Historical Distribution and Current Status of Steelhead/Rainbow Trout *(Oncorhynchus mykiss)* in Streams of the San Francisco Estuary, California

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SANTA CLARA COUNTY

Coyote Creek Watershed

Coyote Creek originates on the slopes of Mount Sizer near Henry Coe State Park and flows generally south and west to the Santa Clara Valley. Near the site of Coyote Reservoir, the creek turns to flow north to enter the southern San Francisco Estuary near Dixon Landing Road. The main stem consists of approximately 42 miles of stream channel, and the creek has approximately ten primary tributaries. The watershed area is about 354 square miles.

Coyote Creek

Snyder documented the occurrence of *Salmo irideus* (*O. mykiss*) from collections likely made in 1898 from two locations in lower Coyote Creek (Snyder 1905). He described *O. mykiss* near the mouth and near the city of San Jose, indicating that the lower creek historically contained suitable habitat. A museum *O. mykiss* specimen from an unknown Coyote Creek location was collected by Synder in 1898, and is designated "Santa Clara Co., Cal." (Snyder 1898).

Oncorhynchus mykiss was collected from upper Coyote Creek in the canyon east of the Town of Madrone (located within present day Morgan Hill) in 1936 (Fry 1936). In 1936, drawdown of Coyote Reservoir caused fill kills (including *O. mykiss*) both upstream and downstream of the dam (Shapovalov 1937). Fish downstream of the dam are likely to have been of wild origin, while upstream fish may have been stocked brown trout or landlocked wild *O. mykiss*.

A DFG stocking record from June 1938 documents the planting of more than 1,000 steelhead rescued from Uvas Creek in the adjacent Pajaro River watershed into Coyote Reservoir (CDFG 1938b). Brown trout also were planted in the reservoir during June-July 1938. Sixteen steelhead ranging in size from 343-445 mm FL were found dead at the outlet of Coyote Reservoir when it was drained in January 1939 (Shapovalov 1938-1942). The following summer (July 1940) trout as large as 330 mm were caught in the reservoir. These fish presumably originated from the upper Coyote Creek watershed and migrated downstream to the reservoir during winter flows (Shapovalov 1938-1942). Scale analysis of four *O. mykiss* (200-345 mm) taken in Coyote Reservoir in May 1941 indicated that researchers were not able to distinguish between wild and hatchery fish (Shapovalov 1938-1942).

An additional 1,500 rescued *O. mykiss* were planted in Coyote Reservoir in the summer of 1942 (Shapovalov 1938-1942). An August 1945 seine survey produced *O. mykiss* off Highway 101, 1.5 miles north of the town of Coyote at a concrete dam (1: "one-third grown") and also at the junction of Malaguira Road and Cochran Road, between Madrone and Morgan Hill (1: "half grown") (Simpson and Simpson 1945). In 1946, DFG stated that a run of steelhead entered Coyote Creek and that the natural propagation in the system was adequate to fill the reduced carrying capacity of the stream due to water diversions and pollution (Shapovalov 1946a).

A 1953 DFG field note reported a healthy trout fishery in upper Coyote Creek upstream of Anderson and Coyote Reservoirs (Pintler 1953). Seven stations along Coyote Creek were sampled by DFG in July 1953. Two fingerling *O. mykiss* were collected downstream of the junction of Gilroy Hot Springs and Canada roads (Merkel 1953).

In January 1962, DFG searched Coyote Creek for dead fish between Coyote and Anderson Reservoir after rotenone use in Coyote Reservoir. No fish of any kind were found (Hinton 1962c). A March 1965 DFG survey of the 8.2-mile reach upstream from Coyote Reservoir noted two *O. mykiss* (125-150 mm). The resulting survey report stated that the stream section had little or no fisheries importance (Brackett 1965). The report also noted on-going stocking in Coyote Reservoir.

In a 1962 report, Skinner indicated that Coyote Creek, from its mouth to the headwaters in Henry Coe State Park, was an historical migration route and habitat for steelhead (Skinner 1962). At that time, the creek was said to be "lightly used" as steelhead habitat (Skinner 1962).

Sampling by seine and electrofishing was performed between 1972 and 1977 at 14 Coyote Creek sites, with *O. mykiss* collected at one location on the middle fork in Coe State Park (Scoppettone and Smith 1977). The resulting report ranked relative abundance at "2" on a 1-5 scale (Scoppettone and Smith 1977).

The Department of Fish and Game electrofished four Coyote Creek stations between the seasonal diversion dam near the mouth and Anderson Reservoir in June 1973. *Oncorhynchus mykiss* (1: 201 mm FL) was found only at the station immediately downstream from Anderson Reservoir (Aceituno et al. 1976).

