstream 1.4 miles. A total of three YOY, 15 age 1+, and six age 2+ *O. mykiss* were captured. No *O. mykiss* were captured past 2,051 feet upstream of the Ranch property line. The survey ended 1.4 miles upstream from the Ranch property line due to lack of access, but this was not believed to be the end of the anadromous reach (DFG 2000a).

A 2002 fish distribution study evaluated 117 meters of stream within the headwaters of Gabilan Creek and determined the average potential population density for *O. mykiss* YOY to be 1.6 fish per meter for the surveyed area (Casagrande 2003, p. 116).

An adult steelhead was collected from Gabilan Creek in 2004 (DFG 2004).

#### *Natividad Creek*

A 2002 DFG letter states, “Natividad Creek is known as a migration route for steelhead trout” (DFG 2002). The basis for the statement is not provided.

#### *Pilarcitos Canyon Creek*

Pilarcitos Canyon Creek appears on an undated list of Monterey County streams with historical steelhead populations. The basis for inclusion is not provided.

#### *El Toro Creek*

As part of a steelhead range contraction study, NMFS staff visited El Toro Creek 2003. It was found to be dry and therefore not capable of supporting *O. mykiss* (NMFS 2005).

#### *Watson Creek*

Watson Creek appears on an undated list of Monterey County streams with historical steelhead populations. The basis for inclusion is not provided.

#### *Limekiln Creek*

Limekiln Creek appears on an undated list of Monterey County streams with historical steelhead populations. The basis for inclusion is not provided.

### *Arroyo Seco River*

DFG staff conducted snorkel surveys in the Arroyo Seco River in June 2000. From the Santa Lucia Creek confluence to just upstream of the Horse Bridge, 155 *O. mykiss* ranging in length from 2 to 14 inches were observed. From the Santa Lucia Creek confluence downstream 600 meters, “numerous” *O. mykiss* ranging in length from 1 to 14 inches were observed (Murphy 2000).

In 2001, one adult male steelhead skeleton and three different age classes of *O. mykiss* were observed in Arroyo Seco River between Government Camp and the gorge near the Willow Creek confluence (Casagrande 2003).

A biological opinion prepared by NMFS in 2007 states, “Based on its current condition and the loss of spawning habitat in the Nacimiento and San Antonio rivers, the Arroyo Seco River is the most important remaining steelhead habitat in the Salinas River watershed... The conservation of steelhead habitats in the Arroyo Seco River watershed is critical for the persistence of this species in the Salinas River” (NMFS 2007, p. 65). The Thorne Road fish ladder and multi-culvert crossing located at a stream mile 7.5 was identified as a partial barrier to migrating steelhead due to poor maintenance. Funding was obtained to remove the fish ladder and replace a series of culverts at the Thorne Road crossing with a clear span bridge. Construction began in summer 2008.

### *Reliz Creek*

In a 1969 document, Reliz Creek is listed as having “spawning and nursery areas” for steelhead (SWRCB 1969).

### *Vaqueros Creek*

During a 1996 stream survey two “resident rainbow trout” were observed in Vaqueros Creek in a reach that extended from the confluence with Arroyo Seco Creek upstream 0.8 miles (HES 1996 p.11).

According to a fish distribution report prepared in 2003, several steelhead were observed in Vaqueros Creek in the winter of 1998, which is reported to be the last year in which an abundant steelhead run was observed in the creek (Casagrande 2003). The recent absence of significant steelhead runs was attributed to “lack of significant and timely runoff in the Salinas Watershed over the last four winters [1999-2002]” (Casagrande 2003, p. 48).

### *Sweetwater Creek*

No fish were observed in a winter 1993-1994 survey of Sweetwater Creek by consulting biologists. The report notes that the stream was dry at the mouth and had “very little water” 300 meters upstream at the time of the survey (Bianchi and Miller 1994).

### *Horse Creek*

In 1936, DFG stocked Brookdale Hatchery steelhead in Horse Canyon Creek (DFG 1938).

### *Piney Creek*

Piney Creek was surveyed from the Arroyo Seco confluence to the Paloma Creek confluence in 1993. Several *O. mykiss* ranging in length from 7.5 to 15 cm were observed in the first stream mile. Several redds and "...some very small fish, possibly young-of-the-year trout" were observed near the Paloma Creek confluence (Bianchi and Miller 1994).

Notes from a survey conducted in Piney Creek in 1997 by DFG staff indicate that four reaches totaling 1,100 meters in length between a closed campground road crossing and an unnamed upper tributary to Piney Creek were sampled. Numerous YOY and age 1+ and older *O. mykiss* were observed in all four reaches. A second set of survey notes describes a survey reach in Piney Creek that began at a road crossing located in the NW ¼ of the NE ¼ of section 12 on the Sycamore Flat Quadrangle and extended 500 meters downstream to a second road crossing. Thirteen YOY and one age 1+ *O. mykiss* were observed. Forty-four *O. mykiss* measuring less than 3 inches in length, 13 *O. mykiss* measuring 6 inches in length, and one *O. mykiss* measuring 15 inches in length were observed downstream of the second road crossing (Chubb 1997).

NMFS staff confirmed the presence of *O. mykiss* in Piney Creek in 2001 (NMFS 2003a).

### *Rocky Creek*

A 1948 DFG letter states that Rocky Creek is not accessible to steelhead because of a natural falls at the confluence (DFG 1948).

### *Santa Lucia Creek*

During a 1997 survey of Santa Lucia Creek, DFG staff collected 10 *O. mykiss* measuring less than 3 inches in length from between the Arroyo Seco confluence and the bridge at the first road crossing. From the bridge upstream 785 meters to a campground, 247 *O. mykiss* measuring less than 3 inches in length and five *O. mykiss* measuring 6 inches in length were observed. From the campground upstream 140 meters, 10 *O. mykiss* measuring less than 3 inches in length were observed (Chubb 1997).

In June 2000 DFG staff conducted snorkel surveys in two sections of Santa Lucia Creek and counted a total of 426 *O. mykiss* ranging in total length from 1 to 8 inches (Murphy 2000).

### *Tassajara Creek*

Staff from DFG surveyed Tassajara Creek in 1945 from the Willow Creek confluence to ½ mile upstream from Tassajara Hot Springs and observed "abundant" YOY *O. mykiss* (DFG 1945a). The survey report notes, "The caretaker at Tassajara Hot Springs...said that there is a very large run of sea-run Steelhead in Tassajara Creek and that the fish run up to the falls... 6 mi. above Tassajara Hot Springs," adding that DFG staff believed the falls to be located 2.5 miles above the Hot Springs (DFG 1945a, p. 2).

During a stream survey conducted in 1997, two *O. mykiss* measuring less than 3 inches in length and six *O. mykiss* measuring 6 inches in length were captured from a reach of Tassajara Creek located between Pasture trail and the Tassajara/ Willow Creek confluence (Chubb 1997). The survey notes refer to this reach as Willow Creek. Two *O. mykiss* measuring less than 3 inches in length and seven

*O. mykiss* measuring 6 inches in length were observed in a 470 meter reach of Tassajara Creek above the Willow Creek confluence (Chubb 1997).

#### *Willow Creek*

In 1997 DFG staff collected eight *O. mykiss* measuring less than 3 inches in length and three *O. mykiss* measuring 6 inches in length in Willow Creek between the confluence with Tassajara Creek and the fifth trail crossing upstream (Chubb 1997).

#### *Lost Valley Creek*

Staff from DFG conducted electrofishing surveys in the lower three miles of Lost Valley Creek in 1971 and estimated the juvenile *O. mykiss* standing crop to be 360 individuals per mile in stream mile 1, 239 individuals per mile in stream mile 2, and 980 individuals per mile in stream mile 3 (DFG 1971).

In 1997 DFG staff observed a total of 427 *O. mykiss* measuring less than 3 inches in length, 63 *O. mykiss* measuring approximately 6 inches in length, and seven *O. mykiss* measuring approximately 15 inches in length in Lost Valley Creek between a trail crossing downstream from the Lost Valley Camp and a 30 foot waterfall barrier located upstream of Fish Camp (Chubb 1997).

#### *ZigZag Creek*

Staff from DFG conducted electrofishing surveys in the lower mile of ZigZag Creek in 1971 and estimated the juvenile *O. mykiss* standing crop to be 689 individuals per mile (DFG 1971).

#### *Higgins Creek*

Staff from DFG conducted electrofishing surveys in the lower two miles of Higgins Creek in 1971 and estimated the juvenile *O. mykiss* standing crop to be 901 individuals per mile in stream mile 1 and 795 individuals per mile in stream mile 2 (DFG 1971).

DFG staff surveyed Higgins Creek in 1997. From the confluence with Lost Valley Creek upstream 60 meters, three *O. mykiss* measuring 3 inches in length were observed. From below Pelon Camp upstream 190 meters, five *O. mykiss* measuring 3 inches in length were observed. In upper Higgins Creek from the tributary below Higgins Camp upstream to where the grade flattens in Indian Valley, 25 *O. mykiss* measuring less than 3 inches in length and five *O. mykiss* measuring 6 inches in length were observed. A 15 foot high falls at the end of the reach in Indian Valley was identified as a total migration barrier (Chubb 1997).

#### *San Antonio River*

During a 1994 stream survey conducted in San Antonio River upstream of the San Antonio Dam, DFG staff estimated average *O. mykiss* population density to be 2,488 individuals per mile of stream for a reach extending from the North Fork San Antonio confluence to two miles upstream of Fresno Camp (DFG 1994a; DFG 1994b; DFG 1994c). Habitat quality was observed to be good from two miles upstream of Fresno Camp to two miles downstream of the Salspuedes Creek confluence. Habitat quality was noted to decrease near the Merle Ranch property due to dam

construction and other types of human disturbance. A summer check dam located 16,450 feet downstream from the Salsipuedes Creek confluence at Merle Ranch was identified as a passage barrier.

#### *Bear Canyon Creek*

Staff from DFG surveyed Bear Canyon Creek in the 1960s. The survey report notes that the stream is intermittent for the first seven miles and continuous from stream mile 7 to the headwaters. The report notes, "Rainbow trout exist all the way up to the headwaters. "Size...between 1 and 5 inches. Abundance...were 3 per 100 feet. Natural propagation...is good" (DFG ca 1965a).

#### *North Fork San Antonio River*

Staff from DFG surveyed North Fork San Antonio River from the mouth to the headwaters in 1965 and noted "good" natural propagation of *O. mykiss*. No fish were observed in the upper 1.5 miles of stream (DFG 1965a).

#### *Rattlesnake Creek*

Staff from DFG surveyed Rattlesnake Creek in the 1960s from the mouth to the headwaters and observed *O. mykiss* ranging from 2 to 5 inches at an abundance of one individual per 100 feet. Natural propagation was noted to be "fair" (DFG ca 1965b).

#### *Pinal Creek*

Staff from DFG surveyed Pinal Creek in the 1960s from the mouth to the headwaters and observed *O. mykiss* ranging from 3 to 5 inches at an abundance of five individuals per 100 feet between the mouth and a barrier falls located at approximately stream mile 1.2. Natural propagation was noted to be "fair" (DFG ca 1965c).

#### *Santa Lucia Creek (Sycamore)*

Staff from DFG surveyed Sycamore Creek in the 1960s from the North Fork San Antonio confluence to the headwaters. The survey report indicates that the length of the stream is seven miles, but the length of the mainstem appears to be closer to 3.6 miles. The survey report notes, "The species of rainbow trout were found only in the upper 4½ miles of stream. The size of rainbow trout was 2 to 3 inches. Abundance of rainbow trout was 8 per 100 feet. Success of rainbow trout, the condition and natural propagation were also good" (DFG ca 1965d).

A DFG stream inventory data sheet from 1979 notes the presence of *O. mykiss* in Sycamore Creek (DFG 1979).

#### *Carrizo Creek*

Staff from DFG surveyed Carrizo Creek from the mouth to the headwaters in 1965 and observed rainbow trout ranging from 1 to 10 inches in length at an abundance of 5 individuals per 100 feet. Natural propagation was described as "good" and suitable spawning and nursery areas were noted throughout the length of the stream. No barriers were noted (DFG 1965b).

### *Wizard Gulch Creek*

A DFG field note from 1961 states, “This is reported to have been a good trout stream near the headwaters in the past” (DFG 1961). The observer found the gulch dry during his visit.

### *Salsipuedes Creek*

Staff from DFG surveyed Salsipuedes Creek from the mouth to the headwaters in 1965 and observed rainbow trout ranging from 5 to 7 inches in length at an abundance of 5 individuals per 100 feet of stream. The survey report states, “Success, condition and natural propagation...was good” (DFG 1965c).

### *San Antonio River tributary*

Staff from DFG surveyed this unnamed tributary to San Antonio River from the mouth to three miles upstream in 1965 and observed rainbow trout ranging from 1 to 8 inches in length at an abundance of 4 individuals per 100 feet of stream. The survey report states, “Success, condition and natural propagation of the rainbow trout was good” (DFG 1965d).

### *Nacimiento River*

DFG staff inventoried wild trout resources within the Los Padres National Forest in 1992. Resident *O. mykiss* populations were surveyed in Nacimiento River above the Nacimiento Dam from the confluence with Negro Fork upstream 5 miles to the headwaters. A total of 284 YOY, 187 age 1+, and 46 age 2+ *O. mykiss* were observed, with the highest densities recorded from the Nacimiento-Ferguson Road Bridge upstream (DFG 1993a).

A steelhead status report for the Salinas River prepared in 1996 states that the section of Nacimiento River below the dam “...is marginal steelhead habitat due to high turbidity, high levels of fine sediments, and high water temperature (HES 1996, p. 1).

A biological opinion prepared by NMFS in 2007 states that the 10 mile segment of Nacimiento River below the dam is accessible to steelhead and “potentially usable” for spawning and rearing, with the three mile section of stream directly below the dam likely containing the best quality habitat within the reach (NMFS 2007).

### *Dip Creek*

Dip Creek appears on a 1969 list of streams in the Salinas River basin identified as having steelhead spawning and rearing habitat (SWRCB 1969).

### *Las Tablas Creek*

Staff from DFG surveyed Las Tablas Creek in 1966 and noted “excellent” quality spawning and nursery areas and rainbow trout from 3 to 12 inches in Las Tablas Creek from the confluence with the Buena Vista Mine effluent and the headwaters (DFG 1966).

#### *Little Burnett Creek*

A long-time Salinas Valley resident produces an account of steelhead in the Salinas River and its tributaries. The account included reports of steelhead in Little Burnett Creek in the 1930's (Franklin 1999).

#### *Tobacco Creek*

A long-time Salinas Valley resident produced an account of steelhead in the Salinas River and its tributaries. The account included reports of steelhead in Tobacco Creek in the 1930's (Franklin 1999).

#### *Stony Creek*

Staff from DFG surveyed Stony Creek in 1945 and 1961 and did not observe *O. mykiss* (DFG 1945b; DFG 1962).

Stony Creek appears on a 1969 list of streams in the Salinas River basin identified as being "spawning and nursery areas" for steelhead (SWRCB 1969).

#### *San Miguel Creek*

A 1979 DFG inventory of Monterey County streams indicates that rainbow trout occurs in San Miguel Creek (DFG 1979).

#### *Negro Fork Nacimiento River*

During a 1992 survey of Negro Fork Nacimiento River, DFG staff captured a total of 249 YOY, 182 age 1+ and 70 age 2+ *O. mykiss* from four sampling stations located in the lower 1.5 miles of stream (DFG 1993a). A bedrock and concrete dam located at stream mile 1.5 on the Negro Fork created a total barrier to fish passage at the time of the survey. A bedrock-boulder barrier occurred at stream mile 2.5.

#### *Huerhuero Creek*

As part of a steelhead range contraction study, NMFS staff visited Huerhuero Creek in 2003. It was found to be dry and therefore not capable of supporting *O. mykiss* (NMFS 2005). Staff from DFG consider Huerhuero Creek as lacking suitable *O. mykiss* habitat due to the seasonal nature of flows (M. Hill pers. comm.).

#### *Paso Robles Creek*

Staff from DFG surveyed Paso Robles Creek in 1960 from the mouth to above the confluence with Jack Creek and observed "numerous" *O. mykiss* ranging from 2 to 4 inches in length "in every pool observed during the course of the survey." The report notes that juvenile survival is limited due to the stream becoming dry in summer, but states "There is some indication that in the lower section of the stream water remains in the deeper pools and...remain relatively cool due to the extensive shading...These pools... are possibly the main factors...deciding survival of steelhead trout in the stream" (DFG 1960a, p. 4).

### *Santa Rita Creek*

Staff from DFG surveyed Santa Rita Creek in 1960 and noted some pool habitat and good cover from approximately 0.5 miles above the Paso Robles Creek confluence to two miles upstream into the North Fork. The survey report noted the presence of steelhead trout in the Santa Rita mainstem and North Fork, but added “Paso Robles Creek... contains a much larger population of juvenile steelhead trout than does Santa Rita Creek” (DFG 1960b).

A 1973 DFG survey report for Santa Rita Creek noted that flow was absent from Santa Rita Creek at the time of the survey (November) and pools provided the only potential habitat in the middle section of Santa Rita Creek during this time (DFG 1973).

A long-time Salinas Valley resident produced an account of steelhead in the Salinas River and its tributaries. The account included reports of steelhead in Santa Rita Creek prior to construction of the Nacimiento Dam (Franklin 1999).

In July 2003 NMFS staff observed *O. mykiss* in Santa Rita Creek near the campground off Santa Rita Road (NMFS 2003c).

### *Rocky Creek*

A long-time Salinas Valley resident produced an account of steelhead in the Salinas River and its tributaries. The account included reports of steelhead in Rocky Creek prior to construction of the Nacimiento Dam (Franklin 1999).

### *Sheepcamp Creek*

A long-time Salinas Valley resident produced an account of steelhead in the Salinas River and its tributaries. The account included a report of “native trout” in Sheepcamp Creek in the 1940s (Franklin 1999).

### *Jack Creek*

Historical accounts from indicate that local fisherman captured steelhead in Jack Creek from below Hidden Valley up to the junction with Santa Rita Creek in 1937 and that steelhead spawned in holes in Jack Creek in 1944 (US-LTRCD 2002)

Consultants found “good” habitat conditions for *O. mykiss* in Jack Creek in March 1998 (EDAW 2001).

In 1997 DFG staff captured 20 *O. mykiss* ranging in length from 55 to 186 mm from Jack Creek (listed as Paso Robles Creek in the notes) in a section of stream located near mile marker 22 on Old Highway 46 (DFG 1999a). At the same location in 2003, NMFS staff observed three age 1+ *O. mykiss* (NMFS 2003b).

### *Graves Creek*

A 1999 DFG survey of Graves Creek noted that flow in the creek “normally disappears in June/July” (DFG 1999b). *Oncorhynchus mykiss* was not observed during the survey.

Graves Creek was “spot checked” downstream of the most downstream barrier by NMFS staff and the results reported in a 2005 study. *Oncorhynchus mykiss* was absent from the creek and the population was deemed “extirpated” (NMFS 2005).

#### *Atascadero Creek*

DFG staff conducted a stream survey of Atascadero Creek in May and December of 1999. During the May survey “abundant” *O. mykiss* were observed in the section of Atascadero Creek upstream of the Hale Creek confluence, however the majority of this section was dry in December and only three YOY *O. mykiss* were observed in the 60 foot long pool that remained. From the confluence with Hale Creek downstream approximately 0.3 miles to a bedrock falls, “numerous” YOY, age 1+, and age 2+ were observed. This section of stream was identified as perennial, and rearing habitat was noted to be “plentiful.” The bedrock falls was identified as a likely barrier to steelhead migration, although the report notes that local residents have observed adult steelhead jumping the barrier. In the section of Atascadero Creek located 4.5 miles upstream from the Salinas River confluence where Highway 41 crosses the creek three times, six YOY, three age 1+, and two age 2+ *O. mykiss* were captured in May. The report notes “abundant” spawning and rearing habitat downstream from the easternmost bridge (DFG 2000b).

In April of 2005, DFG staff captured 11 *O. mykiss* from the three bridges area of Atascadero Creek (Highland 2005).

#### *Eagle Creek*

DFG staff conducted a stream survey of Atascadero Creek and its tributaries in May and December of 1999. Eagle Creek was noted to be perennial from the confluence with Atascadero Creek upstream 0.8 miles. At stream mile 0.8, six *O. mykiss* ranging in total length from 40 to 180 mm were captured. The report notes, “[Eagle Creek] is one of the few areas in the watershed where spawning habitat was abundant and streamflow was perennial” (DFG 2000b).

#### *Hale Creek*

DFG staff conducted a stream survey of Atascadero Creek and its tributaries in May and December of 1999. In May, several adult salmonids were observed in the perennial portion of Hale Creek. In December, 21 YOY, 11 age 1+, and two age 2+ *O. mykiss* were observed. Steelhead rescued from drying tributaries are placed in Hale Creek Reservoir, located at stream mile 1.7 (DFG 2000b).

#### *Kathleen Valley Creek*

DFG staff conducted a stream survey of Atascadero Creek and its tributaries in May and December of 1999. In May only the uppermost 0.5 miles of the Kathleen Valley tributary had streamflow. Several YOY *O. mykiss* ranging in total length from 30 to 50 mm were captured. Approximately 600 *O. mykiss* were moved to the Hale Creek Reservoir from the Kathleen Valley tributary before it went dry in July. The creek was reported to be dry in December (DFG 2000b).

#### *Santa Margarita Creek*

According to a summary of DFG staff field notes, in 1997 a fisherman caught one adult steelhead in Santa Margarita Creek below the bridge at El Camino Real and Asuncion Road (DFG 1999a).

As part of a steelhead range contraction study, NMFS staff surveyed Santa Margarita Creek in 2003 and observed *O. mykiss* (NMFS 2005).

#### *Trout Creek*

During surveys conducted between 2004 and 2006, researchers consistently observed *O. mykiss* at several sites on Trout Creek, including one large *O. mykiss* believed to be a steelhead. A landowner working with researchers during the 2004-2006 surveys reported seeing spawning steelhead in Trout Creek (L. Thompson pers. comm.).

#### *Tassajera Creek*

According to a summary of DFG field notes, in April 1995 and October 1999 multiple *O. mykiss* YOY and age 1+ and 2+ were observed in Tassajera Creek near 9215 Tassajera Creek Road, approximately 2.6 mi. from Highway 101, and in winter of 1995 adult steelhead were observed near Tassajera Creek Road approximately 2.1 miles from Highway 101 (DFG 1999a).

#### *Rinconada Creek*

A stream survey report from the 1940s indicates that Rinconada Creek was stocked with “very poor success” due to low flows and high temperature (DFG ca 1934). However, *O. mykiss* was observed during the survey.

### **Carmel River**

#### *Carmel River*

During a 1994 survey conducted in the Carmel River from upstream of the Los Padres Dam to the Miller Fork confluence, a total of 557 YOY, 140 age 1+, and 33 age 2+ *O. mykiss* were captured from three sampling stations (DFG 1995).

A biological assessment of the Carmel River watershed was conducted in 2004. According to the report, “In normal and above water years, when no temporary barriers limit upstream migration, adult steelhead spawn in a total of 60.5 miles of stream, including 24.5 miles of the Carmel River mainstem, 30 miles of primary tributaries, and 6 miles of secondary tributaries” (MPWMD 2004). Within the mainstem, approximately 62,832 feet of stream downstream of the San Clemente Dam, 28,550 feet of stream between the San Clemente Reservoir and the Los Padres Dam, and 35,800 feet of stream upstream of the Los Padres Reservoir was estimated to provide rearing habitat (MPWMD 2004 p.38). Average juvenile *O. mykiss* population density was estimated to be 0.72 individuals per linear foot of stream downstream of the San Clemente Dam, 1.12 individuals per linear foot of stream between the San Clemente Reservoir and the Los Padres Dam, and 0.65 individuals per linear foot of stream between the Los Padres Reservoir and the anadromous barrier above the Ventana Mesa Creek confluence. Steelhead have access to the mainstem Carmel up to the Los Padres Dam. A trap and truck operation is used to transport steelhead from the Los Padres Dam to high quality habitat upstream.

### *Potrero Canyon Creek*

During a December 2002 stream assessment, the wetted portion of Potrero Canyon Creek extended from 2,400 feet upstream from the gatehouse upstream 1.7 miles. Rearing habitat was rated “fair-good” in the majority of the wetted section. The last 500 feet of the wetted channel did not contain suitable habitat (Entrix 2003a, p. 8). The report indicates that in wet years one additional mile in Potrero Canyon Creek from the Carmel River confluence upstream and one additional mile of stream from the upstream extent of flow to an elevation of 540 feet provide rearing habitat.

### *Robinson Canyon Creek*

Robinson Canyon Creek was surveyed within the Santa Lucia Preserve in December of 2002 and was noted to contain “poor to fair” quality rearing habitat and “very limited opportunities for migration and rearing” due to “naturally low surface flows” and multiple passage barriers (Entrix 2003a).

A 2004 assessment of the Carmel River watershed indicates that 2,500 feet of stream was suitable for rearing in Robinson Canyon Creek (MPWMD 2004, p. 38).

According to the Carmel River Steelhead Association website, fish sampling conducted in Robinson Canyon Creek in 2005 from the Carmel River confluence to the first bridge yielded 210 YOY *O. mykiss*.

### *Las Garzas Creek*

During a survey of Las Garzas Creek conducted in October of 2000, DFG staff observed YOY, age 1+ and age 2+ *O. mykiss* throughout a reach of stream that extended from the Carmel River confluence to the Robinson Canyon Road crossing. According to the survey report, 25 percent of the reach contained suitable rearing habitat (DFG 2000c).