One *O. mykiss* was recorded in a creel census in Anderson Reservoir in March 1974 (Anderson 1974). The Department of Fish and Game speculated that Anderson Reservoir *O. mykiss* were probably emigrants from upstream Coyote Reservoir where DFG had conducted trout-stocking (Anderson 1976).

A study of Upper Coyote Creek and numerous headwater tributaries within Henry Coe State Park identified *O. mykiss* in June and July 1974. A total of seven individuals were sampled between 185 and 275 mm FL, with four trout found dead (Guzzetta 1974).

In September 1975, DFG electrofished seven Coyote Creek stations between Highway 237 and Hellyer Park at the Highway 101 bridge. No *O. mykiss* were collected in the sampling (Curtis and Scoppettone 1977). A subsequent stream survey report noted that Coyote Creek historically was a steelhead stream but apparently no longer supported a viable steelhead resource due to flow regulation, habitat alteration, and pollution (Curtis and Scoppettone 1977). However, the report noted that the upper reaches of Coyote Creek were known to support populations of rainbow trout. A May 1976 DFG memorandum included *O. mykiss* in an ichthyofaunal list for Anderson Reservoir, but noted the species' likely source as emigrants from upstream Coyote Reservoir where DFG conducted a trout stocking (Anderson 1976).

In March 1978, *O. mykiss* were found dead downstream from the Coyote Canal Diversion Dam when all flow was shunted into the associated canal (Meltzer 1978). The Department of Fish and Game reported that releases from Anderson Reservoir (1.2 miles upstream from the diversion dam) into the natural stream channel normally provided approximately five miles of live stream in which some trout were present (Anderson 1978).

Oncorhynchus mykiss were found in a creel census of Coyote Reservoir in July 1980 (Eimoto and Berthelsen 1983). These fish were likely from DFG stocking activities.

The Santa Clara Valley Water District sponsored a study to sample numerous Coyote Creek locations in 1987 and the results are summarized in Table V-1. The report describing this sampling effort noted that lower Coyote Creek is the only portion of the watershed with sufficient flows for steelhead and salmon access and spawning (HSA 1988). The report stated that a small steelhead run apparently still existed in Coyote Creek, but cited regulated stream flows and barriers as restricting salmon and steelhead utilization upstream of Senter Road (HSA 1988).

Table V-1. Santa Clara Valley Water District *O. mykiss* collections in Coyote Creek, 1987

	Method	**Number**	**Size (mm SL)**
May			
Upstream of Dixon Landing Rd.	Gill net	3 "smolts"	153, 191, 207
Tidal area u/s of flashboard dam	Gill net	1 "partial smolt"	134
August			
U/s of Dixon Landing Rd.	Gill net	1	193
Tidal area u/s of flashboard dam	Gill net	3	175, 200, 245
October			
Tidal area u/s of flashboard dam	Gill net	1	395
300 m reach u/s of Old Oakland Rd.	Electrofish	1	178
		1 Age 2-3+	286
		YOY	unmeasured

(Source: HSA 1988)

The Metcalf Percolation Pond and percolation ponds upstream from Ford Road on Coyote Creek were sampled in August 1990. Four *O. mykiss* were collected at each location (Elsey 1990). The Santa Clara Valley Water District sponsored a study to sample Coyote Creek between November 1990 and September 1991 to study the impact on *O. tshawytscha* and *O. mykiss* of summer spreader dams used for groundwater percolation. No adult salmonids were found during the surveys, although one steelhead redd was found in Coyote Creek near the Upper Penitencia Creek confluence (HRG 1992). Electrofishing in the vicinity of the redd in April and May 1991 did not find juvenile *O. mykiss*.

Leidy electrofished six locations on lower Coyote Creek in August and September 1993, from Kelly Park, upstream from the Interstate 280 crossing, to Anderson Dam. Immediately downstream from Anderson Dam he found a single *O. mykiss* (275 mm FL) (Leidy 2002). Leidy also electrofished a location on upper Coyote Creek just upstream from the entrance to Henry Coe State Park, but found no *O. mykiss* (Leidy 2002).

Additional monitoring conducted as part of the SCVWD spreader dam studies was summarized in 1994. No *O. mykiss* were directly observed during the winter migration season of 1992-1993 (HRG 1994). Gillnetting in Metcalf Pond in Coyote Creek captured a few *O. mykiss* (two to five individuals) (HRG 1994). The report identified three fish ladders at Ford Road Dam as seasonal passage barriers and Metcalf Radial Dam as impassable under all flow conditions. In a summary of five years of sampling, SCVWD noted that electrofishing, gill net and seine sampling associated with the monitoring found a few (2-5) *O. mykiss* of suspected hatchery origin in Metcalf Pond in 1993 as well as a few *O. mykiss* in two ponds upstream of Ford Road in 1990 (HRG 1995).

In March 1994, Leidy electrofished two locations on lower Coyote Creek, one upstream of South Coyote and one downstream of Coyote, and found no *O. mykiss* (Leidy 2002). He electrofished four sites on lower Coyote Creek between the Montague Expressway and South Coyote in July 1995, finding no *O. mykiss* (Leidy 2002). Leidy also found no *O. mykiss* when he electrofished three sites on mainstem upper Coyote Creek in August 1995 between the Gilroy Hot Springs Road crossing and the point where the park road leaves the creek towards Coit Camp (approximately 2.5 miles upstream) (Leidy 2002).

The Santa Clara Valley Water District sponsored a study to sample lower Coyote Creek in October 1995 in association with operation of Standish Dam (that includes a fish ladder). No salmonids were captured during the sampling (Jones & Stokes Associates Inc. 1996). The Santa Clara Valley Water District conducted fyke-net surveys in lower Coyote Creek between April 1997 and June 1998. In May 1997, 14 juvenile and 51 YOY *O. mykiss* were found.

Fyke net sampling of lower Coyote Creek was conducted in May 1998 as part of a stormwater environmental indicators demonstration project. Five juvenile *O. mykiss* were collected (Eisenberg 1999).

A 1998 paper by Smith described the use of western Mt. Hamilton streams, including Coyote Creek. He found that steelhead were extremely rare in this system, with habitat on mainstem Coyote Creek largely restricted to the area from Anderson Reservoir downstream to a series of instream percolation ponds (Smith 1998). According to Smith, operation of these ponds can "restrict or block out migration downstream . . . during April and May of all but the wettest years" (Smith 1998, p. 8).

From 1998 to 2000, SCVWD monitored both upstream and downstream migrating salmonids to determine if Standish Dam was either an impediment to passage, or detrimental to spawning and rearing habitat. Downstream traps were set during the 2-2.5 month period spanning dam installation (in May) and upstream traps were set during the 2-2.5 month period spanning dam removal (in October). A total of 15, 159, and 253 out-migrating steelhead smolts were captured in 1998, 1999 and 2000, respectively, along with two steelhead kelts (out-migrating adults) in 1999 (Roessler et al. 2001). In 1999 and 2000, zero and two steelhead adults were captured, respectively (Roessler et al. 2001).

The SCVWD migration study determined that Standish Dam posed a seasonal barrier for migrating fish and may harm smolts adapting to salt water by impounding fresh water (Roessler et al. 2001). Based on these results, Standish Dam has not been installed since 2000 (Roessler et al. 2001).

As part of an environmental indicators testing project, the Santa Clara Valley Urban Runoff Pollution Prevent Program sampled 14 Coyote Creek stations in May-June, late June, and September-October 1999. According to the summary report, *O. mykiss* were collected throughout the length the creek (Demgen and Dorsey 1999). Five locations downstream from Metcalf Dam produced a total of 11 *O. mykiss* in approximately 1,500 meters of area sampled in the three events, while a single site between Metcalf and Anderson Reservoir produced four individuals in approximately 300 meters of collectively sampled stream length. Upstream of Anderson Reservoir, 31 *O. mykiss* were collected in three sampling events at three sites representing approximately 900 meters of reach sampled (Demgen and Dorsey 1999). Sampling in late June and September-October recorded 19 *O. mykiss* (47-250 mm FL) and four *O. mykiss* (175-253 mm FL), respectively (Demgen and Dorsey 1999).

In 1999, a fish ladder was installed on Metcalf Dam. No monitoring of passage has occurred since construction, but in 2000, *O. mykiss* were observed between Metcalf Dam and Anderson Dam (J. Abel pers. comm.). Leidy electrofished a single site immediately upstream of Enterprise-Concourse Drive in July 2000. No *O. mykiss* were found (Leidy 2002).

Lower Penitencia Creek

Lower Penitencia Creek consists of approximately four miles of channel draining approximately 27 square miles. It has one direct tributary, Berryessa Creek.

A June 1975 DFG stream survey reported that the headwaters of Lower Penitencia Creek had been filled for urban and agricultural use, and that the remaining channel had been altered and re-aligned for its entire length to serve as a storm runoff channel (Curtis and Scoppettone 1975a). No salmonids were noted during the survey and the summary report stated that the reach upstream from tidal influence had no fishery value (Curtis and Scoppettone 1975a).