During a 2002 survey consultants found good quality rearing habitat in Las Garzas Creek between stream miles 0.7 and 2.6 (Entrix 2003b). According to the report “Steelhead readily use the downstream 1.8 miles of the 4.3 miles of lower Las Garzas Creek” (Entrix 2003, p. 7). A bedrock falls located at stream mile 2.6 was identified as the upstream limit of anadromy.

The Carmel River Steelhead Association conducts steelhead rescues from drying portions of the Carmel River watershed. According to their website, in one day’s rescue effort conducted in the summer of 2005, 502 YOY and 9 age 1+ *O. mykiss* were rescued from Las Garzas Creek (CRSA 2008).

### *Hitchcock Canyon Creek*

In 1998, DFG staff observed YOY *O. mykiss* in Hitchcock Canyon Creek in pools below multiple bridge crossings between the mouth and approximately 1.85 miles upstream (Highland 1998).

### *Tularcitos Creek*

A steelhead habitat map included in a 2004 assessment of the Carmel River watershed indicates that steelhead use the lower 3.4 miles of Tularcitos Creek for rearing (MPWMD 2004).

### *Chupines Creek*

A 1988 draft management plan for the Carmel River watershed states, "...in 1983 steelhead spawned in Chupines Creek..., reportedly for the first time since the flood year of 1958" (Greenwood 1988).

A steelhead habitat map included in a 2004 assessment of the Carmel River watershed indicates that Chupines Creek does not contain rearing habitat (MPWMD 2004).

### *San Clemente Creek*

A 2004 assessment of the Carmel River watershed indicates that San Clemente Creek provides approximately 22,200 feet of suitable rearing habitat (MPWMD 2004).

A section of San Clemente Creek located within the San Lucia Preserve (SLP) was surveyed in November of 2002. Rearing habitat was rated "good-excellent" for the wetted portions of stream between the SLP boundary and a series of bedrock falls located 1,000 feet upstream of the San Clemente Trail Bridge. "Fair-good" quality rearing habitat was observed between the falls and a series of bedrock ramps beginning 500 feet above the Robinson Canyon Road crossing. The bedrock ramps were identified as the upstream limit of anadromy (Entrix 2003a, pp. 11-15).

In 2003 a migrant trap was operated at the San Clemente Reservoir during the summer drawdown period. Over 43 days, 1,244 YOY and one age 1+ *O. mykiss* were captured and an additional 255 YOY and 10 age 1+ *O. mykiss* were rescued between the migrant trap and the reservoir (Froke 2003).

### *Black Rock Creek*

Staff from DFG surveyed Black Rock Creek in 1957 and noted "This appears to be a fair steelhead spawning area and a very good nursery stream for steelhead ascending from San Clemente Reservoir" (DFG 1957a). A bedrock falls at stream mile 3.5 likely is the limit of anadromy.

### *South Fork Black Rock Creek*

In a 1957 survey report DFG deemed South Fork to be an "unimportant tributary to Black Rock Creek" (DFG 1957b). However, *O. mykiss* was observed downstream of a 10-12 foot high rock falls located about 100 feet upstream from the mouth of the creek.

### *Pine Creek*

Staff from DFG surveyed Pine Creek in 1957 and observed an "abundance of fingerlings throughout the stream" and noted that the stream "appears to be a very good steelhead spawning and nursery tributary to the Carmel River" (DFG 1957c). The upstream limit of anadromy likely occurs at a natural falls at stream mile 2.0.

### *Cachagua Creek*

A 2004 assessment of the Carmel River watershed indicates that Cachagua Creek provides approximately 10,560 feet of suitable rearing habitat for steelhead (MPWMD 2004, p. 38).

The Carmel River Steelhead Association conducts steelhead rescues from drying portions of Carmel River watershed. According to their website, in one day's rescue effort conducted in the summer of 2005, 1,393 YOY and two age 1+ *O. mykiss* were rescued from Cachagua Creek.

#### *Boronda Creek*

Information generated in 1948 by DFG staff indicates that Boronda Creek does not offer spawning habitat (DFG 1970). Notations suggest that low flow precluded access to potential suitable habitat.

#### *Conejo Creek*

A steelhead habitat map included in a 2004 assessment of the Carmel River watershed indicates that Conejo Creek does not contain rearing habitat (MPWMD 2004).

#### *Finch Creek*

A steelhead habitat map included in a 2004 assessment of the Carmel River watershed indicates that steelhead use the lower 2.2 miles of Finch Creek for rearing (MPWMD 2004).

#### *Danish Creek*

A steelhead habitat map included in a 2004 assessment of the Carmel River watershed indicates that steelhead the portion of Danish Creek located downstream from the Rattlesnake Creek confluence for rearing (MPWMD 2004).

#### *Rattlesnake Creek*

A steelhead habitat map included in a 2004 assessment of the Carmel River watershed indicates that Rattlesnake Creek does not contain rearing habitat (MPWMD 2004).

#### *Miller Fork Carmel River*

A survey conducted in August of 1999 noted "rainbow or cutthroat" trout present throughout the entire seven miles of the Miller Fork Carmel (USFS 1999a).

USFS staff conducted a stream survey in a 1.2 mile reach of the upper portion of Miller Fork Carmel River and observed "large numbers" of trout ranging in length from 3 to 15 cm (USFS 2000).

A 2004 assessment of the Carmel River watershed indicates that the Miller Fork Carmel provides approximately 31,000 feet rearing of rearing habitat (MPWMD 2004, p. 38).

#### *Bruce Fork*

A steelhead habitat map included in a 2004 assessment of the Carmel River watershed indicates that Bruce Fork does not contain rearing habitat (MPWMD 2004).

### *Hiding Canyon Creek*

Hiding Canyon Creek enters the Carmel River upstream of the limit of anadromy. A 1979 stream inventory notes the presence of “RT” in Hiding Canyon Creek (DFG 1979). The basis for inclusion is not provided

### *Carmel River tributary*

This unnamed tributary enters the Carmel River upstream of the limit of anadromy. Staff from DFG surveyed the unnamed tributary in 1957 and observed *O. mykiss*. The survey report states, “Appears to be of relatively minor importance judging by evidence of natural reproduction” (DFG 1957d).

## **San Jose Creek**

### *San Jose Creek*

San Jose Creek was surveyed in 2002 as part of a steelhead habitat assessment of the Santa Lucia Preserve (SLP). From the SLP boundary to the Trapper’s Canyon tributary, rearing habitat was characterized as “good” and several *O. mykiss* were observed. A levee and pond located on Lot 21 of the Rancho San Carlos Properties was identified as a barrier to fish passage. Approximately 20 to 30 *O. mykiss* were observed at the base of the culvert that runs from the pond to the creek and approximately five to ten YOY *O. mykiss* were observed upstream of the pond. Over the next 0.25 miles upstream, rearing and spawning habitat was noted to be limited. The report concludes, “There are about 2.5 miles of accessible steelhead habitat on San Jose Creek between the SLP boundary and the Pond, and another 0.5 mile of potential habitat between the pond and the Upstream Limit” (Entrix 2003a, p. 7).

In 2002, a survey was conducted in two reaches of San Jose Creek. From the mouth upstream to the North Fork confluence, *O. mykiss* were observed throughout the entire reach at an estimated density of 2.6 YOY and 0.4 age 1+ per 100 feet of stream. From 0.9 miles above the North Fork upstream 7,140 feet, *O. mykiss* were observed throughout the entire reach at an estimated density of 1.4 YOY and 0.2 age 1+ per 100 feet of stream. The report notes “Although juvenile trout (*O. mykiss*), were observed throughout the reaches surveyed, it is not possible to determine conclusively whether they were the progeny of anadromous steelhead or resident spawning *O. mykiss*” (HES 2002, p. 1).

### *Seneca Creek*

In a recent survey, DFG staff observed YOY and age 1+ *O. mykiss* throughout a section of Seneca Creek (J. Nelson pers. comm.) A map produced by the Central Coast Watershed Studies Team (CCoWS) at California State University, Monterey Bay depicting the results of the DFG survey indicates that approximately 2.0 miles of stream contains rearing habitat.

### *Williams Canyon Creek*

In April 1990, DFG staff sampled a 150 meter section of Williams Canyon Creek downstream of “culvert 3” and captured two *O. mykiss* measuring 149 and 170 mm in length. The stream was described as being in poor condition due to heavy sedimentation that buried suitable spawning and rearing habitat (DFG 1990).

In a recent survey, DFG staff observed YOY and age 1+ *O. mykiss* throughout a section of Williams Canyon Creek (J. Nelson pers. comm.) A map produced by the Central Coast Watershed Studies

Team (CCoWS) at California State University, Monterey Bay depicting the results of the DFG survey indicates that approximately 1.6 miles of stream contains rearing habitat.

### **Malpaso Creek**

#### *Malpaso Creek*

In 1990 DPR staff captured 16 YOY and 2 age 1+ *O. mykiss* in Malpaso Creek 250 meters upstream of the Carmel Riviera Water District diversion dam (Rischbieter 1990).

In 2002 NMFS staff observed one YOY and one age 1+ *O. mykiss* in Malpaso Creek upstream of Highway 1 (NMFS 2002a).

### **Garrapata Creek**

#### *Garrapata Creek*

In 2005 DFG staff captured a total of 68 YOY, 60 age 1+, and 14 age 2+ *O. mykiss* in Garrapata Creek from three sampling stations located between stream mile 0.92 and 215 feet upstream of the Wildcat Creek confluence (DFG 2005, pp. 4-9). The survey report notes that a logjam located at stream mile 2.9 created a total barrier to adult steelhead migration at the time of the survey. The natural upstream limit of anadromy occurs at bedrock falls located at stream mile 3.4.

#### *Joshua Creek*

NMFS staff observed YOY *O. mykiss* in Joshua Creek in 2002. A watershed assessment and restoration plan for the Garrapata watershed prepared in 2006 notes that limited habitat is available to steelhead trout in Joshua Creek. The upstream limit of anadromy occurs at a 40 foot waterfall located at stream mile 0.65 (GCWC 2006).

#### *Wildcat Canyon Creek*

A watershed assessment and restoration plan for the Garrapata watershed published in 2006 identifies a 25-30 foot waterfall located at stream mile 0.2 as the upstream limit of anadromy in Wildcat Canyon Creek (GCWC 2006). Within the short anadromous reach, the report characterizes spawning habitat as “moderately suitable at best” but indicates that rearing habitat is of higher quality (GCWC 2006, p. 44).

### **Rocky Creek**

#### *Rocky Creek*

A steelhead distribution report published in 2003 confirms the presence of steelhead in Rocky Creek in 2002 (NMFS 2003a).

### **Bixby Creek**

#### *Bixby Creek*

Staff from DFG surveyed Bixby Creek from the mouth to the confluence with Mill and Turner creeks in 1981. The survey report notes the electroshocking “indicated a fairly good [*O. mykiss*]

population for a stream of this size” and added “Bixby Creek appears to be a good spawning and nursery stream from steelhead/rainbow trout” (DFG 1981).

A steelhead distribution report published in 2003 confirms the presence of steelhead in Bixby Creek in 2002 (NMFS 2003a).

## **Little Sur River**

### *Little Sur River*

A 1965 DFG report notes that the Little Sur River contains approximately 30 miles of habitat and is “free of serious natural barriers” (DFG 1965e).

The fisheries section of the Little Sur River Protected Waterway Management Plan indicates that access and good quality habitat in the mainstem of the Little Sur River occurs up to the headwaters (HSA 1986).

In 2002 DFG staff conducted a survey on Little Sur River from 1,516 feet downstream of Pico Dam upstream to approximately 1,087 feet upstream of the dam. In the first 25 feet of the survey reach “numerous” YOY and age 1+ *O. mykiss* were observed. “Numerous fry and fingerlings” were observed downstream and upstream of the dam. The concrete apron beyond the dam was “most likely a barrier to adults under certain flows and an absolute barrier to juveniles” and other effects of the dam included destruction of redds and instream wood removal (DFG 2003).

According to the County of Monterey Resource Management Planning website, modifications to Pico Dam to allow fish passage and restoration actions to maintain high quality rearing habitat in the vicinity of the camp were approved in 2005.

### *South Fork Little Sur River*

A barrier survey was conducted in 2003 on 8.0 miles of the South Fork Little Sur River, from the publicly accessible bridge at Old Coast Road to approximately 1.5 miles above Vado Campsite. Snorkeling surveys were conducted from stream mile 4.5 to 5.0. Numerous *O. mykiss* of multiple age classes were observed throughout the surveyed reaches in the barrier and snorkeling surveys. Young-of-year were the most frequently observed age class of *O. mykiss* up to stream mile 3.75 after which age 1+ were the most frequently observed age class, with age 2+ *O. mykiss* also commonly observed (Kittleson 2003, p. 7). The upstream limit of anadromy occurs at a bedrock falls located at stream mile 5.0. A resident rainbow trout population occurs upstream of the barrier (Kittleson 2003).

## **Big Sur River**

### *Big Sur River*

A 2003 steelhead habitat enhancement plan states, “Under most flow conditions and in most years, steelhead spawn and rear exclusively in the lower 8.5 mile segment of the [Big Sur] river... steelhead are widely distributed throughout all available habitats (Duffy 2003).

Boulder falls and log barriers in the Big Sur River Gorge at the Pfeifer Big Sur State Park boundary with the Los Padres National Forest create a total barrier to steelhead passage in the Big Sur River under most conditions, but may be passable in some years.

#### *Pheneger Creek*

Staff from DFG inspected Pheneger Creek in 1978 and observed “many natural falls blocking anadromous fish passage” (DFG 1978).

#### *Juan Higuera Creek*

During surveys conducted between 1992 and 1994 abundant *O. mykiss* were observed in two reaches of Juan Higuera Creek. The population in the lower reach was “clearly dominated by young-of-the-year” while “...sampling in the upper Juan Higuera Creek suggested a resident rainbow trout population where the density was much lower and there was more equal representation by... four age classes” (DFG 1994d, p. 7)

#### *Juan Higuera tributary*

A 1979 DFG inventory of Monterey County streams indicates that steelhead and rainbow trout occur in the creek (DFG 1979). The basis for the determination is not provided.

#### *Pfeiffer-Redwood Creek*

Notes from 1953 indicate that natural falls in Pfeiffer-Redwood Creek preclude fish access (DFG 1953).

A 1990 draft report by DPR states, “Pfeiffer-Redwood Creek flows intermittently and, in its channelized state, is of little habitat value” (DPR 1990, p. 32).

#### *Post Creek*

An enhancement plan for steelhead habitat in the Big Sur River watershed within State Park property was prepared in 2003. The plan states, “Within the [Andrew Molera and Pfeiffer-Big Sur] State Park project area, specifically the mainstem Big Sur River and lower Post Creek, steelhead are widely distributed throughout all available habitats” (Duffy 2003, p.1). Post Creek was surveyed from the confluence with the Big Sur River upstream approximately 3.8 miles to the toe of the 1986 landslide, which creates a total barrier to steelhead migration.

In July 1993 juvenile steelhead density was estimated to be 57 individuals per 100 meters of stream within this sample reach (DFG 1993b). In summer 2002, YOY *O. mykiss* were observed throughout the lower 600 feet of the reach (Duffy 2003).

#### *Ventana Creek*

In 1980 staff from DFG surveyed habitat in the Big Sur watershed prior to modification of a natural barrier on lower Big Sur River. The lower one mile of Ventana Creek was surveyed and was determined to provide suitable habitat; the remainder of the stream possibly contained suitable habitat but was not surveyed (DFG 1980).

### *Terrace Creek*

According to a 1981 stream survey report, a “high waterfall” at the mouth of Terrace Creek precludes fish access (USFS 1981).

### *Lion Creek*

Staff from USFS surveyed Lion Creek in 1981 from the confluence with Big Sur River to a barrier one mile upstream and observed “good” quality habitat and *O. mykiss* ranging from 3 to 10.5 inches in length at an abundance of 40 to 50 individuals per 100 feet (USFS 1981a).

### *North Fork Big Sur River*

In a 1999 survey report USFS staff noted that *O. mykiss* individuals measuring between 2 and 10 inches in length were “common” in North Fork Big Sur River between the mouth and 0.25 miles downstream of the Cienega Creek confluence (USFS 1999b). A 20 foot waterfall at the Cienega Creek confluence was identified as the upstream limit of anadromy.

### *Redwood Creek*

Redwood Creek appears in a 1979 DFG stream inventory in which fish species present in various creeks is noted. The creek is shown to support steelhead with the annotation “(?)” in the inventory (DFG 1979).

### *South Fork Big Sur River*

Staff from USFS surveyed the South Fork Big Sur River in 1981 from the Big Sur confluence to 1.5 miles upstream of Rainbow Camp and observed *O. mykiss* ranging from 4 to 8 inches in length at an abundance of approximately 80 individuals per 100 feet of stream. The survey report states that the South Fork Big Sur “supports a large, healthy rainbow trout population” (USFS 1981b).

### *Mocho Creek*

Mocho Creek enters South Fork Big Sur Creek upstream of the natural limit of anadromy.

### *Pick Creek*

Pick Creek enters South Fork Big Sur River upstream of the natural limit of anadromy.

## **Partington Creek**

### *Partington Creek*

In 2002 NMFS staff observed one age 1+ *O. mykiss* in Partington Creek downstream of Highway 1. A note on the survey data sheet indicates that a total passage barrier occurs under Highway 1 at a several hundred foot long culvert and a 2.5 meter cascading waterfall (NMFS 2002b).

## **Lime Creek**

### *Lime Creek*

A 1963 DFG memo states, “Lime Creek supports a small steelhead run. The fish have been known to spawn in the one mile section above the mouth. In addition, young fish use this section as a nursery” (DFG 1963).

## **Big Creek**

### *Big Creek*

Staff from DFG surveyed Big Creek in 1961 and observed numerous YOY *O. mykiss* from the mouth to a barrier falls located approximately 1.4 miles upstream from the mouth. The survey report states, “This stream provides approximately 1.5 miles of good to excellent steelhead waters” (DFG 1961a).

Big Creek was sampled by NMFS staff in 2006 and 2007 as part of an ongoing study, yielding observations of YOY, age 1+, and age 2+ *O. mykiss* in Big Creek (D. Rundio pers. comm.)

### *Devils Canyon (South Fork Big) Creek*

A 1961 DFG survey report states, “[Devils Canyon Creek] provides approximately 1-1/2 to 1-3/4 miles of good spawning and nursery area for fish moving upstream from the ocean” (DFG 1961b). The survey report identifies a barrier falls located approximately 1.5 miles above the confluence with Big Creek as the upstream limit of anadromy.

NMFS staff observed multiple age classes of *O. mykiss* upstream from the barrier falls on Devils Canyon Creek in 2004 (D. Rundio pers. comm.).

### *North Fork Devils Canyon Creek*

North Fork Devils Canyon enters Devils Canyon Creek upstream of the natural limit of anadromy.

### *Middle Fork Devils Canyon*

Middle Fork Devils Canyon enters Devils Canyon Creek upstream of the natural limit of anadromy.

### *South Fork Devils Canyon*

South Fork Devils Canyon enters Devils Canyon Creek upstream of the natural limit of anadromy.

## **Vicente Creek**

### *Vicente Creek*

In 2002 NMFS staff observed multiple YOY and age 1+ *O. mykiss* in Vicente Creek in pools downstream from the bedrock falls located approximately 63.5 meters from the mouth (NMFS 2002c; NMFS 2002d).

## **Limekiln Creek**

### *Limekiln Creek*

Staff from DFG surveyed Limekiln Creek and its tributaries, Hare Canyon and West Fork Limekiln creeks, in 1961 and observed “very few” *O. mykiss*. The survey report notes that the three streams provide a total of approximately two miles of steelhead habitat with a “noticeable lack of spawning areas”, and that each stream has a bedrock falls that creates the limit of anadromy (DFG 1961c).

In 2002 NMFS staff observed 12 YOY and nine age 1+ *O. mykiss* in the lower mainstem of Limekiln Creek in the vicinity of the Limekiln State Park campground and two YOY *O. mykiss* just upstream of the West Fork confluence (NMFS 2002e; NMFS 2002f).

### *Hare Canyon Creek*

Staff from USFS surveyed Hare Canyon Creek from the Los Padres National Forest boundary to two miles upstream and observed *O. mykiss* ranging from 1 to 6 inches in length at an abundance of approximately six individuals per 100 feet of stream. The survey report states “Heavy mineralization has reduced productivity and the rainbow trout fishery. It is expected that the steelhead runs will be less in numbers and spawning success will be greatly reduced...Hare Canyon has a very low improvement potential” (USFS 1981c).

In 2002 NMFS staff observed six YOY and four age 1+ *O. mykiss* in Hare Canyon Creek a pool just upstream of a foot bridge at the very top of the Limekiln State Park campground (NMFS 2002g).

### *West Fork Limekiln Creek*

In 2002 NMFS staff observed two YOY and two age 1+ *O. mykiss* in West Fork Limekiln Creek. The survey sheet indicates the creek was accessed from Kiln Trail at the top of Limekiln State Park campground (NMFS 2002h).

## **Mill Creek**

### *Mill Creek*

In 1992 USFS staff observed YOY *O. mykiss* in perennial reaches of lower Mill Creek and adult *O. mykiss* in the creek’s upper reaches. The report states, “Mill Creek is typical of anadromous coastal streams, and there are no upstream migration barriers that would have prohibited native steelhead runs” (USFS 1992). The report indicates that some high gradient cascades on the mainstem may prevent upstream migration but that smolt out-migration may occur from stream reaches upstream of barriers.

In 2002 NMFS staff observed four YOY and 14 age 1+ *O. mykiss* in Mill Creek in the first pool downstream of the Highway 1 Bridge foundation (NMFS 2002i).

## **Prewitt Creek**

### *Prewitt Creek*

DFG staff surveyed Prewitt Creek February of 1997 from the mouth upstream to a series of bedrock falls located at stream mile 1.8. At stream mile 0.27, 35 *O. mykiss* ranging in total length from 74 to 98 mm and 52 *O. mykiss* ranging in total length from 100 to 312 mm were captured. At stream mile 0.8, 157 *O. mykiss* ranging in total length from 53 to 99 mm and 59 *O. mykiss* ranging in total length from 101 to 238 mm were captured (DFG 1997).

In 2002 NMFS staff observed six to ten YOY and 51 to 100 age 1+ *O. mykiss* in Prewitt Creek near the Highway 1 Bridge (NMFS 2002j).

### *South Fork Prewitt*

Staff from DFG surveyed South Fork Prewitt Creek in 1997 and observed *O. mykiss* fry throughout the reach downstream from the waterfall barrier located at approximately stream mile 0.15 (J. Nelson pers. comm.).

## **Plaskett Creek**

### *Plaskett Creek*

In 1996 DFG staff observed 10 *O. mykiss* measuring approximately 0.75 inches in length in Plaskett Creek near the Plaskett Creek campground (DFG 1996).

Multiple *O. mykiss* were observed in impact and reference reaches in Plaskett Creek during surveys conducted by USFS staff in 1999 (USFS 1999c).

In 2002 NMFS staff observed 5 age 1+ *O. mykiss* in Plaskett Creek upstream from Highway 1 (NMFS 2002k)

## **Willow Creek**

### *Willow Creek*

Staff from USFS surveyed Willow Creek in 1981 from the mouth to one mile upstream of Willow Camp. *Oncorhynchus mykiss* ranging from 1 to 12 inches in length were observed at an abundance ranging from 15 to 25 individuals per 100 feet of stream, with abundance increasing upstream (USFS 1981d).

According to a field note from DFG staff, more than 50 *O. mykiss* ranging in length from 0.75 to 4 inches were observed 40 yards from the mouth of Willow Creek in 1996 (Highland 1996).

As part of a larger study of streams of the Los Padres National Forest, USFS staff surveyed Willow Creek in 1999. According to the report, Willow Creek "...has an estuarine habitat which is a uniquely productive habitat" (USFS 1999c).

### *North Fork Willow Creek*

Staff from DFG surveyed North Fork Willow Creek in 1961 and observed *O. mykiss* up to a barrier falls located approximately 200 yards from the Willow Creek confluence (DFG 1961d).

### **Alder Creek**

#### *Alder Creek*

Staff from DFG surveyed Alder Creek in 1961 and observed numerous *O. mykiss* throughout the length of stream with the most common size observed measuring approximately 3 ½ inches in length. The middle section of stream was noted to contain several waterfalls that created total passage barriers (DFG 1961e).

In 2002 NMFS staff observed six to ten YOY and one to five age 1+ *O. mykiss* in Alder Creek above a two meter high falls located approximately 50 meters upstream of the Highway 1 culvert (NMFS 2002l).

A 2003 message to NMFS staff regarding a barrier survey conducted on Alder Creek notes that a falls at 1,875 feet elevation creates a total barrier to fish passage, and that other total barriers may exist downstream of the falls (NMFS 2003e).

### **Villa Creek**

#### *Villa Creek*

A 2002 memo from NMFS staff regarding steelhead presence and absence indicates that *O. mykiss* were present in Villa Creek below and above a series of barrier falls near the mouth (Fish 2002).

### **Salmon Creek**

#### *Salmon Creek*

Staff from DFG observed multiple age classes of *O. mykiss* likely to be resident in “great” habitat in Salmon Creek in June 2005. A waterfall near the mouth of Salmon Creek is believed to create a total passage barrier (J. Nelson pers. comm.).