Berryessa Creek

Berryessa Creek consists of approximately ten miles of channel tributary to Lower Penitencia Creek. It drains an area of approximately 22 square miles. Tributaries include Calera Creek and Arroyo de los Coches.

In June 1975, DFG visually surveyed 7.8 miles of Berryessa Creek from near its headwaters to its mouth. The survey report stated that the portion of the creek serving the trout fishery was limited to the lower-most, tidal 200-300 feet (Curtis and Scoppettone 1975c). The Department of Fish and Game noted that on the valley floor, Berryessa Creek is almost entirely channelized including several drop structures (Curtis and Scoppettone 1975c).

Dipnet sampling was conducted in August 1981 at North Main Street as part of a fish distribution study. No *O. mykiss* were collected (Leidy 1981-1984, 1984).

Calera Creek

Calera Creek is tributary to Berryessa Creek and drains an area of approximately three square miles. The creek contains approximately three miles of channel (SCBWMI 2001).

The Department of Fish and Game sampled two Arroyo Colero (Calera Creek) sites in July 1953 and did not encounter salmonids (Merkel 1953). In July 1975, DFG visually surveyed 2.7 miles of Calera Creek from near its headwaters to its mouth. The survey report found that the creek had no “direct” fishery functions and noted channelization of the valley floor reach (Scoppettone and Curtis 1975a).

Calera Creek was sampled as part of a fish distribution study at Jose Hueguera Park in August 1981. No salmonids were encountered (Leidy 1981-1984, 1984).

Arroyo de los Coches

Arroyo de los Coches is tributary to Berryessa Creek and drains an area of approximately four square miles. The creek consists of approximately 3.4 miles of channel (SCBWMI 2001).

In July 1975, DFG visually surveyed four sites on Arroyo de los Coches Creek between its headwaters and mouth. The survey report noted channelization of the creek for flood protection and land development in the valley floor. No fish were observed during the survey, and DFG concluded that the creek appeared to have no immediate fishery function (Curtis and Scoppettone 1975b).

Arroyo de los Coches was sampled by dipnet for a fish distribution study near the Interstate 680/Calaveras Road on-ramp in August 1981. No *O. mykiss* were collected (Leidy 1981-1984, 1984).

Upper Penitencia Creek (Alum Rock Creek)

Upper Penitencia Creek drains an area of approximately 24 square miles and includes approximately 11 miles of channel. It has one major tributary, Arroyo Aguague, and one major impoundment, Cherry Flat Reservoir (SCBWMI 2001).

In 1946, DFG noted a run of steelhead spawned in Penitencia Creek, and cited the presence of "impassable falls" (approximately 0.3 miles above confluence with Arroyo Aguague) upstream from which stocking was performed every third year (Shapovalov 1946a). The Department of Fish and Game sampled two Penitencia Creek sites in July 1953 and did not encounter salmonids (Merkel 1953). However, a 1954 DFG field note stated that a few wild trout were present in the stream (Evans 1954).

In a 1962 report, Skinner indicated Penitencia Creek as an historical migration route and habitat for steelhead (Skinner 1962). At that time, the creek was said to be "lightly used" as steelhead habitat (Skinner 1962).

In June 1975, DFG visually surveyed Upper Penitencia Creek between the Coyote Creek confluence and Cherry Flat Reservoir. One *O. mykiss* (178 mm) was noted approximately one mile downstream of the reservoir (Curtis and Scoppettone 1975l). Numerous *O. mykiss* fry were sighted at and downstream from the Arroyo Aguague confluence to the western boundary of Alum Rock Park (Curtis and Scoppettone 1975l). These fish were approximately 40 mm in length and occurred at a density of approximately 50-60 fish per 30 meters in some areas (Curtis and Scoppettone 1975l). Numerous migration barriers in the creek also were noted. The survey report concluded that channel alteration and sedimentation made the valley portion of the channel of little fishery function, but that the upper canyon reach was a unique fishery resource with ample spawning and rearing habitat for *O. mykiss* (Curtis and Scoppettone 1975a).

Two Upper Penitencia Creek sites were sampled by seining and electrofishing between 1972 and 1977. The survey report included a relative abundance estimate for *O. mykiss* of "1" at Alum Rock Park on a scale of 1-5, with "5" indicating highest abundance (Scoppettone and Smith 1977).

The Department of Fish and Game and the Soil Conservation Service conducted an electrofishing survey of Upper Penitencia Creek in June 1984. The study report found age 1+ and 2+ steelhead to be fairly abundant in the upper reach (*i.e.*, Alum Rock Park to Toyon) (Gray 1984).

The Department of Fish and Game summarized anadromous fish utilization of several Santa Clara County creeks in 1988 based on previous collections. Salmonids in Upper Penitencia Creek were reported as shown in Table V-2. In addition, the report identified potential barriers at the steeply sloping culvert under the ford at Quail Hollow in Alum Rock Park and at a four and one-half foot drop structure with a four to five foot deep plunge pool located 150 yards upstream of the Quail Hollow ford (Ulmer 1988).

Table V-2. Summary of sampling, Upper Penitencia Creek, 1986-87

	Location	**Method**	**Collected (size range)**
Feb. 1986	Quail Hollow in Alum Rock Park	Collected dead	Ripe female *O. mykiss* (640 mm TL)
Late 1986	White & Penitencia Rds.	Collected dead	2 "adult salmonids"
Aug. 1987	Downstream of percolation pond outlet	Electrofishing	5 *O. mykiss* (95-105 mm TL)
Nov. 1987	Upstream of Doral Rd. bridge	Captured	5*O. mykiss* (120-215 mm SL)

(Source: Ulmer 1988)

In August 1987, 50 meters of Upper Penitencia Creek adjacent to SCVWD percolation ponds was electrofished, producing two *O. mykiss* (87, 122 mm SL) (HSA 1988). The resulting report stated that a small steelhead run apparently still existed in Upper Penitencia Creek (HSA 1988).

The Santa Clara Valley Water District sponsored a study to sample Upper Penitencia Creek between November 1990 and September 1991 to study the impact of constructing seasonal spreader dams on *O. tshawytscha* and *O. mykiss*. No adult salmonids were found during the surveys, although two steelhead redds were found in Upper Penitencia Creek near the western edge of Alum Rock Park (HRG 1992). Electrofishing in the vicinity of the redds in April and May 1991 did not find juvenile *O. mykiss*.

The Santa Clara Valley Water District sponsored electrofishing at the following sites and years: at Dorel Drive in 1990 and 1991, Noble Avenue in 1990, upstream of White Road in 1991 and 1992, and downstream of the bridge in Alum Rock Park and at Linda Vista Street from 1991-1994. No *O. mykiss* were collected (HRG 1995).

In May 1997, SCVWD electrofished Upper Penitencia Creek between Dorel Drive and Alum Rock Park. Eleven steelhead smolts (115-180 mm SL) and 33 steelhead YOY (50-69 mm SL) were captured (Salsbery and Abel 1998). An Alum Rock Park site and a Dorel Drive site also were sampled by Smith in May 1997. He collected 23 juvenile *O. mykiss* (45-64 mm SL) and 42 larger individuals (100-239 mmSL) at the Alum Rock site; the Dorel Drive site produced 36 juvenile *O. mykiss* (50-69 mm SL) and (Smith 1997).

According to SCVWD staff, Stacy Li found *O. mykiss* in Upper Penitencia Creek in 2000 (J. Abel pers. comm.). A management plan for Alum Rock Park was published in April 2001 and included a review of biological resources. The plan stated, "Steelhead

are known to spawn and rear in Upper Penitencia Creek within Alum Rock Park. These steelhead coexist with a resident population of rainbow trout" (BRG 2001).

Arroyo Aguague

Arroyo Aguague Creek is tributary to Upper Penitencia Creek. The creek drains an area of approximately nine square miles and includes approximately 15 miles of channel (SCBWMI 2001). A natural waterfall near the boundary of Alum Rock Park prevents anadromous fish passage.

One site on Arroyo Aguague 0.6 miles upstream from the mouth was seined and electrofished between 1972 and 1977. The study produced a relative abundance estimate for *O. mykiss* of "3" on a scale from 1 to 5 (Scoppettone and Smith 1977).

In September 1975, DFG visually surveyed Arroyo Aguague between the mouth and headwaters. *Oncorhynchus mykiss* was present upstream and downstream from a natural falls where sufficient habitat existed to support populations (Scoppettone and Curtis 1975b). The falls referred to in the survey report have a 15-foot drop and occur 1.2 miles upstream from the confluence with Upper Penitencia Creek. Additional barriers associated with land use activities occurred in the system.

According to the 1975 DFG survey report, electrofishing near the mouth revealed an age structure that suggested possible steelhead utilization of the stream (Scoppettone and Curtis 1975b). In a 30-meter reach, 63 *O. mykiss* were collected (45: 38-64 mm; 8: ~75 mm; 2: ~125 mm; 8: ~180 mm) (Scoppettone and Curtis 1975b). The Department of Fish and Game stated that Arroyo Aguague and Upper Penitencia Creek appeared to support the most significant fishery resource of all the tributary streams to lower Coyote Creek (Scoppettone and Curtis 1975b).