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## San Luis Obispo County

### San Carpoforo (San Carpojoro) Creek

#### *San Carpoforo (San Carpojoro) Creek*

Staff from DFG surveyed San Carpoforo Creek in 1961 from the mouth to a 15 foot high boulder barrier located approximately 0.25 miles above Windy Point. Numerous *O. mykiss* were observed in the lower mile of stream, which was intermittent at the time of the survey. Pool habitat and cover were characterized as “excellent” in the upper reaches, and the report notes “The stream appears to be a good steelhead nursery and spawning area” (DFG 1961a).

Staff from DFG surveyed San Carpoforo Creek in 1993 from the Polar Star Mine to the lagoon. “Numerous” YOY, age 1+, and age 2+ *O. mykiss* were observed throughout the surveyed reach, which was reported to contain “numerous high quality spawning and rearing areas” (DFG 1995a).

In 2002 NMFS staff conducted a snorkel survey in lower San Carpoforo Creek. The survey data sheet indicates that the creek was accessed from Los Padres National Forest and describes the survey starting point as “300 m upstream of the bridge.” The diver observed 101 to 500 “relatively large” YOY and approximately five age 1+ *O. mykiss*. At the time of the survey the stream went dry 200 meters downstream of the bridge and did not connect to the ocean (NMFS 2002a).

#### *Estrada Creek*

Staff from DFG surveyed the lower 0.25 miles of Estrada Creek in 1961. A small number of *O. mykiss* ranging from 2 to 4 inches were observed and pool habitat and cover were characterized as “good.” The stream was noted to contribute “minor” flow to San Carpoforo Creek (streamflow was < 1 cfs at the time of the survey) and was not considered an “important spawning tributary,” but the survey report notes “...it may produce a few fish and it may have a small resident trout population” (DFG 1961b).

#### *Dutra Creek*

In 1999 staff from USFS surveyed Dutra Creek from the San Carpoforo Creek confluence to a road crossing upstream and observed *O. mykiss* fry throughout the reach. At the time of the survey the creek went dry 600 meters upstream from the San Carpoforo confluence (USFS 1999a). Dutra Creek is located upstream from a 30 foot high boulder falls on San Carpoforo Creek and the *O. mykiss* population is likely resident.

### Arroyo de los Chinos Creek

#### *Arroyo de los Chinos Creek*

In 2001 *O. mykiss* ranging in length from 2 to 10 inches were observed in Arroyo de los Chinos Creek above and below the Highway 1 culvert (Siepel 2002).

In 2002 NMFS staff observed one juvenile steelhead measuring approximately 4 inches in length just upstream of the lagoon (DFG 2002).

## Arroyo de la Cruz

### *Arroyo de la Cruz*

During a 1993 survey of Arroyo de la Cruz, DFG staff observed YOY, age 1+, and age 2+ and older *O. mykiss* in drying pools within the lower 9.7 miles of intermittent stream and throughout the 1.5 mile perennial upper reach. Electrofishing surveys conducted at three stations yielded a total of 92 YOY, 62 age 1+, and 17 age 2+ *O. mykiss* (DFG 1994b). Spawning and rearing habitat in the perennial reach was characterized as “abundant and in relatively good condition” and the lower reach was noted to serve primarily as a migration corridor.

A 1999 DFG memo regarding fishing opportunities in the central coast region includes Arroyo de la Cruz in a list of coastal streams of San Luis Obispo County that “have limited steelhead runs and native rainbow trout in headwaters” (DFG 1999, p. 12).

### *Green Canyon Creek*

Staff from DFG surveyed the length of Green Canyon Creek in 1973 and observed flows ranging from 0 to 2 cfs, a pool to riffle ratio of 70:30, and abundant shelter. No barriers to anadromy were noted. The survey report states, “Green Creek...appeared to have an over abundance of young-of-the-year SH-RT” (DFG 1973).

### *Burnett Creek*

Staff from DFG surveyed Burnett Creek in 1973. From the context of the report it appears that mainstem Burnett Creek was surveyed from the mouth to the confluence with the West Fork and that the survey continued in the West Fork. The West Fork Burnett is discussed separately below. No natural barriers were noted on Burnett Creek downstream from the West Fork and *O. mykiss* were observed throughout the surveyed reach. The survey report notes “The numbers of fish present... appeared to be small compared to the amount of available habitat” (DFG 1973).

A 1978 DFG survey report notes “...observations indicate that the...lower 3 miles of Burnett Creek represent...prime nursery habitat for [the Arroyo de la Cruz] drainage system (DFG 1978).

DFG staff surveyed Burnett Creek in April 1993 from the confluence with Arroyo de la Cruz upstream 1.5 miles to the Spanish Cabin Creek confluence, collecting a total of 75 YOY, 49 age 1+ and 29 age 2+ *O. mykiss* from two sampling stations (DFG 1994b). Rearing and spawning habitat was noted to be abundant and *O. mykiss* were observed throughout the surveyed reach, with the highest densities observed directly below a weir located at stream mile 1.3. The weir located at stream mile 1.3 was identified as a possible low flow barrier.

### *Spanish Cabin Creek*

Staff from DFG surveyed Spanish Cabin Creek in 1973 and observed *O. mykiss* up to the barrier falls located approximately 0.25 miles from the mouth (DFG 1973).

### *West Fork Burnett Creek*

Staff from DFG surveyed West Fork Burnett Creek in 1973 and observed *O. mykiss* up to a series of bedrock chutes, located approximately five miles from the mouth of Burnett Creek (DFG 1973).

### *Marmolejo Creek*

DFG staff surveyed Marmolejo Creek in August 1993 from the confluence with Arroyo de la Cruz upstream 1.1 miles and collected a total of 90 YOY, 13 age 1+ and seven age 2+ *O. mykiss* from one sampling station (DFG 1994b). From the confluence with Arroyo de la Cruz upstream 0.4 miles to a series of boulders, YOY, age 1+, and age 2+ *O. mykiss* were “frequently” observed. Multiple age classes of *O. mykiss* were also present above the boulders, but “did not appear as abundant.” The series of boulders was noted to be a barrier to anadromy at most flows, and the *O. mykiss* population upstream was believed to be resident. The survey report states, “even though adult steelhead may not be able to make it above the boulders to spawn, resident trout probably make it down, and undoubtedly contribute to the anadromous gene pool” (DFG 1994b, p. 45).

### **Oak Knoll Creek**

#### *Arroyo Laguna*

A 1999 assessment of habitat and species conservation issues on USFS land cites the presence of steelhead in Arroyo Laguna (USFS 1999).

### **Arroyo del Puerto**

#### *Arroyo del Puerto*

A 1999 assessment of habitat and species conservation issues on USFS land cites the presence of steelhead in Arroyo del Puerto (USFS 1999).

### **Little Pico Creek**

#### *Little Pico Creek*

Little Pico Creek appears on a list of “Known Steelhead Runs, San Luis Obispo County” (DFG 1982).

### **Pico Creek**

#### *Pico Creek*

A 1960 DFG survey report for Pico Creek states, “During the summer the stream dries up below the confluence of the north and south forks. A good part of the south fork also dries up in the summer. The north fork appears to be the main part of the stream suitable for fishlife” (DFG 1960a).

Pico Creek was sampled in 1993 as part of steelhead genetics study and *O. mykiss* were captured (USFS 1996).

#### *North Fork Pico Creek*

A 1960 DFG survey report for Pico Creek states that the North Fork “contains adequate spawning grounds, good cover, good pool development and enough shading to keep summer temperatures

down” observations of “as many as 50 to 100 [steelhead] in a single pool. A potential waterfall barrier is located on the North Fork approximately 4.5 miles from the mouth of Pico Creek (DFG 1960a).

North Fork Pico Creek appears on a list of “Known Steelhead Runs, San Luis Obispo County” (DFG 1982).

#### *South Fork Pico Creek*

South Fork Pico Creek appears on a list of “Known Steelhead Runs, San Luis Obispo County” (DFG 1982).

### **San Simeon Creek**

#### *San Simeon Creek*

In 1993 DFG staff sampled San Simeon Creek and captured a total of 205 *O. mykiss* ranging in total length from 69 to 314 mm, including 71 YOY, from 10 sampling stations within the 1.5 mile perennial reach located between the Steiner Creek confluence and a boulder falls at stream mile 5.9 (DFG 1995b).

Researchers conducted fish sampling annually from 1997 to 1999 in San Simeon Creek between the confluence with Van Gordon Creek upstream to the levee valve. Density estimates for the *O. mykiss* population were 1.3 individuals per 100 feet of stream in July 1997, 22.5 individuals per 100 feet of stream in July 1998, and 7.4 individuals per 100 feet of stream in July 1999. The majority of *O. mykiss* captured were YOY (Alley 2001a, pp. 39-43).

DFG staff and volunteers conducting summer rescues of *O. mykiss* from drying pools in San Simeon Creek between Cambria Rock and the Steiner Creek confluence collected a total of 614 YOY *O. mykiss* in 1995, 1228 YOY and 63 age 1+ *O. mykiss* in 1996, 354 (mostly YOY) *O. mykiss* in 1999, and 1550 YOY and 41 age 1+ *O. mykiss* in 2000 (DFG 2001).

#### *Van Gordon Creek*

During surveys conducted in Van Gordon Creek between 1997 and 1999, multiple age classes of *O. mykiss* were observed in a perennial reach of stream extending from the mouth upstream 1,191 feet (Alley 2001a).

A fish passage evaluation prepared in 2005 identified the San Simeon Creek Road crossing on Van Gordon Creek as a severe passage barrier (CCC 2005). According to DFG staff, habitat appears to be minimal upstream from the culvert (J.Nelson pers. comm.).

#### *Steiner Creek*

“At the low flow period, Steiner Creek contains 3.5 miles of flowing water supporting fish life...Observations indicated that Steiner Creek actually did support an average of 76 fish per yard” (DFG 1965, p. 3).

The PAD indicates that the upstream limit of anadromy on Steiner Creek occurs at a boulder falls located approximately 1.5 miles from the confluence with San Simeon Creek; DFG is cited as the data source.

## **Santa Rosa Creek**

### *Santa Rosa Creek*

In 1993 DFG staff surveyed 14.3 miles of Santa Rosa Creek. Electrofishing was conducted at each stream mile, yielding a total of one YOY, one age 1+, 33 age 1 or 2+, and 14 age 2+ *O. mykiss* between the lagoon and stream mile 6.9 and 905 YOY and 414 age 1+ or 2+ *O. mykiss* between stream miles 6.9 and 13.2 (DFG 1994a). According to the survey report, the primary function of the first seven stream miles is migration and rearing of age 1+ and older steelhead. The report notes that lower stream reach is impacted by water diversions. The reach above stream mile 7 is reported to contain higher quality habitat and support spawning and rearing of *O. mykiss*. The report states, "The best opportunity to conserve the steelhead resource is to maintain the upper portion of the watershed and re-establish flows in the lower part" (DFG 1994a, p. 80).

A fish passage evaluation for San Luis Obispo County streams prepared in 2005 noted passage barriers in Santa Rosa Creek at the Ferrasci Road fish ladder and at a broken concrete apron at the Burton Drive crossing (CCC 2005). The report indicated that funding had been obtained to modify both barriers. According to a DFG summary of funded projects for 2006-2007, modification of the barriers in Santa Rosa Creek "... will provide unrestricted steelhead passage to 10 miles of creek and as much as 8 miles of tributaries to spawning and rearing habitat above the project site" (DFG 2006).

### *Perry Creek*

While investigating damages to the Ferrasci Road fishway in 1997, DFG staff observed more than 15 juvenile *O. mykiss* ranging from 4 to 8 inches in length in Perry Creek within the first 150 yards of the Santa Rosa Creek confluence (DFG 2003a).

### *Green Valley Creek*

A 1999 assessment of habitat and species conservation issues on USFS land cites the presence of steelhead in Green Valley Creek (USFS 1996).

## **Villa Creek**

### *Villa Creek*

Staff from DFG surveyed Villa Creek in 1969. The report states, "RT/SH were first observed in shaded area of stream one mile above mouth. Average was 150 per/100 ft., in 2 1/2" to 4" size range in all pools, whether stagnant or flowing, in central five miles of stream. Natural propagation was good at time of survey... In upper 3 miles of stream RT/SH populations averaged 65 to 70 per 100 ft of stream...better shading...increasing chance of survival in upper 3 miles of stream... during dry years it has a limited nursery area because much of the stream dries up, flows decrease in many places to nothing, and the good gravels, which would provide excellent nursery areas, are exposed and dry..." (DFG 1969, pp. 3-4).

NMFS staff observed one *O. mykiss* in Villa Creek in 2002. The data sheet indicates that visibility was poor and more *O. mykiss* may have been present (NMFS 2002b).

Staff from DFG observed juvenile *O. mykiss* in Villa Creek several miles upstream from the ocean in 2004 (D. Highland pers. comm.).

#### *Ellyslly Creek*

A 1999 assessment of habitat and species conservation issues on USFS lands cites the presence of steelhead in Ellyslly Creek (USFS 1999).

### **Old Creek**

#### *Old Creek*

A 1957 DFG survey [pre-construction of Whale Rock Reservoir] notes “scarce” fingerling *O. mykiss* immediately downstream from a fish ladder 3.8 miles from the mouth. “A natural falls 10 ft. high...exists about 6.7 mi. above the mouth. This probably stops steelhead at all flows” (DFG 1957, p. 1).

In 1998 NMFS staff observed 37 YOY *O. mykiss* in Old Creek between the Highway 1 Bridge and Whale Rock Reservoir. NMFS staff recommended maintaining a minimum streamflow of 4.0 cfs downstream of the reservoir to provide summer rearing habitat for juvenile *O. mykiss* (NMFS 1998).

### **Toro Creek**

#### *Toro Creek*

Staff from DFG surveyed Toro Creek in 1973 and found numerous *O. mykiss* and “excellent” habitat in the lower 10 miles of stream. The survey report notes that the upper 2.5 miles of stream are dry except during the rainy season (DFG 1973).

In 2000 CCC and DFG staff inventoried stream habitat conditions in Toro Creek from the mouth upstream seven miles. No barriers were identified within the surveyed reach (DFG 2000a). The Central Coast RCD website indicates that a project to enhance *O. mykiss* rearing habitat in Toro Creek is in progress.

NMFS staff observed 12 YOY and three age 1+ *O. mykiss* in Toro Creek in 2002 (NMFS 2002c).

### **Morro Creek**

#### *Morro Creek*

During surveys conducted between 1996 and 2000, DFG staff observed YOY and age 1+ *O. mykiss* in Morro Creek beneath the orange grove at 2860 Atascadero Road, upstream and downstream of the falls located 0.25 miles west of Cerro Alto Campground, at the downstream entrance of the Hwy 41 culvert at Cerro Alto campground, and at the CalTrans rip-rap wall east of Miner’s Hardware on Highway 41 (DFG ca 2000).

A NMFS survey sheet from 2002 identifies the falls downstream of Cerro Alto Campground in Morro Creek as total barrier to anadromy (NMFS 2002d).

## **Chorro Creek**

### *Chorro Creek*

A 1976 DFG survey report states, “The three mile section of Chorro Creek downstream from the sewage treatment plant maintains a significant percentage of summer nursery habitat in the drainage. This reach sustains approximately 60 percent of the juvenile steel head population” (DFG 1976, pp. 2-3).

Consultants conducted snorkel surveys in 20 pools within a 12.6 mile anadromous reach of Chorro Creek in 2001. The survey began at the upstream end of the lagoon near stream mile 1.6. Observations of *O. mykiss* were “relatively rare” in the surveyed area, with an average of 0.8 individuals observed per pool. Juvenile *O. mykiss* abundance was estimated to be 221 for all sampled pools. No YOY *O. mykiss* were observed (Payne 2001, pp. 8-9).

A 2001 stream inventory report for Chorro Creek identifies a 130 foot long bedrock sheet located 440 feet downstream of the Chorro Reservoir as a total barrier to anadromy (CCC 2001b, p. 8).

### *San Bernardo Creek*

A 1958 DFG survey report for San Bernardo Creek notes “excellent trout habitat” in the upper 2.5 miles of stream, characterizing pools in the upper reach as “excellent... except in the extreme headwaters” and shelter as “good to excellent”, while the lower reach contained “poor” quality habitat (DFG 1958).

A 2003 fish passage evaluation identified several passage barriers on San Bernardo Creek; a private road crossing was identified as a total passage barrier and the report states “there two miles of habitat upstream of the crossing...the upper reaches of San Bernardo Creek have good year-round flow even in drought years...” (Taylor 2003).

### *San Luisito Creek*

In 2006 consultants conducted snorkel surveys in San Luisito Creek in ten pools located between the Adobe Road crossing and an abandoned diversion dam 2.3 miles upstream. The abandoned diversion dam was identified as a total barrier to anadromy. The combined *O. mykiss* abundance for all sampled pools was estimated to be 2,482 YOY and 890 age 1+ and older (Payne 2007, p. 23). The report states that the *O. mykiss* observed were likely resident due to barriers at the Highway 1 and Adobe Road crossings.

### *Pennington Creek*

During surveys conducted in Pennington Creek in 2001, average *O. mykiss* density was estimated to be 876 individuals per mile of stream downstream of Highway 1, 1,483 individuals per mile of stream between Highway 1 and stream mile 2, and 1,145 individuals per mile of stream between stream miles 2 and 3 (Payne 2001).

During a habitat inventory of Pennington Creek conducted in 2001 from the Chorro Creek confluence upstream 4.7 miles, *O. mykiss* of multiple age classes were observed periodically throughout the surveyed reach. According to the survey report, the upstream limit of anadromy occurs at boulder cascade located at stream mile 4.7 (CCC 2001a).

A 2003 stream crossing and barrier inventory report for the Morro Bay watershed identifies the Highway 1 culvert in Pennington Creek as passage barrier to salmonids of all age classes. According to the report, approximately 3.84 miles of good quality habitat exists upstream of the barrier (Taylor 2003).

#### *Dairy Creek*

Consultants conducted snorkel surveys in a total of 10 pools in Dairy Creek in 2001. In the four sampling pools located between 1,681 and 2,098 feet from the stream mouth, a total of six YOY and one age 1+ *O. mykiss* were counted. In the three sampling pools located between 5,130 and 5,298 feet from the stream mouth a total of 12 YOY and two age 1+ *O. mykiss* were counted. In the three sampling pools located between 10,207 and 10,699 feet from the stream mouth, nine YOY and one age 1+ *O. mykiss* were counted (Payne 2001, p. 8).

A 2003 stream crossing and barrier inventory report for the Morro Bay watershed identifies the Highway 1 culvert crossing and the dam off El Chorro Regional Park Road in Dairy Creek as migration barriers to salmonids of all age classes under most flow conditions (Taylor 2003). According to the report, approximately 3.82 miles of good quality habitat exists upstream of the Highway 1 barrier.

### **Los Osos Creek**

#### *Los Osos Creek*

Snorkel surveys were conducted in a total of 20 pools in three reaches of Los Osos Creek in 2001. The lower reach contained approximately 1,630 feet of wetted stream and was located in Los Osos Valley just below the border of Clark Valley, the middle reach contained 968 feet of wetted stream and was located in lower Clark Valley, and the upper reach contained 9,095 feet of wetted stream and was located at the upper end of Clark Valley (Payne 2001, p. 4). An average of 12 *O. mykiss* per pool were observed in 19 of the 20 pools sampled, and *O. mykiss* abundance was estimated to be 2,249 YOY and 83 age 1+ and older for all sampled pools. According to the survey report, the upstream limit of anadromy likely occurs at an eight foot bedrock drop located at the end of the upper survey reach.

### **Islay Creek**

#### *Islay Creek*

In 2002 NMFS staff observed “hundreds” of YOY and age 1+ *O. mykiss* in Islay Creek 200 meters upstream from the mouth (NMFS 2002e).

## Coon Creek

### *Coon Creek*

A 2007 newsletter discusses the results of ongoing steelhead monitoring upstream of the Pecho Valley Road crossing on Coon Creek where a perched culvert that formed a total migration barrier was replaced with a bridge in 2004. According to the article, restoration of the site provided steelhead access to seven miles of additional spawning and rearing habitat upstream, and over 395 *O. mykiss* ranging in total length from 1.5 to 9 inches were counted in the summer of 2006 (Otte 2007).

## Diablo Canyon Creek

### *Diablo Canyon Creek*

In 2002 NMFS staff observed one age 1+ steelhead in Diablo Canyon Creek near the Diablo Creek Power Plant and four age 1+ steelhead downstream of a 40 foot culvert that created a passage barrier. Upstream of the culvert a “steep barrier of fill” extended along a 0.25 mile section of stream (NMFS 2002f).

## San Luis Obispo Creek

### *San Luis Obispo Creek*

Snorkeling and electrofishing surveys were conducted in pool habitat in lower, middle, and upper San Luis Obispo Creek in 2003. Population density of YOY and age 1+ *O. mykiss*, expressed as individuals per mile, was estimated for each reach. The lower reach extended from the San Luis Bay Bridge, located immediately upstream of the Marre Dam Reservoir, upstream 5.88 miles to the Water Reclamation Facility (WRF) outfall and 25 pools were sampled. Average *O. mykiss* density was estimated to be 745 for YOY and 458 for age 1+. The middle reach extended from the WRF outfall upstream 4.79 miles to the first 101 bridge east of the City of San Luis Obispo and contained 2.85 miles of wetted channel, of which 24 pools were sampled. Average *O. mykiss* density was estimated to be 3,417 for YOY and 598 for age 1+. The upper reach extended from the 101 bridge upstream 3.71 miles, 1.5 miles below Cuesta Pass and contained 2.93 miles of wetted channel, of which 12 pools were sampled. Average *O. mykiss* density was estimated to be 5,952 for YOY and 403 for age 1+ (Payne 2004, p. 23).

A fish passage evaluation for San Luis Obispo County streams prepared in 2005 notes that a passage barrier occurs at the Marsh Street/Osos Street crossing on San Luis Obispo Creek (CCC 2005).

### *Harford Canyon Creek*

Staff from DFG surveyed Harford Canyon Creek in 1960 and observed *O. mykiss* from 1 to 4 inches in length and no migration barriers. The survey report notes “fair” pools and “good” shelter and notes that the stream “Provides small spawning and nursery area for San Luis Obispo Creek” (DFG 1960b).

### *See Canyon Creek*

A 1960 DFG survey report for See Canyon Creek notes a “fair size population of RT-SH from 1 to 8 inches, “good spawning gravel throughout the stream...fair to good [pools]...best...in the lower areas” and “good” shelter (DFG 1960c).

A 1994 historical review of See Canyon Creek steelhead resources cites a 1961 DFG survey that notes “Below Davis Cyn, the stream has good cover, shade, and shelter. Above the junction, pool development is not as good and shade and shelter ranges from poor to fair” (CCSE 1994, p. 4).

The 1994 review notes that in 1975 and 1983, multiple age classes of *O. mykiss* were collected from sampling sites in See Canyon Creek located between Belleview Santa Fe Union School and 2.3 miles upstream from the See Cyn Road and San Luis Bay Drive junction (CCSE 1994, p. 4).

In 2003 fish sampling was conducted in 16 pools in See Canyon Creek within the 1.85 miles of stream between the San Luis Bay Bridge and the Meadowbrook Lane crossing. Density of *O. mykiss* was estimated to be 2,327 YOY and 902 age 1+ individuals per mile of stream in the sampled reach (Payne 2004, p. 23).

A fish passage evaluation for San Luis Obispo County streams prepared in 2005 notes that culverts at the Black Walnut crossings on See Canyon Creek create passage barriers for migrating steelhead (CCC 2005).

### *Davis Canyon Creek*

DFG staff observed multiple age classes of *O. mykiss* in Davis Canyon Creek from the mouth up to the culvert on Davis Canyon Road in 2003 (DFG 2003b).

### *Froom Creek*

Consultants conducted fish sampling in Froom Creek in 2003. Sampling was conducted in five pools within the wetted channel that extended from stream mile 1.41 upstream 0.71 miles, and *O. mykiss* density was estimated to be 464 YOY and 891 age 1+ individuals per mile of stream in the sampled reach (Payne 2004, p. 23).

### *Prefumo Creek*

Consultants conducted fish sampling in Prefumo Creek in 2003. Sampling was conducted in six pools within the wetted channel that extended from 1.75 miles upstream of the Laguna Lake confluence upstream 0.42 miles. Density of *O. mykiss* was estimated to be 758 YOY and 253 age 1+ individuals per mile of stream in the sampled reach (Payne 2004, p. 23).

A fish passage evaluation for San Luis Obispo County streams prepared in 2005 notes that the culvert at the Los Osos Valley Road crossing on Prefumo Creek creates a total barrier to juvenile steelhead and a partial barrier to adult passage (CCC 2005).

### *Stenner Creek*

Staff from DFG surveyed Stenner Creek in 1973 from one mile above to one mile below the Brizzolara Creek confluence and observed YOY and juvenile *O. mykiss*. The report notes, “the

stream provides good spawning areas for steelhead, and even in low-flow years has sustained pool-type habitat” (DFG 1973, p. 3).

In 2003 fish sampling was conducted in Stenner Creek in 16 pools between the mouth and 1.59 miles upstream and in 20 pools in a 2.36 mile reach in the upper section of the creek. Density of *O. mykiss* was estimated to be 3,299 YOY and 395 age 1+ individuals per mile in the lower reach and 506 YOY and 593 age 1+ individuals per mile in the upper reach (Payne 2004, p. 23).

A fish passage evaluation for San Luis Obispo County streams prepared in 2005 notes that the concrete apron at the Stenner Creek Road crossing on Stenner Creek creates a total migration barrier and identifies the Murray Street crossing as a partial barrier. A culvert at Foothill Boulevard was replaced with a bridge in 2004 to allow passage of juvenile steelhead (CCC 2005).