Surveys conducted in 1999 found resident *O. mykiss* upstream from the falls and "abundant" potentially anadromous *O. mykiss* downstream from this barrier (Buchan et al. 1999). The creek was referred to as containing "regionally significant" steelhead spawning and rearing habitat in a 1999 report on western Mt. Hamilton streams (Buchan et al. 1999).

Lower Silver Creek

Lower Silver Creek drains an area of approximately 44 square miles and includes approximately seven miles of channel (SCBWMI 2001). Tributaries include North Babb Creek, South Babb Creek, Flint Creek, and Thompson Creek. In the 1970s, the East Zone Flood Project connected many of these tributaries to Thompson Creek/Lower Silver Creek to provide storm drainage for urban development (Curtis and Scoppettone 1975g).

In a 1962 report, Skinner indicated Lower Silver Creek as an historical migration route and habitat for steelhead (Skinner 1962). At that time, the creek was said to be "lightly used" as steelhead habitat (Skinner 1962).

In July 1975, DFG visually surveyed a 6.3-mile reach of Lower Silver Creek between the mouth and the Thompson Creek confluence. Lower Silver Creek was characterized as an altered channel of little function for fisheries, and no *O. mykiss* were observed (Curtis and Scoppettone 1975g).

Fish sampling was performed in numerous Santa Clara Valley creeks in September and October of 1999. A station coded "U3" on Lower Silver Creek produced two *O. mykiss* (235, 253 mm FL) (Demgen and Dorsey 1999). It appears unlikely that an *O. mykiss* population exists in Lower Silver Creek (D. Salsbery pers. comm.).

North Babb Creek

North Babb Creek is tributary to Lower Silver Creek and drains an area of 2.6 square miles, consisting of 1.3 miles of channel (SCBWMI 2001). The creek provides storm drainage to an almost entirely urbanized area and includes channelized and underground culverted sections.

In June 1975, DFG visually surveyed North Babb Creek between the mouth and headwaters and found no fish. The Department of Fish and Game concluded that channel modifications and low seasonal flow created conditions with no "direct" functions for fisheries (Curtis and Scoppettone 1975h).

South Babb Creek

South Babb Creek is tributary to Lower Silver Creek and drains an area of approximately four square miles, consisting of 3.6 miles of channel (SCBWMI 2001). It originates in foothill ravines and flows across the urbanized valley floor to its confluence with Lower Silver Creek (Curtis and Scoppettone 1975j). The creek is concrete-lined between Clayton Road and the mouth.

In July 1975, DFG visually surveyed South Babb Creek between the mouth and headwaters. No fish were observed and DFG concluded that seasonal dryness and channel modifications led to the stream having no fishery value (Curtis and Scoppettone 1975j).

Flint Creek

Flint Creek is tributary to Lower Silver Creek. It drains an area of approximately two square miles and includes 1.5 miles of channel (SCBWMI 2001).

In July 1975, DFG visually surveyed Flint Creek between its mouth and headwaters, finding no fish. The Department of Fish and Game considered Flint Creek not to provide a sport fishery because of seasonally intermittent flow (Curtis and Scoppettone 1975e).

Thompson Creek (Dry Creek)

Thompson Creek is tributary to Lower Silver Creek. It drains an area of approximately 18 square miles and includes 8.8 miles of channel (SCBWMI 2001). Tributaries include Quimby, Fowler, Yerba Buena, and Dry creeks. Historically, Thompson Creek emptied into a large freshwater marsh in the Evergreen area of the Santa Clara Valley. For land reclamation purposes, Thompson Creek was extended to Lower Silver Creek, which was also realigned and channeled (Curtis and Scoppettone 1975k).

In January 1961, DFG visually surveyed Dry (Thompson) Creek at two locations and did not find fish. The Department of Fish and Game concluded that Thompson Creek had insufficient flow to provide suitable spawning or nursery habitat for steelhead (Hinton 1961a).

In July 1975 DFG visually surveyed Thompson Creek between its mouth and headwaters, finding no fish. The survey report concluded that the creek did not directly support a fishery due largely to its tendency to dry by the fall as well as control of flow by SCVWD (Curtis and Scoppettone 1975k).

Quimby Creek

Quimby Creek drains an area of 2.2 square miles and consists of approximately two miles of channel (SCBWMI 2001). Although it has no defined confluence with a receiving stream, it is considered to be tributary to Thompson Creek (Curtis and Scoppettone 1975i).