#### *Old Garden Creek*

According to a DFG memo, local residents reported spotting approximately six adult *O. mykiss* ranging in length from 14 to 16 inches in Old Garden Creek immediately upstream of the Mission Street Bridge between the years 1998 and 2000 and one juvenile *O. mykiss* near 147 Chorro Street in 2000 (DFG 2000b).

#### *Brizzolara Creek*

Consultants conducted fish sampling in pool habitat in Brizzolara Creek in 2003. Sampling was conducted in a total of ten pools in the lower and upper 0.4 miles of stream in a reach that extended 1.58 miles upstream from the Stenner Creek confluence. The middle 0.78 miles of the reach was dry. Density of *O. mykiss* was estimated to be 46 YOY and 367 age 1+ individuals per mile of stream (Payne 2004, p. 23).

A fish passage evaluation for San Luis Obispo County streams prepared in 2005 identifies passage barriers at the Feed Mill Road and Poly Canyon Road crossings on Brizzolara Creek, and notes that frequent clogging occurs at the Highland Drive fish ladder (CCC 2005).

#### *Reservoir Canyon Creek*

Consultants conducted fish sampling in Reservoir Canyon Creek in pool habitat within the upper 0.06 miles of a reach that extended from the San Luis Obispo Creek confluence upstream 0.24 miles to a 20 foot bedrock sheet. Density of *O. mykiss* was estimated to be 3,791 YOY and 406 age 1+ individuals per mile of stream in the surveyed reach (Payne 2004, p. 23). The bedrock sheet creates a total barrier to anadromy. The survey report notes the presence good quality habitat and numerous resident rainbow trout upstream of the barrier.

### **Pismo Creek**

#### *Pismo Creek*

DFG staff surveyed Pismo Creek in 2005 from the mouth to the confluence of East and West Corral de Piedra creeks and observed low densities of YOY and age 1+ *O. mykiss* in multiple locations throughout the surveyed reach (DFG 2005a).

A concrete ford at stream mile 4.6 and a fish ladder at a railroad crossing at stream mile 5.5 on Pismo Creek were identified as a partial passage barriers during the 2005 survey (DFG 2005a). The report indicates that funding has been approved to modify the fish ladder at the railroad crossing.

#### *West Corral de Piedra Creek*

DFG staff surveyed West Corral de Piedra Creek in 2005 and noted suitable rearing habitat and “very low abundances” of juvenile *O. mykiss* between the Pismo Creek confluence and Highway 227 and in a 2,233 foot wetted portion of stream above the Righetti Road crossing. Upstream of the Righetti Dam, “abundant” *O. mykiss* of multiple age classes were observed (DFG 2005b).

A fish passage evaluation for San Luis Obispo County streams prepared in 2005 notes that the concrete apron under the bridge at the Righetti Road crossing on West Corral de Piedra Creek can create a barrier to all age classes of salmonids depending on flow conditions (CCC 2005).

### **Arroyo Grande**

#### *Arroyo Grande*

Electrofishing surveys were conducted in nine reaches of Arroyo Grande in the 13.2 miles downstream of Lopez Dam in 1996. Young-of-year and age 1+ *O. mykiss* were observed throughout the surveyed reach, with the highest densities observed between the Talley Farms Road and Biddle Park access road crossings (Alley 1997).

During a survey conducted in 1999, DFG staff observed multiple age classes of *O. mykiss* in Arroyo Grande downstream of Lopez Dam. At the time of the survey, flows were sufficient to provide rearing habitat (DFG 2000c). Resident *O. mykiss* have been observed in several tributaries located upstream of Lopez Dam.

A fish passage evaluation for San Luis Obispo County streams prepared in 2005 notes that the Cecchetti Road culvert on Arroyo Grande prevents the migration of juvenile steelhead at all flow levels and adult steelhead at certain flows (CCC 2005).

#### *Los Berros Creek*

Los Berros Creek was sampled by NMFS staff as part of a 2006 genetic study of *O. mykiss* populations above and below barriers. At the time of the survey, Los Berros Creek was mostly dry. Tissue samples were collected from 63 *O. mykiss* in a small wetted section of stream located approximately 3.9 miles upstream from the old USGS gauging station on Los Berros Canyon Road (Girman and Garza 2006).

A fish passage evaluation for San Luis Obispo County streams prepared in 2005 notes that the concrete weirs at the Los Berros Road crossing on Los Berros Creek near the Arroyo Grande confluence create a passage barrier for juvenile steelhead (CCC 2005).

### *Tar Spring Creek*

Staff from DFG surveyed Tar Spring Creek in 1961 and did not observe *O. mykiss*. The field report states, “In general, the drainage is a marginal spawning area; probably providing some spawning area during very wet winters and none during most years” (DFG 1961).

### *Lopez Canyon Creek*

Lopez Reservoir fills the lower portion of Lopez Canyon Creek.

A 1961 DFG survey report states “Lopez Canyon Creek is the main tributary to Arroyo Grande Creek which supplies a flow of water, as well as a spawning and nursery area for steelhead and/or rainbow trout” (DFG 1961c, p. 1).

Staff from USFS surveyed Lopez Canyon Creek in 1980 from the Forest boundary to Upper Lopez Camp and observed multiple age classes of *O. mykiss*. The survey report notes “good” reproduction and notes “the habitat is good enough to support a large fishery” (USFS 1980, p. 3).

Staff from DFG observed YOY and age 1+ *O. mykiss* in the upper portion of Lopez Canyon Creek in 2004. The fish were of unknown origin and may have been part of a resident population (D. Highland pers. comm.).

### *Vasquez Creek*

Staff from DFG surveyed the lower two miles of Vasquez Creek in 1961 and observed *O. mykiss* ranging from 2 to 4 inches in length in “very scarce” numbers. Pools were noted to be “poor and scattered” and natural reproduction was believed to be low due to a series of dry years. The report notes that Vasquez Creek “is probably a fair to good spawning tributary when steelhead are able to get into Lopez Canyon” (DFG 1962).

### *Little Falls Creek*

In 1999 staff from USFS observed multiple age classes of “trout” in Little Falls Creek downstream from the natural falls at stream mile 0.5 (USFS 1999b).

### *Big Falls Canyon Creek*

In 1999 staff from USFS observed “numerous trout” in Big Falls Canyon Creek above and below the falls (USFS 1999c).

### *Wittenberg Creek*

Lopez Reservoir inundates the lower mile of Wittenberg Creek. A DFG field report from 1959 states, “steelhead used to run up the stream in large numbers in the early days and now they are seldom seen” (DFG 1959).

*Huffs Hole Creek*

Staff from USFS surveyed Huffs Hole Creek in 1980 and observed multiple *O. mykiss* year classes. The survey report states, “Huff’s Hole Creek has a low flow but serves as an important spawning creek for rainbow trout leaving Lopez Lake” (USFS 1980).

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## Santa Barbara County

### Santa Maria River

#### *Santa Maria River*

A 1945 DFG report notes that the Santa Maria River serves as a migration corridor to Sisquoc River, and “by far the largest part of the spawning takes place [in upper Sisquoc drainage]” (DFG 1945).

A NMFS draft steelhead recovery plan from July 2009 states, “Twitchell Dam is managed for aquifer recharge in the Santa Maria Valley with the aim of minimizing surface flows to the ocean. Consequently, the Santa Maria River, which is the access corridor for both the Cuyama and Sisquoc rivers, is dry most of the year in most years” (NMFS 2009).

#### *Suey Creek*

Local residents reported catching *O. mykiss* in Suey Creek in the 1940s and 1950s prior to construction of Twitchell Dam (Stoecker 2003).

#### *Cuyama River*

A 2003 migration barrier assessment for the Sisquoc River states, “Natural reproduction of *O. mykiss* has continuously existed through the historical records within the...tributaries of the Cuyama River” (Stoecker 2003, p. 22). The report notes that the mainstem Cuyama has intermittent surface flows, a relatively low abundance of pools, and lacks in-stream and riparian canopy cover (Stoecker 2003).

#### *Alamo Creek*

Field notes from a 1947 DFG survey of Alamo Creek state, “aquatic plants are most abundant; native trout are up in the stream, 3 cfs flow; good gravel bottom for spawning areas...” (DFG 1947).

Rainbow trout were observed “rarely” during sampling in 1969 and 1970 in Alamo Creek immediately upstream from Twitchell Reservoir (Greenfield and Deckert 1973).

“The headwater area of Alamo Creek flows intermittently, ranging from high flows of several hundred cfs during the winter to no flow with several spring-fed pools during late summer and fall” (DFG 1975).

#### *Kelly Canyon Creek*

“There are only a few holes near the head of [Kelly Canyon Creek] which carry water during the summer. Past stocking unsuccessful, no natural propagation, no spawning grounds, not suitable for stocking” (DFG ca 1934a).

### *Santa Barbara Canyon Creek*

Staff from USFS surveyed Santa Barbara Canyon Creek in 1980. The survey report notes, “Most of Santa Barbara Canyon was dry...Few pools and no fish were observed” (USFS 1980a).

A USFS document from 1980 reports that a rainbow trout fishery consisting of a total of 10 miles—four miles on national forest land and six miles on private land— occurs in Santa Barbara Canyon Creek (Unknown 1980).

### *Alamo Canyon Creek*

“The habitat conditions of [Alamo Canyon Creek] are not suitable for fish because of the low-flow, heavy minerals and high water temperatures” (USFS 1980b).

### *Tinta Creek*

Fisheries information for mainstem Tinta Creek was not available.

### *Rancho Nuevo Creek*

Fisheries information for mainstem Rancho Nuevo Creek was not available.

### *Deal Canyon Creek*

Staff from USFS surveyed Deal Canyon Creek from the Rancho Nuevo confluence upstream two miles in 1980 and observed six rainbow trout in pools formed by boulders in the lower mile of stream. Streamflow was noted to decrease to “a trickle” beginning approximately one mile upstream from the Rancho Nuevo Creek confluence. The survey report states, “Deal Canyon is a small but important tributary to Rancho Nuevo Creek. This creek is characterized by a low-flow of cool water, good-poor canopy, and very few trout” (USFS 1980c).

### *Reyes Creek*

Staff from DFG surveyed Reyes Creek in 1949 from Scheideck’s camp upstream noted good to excellent quality pools and shade throughout the stream. The survey report states that Reyes Creek “contains approximately 7 miles of good trout stream...About 6 miles of good trout fishing water is found from Scheideck’s camp upstream. A fairly good wild fish population is present” (DFG 1949).

As part of a 1979 study of streams within the Los Padres National Forest, a 3.5 mile section of Reyes Creek was surveyed and *O. mykiss* was observed (Moore 1980).

### *Alamo Creek*

Fisheries information for mainstem Alamo Creek was not available.

### *Beartrap Creek*

Staff from DFG surveyed Beartrap Creek in 1979 from the confluence with Alamo Creek to the headwaters. In the lower reach, between the elevations of 3,800 to 4,400 feet, the stream was noted to be intermittent with “few” pools, and “few” rainbow trout ranging from 2 to 8 inches in length

were observed (DFG 1979). Notes from the survey state “the lower section had little or no canopy pooled up water or no flow, and generally poor trout habitat. Pooled up areas had some 0+ trout but were largely murkey [sic] or stagnating” (DFG 1979). Between the elevations of 4,400 and 5,200 feet, streamflow increased, pools were “abundant,” and rainbow trout ranging from 2 to 14 inches in length were noted to be “common” (DFG 1979). Between the elevations of 5,200 and 6,000 feet, pools were “common” and rainbow trout ranging from 1 to 12 inches in length were noted to be “common” to “few” (DFG 1979). Notes from the survey state that flows were intermittent in the upper reach and no trout were observed past the elevation of 5,550 feet (DFG 1979).

#### *Sisquoc River*

A steelhead population survey was conducted in the Sisquoc River and its tributaries in fall of 2005. Sampling was conducted at 26 sites within the lower section of the Sisquoc River over a total distance of 23,048 feet and a total of two age 2+ and two age 3+ *O. mykiss* were observed (Stoecker 2005).

During a survey of the former Horse Dam site in June 2007, eight age 2+ *O. mykiss* were observed in the lower Sisquoc River between the Manzana Creek confluence and 2,000 feet downstream (Stoecker 2007). According to the 2005 survey report, “The lower Sisquoc River is likely primarily used as a migration corridor for Sisquoc River steelhead traveling between the ocean, Manzana Creek, and other downstream tributaries” (Stoecker 2005, p. 11).

During the 2005 steelhead population survey, sampling was conducted at 26 sites within the upper section of the Sisquoc River over a total distance of 4,297 feet and total of 97 YOY, 44 age 1+, 38 age 2+, and 11 age 3+ *O. mykiss* were observed, with the majority of YOY observations occurring upstream of the Heath Campsite (Stoecker 2005). Rearing habitat was rated “good to excellent” throughout the reach.

According to a migration barrier assessment for the Sisquoc River prepared in 2003, the upstream limit of anadromy in the mainstem Sisquoc occurs at a 150 foot high bedrock waterfall located at the approximate elevation of 4,670 feet within Los Padres National Forest (Stoecker 2003).

#### *Tepusquet Creek*

A steelhead migration barrier assessment prepared for the Sisquoc River basin in 2003 identifies multiple passage barriers on Tepusquet Creek. The Hauling Road culvert crossing located immediately upstream of the confluence with Sisquoc Creek is reported to create a total barrier (Stoecker 2003). The report notes that in 1993, staff from DFG observed *O. mykiss* in the middle reaches of Tepusquet Creek and believed natural reproduction was occurring, and a long time resident reported observing *O. mykiss* up to waterfall barrier in many years between 1990 and 2001 (Stoecker 2003).

#### *La Brea Creek*

A DFG report from the 1930’s notes that La Brea Creek “Originally...was a natural spawning ground of steelhead. In later years it was stocked with rainbow and steelhead [and] was a famous fishing stream (DFG ca 1934b).

Staff from USFS surveyed La Brea Creek in 1999 and did not observe *O. mykiss*, noting impacts from heavy grazing (Slaughter 1999).

A steelhead migration barrier assessment prepared for the Sisquoc River basin in 2003 notes, “during wet years in the late 1980's and 1990's, large rainbow trout and possibly steelhead were caught in the upper reaches of La Brea Creek and especially the upper North Fork of La Brea Creek” (Stoecker 2003).

#### *North Fork La Brea Creek*

Staff from USFS surveyed North Fork La Brea Creek in 1999 and 2001 and did not observe *O. mykiss* (USFS 2001).

A steelhead migration barrier assessment prepared for the Sisquoc River basin in 2003 notes, “during wet years in the late 1980's and 1990's, large rainbow trout and possibly steelhead were caught in the upper reaches of La Brea Creek and especially the upper North Fork of La Brea Creek” (Stoecker 2003).

#### *Horse Canyon Creek*

Consultants surveyed the Horse Canyon Creek drainage in 2005 to assess salmonid habitat conditions upstream of the Horse Creek dam, which was subsequently removed in 2007. The report states, “The highest quality salmonid habitat was observed in the lower 5.0 miles of Horse Creek, the lower 0.15 miles of the Middle Fork of Horse Creek, and the 0.05 miles of Horse Creek upstream of the East Fork Horse Creek. These reaches provide fair to good summer rearing habitat conditions for salmonids. Adequate spawning substrate occurs throughout the surveyed reaches in low to moderate abundance and provide sufficient habitat conditions during spawning season” (Stoecker 2005).

#### *Manzana Creek*

In 2005, consultants conducted fish sampling at ten sites in Manzanita Creek over a distance of 8,169 feet and observed a total of 97 YOY, 61 age 1+, 45 age 2+, and 28 age 3+ *O. mykiss* (Stoecker 2005). Manzanita Creek was dry from the confluence with Sisquoc River to approximately 0.5 miles upstream and for several hundred feet above the confluence with Fish Creek at the time of the survey. The survey report states “Good to excellent spawning and rearing habitat occurred throughout the surveyed reaches” (Stoecker 2005, p. 15).

A steelhead migration barrier assessment prepared for the Sisquoc River basin in 2003 identifies a bedrock waterfall located 0.4 miles upstream of Manzanita Campsite in Manzanita Creek as an impassible migration barrier to salmonids of all age classes under most flow conditions, but notes that “limited upstream adult steelhead migration during high flows may be possible” (Stoecker 2003, p. 77).

#### *Davy Brown (Fir Canyon) Creek*

In fall of 2005 consultants conducted snorkeling surveys at two sites in Davy Brown Creek between the confluence of Munch Creek and the upstream limit of anadromy created by a series of barrier falls located 4,220 feet upstream. A total of 181 YOY, 57 age 1+, 37 age 2+, and 13 age 3+ *O. mykiss*

were counted. According to the survey report, “Good to excellent spawning and rearing habitat” was present throughout the surveyed reach (Stoecker 2005, p. 19).

#### *Munch Canyon Creek*

As part of a steelhead migration barrier assessment prepared for the Sisquoc River basin in 2003, a review of documented steelhead presence in the watershed was performed. The report cites a Los Padres National Forest occupancy survey conducted in Munch Creek in July 1999 that yielded a total of 327 *O. mykiss* ranging from 21 to 260 mm between the confluence with Davey Brown Creek and 656 meters upstream (Stoecker 2003, p. 18). The assessment notes, “Munch Creek is an important perennial tributary for rainbow trout and potentially steelhead, especially during drier years” (Stoecker 2003, p. 87).

According to the assessment, the upstream limit of anadromy in Munch Creek occurs at a bedrock waterfall located approximately 0.5 miles upstream from the Davy Brown Creek confluence (Stoecker 2003).

#### *Sunset Valley Creek*

Sunset Valley Creek enters Munch Canyon Creek upstream from the limit of anadromy. Rainbow trout were observed in Sunset Valley Creek in 1934. A natural falls is located approximately 0.75 miles from the mouth.

#### *Fish Creek*

A steelhead migration barrier assessment prepared in 2003 notes that the upstream limit of anadromy in Fish Creek occurs at a bedrock waterfall located approximately 1.1 miles upstream from the Manzana Creek confluence. During barrier surveys in 2002, *O. mykiss* was observed immediately downstream of the falls (Stoecker 2003).

#### *Abel Canyon Creek*

Consultants observed nine YOY and ten age 1+ *O. mykiss* in the lower 1.5 miles of Abel Creek while conducting barrier surveys in the Sisquoc River basin in December 2002 (Stoecker 2003). Spawning and rearing habitat within the reach was characterized as “fair to good” and natural reproduction was observed. The report notes that the upstream limit of anadromy in Abel Creek likely occurs along a section of stream with a steep gradient located at the approximate elevation of 3,400 feet.

#### *South Fork Sisquoc River*

Snorkeling surveys were conducted in sections of the lower middle, and upper South Fork Sisquoc River in fall of 2005. Two age 2+ and one age 3+ *O. mykiss* were counted in a sample reach located near the Sisquoc River confluence, 39 YOY, 18 age 1+, nine age 2+, and three age 2+ *O. mykiss* were counted in sample reaches located downstream of the Lonnie Davis Campsite trail crossing, and 26 YOY, 18 age 1+, six age 2+, and one age 3+ *O. mykiss* were counted in sample reaches located 0.5 miles upstream of the Lonnie Davis Campsite trail crossing (Stoecker 2005).

According to a steelhead migration barrier assessment prepared in 2003, the upstream limit of anadromy in the South Fork Sisquoc River occurs at a series of bedrock and boulder cascades

located approximately 1.15 miles upstream from the White Ledge Creek confluence. The report states, “It is possible that the large boulders present may become mobile during high stream flows and change the severity of upstream migration” (Stoecker 2003, p. 107).

#### *White Ledge Canyon Creek*

Fisheries information for White Ledge Canyon Creek was not available.

#### *White Ledge Canyon tributary*

Staff from USFS surveyed the unnamed tributary to White Ledge Canyon Creek in 1980 and observed “common” rainbow trout ranging from 3 to 20 inches in length. A 20 foot high bedrock falls located at the approximate elevation of 3,150 feet was determined to be a total passage barrier. The survey sheet notes, “this creek is an important water source for wildlife and supports a fair trout fishery” (USFS 1980d).

#### *Rattlesnake Canyon Creek*

A steelhead population survey was conducted in the Sisquoc River basin in the fall of 2005. Rattlesnake Canyon Creek was surveyed from the confluence with Sisquoc River upstream 1,043 feet to a waterfall barrier that creates the upstream limit of anadromy. One YOY, two age 1+, and three age 2+ *O. mykiss* were observed. The report states “it is likely that this tributary is not highly utilized for spawning and rearing due to its small size and shallow water depth, scarce spawning substrate, and low instream cover” (Stoecker 2005, p. 23).

#### *Big Pine Canyon Creek*

A 1983 USFS report indicates the presence of an “excellent rainbow trout population in Big Pine Canyon Creek (Stoecker 2003).

### **San Antonio Creek**

#### *San Antonio Creek*

San Antonio Creek was surveyed in 1999 from one kilometer upstream of Lompoc Casmalia Road upstream to the State Route 1 crossing. The survey report states, “Essentially canopy, water temperature, and flow volumes were within the lower end of being acceptable for residence for young steelhead, whereas most other features were marginal or not adequate for steelhead....San Antonio Creek has a good probability to support steelhead since the residential rearing habitat in the lagoon and corridor functions are the most viable...” (Swift 2000).

### **Santa Ynez River**

#### *Santa Ynez River*

In reference to studies conducted on the Santa Ynez River between 1995 and 1999, a biological opinion prepared in 2000 states “Steelhead appear to persist in the mainstem from 0-10 miles downstream of Bradbury Dam over the summers of some of the years observed... Steelhead have been occasionally observed farther downstream” (NMFS 2000a, p. 21).

In November 2003, consultants conducting a barrier survey observed three *O. mykiss* measuring approximately 10 inches in length in Santa Ynez River in a pool immediately upstream of the crossing east of the Live Oak Day Use Area and 12 *O. mykiss* measuring 5 to 7 inches in length were observed in a reach of pool habitat over 800 feet in length located upstream of the Juncal Camp crossing (Stoecker 2004).

In spring 2008, out-migrating *O. mykiss* smolts in the Santa Ynez River were captured and tagged to monitor survival and estuary use. A total of 56 smolts were counted, eight of which were tagged. Two of the eight smolts were observed to complete migration to the ocean. The survey report concludes, “There are too few smolts surviving the migration on the...Santa Ynez River...to produce sustainable adult runs or to meet the criteria for recovery (NMFS 2007). Larger smolt runs and greater smolt survival is needed if these stocks are to be recovered” (Kelley 2008, p. 41).

#### *San Miguelito Creek*

A steelhead migration barrier assessment of the Santa Ynez River prepared in 2004 notes that the flood control basin located 100 feet upstream from the Olive Avenue crossing near the mouth of San Miguelito Creek creates a total barrier to anadromy. The report states, “San Miguelito Creek contains adequate salmonid spawning and rearing habitat as well as an existing salmonid population and effective fish passage should be provided...” (Stoecker 2004, p. 49).

A Cachuma Project Biology Staff memo to NMFS staff dated June, 2007 notes, “Although San Miguelito Creek has an impassable migration barrier...this is the first perennial tributary anadromous steelhead encounter coming from the ocean, NMFS includes this creek in its Technical Recovery Team (TRT) reports, and CPBS have observed reproducing population of steelhead/rainbow trout present” (CPBS 2007, p. 8).

#### *Salsipuedes Creek*

A streambed violation report summarizes stream survey data for Salsipuedes Creek collected by the Cachuma Technical Advisory Committee in April and June of 1997. In April, approximately 200 *O. mykiss* ranging in total length from 25 to 254 mm were collected in Salsipuedes Creek between the Santa Rosa Bridge and the El Jaro Creek confluence. In June, a total of 21 YOY *O. mykiss* were collected from large pools downstream of the Highway 1 Bridge (Unknown 1997).

A 1999 report summarizes data from snorkel surveys conducted in Salsipuedes Creek in July 1999 downstream and upstream of the El Jaro Creek confluence. One YOY and five age 2+ *O. mykiss* were counted in the lower reach and 11 YOY *O. mykiss* were counted at the El Jaro Creek confluence. In the upper reach, 42 YOY and one age 1+ *O. mykiss* were counted (Unknown 1999). A draft fish management plan prepared in 1999 characterizes rearing habitat in Salsipuedes Creek as “fair” below the El Jaro Creek confluence and “good” above the confluence (SYRTAC 1999).

A consultant’s report notes that modifications to improve fish passage at the grade control structure located 80 feet downstream from the Jalama Road Bridge in Salsipuedes Creek were completed in 2004 (Entrix 2004). According to the report, the upstream limit of anadromy in Salsipuedes Creek likely occurs downstream of the third Jalama Road crossing due to extreme gradient and lack of flow.

### *El Jaro Creek*

Electrofishing surveys conducted by DFG staff in El Jaro Creek between Palos Colorados and Ytias Creek in July 1993 yielded three adult *O. mykiss* (DFG 1993).

During a 1996 survey, a total of 20 *O. mykiss* ranging from 4 to 8 inches in length were collected from El Jaro Creek between the Salsipuedes Creek confluence and approximately 1,700 meters upstream (Unknown 1996).

A steelhead migration barrier assessment of the Santa Ynez River prepared in 2004 notes that a concrete ford located upstream from the Cross Creek Bridge on El Jaro Creek had previously been identified as a low-flow passage barrier and states, “Adequate and abundant upstream salmonid habitat occurs in El Jaro Creek” (Stoecker 2004, p. 86). A 2007-2008 summary of projects funded under the DFG’s Fisheries Restoration Grant Program indicates that funding was obtained for a restoration project that will modify the Cross Creek Bridge barrier to “Provide access to over 18 miles of high quality spawning habitat in the El Jaro creek basin above Cross Creek ranch” (DFG 2007).