In July 1975, DFG visually surveyed Quimby Creek from the Quimby Road Bridge to the termination of the defined channel. No fish were found, and DFG concluded that Quimby Creek was a minor seasonal drainage that did not support a sport fishery (Curtis and Scoppettone 1975i).

Fowler Creek

Fowler Creek drains an area of 2.8 square miles and contains 2.8 miles of channel (SCBWMI 2001). Although it has no defined confluence with a receiving stream, it is considered to be tributary to Thompson Creek (Curtis and Scoppettone 1975f).

In July 1975, DFG visually surveyed Fowler Creek between its discontinuation and headwaters. The creek was described as a minor seasonal drainage issuing from the foothills into the valley, where it gradually lost definition. For this reason, DFG concluded Fowler Creek did not support a sport fishery (Curtis and Scoppettone 1975f).

Yerba Buena Creek

Yerba Buena Creek is tributary to Thompson Creek. It drains an area of 2.6 square miles and includes 1.5 miles of channel (SCBWMI 2001).

In July 1975, DFG visually surveyed Yerba Buena Creek between the mouth and headwaters, finding the channel dry for most of the creek's length. The survey report stated that the stream did not directly contribute to a sport fishery (Curtis and Scoppettone 1975n).

Upper Silver Creek

Historically, Upper Silver Creek and Thompson Creek issued into a large freshwater marsh in the Evergreen area of Santa Clara. This marsh served as the headwaters of Lower Silver Creek but was drained for flood control and urban development. In the 1970s, Upper Silver Creek flows were shunted into a flood control channel discharging directly to Coyote Creek (Curtis and

Scoppettone 1975m). The creek currently drains an area of about six square miles and consists of approximately seven miles of channel (SCBWMI 2001).

In a 1962 report, Skinner shows Upper Silver Creek as an historical migration route and habitat for steelhead (Skinner 1962). At that time, the creek was said to be "lightly used" as steelhead habitat (Skinner 1962).

In July 1975, DFG visually surveyed Upper Silver Creek between the Highway 101 bridge and the headwaters. The survey report noted an impassable culvert in the lower reach that was suspected of precluding use by salmonids. No *O. mykiss* were observed (Curtis and Scoppettone 1975m). An electrofishing survey during the period 1972-1977 included sampling in Upper Silver Creek at Upper Silver Creek Road near the Capitol Expressway. No *O. mykiss* were found (Scoppettone and Smith 1977).

Fisher Creek

Fisher Creek drains an area of 15.8 square miles and contains approximately eight miles of channel (SCBWMI 2001). Fisher Creek is the receiving stream for numerous minor, foothill drainages on the western side of the La Laguna Seca Valley. Historically, it passed through a marsh in the vicinity of the present day Calero Hills Golf Course before entering Coyote Creek. The marsh was drained and the creek channelized during construction of the golf course and development of the surrounding area in the 1970s (Curtis and Scoppettone 1975d).

In June 1975, DFG visually surveyed Fisher Creek from its mouth upstream to Laguna Avenue. No *O. mykiss* were observed. Because of intermittent flow and warm temperatures, DFG concluded that Fisher Creek did not provide suitable habitat for salmonids and did not contribute substantially to a sport fishery (Curtis and Scoppettone 1975d).

San Felipe Creek

San Felipe Creek is tributary to Anderson Reservoir. According to a watershed characteristics report, the creek consists of approximately 29 miles of channel and drains eight square miles (SCBWMI 2001).

In January 1961, DFG visually surveyed the lower areas of San Felipe Creek and interviewed local residents. A resident reported a steelhead run several years prior to 1961 when Anderson Reservoir had overflowed (Hinton 1961b). The Department of Fish and Game interpreted the run as land-locked *O. mykiss* residing in Anderson Reservoir (Hinton 1961b). In a field note from 1961, DFG reported that "Anderson Dam and the dams from the Coyote percolation basin prevent steelhead from using the creek as they formerly did" (Hinton 1961b, p. 1).

Leidy found *O. mykiss* at four locations electrofished on San Felipe Creek in June and July 1997 (Leidy 2002). His downstream-most station, approximately 0.9 miles downstream from the confluence with Cow Creek, yielded 28 *O. mykiss* between 40 and 220 mm FL (Leidy 2002). Here he estimated density at 20 *O. mykiss* per 30 meters of stream. At a location 0.3 miles downstream from Cow Creek, Leidy caught three *O. mykiss* (68, 76, 87 mm) and estimated density at 5 fish per 30 meters (Leidy 2002). Two pools immediately downstream from San Felipe Road contained 11 *O. mykiss* (66-165 mm) at a density of 15 fish per 30 meters. Finally, at his upstream-most location, immediately upstream from where the unpaved road leaves San Felipe Creek, Leidy caught 28 *O. mykiss* between 40 and 220 mm long, and estimated density at 50 fish per 30 meters of stream (Leidy 2002).