### *Los Amoles Creek*

During surveys in 2006 and 2008, redds believed to be made by *O. mykiss* were observed in Los Amoles Creek (T. Robinson pers. comm.).

### *Ytias Creek*

Snorkel surveys were conducted in Ytias Creek from the El Jaro confluence to mid-creek in September 2002 and July 2006. In 2002, 89 *O. mykiss* ranging in size from 0 to 3 to 6 to 9 inches were observed. In 2006, 162 *O. mykiss* ranging in size from 0 to 3 to 6 to 9 inches were observed (T. Robinson pers. comm.).

### *Zaca Creek*

According to a 1991 study, Zaca Creek is one of several Santa Ynez tributaries that “...are in areas extensively developed for agriculture and cattle or equestrian ranching, contain extensive alluvial fill, and do not support surface waters” (Payne 1991).

### *Nojoqui Creek*

“...summer temperatures regularly exceed [suggested thermal criteria for rainbow trout/steelhead]... in the downstream portions of ...Nojoqui...” Habitat conditions in Nojoqui look good above a small reach that dries near the mainstem Santa Ynez River (SYRTAC 1999).

According to a steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004, Nojoqui Creek contains “High quality salmonid habitat” upstream of a barrier created by the upstream-most Highway 101 crossing and “*O. mykiss* was trapped migrating into the creek in 1997” (Stoecker 2004).

### *Alisal Creek*

“Good habitat exists above passage barriers in...upper Alisal Creek” (SYRTAC 1999).

### *Alamo Pintado Creek*

A 1993 USFS report notes that the section of Alamo Pintado Creek near the southern Forest boundary contains “good to very good” habitat. Multiple *O. mykiss* classes were observed in low densities in Alamo Pintado Creek from Ballard up through Upper Ballard Camp (Peckham 1993).

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 notes that *O. mykiss* were observed in Alamo Pintado Creek in 2001 and states that “fair to good quality habitat” exists in the headwaters (Stoecker 2004, p. 121). The report notes that a concrete grade control structure located under the Figueroa Mountain Road crossing on Alamo Pintado Creek appears to create an impassible barrier to migrating steelhead under most flow conditions, preventing access to the spawning and rearing habitat in the headwaters.

### *Quiota Creek*

A 1999 draft management plan for the lower Santa Ynez River states “Good spawning habitat for rainbow trout/steelhead can be found in... mid-to-upper Quiota Creek” (SYRTAC 1999, p. 2-25). The report notes that *O. mykiss* of all age classes have been observed to be “present in low numbers” to “relatively common” in Quiota Creek with population density varying between water year types (SYRTAC 1999, p. 2-17).

A steelhead habitat distribution table prepared by NMFS notes that Quiota Creek “contains [the] best habitat of the [Santa Ynez River] system” and reports that juvenile *O. mykiss* have been present annually between 1994 and 2000 along a one mile reach located approximately two miles above the creek mouth (NMFS 2000b).

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 states “Quiota Creek is a critical spawning and rearing tributary for the Santa Ynez River steelhead population” (Stoecker 2004, p. 122). Refugio Road crosses Quiota Creek at nine locations. A Coastal Conservancy staff recommendation dated September, 2008 indicates that the Cachuma Conservation and Release Board (CCRB) is developing plans to remove or modify all nine crossings to improve fish passage by the year 2010 (CCC 2008).

### *Quiota Creek tributary*

A stream habitat distribution table for southern California steelhead was prepared in 2006. This table and a 1995 consultant’s report on steelhead in the Santa Ynez system note successful reproduction and a “healthy” resident population in the unnamed tributary to Quiota Creek (Entrix 1995; NMFS 2000b).

### *Zanja de Cota Creek (Santa Cota)*

A DFG survey report from the 1930s notes that Zanja de Cota Creek is “Ideal as a holding stream for trout while waiting for fall rains” (DFG ca 1934c).

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 notes, “Excellent late summer/fall stream flows and adequate salmonid spawning and rearing habitat occurs” in Zanja de Cota Creek in the vicinity of the Highway 246 crossing (Stoecker 2004).

#### *San Lucas Creek*

A memo describing the results of a visit to San Lucas Creek by consulting biologists states, “Of the streams examined, San Lucas Creek was one of the few which retained discharge to the lowest point in the watershed and drained predominantly through undisturbed chaparral rather than impacted meadows” (Payne 1991).

#### *Hilton Creek*

Construction of the Hilton Creek Watering System was completed in 2000. It provides high-quality perennial spawning and rearing habitat for *O. mykiss* in Hilton Creek by diverting water from Lake Cachuma through a pipeline and over a series of boulders and rocks to two release points in the creek. From 2005-2008, biologists counted between 1,300 and 2,700 *O. mykiss*, the majority of which were YOY, every summer in Hilton Creek (T. Robinson pers. comm.).

#### *Cachuma Creek*

“The stream, according to local residents, does support a few small trout in its headwaters, however, these fish are probably hard hit during the midseason drought period” (DFG 1954).

While conducting a barrier survey in 2003, consultants observed eight *O. mykiss* ranging from 7 to 11 inches in length “spread out in several pools with good rearing habitat and flows” in Cachuma Creek between the Los Padres National Forest boundary and Lion Canyon Creek (Stoecker 2004).

#### *Lion Canyon Creek*

“The mainstem of Cachuma Creek and the lower end of Lion Creek support moderate densities of resident trout with a put-and-take stocked fishery established near the easy access roads” (USFS 1997).

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 notes that Lion Canyon Creek contains rearing habitat in pool located downstream from a waterfall barrier (Stoecker 2004).

#### *Tequepis Canyon Creek*

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 notes that the Highway 154 crossing on Tequepis Creek creates a partial passage barrier. The report states, “Tequepis Creek is a known rainbow trout, and former steelhead, spawning and rearing tributary and improving passage here would benefit the rainbow trout population” (Stoecker 2004, p. 151).

#### *Santa Cruz Creek*

In December 2003, consultants conducting a barrier survey for the Santa Ynez River observed “hundreds” of *O. mykiss* ranging from 3 to 13 inches in Santa Cruz Creek from the Los Padres National Forest boundary upstream to the confluence of East and West Fork Santa Cruz creeks.

The subsequent report states that Santa Cruz Creek contains “Arguably the highest quality salmonid habitat observed in the entire watershed” (Stoecker 2004, p. 5).

#### *Peachtree Canyon Creek*

“Very good habitat exists within that section of Peachtree that runs through private land adjacent to the southern Forest boundary... Good population of RBT observed” (Peckham 1993).

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 notes that downstream of a steep boulder gradient at the elevation of 3,360 feet in Peachtree Canyon Creek, “Large downstream pools, good summer stream flow, and high quality salmonid habitat was observed downstream within the Los Padres National Forest” (Stoecker 2004).

#### *Santa Cruz Creek tributary (Little Pine Spring)*

A 2004 steelhead migration barrier assessment of the Santa Ynez River notes that Little Pine Spring contains “good pool habitat and perennial flow” (Stoecker 2004, p. 5).

#### *Black Canyon Creek*

A USFS report notes that Black Canyon Creek was observed to have “poor habitat conditions” during a survey conducted in 1980 (Edwards ca 1980).

#### *West Fork Santa Cruz Creek*

In December 2003, consultants conducting a barrier survey for the Santa Ynez River observed 92 *O. mykiss* ranging from 4 to 13 inches in West Fork Santa Cruz Creek from the East Fork confluence upstream to the natural limit of anadromy. Spawning and rearing habitat was characterized as “high quality” (Stoecker 2004, p. 5). The report states that the natural upstream limit of anadromy in West Fork Santa Cruz creek occurs at series of boulder and bedrock falls located near the 2,680 foot elevation line on the USGS 7.5 minute quad.

#### *Coche Creek*

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 notes that Coche Creek contains “Excellent habitat and abundant *O. mykiss* population with diverse age classes and high numbers of YOY” (Stoecker 2004, p. 6). During barrier surveying in December 2003, 80 *O. mykiss* ranging from 2 to 13 inches were observed in Coche Creek from upstream of the first northern tributary upstream to the limit of anadromy, created by the bedrock chutes located immediately downstream of the upper western unnamed tributary near the Mission Pine Basin Camp.

#### *East Fork Santa Cruz Creek*

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 notes that “Excellent pool habitat and flows were observed” in East Fork Santa Cruz Creek between the West Fork confluence and a waterfall barrier and from the waterfall barrier two miles upstream to the Grapevine Creek confluence. The waterfall barrier was believed to create a total passage barrier (Stoecker 2004).

### *Grapevine Creek*

In 1980 Grapevine Creek was surveyed from the East Fork Santa Cruz Creek confluence to the Lower Grapevine campground. “Abundant” *O. mykiss* ranging from 2 to 12 inches in length were observed in the lower section of stream and a small *O. mykiss* population was observed in the upper section (USFS 1980e).

“Grapevine Creek...retains water through most reaches and most years. Grapevine flows a total of two miles through an upper narrow but largely unshaded moderately steep valley and lower well shaded incised channel. Trout are found throughout in relatively high densities but small sizes. Grapevine may function well as a spawning and rearing area for Santa Cruz resident fish” (USFS 1997).

In 2004, CCRB staff observed multiple size classes of *O. mykiss* in Grapevine Creek near the Santa Cruz River confluence. The middle section of Grapevine Creek was observed to be dry. Small trout were observed in the upper section (near the Grapevine headwater trail) in the short (approximately 0.25 miles) wetted section of stream (T. Robinson pers. comm.).

### *Kelly Creek*

A DFG stream survey from the 1930's indicates steelhead spawned in Kelly Creek (DFG ca 1934d).

### *Bear Creek*

In November 2003, consultants conducting a barrier survey for the Santa Ynez River observed one age 1+ and one age 2+ *O. mykiss* in Bear Creek upstream from Highway 154. The creek was noted to contain “good spawning and rearing habitat...and perennial flow” (Stoecker 2004, p. 6). The survey report notes that the Highway 154 culvert crossing likely creates a total passage barrier.

### *Paradise Canyon Creek*

A 1997 USFS report describes Paradise Canyon Creek as “generally too small and quick to dry to support a significant number of spawning or rearing steelhead” (USFS 1997).

### *Oso Canyon Creek*

A 1997 USFS report describes Oso Canyon Creek as “generally too small and quick to dry to support a significant number of spawning or rearing steelhead” (USFS 1997).

### *Arroyo Burro*

In a 1995 letter, a researcher indicates the presence of “historical spawning/nursery area habitat” for steelhead and “native/[resident] trout” in Arroyo Burro (Henke 1995).

### *Devils Canyon Creek*

Electrofishing surveys were conducted in Devils Canyon Creek in May 1995 from the mouth upstream approximately 0.75 miles. One *O. mykiss* measuring 15 inches in length and three *O. mykiss*

ranging in length from 9 to 11 inches were captured. The 15 inch trout was believed to be a spawning fish. “Numerous” *O. mykiss* fry ranging from 2 to 3 cm in length were also observed (Dvorsky 1995).

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 notes that NMFS staff observed *O. mykiss* in Devil’s Canyon Creek in fall 2003 (Stoecker 2004, p. 177). According to the report, the upstream limit of anadromy likely occurs at a steep boulder gradient located approximately 0.75 miles upstream from the Santa Ynez River confluence.

#### *Gidney Creek*

A draft steelhead restoration report was prepared for the Santa Ynez River watershed in 1997. According to the report, “Gidney Creek is the only tributary draining directly into the [Gibraltar] reservoir with opportunities for supporting spawning and rearing trout” (USFS 1997, p. 3). Resident rainbow trout were reported to be found only in the lower 0.6 miles of stream. Within this reach, YOY *O. mykiss* density was estimated to be 80 individuals per 100 meters of stream.

#### *Camuesa Creek*

According to a 1997 USFS report, “Camuesa only has seasonal and isolated pockets of intermittent flow, not enough to support a year-round fishery and limited access and qualities for spawning habitat” (USFS 1997).

#### *Mono Creek*

A draft steelhead restoration report prepared for the Santa Ynez River watershed in 1997 notes that *O. mykiss* are present in Mono Creek upstream of the Mono Debris dam. “Most of the reaches are intermittent but retain fish within year-round isolated pools” (USFS 1997, p. 4).

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 recommends modifying Mono Debris Dam to allow fish passage. The report notes “Excellent salmonid habitat with large pools and surface flow...from the Roblar Creek confluence downstream through The Narrows” and “fair to good salmonid habitat... with smaller pools and inconsistent surface flow” between the Narrows and the upstream extent of the Mono Debris basin (Stoecker 2004).

#### *Indian Creek*

A steelhead migration barrier assessment of the Santa Ynez River watershed prepared in 2004 notes the presence of more than 100 *O. mykiss* ranging in length from 3 to 13 inches in Indian Creek from approximately 1.0 mile upstream from a weir barrier located above Camuesa Road upstream to the waterfall that forms the limit of anadromy. The report states “Isolated reaches of flow and excellent pool habitat occur downstream of the waterfall and rainbow trout are present” (Stoecker 2004, p. 190).

#### *Buckhorn Creek*

Staff from USFS surveyed Buckhorn Creek in 1980 and noted “good” reproduction of rainbow trout throughout the stream with high quality habitat in the upper canyon. Lower numbers of trout

were observed in the lower reach due to elevated water temperatures, but the survey report indicates some rearing habitat is available in this reach, noting “Boulders and surfacing bedrock form many large, shallow pools which hold aquatic invertebrates, and rainbow trout up to twelve inches (USFS 1980f).

In October 2003, consultants conducting a barrier survey for the Santa Ynez River observed more than 100 *O. mykiss* ranging in length from 2 to 11 inches in Buckhorn Creek from the Lower Buckhorn campsite upstream to 0.25 miles downstream of the second upstream northern unnamed tributary. The report indicates that the reach becomes perennial moving upstream and provides “excellent” rearing habitat with “abundant *O. mykiss* and natural reproduction” (Stoecker 2004, p. 6).

#### *Alamar Creek*

Spawning and rearing habitat in Alamar Creek was noted to have been eliminated in a flooding event following a fire in 1933 (DFG ca 1934e).

A 1944 DFG report notes that steelhead spawned in Alamar Creek prior to construction of Gibraltar Dam (DFG 1944).

#### *Blue Canyon Creek*

“Only the upper most section, and parts of the Escondido tributary support year-round flows, pools of any significance, and adult trout. Phenomenal numbers of fry are observed in the mid to lower reaches, however, and large size spawning trout have been seen utilizing the area” (USFS 1997).

In December 2003, consultants conducting a barrier survey for the Santa Ynez River observed one YOY and one age 2+ *O. mykiss* in Blue Canyon Creek approximately 500 feet downstream from the confluence of Escondido Creek. The report notes that this reach of Blue Canyon Creek contains “High quality habitat and perennial stream flow” and notes poor quality habitat in the reach downstream from boulder gradient barrier (Stoecker 2004, p. 6).

#### *Escondido Canyon Creek*

A stream survey was conducted in Escondido Canyon Creek in May 1994. From the Blue Canyon Creek confluence upstream to the gradient increase at elevation 1,950 feet, “numerous fry sized trout” were observed. Five *O. mykiss* measuring 12 to 18 inches in length were observed in pools beneath a 15 foot boulder falls located approximately 0.25 mile upstream from Blue Canyon Creek. No fish were observed above the falls (Unknown 1994).

In December 2003, consultants conducting a barrier survey for the Santa Ynez River observed one 4 inch long *O. mykiss* in Escondido Creek 500 feet upstream from the confluence with Blue Creek. The report states, “High quality habitat and perennial flow occurs from Blue Creek to the upstream waterfall limit” (Stoecker 2004, p. 6).

#### *Agua Caliente Canyon Creek*

“Agua Caliente supports good year round flows and has suitable habitat within the upper reaches but water temperatures are too warm from the hot springs to support trout” (USFS 1997, p. 4).

Researchers collected two *O. mykiss* from Agua Caliente Creek as part of a genetic study of the Santa Ynez system in 2000-2001 (Campton 2005).

#### *Fox (Pipeline) Creek*

“Flow is perennial and could support a low number of year-round trout...” (USFS 1997).

In November 2003, consultants conducting a barrier survey for the Santa Ynez River observed four *O. mykiss* ranging in length from 4 to 7 inches in Fox Creek between the Santa Ynez confluence and the diversion dam. The survey report characterizes habitat downstream from the dam as “excellent” and notes “high quality habitat occurs upstream of this dam for approximately 750 feet to the upstream waterfall (Stoecker 2004).

#### *Alder Creek*

In November 2003, consultants conducting a barrier survey for the Santa Ynez River observed 16 *O. mykiss* ranging in length from 2 to 6 inches in Alder Creek between the Morse Creek confluence and 700 feet upstream of the diversion dam. The survey report characterizes habitat upstream of Morse Creek as “excellent” (Stoecker 2004).

Researchers surveyed Alder Creek in 2000 to collect tissue samples and observed abundant *O. mykiss* in the lower section of Alder Creek, including “hundreds” of YOY in drying habitat near the Santa Ynez River confluence (T. Robinson pers. comm.)

#### *Franklin Creek*

Researchers collected *O. mykiss* from Franklin Creek in 1994 as part of a genetic study (USFS 1996).

#### *North Fork Juncal Creek*

In November 2003, consultants conducting a barrier survey for the Santa Ynez River observed 17 *O. mykiss* ranging in length from 4 to 9 inches in North Fork Juncal Creek between approximately 0.2 miles upstream of Jameson Reservoir and a waterfall that forms the upstream limit of anadromy. The report notes “excellent salmonid habitat conditions” downstream from the waterfall barrier (Stoecker 2004).

#### *Santa Ynez River tributary (Steelhead)*

A consultant’s report notes that “high quality habitat and perennial stream flow provide spawning and rearing habitat” in Steelhead Creek from upstream of the road crossing at Santa Ynez campsite to the natural upstream limit (Stoecker 2004).

### **Cañada Honda Creek**

#### *Cañada Honda Creek*

Fisheries information for Cañada Honda Creek was not found.

## **Jalama Creek**

### *Jalama Creek*

Historic documentation included in a 2002 consultant's report indicates steelhead use of Jalama Creek throughout the 1970s and 1980s (Stoecker 2002).

Jalama Creek was surveyed in 1994. Downstream from Gaspar Creek "Only minimal summer holding pools for adult and juvenile trout were observed.... None were observed upstream from the Gaspar Creek confluence. Above the Bucket Bridge crossing, Jalama Creek appeared to be an unlikely trout stream" (Bustillos 1994).

A survey report from 2000 notes good quality rearing habitat in the lagoon and in the reach of Jalama Creek within Vandenberg AFB (Swift 2000). A 2002 consultant's report notes moderate to good quality habitat in Jalama Creek between the lagoon and Escondido Creek and assigned high pool habitat scores for this reach (Stoecker 2002).

## **Cañada del Cojo Creek**

### *Cañada del Cojo Creek*

A 1994 DFG report notes perennial flow and good canopy in Cojo Creek. A 2002 consultant's report notes moderate to high quality salmonid habitat in Cojo Creek up to a natural barrier (Stoecker 2002).

## **Cañada de Santa Anita (Santa Anita) Creek**

### *Cañada de Santa Anita (Santa Anita) Creek*

A 2002 consultant's report notes consistent historical observation of *O. mykiss* in Santa Anita Creek and assigned good pool habitat scores in the upper reach downstream from a waterfall barrier (Stoecker 2002).

## **Cañada del Sacate Creek**

### *Cañada del Sacate Creek*

Fisheries information for Cañada del Sacate Creek was not found.

## **Cañada de la Gaviota (Gaviota) Creek**

### *Cañada de la Gaviota (Gaviota) Creek*

According to a 1994 stream inventory report "The presence of large numbers of YOY rainbow trout in the upper reaches of Gaviota Creek indicates that wild trout have successfully spawned in the stream... the presence of the smolts indicates... stream conditions have allowed successful rearing up to smoltification for juveniles" (DFG 1994, p. 32).

A 2007 passage assessment for Gaviota Creek states, “Gaviota Creek produces relatively high summer base flows and maintains cool water temperatures in the headwaters of the mainstem, Las Canovas Creek, and the lower mainstem (Love and Stoecker 2007).

A steelhead migration barrier assessment for Southern Santa Barbara County prepared in 2002 reports that during barrier surveying in 2000 to 2001, eight *O. mykiss* ranging from 6 to 12 inches in length were observed throughout the reach of stream that extends from the upstream end of the lagoon to 300 feet upstream of the Las Canovas Creek confluence, and more than 50 *O. mykiss* ranging from 3 to 12 inches in length were observed throughout this reach during surveys conducted between 1993 and 2001. Approximately 2.45 miles of high quality habitat is reported to exist upstream of a total barrier created by the Highway 101 box culvert at stream mile 4.44 (Stoecker 2002).

The Stoecker Ecological website notes “designs, permitting, and/or funding has been obtained” for modification of grade control structures between stream mile 1.38 and 2.27 and Highway 101 barriers in Gaviota Creek.

### **Cañada de San Onofre (San Onofre) Creek**

#### *Cañada de San Onofre (San Onofre) Creek*

A 2002 consultant’s report notes historical documentation of *O. mykiss* and moderate quality habitat in San Onofre Creek between Highway 101 and the upstream limit (Stoecker 2002).

### **Arroyo Hondo Creek**

#### *Arroyo Hondo Creek*

A steelhead migration barrier assessment of Southern Santa Barbara County streams prepared in 2002 reports that over 200 *O. mykiss* ranging in length from 3 to 11 inches were observed in Arroyo Hondo Creek between the elevations of 101 feet and 408 feet in January 2001, and “many dozens to hundreds” of *O. mykiss* measuring less than 24 inches in length were observed in the lagoon downstream of Highway 101 between March and June 2001 (Stoecker 2002). The assessment identifies a bedrock and boulder waterfall located at stream mile 1.89 as a total barrier to anadromy.

According to staff from CCRB, “CCRB surveyed the [Arroyo Hondo] creek three times a year from 2006-2008 and observed multiple size classes of trout from the estuary to approximately 2 miles upstream. The spring surveys revealed multiple spawning sites with 6”-10” trout spawning in them. Summer surveys revealed many hundreds of y.o.y. that had recently been produced in the spring. Several sections of Arroyo Hondo Creek run dry every year, and can be found approximately ¼ mile upstream of the Pacific Ocean to approximately ½ mile upstream. The remainder of the creek appears to be perennial. The lagoon (approximately 15’-30’ in length and 40’-60’ in width) appears to maintain a small population of trout, with numbers ranging from 5-17 from 2005-2008. Arroyo Hondo passes through the large Highway 101 culvert before exiting into the Pacific Ocean. In the summer of 2007, a series of concrete baffles was installed to allow anadromous passage upstream” (T. Robinson pers. comm.).

## **Arroyo Quemado**

### *Arroyo Quemado*

A 2007 consultant's report summarizes the findings and recommendations for steelhead recovery in Arroyo Quemado from a 2002 barrier survey. According to the report, the Highway 101 culvert crossing on Arroyo Quemado creates an impassible passage barrier. Approximately 0.11 miles of stream is accessible to steelhead downstream of the culvert. A resident rainbow trout population existed upstream of the barrier prior to 1986 but was extinguished due to water diversions. Additional migration barriers upstream of the culvert include an agricultural diversion dam and two culvert road crossings. The report states, "By providing fish passage at identified migration barriers, improving stream flow conditions, and reducing erosion the Arroyo Quemado watershed can likely support the natural recolonization of wild steelhead trout" (Stoecker 2007, p. 5).

## **Tajiguas Creek**

### *Tajiguas Creek*

A 2002 consultant's report assigns high quality pool habitat ratings in the upper reaches of Tajiguas Creek (including West Fork Tajiguas habitat) and notes historic documentation of steelhead (Stoecker 2002).

## **Cañada del Refugio (Refugio) Creek**

### *Cañada del Refugio (Refugio) Creek*

A 2002 consultant's report notes historic documentation of *O. mykiss* in Refugio Creek and assigned high quality habitat ratings in the upper reaches (including headwater forks), noting perennial rearing habitat and high quality spawning substrate upstream of Refugio Road crossing #3 (Stoecker 2002).

## **Cañada del Venadito**

### *Cañada del Venadito*

Fisheries information for Cañada del Venadito was not found.

## **Cañada del Corral**

### *Cañada del Corral*

"There exists historic documentation of adult steelhead in Corral Creek and rainbow trout presence until sometime in the early 1990's. High quality salmonid habitat is present in the upper reaches of Corral Creek" (Stoecker 2002).

## **Cañada del Capitan (Capitan)**

### *Cañada del Capitan (Capitan)*

"High quality salmonid habitat exists in upper El Capitan Creek" (Stoecker 2002).

## **Las Llagas Canyon Creek**

### *Las Llagas Canyon Creek*

Consultants recently confirmed historic use of Las Llagas Creek by steelhead, finding *O. mykiss* presence in Las Llagas Creek as recently as the early 1980s. The Highway 101 culvert currently presents a total barrier to steelhead access but has been recommended for modification. Surveys conducted in the summer and fall of 2008 found Las Llagas Creek to provide “excellent perennial flow..., adequate spawning gravels and rearing habitat and excellent lagoon habitat” up to the natural limit of anadromy located approximately one mile upstream of the Highway 101 culvert (M. Stoecker pers. comm.).

## **Gato Canyon Creek**

### *Gato Canyon Creek*

A 2002 consultant’s report notes the presence of *O. mykiss* in Gato Canyon Creek in the 1970s (Stoecker 2002).

## **Dos Pueblos Canyon Creek**

### *Dos Pueblos Canyon Creek*

A steelhead migration barrier assessment of Southern Santa Barbara County streams prepared in 2002 notes that in April 2002 consultants observed 200 *O. mykiss* ranging in length from 2 to 10 inches in Dos Pueblos Creek between the approximate elevations of 640 and 1,240 feet (Stoecker 2002).

The barrier assessment report assigns a barrier severity value of 0.90 (out of maximum 1.0) to the concrete channel that extends from the mouth of Dos Pueblos Creek upstream 0.2 miles and a culvert stream crossing at stream mile 2.32. Upstream passage at the concrete grade control structure downstream of the Highway 101 Bridge at stream mile 0.58 “...is likely limited to short periods during moderate to high stream flows” (Stoecker 2002, p. 279). A concrete channel and water diversion structure is located at stream mile 3.28. The report states, “Based on...limited observations, it appears that upstream migration of steelhead past this entire structure would be extremely difficult or impassable” (Stoecker 2002, p. 284). The natural upstream limit of anadromy likely occurs at a gradient increase at stream mile 4.68 (Stoecker 2002).

## **Eagle Canyon Creek**

### *Eagle Canyon Creek*

A 2002 consultant’s report cites 1984 documentation of steelhead entering Eagle Canyon Creek (Stoecker 2002).

## **Tecolote Canyon Creek**

### *Tecolote Canyon Creek*

A 1974 letter notes the presence of an abundant naturally reproducing population of *O. mykiss* in Tecolote Canyon Creek (Gantt 1973).

A 2002 consultant's report assigns a high quality habitat rating to the reach of Tecolote Creek upstream from a series of grade control structures on the lower section of stream (Stoecker 2002).

## **Bell Canyon Creek**

### *Bell Canyon Creek*

A 2002 consultant's report cites 1984 documentation of steelhead entering Bell Canyon Creek (Stoecker 2002).

## **Goleta Slough Complex**

### *Tecolotito Creek (Glen Annie Canyon)*

A 2002 consultant's report cites Dougal House as observing *O. mykiss* in Glenn Annie Creek in 1970 (Stoecker 2002).

### *San Jose Creek*

A steelhead migration barrier assessment of Southern Santa Barbara County streams prepared in 2002 includes a summary of recent *O. mykiss* documentation. The report notes that biological surveyors with the Water Watch Program observed more than 100 *O. mykiss* ranging in length from 2 to 14 inches in San Jose Creek between the elevations of 240 and 620 feet during surveys conducted between 1993 and 1998 (Stoecker 2002).

Biological assessments have been conducted annually since 2000 in several Santa Barbara County streams. High numbers of *O. mykiss* have been observed each year in the high gradient section of San Jose Creek adjacent to the San Marcos Trout Club (ECI 2007).

The 2002 barrier assessment identifies the concrete lined channel extending from the Goleta Slough upstream approximately 0.78 miles to 100 feet upstream of the Hollister Avenue Bridge on San Jose Creek as a total passage barrier (Stoecker 2002). The City of Goleta proposed a project to modify the concrete channel to provide improved flood control in 2007 and updated the project plan in 2008 to include a fish passage component (SAIC 2008). The natural upstream limit of anadromy likely occurs at a bedrock waterfall at stream mile 6.46 (Stoecker 2002).

### *San Pedro Creek*

Five *O. mykiss* measuring between 4 and 5 inches in length were observed in the headwaters of San Pedro Creek in 1992 and one adult *O. mykiss* was collected from near the confluence with San Jose Creek in 1995 (Trautwein 1996).

A steelhead migration barrier assessment of Southern Santa Barbara County streams prepared in 2002 identifies the concrete channel in San Pedro Creek that extends from the Highway 101 culvert upstream 0.29 miles as an impassible barrier (Stoecker 2002).

### **Atascadero Creek**

#### *Atascadero Creek*

A steelhead migration barrier assessment of Southern Santa Barbara County streams prepared in 2002 includes a summary of recent *O. mykiss* documentation. According to the report, DFG staff observed 12 *O. mykiss* measuring approximately 12 inches in length in Atascadero Creek downstream of the Cieneguitas Creek confluence in 2000 (Stoecker 2002). The report identifies the concrete lined channel extending from stream mile 3.12 upstream 0.43 miles as an impassible barrier to upstream migration (Stoecker 2002).

#### *Maria Ygnacio Creek*

A steelhead migration barrier assessment of Southern Santa Barbara County streams prepared in 2002 includes a summary of recent *O. mykiss* documentation. The report notes that in June 2000, DFG staff observed one adult steelhead in Maria Ygnacio Creek in a pool downstream of the Union Pacific Railroad crossing at stream mile 2.87 and in January 2002 20 *O. mykiss* ranging from 6 to 15 inches in length were observed downstream of the debris dam at a stream mile 5.65 (Stoecker 2002). During barrier surveying in June 2001, 10 *O. mykiss* ranging from 2 to 5 inches in length were observed from the San Antonio creek confluence to just downstream of the culvert at the Cathedral Oaks Road crossing at stream mile 3.79 (Stoecker 2002).

The barrier assessment identifies multiple impediments to upstream steelhead migration in Maria Ygnacio Creek, including the concrete channelization under the Union Pacific Railroad crossing and Highway 1 Bridge (Stoecker 2002, p. 213). A conceptual plan to modify the structure has been prepared. Additional barriers occur at the Cathedral Oaks Road and the Old San Marcos Road Bridge, and *O. mykiss* is not known to occur upstream of the debris dam at the approximate elevation of 260 feet, which likely creates an impassible barrier to migration.

#### *San Antonio*

A 2002 consultant's report assigns good quality pool habitat ratings for the reach of San Antonio Creek extending from the debris basin dam to the upper limit on the west fork (Stoecker 2002).

### **Arroyo Burro**

#### *Arroyo Burro*

A 2002 consultant's report assigns good quality pool habitat ratings to San Roque Creek, tributary to Arroyo Burro Creek (Stoecker 2002).

## **Mission Creek**

### *Mission Creek*

A steelhead migration barrier assessment of Southern Santa Barbara County streams prepared in 2002 includes a summary of recent *O. mykiss* documentation. According to the report, Mission Creek residents observed between six and 12 *O. mykiss* measuring approximately 6 inches in length in Mission Creek in a pool behind 1811 Castillo Street in March of 2000. Mission Creek residents and DFG staff observed two steelhead spawning near 719 Bath Street. During barrier surveying in February and April 2001, more than 40 *O. mykiss* ranging in length from 4 to 12 inches were observed in Mission Creek from 500 feet downstream of the Santa Barbara Museum of Natural History to the first pool upstream of Rattlesnake Creek. No *O. mykiss* were observed upstream of the boulder cascade just upstream of the Rattlesnake Creek confluence (Stoecker 2002).

According to staff from CCRB, Mission Creek supports YOY, age 1+, age 2+, and likely age 3+ and 4+ *O. mykiss* in its headwaters year-round but the lower section of stream contains little to no rearing habitat (T. Robinson pers. comm.).

The 2002 barrier assessment identifies multiple impediments to upstream steelhead migration in Mission Creek, including three sections of concrete-lined channel in the downstream 2.49 miles of stream and the bridge and concrete grade control structures at the Tallant Road crossing and the Highway 192 Bridge (Stoecker 2002). A council agenda report from the City of Santa Barbara Department of Parks and Recreation dated July, 2008 states, "Mission Creek contains high quality spawning and rearing habitat within the stream channels in the mid and upper watershed and currently has an existing population of rainbow trout ...every year for the last five years, steelhead trout have been recorded attempting to migrate upstream without success due to barriers within the stream channel" (DPR 2008). The report indicates that funding has been approved to remove the barriers.

### *Rattlesnake Canyon Creek*

A steelhead migration barrier assessment of Southern Santa Barbara County streams prepared in 2002 includes a summary of recent *O. mykiss* documentation. According to the report, 30 *O. mykiss* ranging in length from 2 to 12 inches were observed in the Rattlesnake Creek headwaters in 1999 and more than 12 *O. mykiss* ranging in length from 2 to 12 inches were observed in Rattlesnake Creek upstream from Las Canoas Road in 2000 (Stoecker 2002). During barrier surveying in April 2001, more than 180 *O. mykiss* ranging in length from 1 to 13 inches were observed in Rattlesnake Creek from the Mission Creek confluence upstream to the Bedrock Waterfall located 1.16 miles upstream from the Las Canoas Road Bridge. The report notes the consistent presence of "... a naturally reproducing *O. mykiss* population in Rattlesnake Creek upstream of Las Canoas Road from 1993 to 2002" (Stoecker 2002).

## **Montecito Creek**

### *Montecito Creek*

A steelhead migration barrier assessment of Southern Santa Barbara County streams prepared in 2002 includes a summary of recent *O. mykiss* documentation. According to the report, several *O. mykiss* juveniles were observed in pools in Montecito Creek between Highway 192 and 0.5 miles

downstream. During barrier surveying in June 2001, four *O. mykiss* ranging in length from 6 to 13 inches were observed in Montecito Creek between 275 feet upstream of Highway 101 and the Hot Springs Creek confluence. (Stoecker 2002).

Biological assessments conducted annually between 2000 and 2007 in several Santa Barbara County streams document the presence of an *O. mykiss* population in Montecito Creek from the Hot Springs Creek confluence to downstream of the Olive Mill Road crossing (ECI 2007).

The 2002 barrier assessment notes that the concrete channel extending from the mouth of Montecito Creek upstream over 800 feet to downstream of the Union Pacific Railroad crossing “presents a high degree of difficulty to upstream passage” (Stoecker 2002).

### **Oak Creek**

#### *Oak Creek*

Fisheries information for Oak Creek was not found.

### **San Ysidro Creek**

#### *San Ysidro Creek*

During barrier surveying in 2001, 273 YOY *O. mykiss* were observed in San Ysidro Creek in a reach extending from the upstream end of the lagoon to a pipeline crossing barrier located 3.25 miles upstream. Multiple *O. mykiss* ranging in length from 4 to 9 inches were observed from the pipeline crossing to upstream of a bedrock waterfall (Stoecker 2002).

### **Romero Creek**

#### *Romero Creek*

Romero Creek was included in 1974 list of historical steelhead streams (Gantt 1974).

One 11 inch *O. mykiss* was observed in the Romero Creek lagoon in 2001 (Stoecker 2002).

NMFS staff observed *O. mykiss* in Romero Creek in 2006.

### **Arroyo Paredon**

#### *Arroyo Paredon*

A 2002 consultant’s report notes documentation of *O. mykiss* in Arroyo Paredon Creek in 2000 and assigns good quality pool habitat ratings in the reach between Highway 192 and the natural limit (Stoecker 2002).

## **Carpenteria Salt Marsh Complex**

### *Santa Monica Creek*

A 2002 consultant's report cites Irving Treloar as having caught *O. mykiss* in Santa Monica Creek in the 1930s or 1940s (Stoecker 2002).

### *Franklin Creek*

A 2002 consultant's report cites Irving Treloar as having caught *O. mykiss* in Franklin Creek in the 1930s or 1940s (Stoecker 2002).

## **Carpinteria Creek**

### *Carpinteria Creek*

A steelhead migration barrier assessment of Southern Santa Barbara County streams prepared in 2002 includes a summary of recent *O. mykiss* documentation. According to the report, hundreds of *O. mykiss* ranging in length from 2 to 12 inches were observed in Carpinteria Creek upstream of the Gobernador Creek confluence between 1980 and 2001 (Stoecker 2002).

Multiple *O. mykiss* age classes were observed in Carpinteria Creek between Lilington Canyon Road and the Carpinteria Debris Basin Dam during barrier surveys conducted in 2001 and 2002, and more than 130 *O. mykiss* ranging in length from 1.5 to 15 inches were observed between the upstream end of the debris dam and 0.25 miles upstream of a bedrock waterfall in 2002 (Stoecker 2002).

### *Gobernador Creek*

While conducting barrier surveys in 2001, consultants observed more than 400 *O. mykiss* ranging in length from 2 to 13 inches in Gobernador Creek in the 0.75 mile reach downstream from the confluence of Steer and Eldorado creeks (Stoecker 2002).

According to a Watershed Plan for Carpinteria Creek, during habitat surveys conducted in the Carpinteria Creek watershed in 2003, 63 YOY, 88 age 1+ and eight age 2+ *O. mykiss* were observed in a one mile section of upper Gobernador Creek, and high numbers of *O. mykiss* have been observed in Gobernador Creek in consecutive years in a high gradient reach approximately 0.25 miles above the Gobernador debris basin dam. Habitat quality in this reach is characterized as excellent (CRCDC 2005).

According to the Carpinteria Creek Watershed Coalition, a project to remove the debris basin dam, which creates a total barrier to steelhead passage, is currently in progress. Downstream of the dam, a stream crossing on the Widdoes property creates a total passage barrier. A project to remove this barrier is slated to occur in the summer of 2009 and is expected to restore anadromous access to Eldorado and Steer Creeks up to the natural limits. Two concrete Arizona crossings that created total migration barriers on lower Gobernador Creek were removed in 2008 (M. Gomez pers. comm.).

#### *Eldorado Creek*

During barrier surveys conducted in 2001, 25 *O. mykiss* ranging in length from 3 to 9 inches were observed in Eldorado Creek between the Steer Creek confluence and 0.1 mile upstream. The natural limit of anadromy occurs at a steep gradient within the upper stream reach (Stoecker 2002).

#### *Steer Creek*

During barrier surveys conducted in 2001, 15 *O. mykiss* ranging in length from 3 to 8 inches were observed in Steer Creek between the Eldorado Creek and 0.1 mile upstream. The natural limit of anadromy occurs at a steep gradient within the upper stream reach (Stoecker 2002).

#### *Sutton Canyon Creek*

Anadromous access on Sutton Canyon is blocked due to total barriers on the Carpinteria mainstem. The natural limit of anadromy in Sutton Canyon Creek occurs at a steep gradient within the upper stream reach (Stoecker 2002).

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## Ventura County

### Rincon Creek

#### *Rincon Creek*

A 2007 watershed plan for Rincon Creek notes good quality habitat in Rincon Creek upstream of the impassible Highway 101 culvert and the presence of *O. mykiss* upstream from the Casitas Creek confluence (Tetra Tech 2007).

Caltrans removed fish migration barriers at two damaged road crossings and restored natural stream reaches in the Rincon Creek mainstem. Plans to modify the Highway 101 culvert to restore anadromy to Rincon Creek are being developed (Stoecker 2009).

### Ventura River

#### *Ventura River*

DFG staff conducted electrofishing surveys on 5.75 miles of the mainstem Ventura River between the Robles Diversion Dam and the Ventura River estuary in April and May of 1995. A total of 50 *O. mykiss* ranging in total length from 19 to 39.5 cm were captured within the sampled reaches, with the highest densities occurring upstream of Foster Park Bridge (DFG 1997).

A NMFS steelhead sightings record notes the presence of over 100 six to eight inch smolts in the Ventura River lagoon in April of 2002 (NMFS 2002).

In 2003 consultants prepared a habitat evaluation report for the Ventura River watershed. The best quality spawning and rearing habitat in the Ventura River downstream of the Robles Diversion Dam was noted to occur between Foster Park and 0.5 miles upstream of the San Antonio Creek confluence, where perennial flow occurs in wet years (Entrix 2003). Similar results were obtained in a survey conducted by consultants in 2004, in which the best quality habitat downstream of Robles Diversion Dam was noted to occur between the Ojai Valley Sanitary District treatment plant and the San Antonio Creek confluence (Payne 2004).

Installation of a fish ladder at Robles Diversion Dam on the Ventura River was completed in December 2004. Adult steelhead were observed passing upstream through the fish passage facilities in 2008, and in April 2009 over 100 fish believed to be out-migrating smolts were observed immediately above and immediately below the diversion (A. Spina pers. comm.).

#### *Coyote Creek*

A 1980 survey notes 3.83 miles of "existing fishery" in Coyote Creek (Moore 1980). The upper section of the creek was said to have rearing habitat "in quantity."

#### *Santa Ana Creek*

A 1980 survey notes about two miles of "existing fishery" in Santa Ana Creek, with one mile located within national forest land and one mile located within private land (Moore 1980).

### *San Antonio Creek*

DFG staff conducted electrofishing surveys in June 1992 in San Antonio Creek from the Signal Road/Creek Road intersection downstream to the Ventura River confluence. One *O. mykiss* measuring between 250 to 300 mm in length was observed approximately 1 km upstream of the Ventura River confluence. The report states, "Habitat throughout San Antonio Creek is very good and this stream possesses the most abundant steelhead spawning areas presently available in the Ventura River system" (DFG 1999, p. 5).

A habitat survey of the Ventura River watershed prepared in 2003 notes that San Antonio Creek provides only marginal quality steelhead habitat due to erosion and multiple passage barriers. Suitable rearing habitat was found from downstream of Camp Willetts Road to upstream of the Soule Park Golf course crossing, identified as a total migration barrier (Entrix 2003).

### *Gridley Canyon Creek*

NMFS staff observed 46 *O. mykiss* ranging in length from 1 to 12 inches in Gridley Creek upstream of the Hermitage diversion dam in October 2001 (NMFS 2002).

### *Matilija Creek*

The Matilija Dam Ecosystem Restoration Project is in its final design phase. The project will restore passage to steelhead and involves the removal of the Matilija Dam and the six million cubic yards of accumulated sediment behind it, the installation of a high flow sediment bypass and silt removal system at the Robles Diversion Dam, and the construction of levees to prevent flooding. The natural upstream limit of anadromy in Matilija Creek occurs at a bedrock falls.

According to a consultant's report, modifications to Robles Diversion Dam and the removal of Matilija Dam will allow steelhead access "...to approximately 8.2 miles of habitat in the mainstem Matilija Creek, 4.9 miles in the Upper North Fork (including the unnamed tributary), at least 2.3 miles in Old Man Creek, 1.9 miles in Murietta Creek, and 4.3 miles in the Lower North Fork" (Payne 2003, p. 19).

### *North Fork Matilija Creek*

Electrofishing surveys were conducted in North Fork Matilija Creek in 1993 in four reaches located between the Middle Fork Matilija confluence and the twin tunnels on Highway 33 four miles upstream. A total of 58 *O. mykiss* ranging in total length from 93 to 332 mm were captured within the surveyed reaches (DFG 1994). The report states "None of the trout found in the North Fork Matilija Creek could be concluded to be steelhead, although the wild fish there may be derived from landlocked sea-run stock" (DFG 1994, p. 33).

In 1999, USFS staff conducted habitat typing and snorkeling surveys in North Fork Matilija Creek. Snorkeling surveys were conducted in July in four stream reaches, 231.8 meters downstream and 729.2 meters upstream of Highway 33 Bridge construction site and 669.6 meters downstream and 725 meters upstream of the Wheeler Gorge Campground. Downstream of the Highway 33 Bridge, 503 YOY, 166 age 1+, and three age 2+ *O. mykiss* were captured. Upstream of the bridge, 72 YOY and 24 age 1+ *O. mykiss* were captured. Downstream of the Wheeler Gorge Campground, 217 YOY,

38 age 1+, and 11 age 2+ *O. mykiss* were captured. Upstream of the Campground, 96 YOY, 11 age 1+, and eight age 2+ *O. mykiss* were captured (USFS 2000).

#### *Murietta Canyon Creek*

According to a consultant's report, the removal of Matilija Dam will open up steelhead access to approximately 1.9 miles of habitat in Murietta Creek. (Payne 2003).

#### *Upper North Fork Matilija Creek*

According to a consultant's report, the removal of Matilija Dam will open up steelhead access to approximately 4.9 miles of habitat in the Upper North Fork, including habitat in the unnamed tributary. The report notes "...consistently good habitat throughout all mapped reaches" of the Upper North Fork (Payne 2003, p. 19). The PAD identifies a falls at approximately stream mile 4.0 as the upper limit of anadromy in the Upper North Fork.

#### *Upper North Fork Matilija tributary*

According to a consultant's report, the removal of Matilija Dam will open up steelhead access to the unnamed tributary to Upper North Fork Matilija Creek. A barrier falls at approximately stream mile 0.9 is noted to create a total barrier to anadromy (Payne 2003).

#### *Old Man Canyon Creek*

According to a consultant's report, the removal of Matilija Dam will open up steelhead access to "...at least 2.3 miles in Old Man Creek" (Payne 2003, p. 19).

### **Santa Clara River**

#### *Santa Clara River*

The mainstem Santa Clara does not itself provide suitable steelhead habitat, but functions as a critical migration route to and from tributaries that provide high quality spawning and rearing habitat (Stoecker 2005). When a migration corridor is not present downstream of the Vern Freeman Diversion Dam, smolts are trapped at the dam and released into the Santa Clara River estuary.

A study examining smolt survival and estuary use in the Santa Clara and Santa Ynez Rivers was conducted in 2008. A total of 133 smolts were captured in the downstream migrant trap (Kelley 2008).

#### *Santa Paula Creek*

As part of a steelhead population status and migration barrier assessment of the lower Santa Clara River, Santa Paula Creek was surveyed in 2004 from the mouth upstream to upstream limit of anadromy at the East Fork Santa Paula Creek confluence formed by a bedrock chute and waterfall. From the Sisar Creek confluence upstream to the limit of anadromy, a total of four YOY, 19 age 1+, seven age 2+, and one age 3+ *O. mykiss* were observed. The report notes that the upper reaches of Santa Paula Creek contain high-quality habitat and high densities of *O. mykiss* (Stoecker 2005).

A steelhead habitat and population assessment was conducted in Santa Paula Creek in 2007. Sampling was conducted in May and repeated in portions of the stream containing high-quality habitat in November. The length of dry reaches was compared in May and November to estimate the extent of summer rearing habitat. In May, age 1+ *O. mykiss* were observed in two of 44 pools surveyed in a reach that extended from stream mile 4.5 near the downstream end of Steckel Park upstream 2.1 miles to the Sisar Creek confluence. From the Sisar Creek confluence upstream to the natural waterfall barrier located at the East Fork Santa Paula Creek confluence, *O. mykiss* were observed in 102 of the 148 pools surveyed. Santa Paula Creek was observed to be dry from the Sisar Creek confluence upstream 0.06 miles in May and from the Sisar Creek confluence upstream 0.3 miles in November (Stillwater Sciences 2007).

The Harvey Diversion Dam and the grade control structures under the Highway 150 Bridge currently bar upstream passage to Santa Paula Creek for *O. mykiss* of all age classes due to damage incurred during winter flooding in 2005. Reconstruction of the damaged structures is in progress. A Caltrans news release dated November, 2008 indicates that repairs to the Highway 150 Bridge on Santa Paula and Sisar Creeks will be completed by 2011.

#### *Sisar Creek*

As part of a steelhead population status and migration barrier assessment of the lower Santa Clara River, fish sampling was conducted in Sisar Creek in 2004, yielding a total of 82 YOY, 59 age 1+, 19 age 2+, and one age 3+ *O. mykiss* between the Santa Paula Creek confluence and the natural waterfall barrier. The subsequent report states that Sisar Creek accounts for 84 percent of the trout observed in the Santa Paula Creek drainage (Stoecker 2005).

In May 2007, juvenile *O. mykiss* were observed in 75 of the 86 pools surveyed in Sisar Creek from the Santa Paula Creek confluence upstream 4.1 miles (Stillwater Sciences 2007). The Highway 150 Bridge grade control structure in Sisar Creek was identified as a partial migration barrier (Stoecker 2005). A Caltrans news release dated November, 2008 indicates that repairs to the Highway 150 Bridge on Santa Paula and Sisar Creeks will be completed by 2011.

#### *East Fork Santa Paula Creek*

A 1979 survey report states, "...this stream has enough cover, low enough temperatures (much ground water input) and sufficient food to warrant the re-establishment of a RB trout population" (USFS 1979).

#### *Sespe Creek*

A Watershed Analysis for Sespe Creek was prepared in 1997. The report states, "Trout densities are highest within the mainstem Sespe between the West Fork and Alder Creek and in short segments near Park, Timber, Bear, Piedra Blanca, and Howard Creeks" (USFS 1997a, p. 32). Lower Sespe downstream of the Vantrees property likely serves only as a migration corridor (Kelley 2004).

Multiple *O. mykiss* age classes were observed in small numbers throughout Sespe Creek during habitat surveys conducted in 2004. The subsequent report states, "Due to the high quality salmonid habitat, large quantity of habitat, lack of mainstem migration barriers, and presence of wild, self-sustainable *O. mykiss* populations, Sespe Creek offers the greatest potential for immediate steelhead

recovery in the Santa Clara River. The ability of Sespe Creek to provide Santa Clara River steelhead recovery is entirely dependent upon adequate migration flows on the mainstem Santa Clara River and effective fish passage at the Vern Freeman Diversion Dam” (Stoecker 2005, p. 123).

#### *West Fork Sespe Creek*

During a 2004 steelhead population assessment, 19 YOY, 82 age 1+, 20 age 2+, and four age 3+ *O. mykiss* were observed in West Fork Sespe Creek between the mouth and the upstream limit of anadromy formed by bedrock chute (Stoecker 2005).

#### *Alder Creek*

A 1997 watershed analysis of Sespe Creek states, “Physical boulder or bedrock falls block fish from moving upstream into Coldwater, West Fork, Alder, and Bear Creeks” (USFS 1997a, p. 12).

#### *Park Creek*

During a 2004 steelhead population assessment, 12 YOY, three age 1+, five age 2+, and three age 3+ *O. mykiss* were observed in Park Creek downstream from the limit of anadromy formed by a boulder cascade (Stoecker 2005).

#### *Timber Creek*

During a 2004 steelhead population assessment, a total of 50 YOY, two age 1+, ten age 2+ and two age 3+ *O. mykiss* were observed in perennial reaches of Timber Creek (Stoecker 2005). The upstream limit of anadromy occurs at a boulder cascade.

#### *Bear Canyon Creek*

During a 2004 steelhead population assessment, a total of 87 YOY 19 age 1+ seven age 2+ four age 3+ *O. mykiss* were observed within the perennial reach of Bear Creek (Stoecker 2005).

#### *Trout Creek*

A 1980 report on streams of the Los Padres National Forest noted that Trout Creek contains about one mile of "trout fishery" (Moore 1980). The population appears to have been encountered in the lower-most stream reach.

As part of a genetic study, Trout Creek was sampled in 1995 and *O. mykiss* individuals were collected from five sampling sites (USFS 1997b).

#### *Piedra Blanca Creek*

During a 2004 steelhead population assessment, a total of 1,357 YOY, 746 age 1+, 80 age 2+ and two age 3+ *O. mykiss* were observed from upstream of the Sespe Creek confluence to the upstream limit of anadromy formed by a waterfall (Stoecker 2005).

### *Lion Canyon Creek*

A 1980 survey report noted that Lion Canyon Creek contained rearing habitat in its upper section downstream from the confluence of the headwater forks. The creek was said to contain three miles of "fishery" (Moore 1980).

During a 2004 steelhead population assessment, a total of 73 YOY, 24 age 1+, and two age 2+ *O. mykiss* were observed in Lion Canyon Creek. The subsequent report characterizes spawning and rearing habitat in the perennial reach of Lion Creek as "excellent" (Stoecker 2005). The report identifies an abandoned diversion dam in Lion Creek as a severe passage barrier.

### *Howard Creek*

A 1980 survey report states, Howard Creek serves as a spawning and nursery area as well as for summering over of large trout" (Moore 1980). The creek was noted to contain about one mile of "fishery."

During a 2004 steelhead population assessment , a total of 112 YOY, 41 age 1+, 15 age 2+, and one age 3+ *O. mykiss* were observed in Howard Creek between the Sespe Creek and Rose Creek confluences. The subsequent report identified multiple partial migration barriers in Howard Creek, including the culvert at the Forest Road crossing, the Rancho Grande private airstrip culvert crossing, and four dams on the Rancho Grande property (Stoecker 2005).

### *Rose Valley Creek*

During a 2004 steelhead population assessment , a total of 55 YOY, 14 age 1+, six age 2+, and one age 3+ *O. mykiss* were observed in Rose Valley Creek between the Howard Creek confluence and the end of the perennial reach (Stoecker 2005). Total migration barriers were identified at the Lower Rose Valley Lake Dam, the Rose Valley Road culvert crossing, the Middle Rose Valley Lake Dam, and the Upper Rose Valley Lake Dam. The Los Padres National Forest Rose Valley Campground crossing was identified as a partial barrier. The natural upstream limit of anadromy occurs at Rose Valley Falls (Stoecker 2005).

### *Rock Creek*

A 1980 survey report notes about one mile of "fishery" on Rock Creek (Moore 1980).

### *Tule Creek*

A 1980 survey report notes 2.33 miles of "trout fishery" in Tule Creek (Moore 1980). The lower portion was deemed "important spawning tributary to upper Sespe Creek fish [emphasis original]."

In August 1995 LPNF staff conducted habitat typing in Tule Creek from near the Highway 33 crossing upstream 2000 feet. A note on the field data sheet indicates the presence of "tons" of *O. mykiss* fry in the surveyed reach (USFS 1995).

### *Potrero John Creek*

A 1980 survey report notes about two miles of "fishery" on Potrero John Creek (Moore 1980).

The upper limit of anadromy occurs at bedrock chute located at approximately stream mile 2.6 (Stoecker 2005)

#### *Munson Creek*

A 1997 watershed analysis of Sespe Creek states “Rainbow trout extend up most of the major tributaries of the Sespe including... Munson Creek” (USFS 1997).

The upstream limit of anadromy in Munson Creek occurs at a bedrock chute located at approximately stream mile 1.0. (Stoecker 2005)

#### *Chorro Grande Canyon Creek*

Low abundances of *O. mykiss* were observed during USFS surveys conducted in 1994 – 1995. A natural falls occurs about 0.75 miles upstream from the mouth (Stoecker 2005).

#### *Ladybug Creek*

Two perennial reaches of Ladybug Creek were surveyed in 2004. A total of two YOY two age 1+ and one age 2+ *O. mykiss* were observed (Stoecker 2005). The upstream limit of anadromy occurs at a waterfall.

#### *Cherry Creek*

Surveys conducted by LPNF staff in July 2000 indicate abundant *O. mykiss* of multiple age classes in pools throughout Cherry Creek, with abundance decreasing further upstream.

According to a 1997 assessment of Sespe Creek, “Cherry Creek is also important as the upper most [Sespe Creek] tributary supporting a viable resident trout population (USFS 1997a).

#### *Hopper Canyon Creek*

Hopper Canyon Creek was surveyed in 1992 from the Santa Clara River confluence upstream to the waterfall that creates the upstream limit of anadromy. Adult *O. mykiss* were frequently spotted at densities of one to four individuals per pool from approximately 2.5 to 3 km above the upstream-most Hopper Canyon Road crossing to the waterfall barrier. At the base of the waterfall barrier 20 to 30 *O. mykiss* ranging in length from 120 to 250 mm were observed. One YOY *O. mykiss* was observed 200 meters downstream from the pool at the base of the waterfall (DFG 1999).

During surveys conducted in 2004, high quality habitat was observed in the upper reaches of Hopper Canyon Creek and *O. mykiss* were observed in the headwaters above and below waterfall barrier (Stoecker 2005). The Highway 126 bridge apron created a partial migration barrier. Potential partial barriers at three upstream road crossings were noted, though access to the sites was not granted by landowners.

#### *Piru Creek*

A 2004 report notes that an “abundant” resident rainbow trout population exists in Piru creek between Pyramid Lake and Lake Piru (Kelley 2004).

According to a 2005 consultant's report "...effective steelhead passage upstream of Santa Felicia Dam would open up over 15 miles of high quality habitat along middle Piru Creek and its large tributaries in that reach including Agua Blanca Creek and Fish Creek" (Stoecker 2005, p. 133).

#### *Agua Blanca Creek*

Descriptions of Agua Blanca Creek note low water in summer. However, a 2005 study points to use by an adfluvial population in Lake Piru.

#### *Fish Creek*

A 1980 report notes, Fish Creek is the only spawning tributary available to trout in Piru Creek between Pyramid Lake and Agua Blanca Creek, and appears heavily used as such" (Moore 1980).

#### *Lockwood Creek*

A 1955 memo states, "Rainbow trout are present and spawn naturally in Lockwood Creek..." (DPW 1955). A survey report notes that fish "are aggregated in the few areas that provided suitable depth and cover" (Swift 1975).

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## Los Angeles County

### Arroyo Sequit

#### *Arroyo Sequit*

In September 1979 DFG staff surveyed Arroyo Sequit Creek from Leo Carrillo State Park campground to approximately 3.2 km upstream. The stream was noted to be dry from its mouth to approximately 91 meters upstream of the upper campsites. Multiple age classes of *O. mykiss* were observed, including “abundant” (over 200) *O. mykiss* ranging in length from 5 to 7 cm (DFG 1980).

Extensive habitat typing and barrier surveys in were conducted in Arroyo Sequit Creek in 2003 (California Trout 2006), and monthly snorkel surveys were conducted in Arroyo Sequit Creek from June 2005 to March 2007 as part of the Malibu Creek and Arroyo Sequit Southern Steelhead Monitoring Project (Dagit 2007). While the watershed was found to contain good to excellent spawning and rearing habitat in 2003, only one adult *O. mykiss* was observed during the 2005-2007 surveys and the lower reach of stream contained multiple severe passage barriers.

The 2006 habitat and barrier survey report states, “Combining the mainstem stream (also called West Fork Arroyo Sequit) and the East Fork tributary, the linear distance of potential habitat gain above [lower campground road] up to the natural limits of anadromy is 7,602 meters” (California Trout 2006, p. 39). According to the report, the natural upstream limit of anadromy occurs on the West Fork Arroyo Sequit at a waterfall referred to as “The Grotto.”

#### *East Fork Arroyo Sequit*

“The natural upstream limit of anadromy for the East Fork tributary lies 838 linear meters above the confluence with the mainstem channel, and consist of 2 contiguous features ...a natural waterfall 3.2 meters in height...and an old concrete wall or dam with additional concrete placed immediately upstream in the stream channel...” (California Trout 2006, p. 41).

### Zuma Canyon

#### *Zuma Canyon*

Extensive habitat typing and barrier surveys in were conducted in Zuma Canyon Creek in 2003. Numerous man-made structures were noted to create severe partial barriers within the lower three miles of stream. Good quality rearing habitat was noted from the Bonsall Drive crossing upstream to the natural limit of anadromy created by a natural waterfall at approximately stream mile 4.6 (California Trout 2006).

### Solstice Canyon

#### *Solstice Canyon*

“The habitat of Solstice Creek is relatively complex and appears suitable for juvenile steelhead ontogeny and survival....The relatively deep pools, particularly in the upper reaches, are expected to favor survival of juvenile steelhead by providing refuge from...predators...and periods of elevated water temperature...” (NMFS 1999, p. 6).

A 2006 analysis of Santa Monica Mountain watersheds notes that multiple fish passage and habitat improvements have recently been implemented in Solstice Creek, and a Caltrans project to restore steelhead passage past the Highway 1 culvert is in progress (California Trout 2006). “Excellent” habitat is noted to occur throughout the stream up to the natural waterfall barrier.

## **Malibu Creek**

### *Malibu Creek*

A habitat quality and barrier survey report prepared in 2005 for the Malibu Creek watershed notes that steelhead habitat occurs in the three miles downstream of Rindge Dam, and “good” to “excellent” quality habitat occurs in the Malibu Creek mainstem between Rindge and Century dams. Additionally, the tributary streams Las Virgenes and Cold Creeks are noted to contain “excellent” quality habitat downstream of barriers (HTB 2005).

A severe fish kill occurred in Malibu Creek in 2006, resulting in the loss of all *O. mykiss* downstream of Rindge Dam (Dagit 2007).

## **Las Flores Canyon**

### *Las Flores Canyon*

A 2006 analysis of Santa Monica Mountain watersheds notes that Las Flores Canyon contains excellent quality rearing habitat upstream to the waterfall that creates the natural limit of anadromy. Several total anthropogenic barriers occur downstream from the waterfall (California Trout 2006).

## **Topanga Canyon Creek**

### *Topanga Canyon Creek*

The *O. mykiss* population in Topanga Creek was surveyed monthly from June 2001 to March 2003. All *O. mykiss* were located within the lower 2.73 miles of creek due to low flow conditions and natural and man-made barriers upstream (Dagit 2003). In June 2001, 118 YOY and two adult (>26 cm) *O. mykiss* were observed in Topanga Creek between the mouth and 2.71 miles upstream. In June 2002, 102 YOY, 22 parr (10-15 cm), 34 silver parr (15-23 cm), and one adult (>26 cm) *O. mykiss* were observed between stream miles 1.61 and 2.73. In March 2003, 18 parr, two silver parr, one smolt, and one adult *O. mykiss* were observed within the lower 2.73 miles of stream. The survey report states, “Clearly reproduction took place during the spring of 2001 and 2002, resulting in a rise in the overall Topanga Creek steelhead population” (Dagit 2003, p. 106).

Multiple age classes of *O. mykiss* were observed in Topanga Canyon Creek in a survey conducted in 2008. The survey report notes that monthly snorkel surveys indicate that the *O. mykiss* population increased between 2007 and 2009, and that the upstream distribution had extended to a waterfall barrier located 5,300 meters upstream from the mouth (Dagit 2009). A 2007 report states “migration in Topanga Creek is limited to times of peak flows that provide sufficient flow to breach the sand berm and maintain a connection to the ocean” (Dagit 2007).

## Los Angeles River

### *Rio Hondo*

“Steelhead trout ...migrated upstream to the headwaters to spawn and downstream to the Pacific Ocean as smolts before dams and diversions disrupted their passage through the drainage” (Soltz 1992, p. 4).

### *Eaton Canyon*

A DFG stream survey sheet from 1946 notes the presence of rainbow trout “good” pools, and “fair” spawning areas in an approximately 2 mile reach of Eaton Canyon Creek beginning at a trail crossing near Henniger Flats road and ending near Yucca Flats. Upstream of Yucca Flats pools the stream was noted to lack “both food and adequate pools” (DFG 1946).

### *Arroyo Seco*

Arroyo Seco is not accessible to anadromous *O. mykiss* due to channelization of the mainstem Los Angeles River, however, a resident *O. mykiss* population persists in the Arroyo Seco headwaters. In 2000 consultants observed *O. mykiss* in Arroyo Seco from upstream of the Brown Mountain Debris Dam to the Lower Switzer Campground (Stoecker 2001). The survey report states, “Several age classes of rainbow trout, including young-of-the-year, were observed in the upper Arroyo Seco and natural reproduction is occurring. Upstream of the Long Canyon tributary, rainbow trout were observed in moderate to high numbers and appeared in good health with individuals up to 13 inches in length” (Stoecker 2001, p. 18)

### *Bear Canyon Creek*

Staff from DFG surveyed the lower 0.5 miles of Bear Canyon Creek in September of 1947 and 1949. Stream flow was noted to be extremely low, however fingerling trout were observed in standing pools. Pools were noted to be “frequent and good” and spawning areas were characterized as “fair” (DFG 1949a).

In 2000 consultants observed *O. mykiss* in the lower 200 feet of Bear Canyon Creek (Stoecker 2001).

### *Little Bear Canyon Creek*

During surveys conducted in 1947 and 1949 in Little Bear Canyon Creek, DFG staff observed fingerling trout downstream of the barrier falls located 150 feet from the mouth. Survey notes indicated summer rearing habitat, stating, “This stream holds a good constant flow, even better than Bear Creek proper” (DFG 1949b).

In 2000 consultants observed *O. mykiss* in the lower 50 feet of Little Bear Canyon Creek (Stoecker 2001).

### *Big Tujunga Creek*

Staff from DFG surveyed Big Tujunga Creek from Hansen Dam to the headwaters in 1947. “Good” pools, “excellent” spawning habitat and “abundant” natural propagation of rainbow trout was noted

in the reach between Big Tujunga Dam and Wickiup Camp. The survey sheet notes “generally unfavorable” habitat conditions upstream from Wickiup Camp (DFG 1947a).

#### *Mill Creek*

In 1971 staff from DFG surveyed Mill Creek from the Big Tujunga Creek confluence to approximately one mile upstream of Monte Cristo Campground and observed “good trout habitat” in the first 1.5 miles of stream. The survey memo noted that “some spawning” may occur between stream mile 1.5 and Monte Cristo Campground [no rearing habitat noted]. The reach of stream above Monte Cristo campground was deemed “probably not suitable for trout” (DFG 1971a).

### **San Gabriel River**

#### *San Gabriel River*

A 1988 letter from DFG notes a “remnant trout fishery below Morris Dam” and “a fairly intense fishery for large rainbow trout which annually migrate from San Gabriel Reservoir to the north, west, and east forks... to spawn” (DFG 1988a).

Field notes from DFG staff for a survey conducted in the San Gabriel River in 1948 note “good” pool habitat in East Fork San Gabriel (upper mainstem) downstream of Alder Gulch and downstream of Mine Gulch, and several 8-inch rainbow trout were observed downstream of Alder Gulch. “Some deep holes” containing one 13-inch and “several smaller” rainbow trout were observed upstream of the Narrows, and “many nice pools” were observed downstream of the Narrows (DFG 1954).

Fishermen report the presence of “wild” trout in East Fork San Gabriel Creek between the ranger station and Fish Creek (SoCalFish’N 2009).

#### *San Jose Creek*

Fisheries information for San Jose Creek was not available.

#### *Walnut Creek*

Fisheries information for Walnut Creek was not available.

#### *Big Dalton Canyon Creek*

A letter to DFG from 1971 indicates that Big Dalton Reservoir “appears to have abundant fish life” (Brown 1971).

#### *Little Dalton Canyon Creek*

Little Dalton Canyon Creek was stocked with rainbow trout in 1945 (DFG 1945).

### *San Dimas Canyon Creek*

An issue of the DFG journal from 1938 refers to San Dimas Canyon Creek as having “consistently good” trout fishing upstream from the San Dimas Reservoir (DFG 1938).

### *Santa Anita Canyon Creek*

Field notes from DFG staff regarding surveys conducted in Santa Anita Canyon Creek between 1946 and 1952 indicate that the falls located above the Winter Creek confluence in Santa Anita Canyon Creek prevent the upstream migration of fish, but also notes “good pools present and fingerlings common” upstream of the falls. The notes indicated that pool habitat began approximately 0.5 miles above the reservoir and improved moving upstream toward Winter Creek. The section of Santa Anita Canyon Creek from 0.5 miles downstream to 0.25 miles upstream of the Winter Creek confluence was noted to contain good quality pool habitat and “very numerous fingerling and adult” rainbow trout (DFG 1952a).

### *Monrovia Canyon Creek*

An angler reported that multiple year classes of rainbow trout were observed in Monrovia Canyon Creek in recent years and noted severe habitat degradation in the lower reaches due to flood control activities (M. Grubbs pers. comm.).

### *Winter Creek*

Field notes from DFG staff for surveys conducted between 1947 and 1952 note the following about Winter Creek. “Falls at Winter Creek campground are impassible barrier to fish”(DFG 1952b). From the Santa Anita Canyon Creek confluence to 1/8 mile upstream “pools poor and cover poor... probably improves upstream.” Notes for a reach of Winter Creek described as “old gold mine tunnel” section state “pools good... cover and shade good... stream in excellent condition” (DFG 1952b).

### *Fish Canyon Creek*

Field notes from DFG staff in 1951 refer to a lower reach of Fish Canyon Creek as “Cabin area” and note good quality pools and cover from the station in this reach for approximately 0.15 miles upstream. “A few native fish” measuring 4 inches in length were observed in the section of stream 0.5 miles upstream from the dam (DFG 1951a).

### *Roberts Canyon Creek*

Staff from DFG surveyed Roberts Canyon Creek in 1947 from the mouth to the headwaters. The survey sheet indicates that a 10-foot falls located approximately 0.75 miles above the mouth creates a total barrier to fish passage and also notes the presence of an impassible 20-foot high dam at stream mile 3.5. The survey sheet notes “nice pools,” “good” shelter, and “common” rainbow trout fingerlings in the lower 2.5 miles of stream, “few pools,” “little shelter,” and rainbow trout fingerlings and adults in the next mile upstream, and “nice pools” and “good shelter” in the upper mile of stream. No fish were observed in the upper mile of stream (DFG 1947b).

### *West Fork San Gabriel River*

A 1971 letter from DFG staff states, “The West Fork of the San Gabriel River below Cogswell supports substantial wild trout and catchable trout fisheries...” (DFG 1971b). According to a DFG report regarding damages to the fishery incurred during desilting and dewatering of Cogswell Reservoir in 1981, “The lower portion of the stream from the Highway 39 bridge and junction with the North Fork upstream 1.6 miles to the second bridge along the road leading to the dam was planted with about 30,000 catchable rainbow trout annually... The stream adjacent to the 3 miles of road upstream from the second bridge had the reproductive and productivity capabilities to provide anglers with a substantial number of stream-raised trout (wild trout). The 2.85-mile stream section below the dam was managed by the Department as a wild trout stream” (DFG 1983).

Sediment releases from Cogswell Dam have caused damaged fish habitat in West Fork San Gabriel on multiple occasions (DFG 1971b; DFG 1983; DFG 1988b; DFG 1992). Approximately eight miles of aquatic habitat downstream of Cogswell Dam were destroyed following desilting in 1981 (DFG 1983).

Fishermen report observing small wild trout in West Fork San Gabriel in the reach between the bridge near Bear Creek and Cogswell Dam (SoCalFish’N 2009).

### *North Fork San Gabriel River*

Staff from DFG surveyed North Fork San Gabriel River in the 1930s and noted in regards to past stocking efforts that rainbow trout fingerlings had done “exceptionally well” before the stream began to be so heavily fished, adding that “some” spawning grounds were present, “but fish never get old enough to spawn” (DFG ca 1934a).

The North Fork San Gabriel River has been stocked with rainbow trout by DFG and contains numerous fishing pools.

### *Soldier Creek*

Staff from DFG surveyed Soldier Creek in 1952 and noted “abundant” pools and shelter and “excellent” shade created by “numerous falls” in the lower, middle, and upper surveyed reaches (DFG 1952c).

A DFG letter from 1964 notes “many small rainbow trout” in Soldier Creek downstream from the falls and indicates that the population is natural producing, but discourages stocking of rainbow trout above the falls due to “limited amount of water available” upstream of the falls (DFG 1964).

### *Bear Creek*

Staff from DFG surveyed Bear Creek in 1948 and noted “good” pools and shelter and “common” rainbow trout 3 to 4 inches in length throughout the length of the stream. “Good” spawning areas were observed from the West Fork confluence to the headwaters. The survey sheet notes “Bear Creek is one of the best trout streams of the district...” (DFG 1948a).

An angler reports observing both “wild” and stocked rainbow trout of multiple year classes in Bear Creek in 2005-2006 (S. Lightner pers. comm.).

### *West Fork Bear Creek*

Staff from DFG surveyed West Fork Bear Creek in 1948 and observed “good pools and shelter” and “abundant” natural reproduction of rainbow trout. The survey sheet notes the present of numerous “impassible falls” in the lower section of the stream, but also notes that rainbow trout were naturally reproducing upstream from the falls (DFG 1948b).

### *Chileno Canyon Creek*

Staff from DFG surveyed Chileno Canyon Creek in 1947 from the mouth to a barrier falls located one mile from the mouth (DFG 1947c). Field notes indicate that at the time of the 1947 survey there was no flow from the mouth to 0.25 miles upstream, but this section contained “many standing pools” with “abundant” fingerlings. Rainbow trout from 2 to 6 inches in length were observed from 0.25 miles upstream from the mouth to the barrier falls, and this section was noted to contain “nice bedrock pools” (DFG 1952d).

### *Devils Canyon Creek*

Field notes from DFG for surveys conducted in Devils Canyon Creek in 1947 note that the stream was dry from the mouth to about stream mile 2.0 in September of 1947. From approximately stream mile 2 to the bottom of the Chilao trail, the stream was noted to be intermittent with “good pools” expected to hold over through the summer that contained rainbow trout 2 to 7 inches in length (DFG 1947d). An impassible falls was noted to be located approximately 3 miles upstream from the base of the Chilao trail.

### *Cattle Canyon Creek*

Staff from DFG surveyed Cattle Canyon Creek in 1933 throughout its length and noted constant flow and no obstructions, but scarce spawning grounds. The survey sheet notes “Several years ago a cloudburst cleared out this canyon destroying all pools and hiding places for trout. The stream is improving some but is small and accessible so is fished out easily early in season” (DFG 1933).

An angler reports observing “native” and stocked rainbow trout in Cattle Canyon Creek since the 1990’s (D. Kunitomi pers. comm.).

### *Coldwater Canyon Creek*

Staff from DFG surveyed Coldwater Canyon Creek in 1981 in the vicinity of Thompson Ranch and rainbow trout were the only fish observed. Fingerlings and larger rainbow trout were present. Notes describing the sampled reach state, “Many small pools with much more sand and gravel present than area further upstream where much of substrate cemented together” (DFG 1981).

An angler notes that Coldwater Canyon Creek “has never shown any appreciable flow” (D. Kunitomi pers. comm.).

*Devil Gulch Creek*

Staff from DFG surveyed Devil Gulch Creek in the 1930's and noted the presence of rainbow trout and "some spawning grounds" in the upper creek. Natural propagation is characterized as "light." The survey sheet indicates the presence of a 30 foot falls 100 yards from the mouth (DFG ca 1934b).

Field notes from DFG staff indicate the presence of rainbow trout fingerlings in the lower 100 yards of Devil Gulch Creek in 1948 (DFG 1954).

*Iron Fork San Gabriel River*

In 1951 staff from DFG surveyed Iron Fork San Gabriel River from the mouth to approximately 1.5 miles upstream and observed rainbow trout between 4 to 12 inches in length. The survey report notes "good" stream conditions, including "deep bedrock pools" and "adequate spawning grounds, and describes the stream as "a good producer" of rainbow trout (DFG 1951b).

An angler reports observing multiple year classes of rainbow trout ("wild" and stocked) in Iron Fork San Gabriel River between 2004 and 2007 (J. Nosek pers. comm.).

*Fish Fork San Gabriel River*

In 1951 staff from DFG surveyed Fish Fork San Gabriel River from the mouth to approximately 1.5 miles upstream and observed good quality pool habitat, "common" spawning areas, and "many... naturally propagated" 2 to 3 inch rainbow trout (DFG 1951c).

An angler reports observing multiple year classes of rainbow trout (believed to be "wild") in Fish Fork San Gabriel River between 2005 and 2007 (J. Nosek pers. comm.).

*Prairie Fork San Gabriel River*

Staff from DFG surveyed the length of Prairie Fork San Gabriel River in 1951 and observed rainbow trout 3 to 4 inches in length. The stream bed type was described as "rubble, lime encrusted" and spawning areas and extent of natural propagation were described as "poor" (DFG 1951d).

An angler reports observing multiple year classes of rainbow trout (believed to be "wild") in Iron Fork San Gabriel River between 2000 and 2004 (J. Nosek pers. comm.).

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## Orange County

### Santa Ana River

#### *Santa Ana River*

In the 1930s staff from DFG surveyed an 18 mile reach of the upper Santa Ana River within the San Bernardino National Forest. The survey sheet noted “excellent” success from stocking of rainbow trout, with “common” spawning grounds in the upper 12 miles of the surveyed reach, between the elevations of 4,500 and 6,500 feet, and “very good” natural propagation. The section of stream within the lower six miles of the Santa Ana Canyon was deemed to be “of no value for fish cultural purposes” (DFG ca 1934a).

Staff from DFG conducted sampling in two reaches of Santa Ana River upstream of the hydroelectric dam near the Bear Creek confluence in 1987. Three “apparently wild” *O. mykiss* ranging from 125 to 174 mm FL were observed near Bear Creek, and two adult *O. mykiss* of hatchery origin were observed in the vicinity of Seven Oaks, an area noted to be “heavily stocked” (DFG 1990).

As a condition of the new 30-year hydroelectric license issued by FERC in 2003 to the Southern California Edison Company (SCE) for operation of the Santa Ana Project, SCE is required to maintain prescribed minimum flows and mean daily water temperature of 20° C in the Santa Ana River mainstem in the 3.4 mile bypassed reach downstream of the dam at the Bear Creek confluence (SAR 1) in order to support a coldwater fishery (FERC 2003a).

The relicensing agreement required that annual fish monitoring be conducted for three years in this reach following the first year the minimum stream flow requirements were in effect. The subsequent annual sampling, conducted between 2005 and 2007, found evidence of natural reproduction of *O. mykiss* at both sampling sites in the bypassed reach, which was observed to support four age classes of rainbow trout, including a “strong YOY cohort” (PBS&J 2008).

#### *Santiago Creek*

A DFG stream inventory sheet from the 1970s notes the presence of rainbow trout in Santiago Creek between the headwaters and Santiago Reservoir (Irvine Lake) and between the Santiago Dam and Villa Park Dam (DFG ca 1973).

Irvine Lake, formed by Santiago Dam, is stocked with trout and is currently operated for recreational fishing.

#### *Silverado Creek*

Fisheries information for Silverado Creek was not available.

#### *Harding Canyon Creek*

A remnant population of *O. mykiss* in Harding Canyon Creek was apparently extirpated following a severe mudslide in December of 2007 (Brennan 2007).

### *Chino Creek*

Fisheries information for Chino Creek was not available.

### *Cucamonga Creek*

In 1948 DFG staff surveyed a 6.75 mile reach of Cucamonga Creek within the San Bernardino National Forest between the elevations of 2,200 and 3,900 feet, downstream from the upper west fork headwaters. Rainbow trout fingerlings and adults were observed, and the survey sheet notes “good” natural propagation and “good pools and shelter” (DFG 1948a).

Fishermen note the presence of year round flows, except in dry years, and a reproducing population of rainbow trout [noted to be progeny of stocked fish] in Cucamonga Creek within the San Gabriel Mountains (SoCalFish’N 2009).

### *San Antonio Canyon Creek*

Fishermen characterize the section of San Antonio Creek within the Angeles National Forest upstream of the San Antonio Dam as “a very nice freestone creek” and “a major runoff area” with high numbers of rainbow trout. The site notes that DFG stocks the upper reaches of the creek (SoCalFish’N 2009).

An angler familiar with the streams of the Santa Ana River basin noted that *O. mykiss* individuals between 7 and 14 inches in length have been observed in San Antonio Creek in recent years (B. Yin pers. comm.).

### *Icehouse Canyon Creek*

A DFG memo from 1950 shows that one rainbow trout and 22 brown trout were captured in Icehouse Canyon Creek on the opening day of fishing for a creel survey (DFG 1950a).

Brown trout also have been observed recently in Icehouse Canyon Creek (SoCalFish’N 2009).

### *Temescal Wash*

Fisheries information for Temescal Wash was not found.

### *Coldwater Canyon Creek*

Staff from DFG surveyed Coldwater Canyon Creek in 1947 from the Temescal Wash confluence to the headwaters. The stream was dry downstream of a diversion at stream mile 3.0. Rainbow trout ranging from 2 to 7 inches were observed in the section of stream located between 100 yards above the diversion and the headwaters. The survey sheet notes “numerous small pools” and “fair to poor” natural propagation (DFG 1947a).

During 1950 inspection of Coldwater Canyon Creek DFG staff observed “numerous” rainbow trout ranging from 2 to 7 inches in all pool habitat. The survey report describes pools as “fair to good,” and notes, “natural reproduction appears excellent” (DFG 1950b).

Staff from USGS observed *O. mykiss* in Coldwater Canyon Creek in recent years (R. Fisher pers. comm.).

#### *Warm Creek*

Fisheries information for Warm Creek was not found.

#### *Lytle Creek*

An Environmental Assessment was prepared in 2002 for the Lytle Creek Hydroelectric Project as part of the FERC relicensing process. The assessment notes that “where flows are present above the diversion dam, the water quality is generally good enough to support aquatic resources in Lytle Creek” (FERC 2002, p. 81). Lytle Creek downstream from the diversion was noted typically to be dry during the summer and fall, while during winter and spring flows estimated at 1.5 cfs occur due to leakage at the diversion dam. Leakage flows in the Lytle Creek bypassed reach were noted to be visible between the diversion dam and the Korean Christian Camp 0.34 miles downstream. Streamflow was noted to disappear downstream of the Korean Christian Camp due to the permeable streambed in the vicinity of Turks basin, and reappear 1.2 miles downstream.

The Middle and North Forks of Lytle Creek are stocked with rainbow trout by DFG. As part of the Environmental Assessment, surveys were conducted between 1999 and 2000 in the Lytle Creek mainstem downstream of the diversion, in the mainstem and adjacent channels upstream of the diversion, and in the Middle Fork. A total of 558 rainbow trout were captured in Lytle Creek downstream of the diversion between the dam and the powerhouse, and a total of 50 rainbow trout were collected in the Middle Fork. In spring channels upstream of the diversion, 68 rainbow trout were captured (FERC 2002). The report notes problems with fish mortality due to entrainment at the diversion structure.

A new 30-year hydroelectric license issued by FERC in 2003 to the Southern California Edison Company for operation of the Lytle Creek Hydroelectric Project required environmental enhancement measures for maintaining the fishery. The conditions are summarized as follows:

“Continue to allow leakage flows from the dam into the bypass reach; monitor stream flows in the bypass reach; develop a stream channel modification plan and for ensuring that leakage flows are directed into the channel on the west side of the Lytle Creek bypass reach between the Korean Christian Camp bridge and Turk’s Point, and monitor its effectiveness; monitor water temperatures and conduct fish surveys in the bypass reach; install a fish screen at the intake” (FERC 2003b, p. 18).

#### *Cajon Wash*

Fisheries information for Cajon Wash was not found.

#### *Cable Creek*

A DFG stream survey sheet for Cable Creek from the 1930s notes the presence of rainbow trout. The survey sheet notes constant, rapid flow and characterizes natural propagation as “problematical,” adding that stocking success was “of doubtful value” (DFG ca 1934b).

### *City Creek*

A 1938 issue of the DFG journal includes City Creek in a list of streams with “consistently good” fishing (DFG 1938).

### *West Fork City Creek*

In 1948 DFG staff surveyed West Fork City Creek from the confluence to one mile upstream of the Forest Service road crossing and observed rainbow trout adults and fingerlings throughout the surveyed reach. The survey sheet noted “good” spawning areas and “fair” natural propagation (DFG 1948b).

### *Mill Creek*

An Environmental Assessment prepared in 2002 for the Mill Creek Hydroelectric Project notes that except during high-flow periods, the section of Mill Creek between the diversion dam and the Mountain Home Creek confluence is intermittent, and often without flow in dry years (FERC 2002). According to the assessment, “. . .most of Mill Creek is considered unsuitable for rainbow trout because of its high gradient, lack of riparian vegetation, and channel instability” (Leidy *et al.* 2001 cited in FERC 2002, p. 86). Rainbow trout are stocked in Mill Creek upstream of the diversion dam by DFG.

A new 30-year hydroelectric license issued by FERC in 2003 to the Southern California Edison Company for operation of the Mill Creek Hydroelectric Project did not include minimum flow requirements for the Mill Creek bypassed reach. Existing leakage of 1 to 2 cfs will be maintained to support “small populations of stocked rainbow trout. . . this flow is not intended to enhance the existing rainbow trout populations in the Mill Creek 3 bypassed reach” (FERC 2003c, p. 11).

### *Mountain Home Creek*

An Environmental Assessment prepared in 2002 for the Mill Creek Hydroelectric Project notes that sampling conducted in 1992 and 2000 in Mountain Home Creek indicated the presence of “a small self-sustaining population of rainbow trout” (Leidy *et al.* 2001 cited in FERC 2002, p. 86).

### *Falls Creek*

Staff from DFG surveyed Falls Creek from the mouth to the headwaters in 1948 and noted “good” quality spawning areas. A several hundred foot high falls in the lower 0.5 miles of creek was noted to create a barrier. Adult rainbow trout were observed in the two mile section above the falls. Natural propagation was characterized as “poor” (DFG 1948c).

### *Alder Creek*

Staff from DFG surveyed the entire length of Alder Creek in the 1930ss and observed “scarce” spawning grounds and “very light if any” natural propagation (DFG ca 1934c).

A diversion dam and intake structure on Alder Creek near the Hemlock Creek confluence contributes water to the Santa Ana River Hydroelectric Project. As a condition of the new 30-year hydroelectric license issued by FERC in 2003 to the Southern California Edison Company (SCE) for

operation of the Santa Ana Project, SCE was required to install a fish barrier at the Alder Creek diversion dam that would prevent non-native fish from migrating into Alder Creek in order to protect the existing population of native fish and stocked rainbow trout. In addition, the license required that a fish screen at the diversion be installed to prevent fish entrainment (FERC 2003a).

#### *Keller Creek*

Staff from DFG surveyed the entire length of Keller Creek in the 1930s and observed “scarce” spawning grounds and “very light if any” natural propagation. Keller Creek was noted to be intermittent in its lower section (DFG ca 1934d).

A diversion dam and intake structure on Keller Creek near the mouth contributes water to the Santa Ana River Hydroelectric Project. The 2003 license agreement notes that a rainbow and brown trout fishery exists on Keller Creek but adds that it is not characterized by DFG as “highly valued” (FERC 2003a).

#### *Bear Creek*

Bear Creek downstream from Big Bear Lake is a designated Wild Trout Stream and is not stocked. Fish population surveys were conducted in four sample reaches of Bear Creek between 1987 and 1990 and repeated in 1992. In all sampling years *O. mykiss* was observed in the two sample reaches within the lower section of the creek, located approximately 0.2 miles upstream of the confluence with Santa Ana River and above Slide Creek. Brown trout, but not *O. mykiss*, were observed in the two sample reaches in the upper section of the creek, located near the Glory Ridge Trail. Yearly sampling yielded *O. mykiss* population estimates ranging from 163 to 727 individuals per mile in riffle/run habitat and 132 to 328 individuals per mile of stream in pool habitat within the lower sample reaches. Multiple age classes were observed (Deinstadt 1992).

Fishermen note that rainbow trout are the dominant species of fish throughout Bear Creek (SoCalFish’N 2009).

#### *Siberia Creek*

Staff from DFG surveyed the entire length of Siberia Creek in the 1930s and observed “small falls and frequent good pools” between the mouth and one mile downstream from the meadow at its head, noted to be ditched to contribute flow to Siberia Creek. Siberia Creek was noted to be stocked with rainbow trout, with most fishing taking place in the lower reaches. Natural propagation was described as “very slight.” The survey staff determined that Siberia Creek’s “...principal fishing value is as a feeder stream for Bear Creek” (DFG ca 1934e).

#### *Grout Creek*

In 1947 DFG staff surveyed Grout Creek from Big Bear Lake to the headwater forks as well as sections of the East, North, and West forks. At the time of the survey, the Grout Creek mainstem was dry at the mouth and a highway culvert was identified as an upstream barrier except “during good water flow.” No fish and few pools were observed in the East Fork, and rainbow trout were observed in pools in the North Fork and at the mouth of the West Fork. The survey sheet notes “This stream is important only as a spawning stream for Big Bear Lake rainbow trout. However, in late summer it often goes dry causing loss of all spawn” (DFG 1947b).

### *Deer Creek*

A DFG survey sheet from the 1930s indicates that Deer Creek was stocked and heavily fished. The survey sheet notes the presence of pool habitat in the lower section of stream and “some spawning beds” in the middle section, adding that the Deer Creek was “not suitable for stocking in dry seasons” (DFG ca 1934f).

### *Forsee Creek*

In 1934 DFG staff surveyed Forsee Creek between the elevations of 4,500 and 7,000 feet and observed rainbow trout but no evidence of rainbow trout natural production, noting a lack of spawning grounds (DFG 1934). The survey sheet notes “the principal value of this stream is as a feeder for the Santa Anna [sic]. This year—1934—the stream will get very low” (DFG 1934).

### *Barton Creek*

Staff from DFG surveyed Barton Creek in the 1930s between the elevations of 4,500 and 6,000 feet and observed rainbow trout. Some natural reproduction and “few” spawning beds were observed. The survey sheet notes good flow and temperature in the middle section of the stream (DFG ca 1934g).

### *South Fork Santa Ana Creek*

Sampling by DFG staff in 1987 indicated that South Fork Santa Ana Creek did not support rainbow trout due to diversion of water from the creek into Jenks Lake (DFG 1990).

## **Aliso Creek**

### *Aliso Creek*

An angler observed six pairs of spawning steelhead in lower Aliso Creek in 1993 (F. Selby pers. comm.).

## **San Juan Creek**

### *San Juan Creek*

In 1940 staff from DFG observed three pairs of spawning steelhead in San Juan Creek in a 1 km section of stream, approximately 24 km upstream from the mouth (Knight 1998).

A Steelhead Recovery Plan was prepared in 2007 for the San Juan Creek watershed. Surveys were conducted during the spring and fall of 2006 in approximately 2,500 foot reaches in lower, middle, and upper San Juan Creek. Sampling in the lower reach began at the La Novia Bridge crossing in the City of San Juan Capistrano, sampling in the middle reach began at a bridge crossing approximately 0.75 miles south of the fire station, and sampling in the upper reach was conducted in the vicinity of lower San Juan campground in Caspers Park (CDM 2007). The plan states “The upper portions of the watershed are relatively healthy and will be vital to steelhead recovery efforts... If accessible, the upper watershed has suitable rearing/spawning habitat and adequate flow, although not year round,

to support steelhead migration. Despite the lack of flow in the upper reaches during the dry season, wetted pools remain in tact and can act as holding ponds until the onset of the wet season” (CDM 2007, p. 4-26).

A DFG memo dated March, 2007 states that an adult salmonid measuring between 18 and 24 inches in length observed approximately 300 feet upstream of the Pacific Coast Highway Bridge in San Juan Creek was most likely a steelhead trout based on examination of photographs by DFG and NMFS biologists (DFG 2007).

#### *Arroyo Trabuco (Trabuco Creek)*

A DFG memo dated November 2003 states that on several occasions in May and June of 2003 DFG staff observed several adult trout measuring over 10 inches in length on at the outlet of the culvert and grade control structure under the I-5 freeway crossing on Arroyo Trabuco. After examination of photographs, DFG biologists identified the trout as steelhead (DFG 2003).

Trabuco Creek is stocked with rainbow trout just upstream of O'Neill Regional Park by DFG. Surveys were conducted during the spring and fall of 2006 in approximately 2,500 foot reaches in lower, middle, and upper Trabuco Creek. Sampling in the lower reach began at the Metrolink Railroad crossing in the City of San Juan Capistrano, sampling in the middle reach was conducted within O'Neill Regional Park and started at the Oso Road Bridge crossing, and sampling in the upper reach was conducted in the vicinity of the Holy Jim Canyon campground. *Oncorhynchus mykiss* was found to be “relatively abundant” in the upper stream reach, though it was not observed on the lower reaches surveyed. The report indicates that funding was obtained or planning is in progress to modify two major barriers on Arroyo Trabuco Creek, including the Metrolink Drop Structure and the I-5/Camino Capistrano concrete channel and drop structure (CDM 2007).

#### *Falls Creek*

Field notes from surveys conducted between 1947 and 1950 in Falls Creek by DFG staff note the presence of “abundant” fingerlings downstream from the falls located 0.5 miles from the mouth (DFG 1950c).

#### *Holy Jim Canyon Creek*

During a 1951 creel census, anglers captured wild and hatchery trout [species not specified] in Holy Jim Creek (DFG 1951).

#### *Hot Spring Creek*

According to a historical review of steelhead resources “Rainbow trout were present in Hot Springs Canyon Creek during a 1946 CDFG survey, and rainbow trout stocking records dated back to 1943” (Titus *et al.* unpublished).

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## San Diego County

### San Mateo Creek

#### *San Mateo Creek*

In 1939, the San Mateo Creek lagoon was said to be seven acres in area. According to a survey report, "The live water area for this year seems to be that part of the stream for eight miles above the first 12, the lagoon and one tributary, Blue Water canyon" (DFG 1939). The report notes, "The total available spawning area of the stream and its tributaries is about 25 miles or more."

Field notes on San Mateo Creek were compiled from DFG surveys conducted between 1947 and 1952. A note from a 1947 survey states, "I presume this entire headwaters area is of little or no importance as a trout stream due to low water and high water temperatures, in the summer season" (DFG 1952). Additional notes state, "The stream holds out thru the summer better than most of the others."

Field notes taken in 1950 (a dry year) provide the most accurate description of over-summering habitat in the San Mateo Creek mainstem. Rearing habitat was observed between the Devil Canyon Creek confluence and a point about 0.5 miles downstream from the La Cienega Road crossing, a distance of about 6.75 miles (DFG 1952).

A small *O. mykiss* population was discovered in San Mateo Creek in the spring of 1999, the first such observation in over 50 years. Subsequent surveys conducted by DFG biologists confirmed the presence of over-summering *O. mykiss* in the creek, with a distribution extending in the mainstem from near the upper gauging station upstream to approximately 4 km upstream of the Devil Canyon Creek confluence, and in Devil Canyon Creek (DFG 2000, p. 7). The report states "Overall, the best habitat in San Mateo Creek is in the reach upstream of the [Camp Pendleton] Base in the Cleveland National Forest."

The NMFS July, 2009 draft Southern California Steelhead recovery plan notes that 76 percent of San Mateo Creek's historical estuarine habitat remains.

#### *Devil Canyon Creek*

DFG staff conducted multiple stream surveys along the entire length of Devil Canyon Creek between 1999 and 2003. In May and July 2000, a total of 22 *O. mykiss* ranging in total length from 60 to 81 mm were observed in Devil Canyon Creek between the San Mateo Creek and 1.2 km upstream; regular observations of juvenile *O. mykiss* in this reach occurred through September 2000. In August 2001, several adult *O. mykiss* were observed in pools located approximately 0.8 and 1.6 km upstream from the San Mateo Creek confluence; regular observations of adults in this reach occurred through December 2003 (DFG 2004, p. 143). The survey report states, "The discovery of juvenile trout in the lower reaches of [Devils Canyon Creek]...illustrated that even with infrequent and intermittent steelhead trout migration into the drainage, successful resident...reproduction could result. These observations also confirmed that adequate resident spawning habitat does exist...This tributary is completely free of exotic fish species and holds promising trout habitat

...Additionally temperature stratified pools, deep enough and cold enough to support trout year-round are readily available in the drainage" (DFG 2004, p. 146).

#### *Blue Water Canyon Creek*

A 1939 stream survey report noted "live water" (assumed to be over-summering habitat) in Blue Water Canyon Creek (DFG 1939).

### **San Onofre Creek**

#### *San Onofre Creek*

Juvenile steelhead were observed in the San Onofre Creek lagoon in June 1950 (DFG 1979).

A 1998 USFWS study states, "The best steelhead habitat on [Camp Pendleton] occurs within the upper San Onofre Creek drainage" (USFWS 1998). Near the entrance of San Onofre Canyon, surveyors noted surface flow, multiple bedrock pools, and relatively high levels of riparian vegetation and canopy cover (USFWS 1998). "The mainstem SOC may have been a migratory corridor to habitat located on the Middle Fork SOC"

According to a naturalist and long-time resident, suitable habitat is available in the upper reaches of San Onofre Creek (A. Greenwood pers. comm.)

### **Santa Margarita River**

#### *Santa Margarita River*

The lagoon varies from about 3-6 km in length (Warburton 2000). The lagoon and wetlands are in relatively natural condition, although a long southern extension has been obliterated.

"A constant flow is present in the section opposite Fallbrook but summer temperatures and shifting sand make is unsuitable for trout" (DFG 1947).

Steelhead habitat for rearing is present in the main river from about the DeLuz Ford [about 0.5 km upstream of the mouth of De Luz Creek in the river] to the top of the gorge, about 32 km (Warburton 2000).

#### *DeLuz Creek*

"Steelhead habitat for rearing is present...in upper DeLuz Creek from about the DeLuz School upstream to the upper limit of accessible flow, about 11-12 km" (Warburton 2000). Spawning habitat has been obliterated.

#### *Roblar Creek*

A 1998 USFWS study states, "Roblar Creek possesses spawning but limited rearing habitat" (USFWS 1998). "Spawning can occur in Roblar Creek, but rearing is possible only during wet years."

### *Fern Creek*

Regarding habitat in Fern Creek DFG stated, "It is useless to stock this creek. Water is too warm, with very few pools" (DFG 1932).

### *Sandia Canyon Creek*

Steelhead habitat for rearing is present in Sandia Creek in its lower 4-5 km. Spawning habitat is absent (Warburton 2000).

### *Rainbow Creek*

Steelhead habitat for rearing is present at Rainbow Creek in its lower 5 km. Spawning habitat is absent (Warburton 2000).

### *Stone Creek*

Steelhead habitat for rearing is present in Stone Creek in its lower 2 km. Spawning habitat is absent (Warburton 2000).

### *Temecula Creek*

"The main Temecula Creek down to the top of the gorge was probably a major rearing and spawning area for steelhead before 1900" (Warburton 2000).

### *Arroyo Seco*

According to a 2000 study, Arroyo Seco is too dry to support steelhead rearing or has natural barriers to access (Warburton 2000).

### *Cottonwood Creek*

According to a 2000 study, Cottonwood Creek is too dry to support steelhead rearing or has natural barriers to access (Warburton 2000).

## **San Luis Rey River**

### *San Luis Rey River*

The San Luis Rey River system has 11 miles of Trout Water, according to 1947 DFG memo (DFG 1947).

A 2010 watershed assessment for the San Luis Rey River watershed notes that resident *O. mykiss* occur upstream of barriers in the Pauma Creek sub-basin (Kajtaniak and Downie 2010).

### *Gomez Creek*

A 2010 watershed assessment for the San Luis Rey River watershed notes that consulting biologists observed two *O. mykiss* in Gomez Creek in September 2005. The report notes that approximately 400 feet of Gomez Creek were surveyed in 2008 and states, "A greater amount of Gomez Creek

needs to be surveyed to determine overall habitat suitability, but it appears that it could support a small trout population” (Kajtaniak and Downie 2010, p. 17).

#### *Pala Creek*

A 2010 watershed assessment report for the San Luis Rey River watershed notes that Pala Creek contains sections of perennial surface flow that may be sufficient to support *O. mykiss*. The report includes Pala Creek in a list of San Luis Rey River tributaries “whose current habitat status is relatively unknown, but anecdotal records describe them as containing steelhead/rainbow trout habitat that was formerly utilized by these fish” (Kajtaniak and Downie 2010, p. 31).

#### *Agua Tibia Creek*

A 2010 watershed assessment report for the San Luis Rey River watershed includes Agua Tibia Creek in a list of San Luis Rey River tributaries “whose current habitat status is relatively unknown, but anecdotal records describe them as containing steelhead/rainbow trout habitat that was formerly utilized by these fish” (Kajtaniak and Downie 2010, p. 31).

#### *Frey Creek*

A 2010 watershed assessment report for the San Luis Rey River watershed includes Frey Creek in a list of San Luis Rey River tributaries “whose current habitat status is relatively unknown, but anecdotal records describe them as containing steelhead/rainbow trout habitat that was formerly utilized by these fish” (Kajtaniak and Downie 2010, p. 31).

#### *Pauma Creek*

Pauma Creek has seven miles of Trout Water according to 1947 DFG memo (DFG 1947).

Staff from DFG surveyed Pauma Creek in May of 2008 from DFG staff surveyed Pauma Creek from upstream of the Cleveland National Forest Service boundary to the confluence of French and Doane creeks. “Numerous rainbow trout of all age classes” were observed near the confluence of French and Doane creeks (DFG 2008). The Highway 76 Bridge crossing was noted to create a total passage barrier.

#### *French Creek*

A 2010 assessment report for the San Luis Rey River watershed notes that French Creek contains approximately 1.5 miles of perennial flow (Kajtaniak and Downie 2010). The report notes that staff from DFG surveyed approximately 0.26 miles of French Creek in 2008 and observed *O. mykiss*.

#### *Doane Creek*

A 2010 watershed assessment report for the San Luis Rey River watershed notes that staff from DFG observed “abundant numbers” of *O. mykiss* in the upper reaches of French Creek in 2007 (Kajtaniak and Downie 2010).

*West Fork San Luis Rey River*

In July 1997, fish sampling conducted in West Fork San Luis Rey River in a 208 foot reach located approximately three miles upstream of the County Prison Camp yielded 57 *O. mykiss* ranging in total length from 133 to 221 mm. Spot shocking confirmed the presence of YOY *O. mykiss* (Unknown 1997).

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## Personal Communications

Greenwood, A. E-mail communications in April and October 2008.