Cow Creek

Cow Creek is tributary to San Felipe Creek. It drains a relatively undeveloped area northeast and upstream from Anderson Reservoir.

In June 1997, Leidy electrofished Cow Creek one-half mile upstream from the first road crossing upstream from San Felipe Creek. In a 15-meter reach he caught 17 juvenile *O. mykiss* (42-70mm FL) and one adult (275 mm) (Leidy 2002). He observed ten additional juvenile *O. mykiss* in the same size range.

Packwood Creek

Packwood Creek is tributary to Anderson Reservoir. It drains an area of approximately ten square miles, and includes approximately 11 miles of channel (SCBWMI 2001). Leidy surveyed pools in a Packwood Creek in the canyon downstream from Dairy Flat in July 1997. He observed several juvenile *O. mykiss* (5-10: 35-75 mm TL) (Leidy 2002).

Hoover Creek

Hoover Creek is tributary to Packwood Creek. It drains the hills area immediately west of Henry Coe State Park.

Leidy electrofished a 30-meter reach on Hoover Creek 0.7 miles upstream from Packwood Creek in July 1997. He caught 30 *O. mykiss* (58-96 mm FL) and observed approximately 15 additional individuals in the same size range (Leidy 2002). The estimated *O. mykiss* density was 40 fish per 30-meter reach.

Cañada de los Osos Creek (La Cañada Creek)

Cañada de los Osos Creek is a headwater tributary of Coyote Creek. It drains the hills area east of the city of Gilroy and joins Coyote Creek approximately two miles upstream from Coyote Lake.

In June 1940, 6,000-10,000 *O. mykiss* fingerlings rescued from Uvas Creek were planted in Cañada de los Osos Creek (Holladay 1940). A July 1940 DFG stream survey noted that the channel went dry at its confluence with Coyote Creek. The lower mile of Cañada de los Osos Creek was said to be intermittent, with the upstream area perennial. The surveyor noted that the planted fingerlings from Uvas Creek were healthy (Shapovalov 1940b).

Hunting Hollow Creek

Hunting Hollow Creek joins Coyote Creek immediately upstream from the confluence with Cañada de los Osos Creek. The creek consists of approximately 3.5 miles of channel.

The Department of Fish and Game surveyed the entire length of Hunting Hollow Creek in July 1940. The stream was dry at the time of the survey, and no fish were observed (Shapovalov 1940a).

Big Canyon Creek

Big Canyon Creek is formed by the combined drainages of Rough Gulch and Little Rough Gulch. The creek enters Coyote Creek from the west, and its watershed is the eastern flank of the Palassou Ridge.

Leidy surveyed about 100 meters of Big Canyon Creek upstream from the Coyote Creek confluence in October 1999. He noted juvenile O. mykiss (25-90 mm TL) at a density of about 15-20 fish per 30 meters (Leidy 2002).

Middle Fork Coyote Creek

Immature trout were noted in Middle Fork Coyote Creek when the site was surveyed in June-July 1974 as part of an aquatic habitat survey of Henry Coe State Park (Guzzetta 1974).

Electrofishing on the Middle Fork in September 1995 produced 12 *O. mykiss* (45-195 mm) at Upper Camp, plus another 20 observed in the same size range (Leidy 2002). Leidy estimated *O. mykiss* density at this last site to be 75 per 30 meters of stream. In April 1997, Leidy electrofished the same site at Upper Camp. He caught five *O. mykiss* (45-176 mm FL) and estimated density at 15 per 30 meters of stream.

East Fork Coyote Creek

Leidy electrofished two sites on the East Fork of Coyote Creek downstream of Water Gulch in September 1995. At one site he caught a single *O. mykiss* (225 mm FL) (Leidy 2002).

Kelly Cabin Creek

Kelly Cabin Creek drains the hills south of Henry Coe State Park. It flows generally north and joins East Fork Coyote Creek in the southern portion of the park.

Leidy electrofished an isolated pool on Kelly Cabin Creek approximately 0.2 miles upstream from the confluence with East Fork Coyote Creek in August 1995. No *O. mykiss* were found (Leidy 2002). Informal surveys of Kelly Cabin Creek suggest that the system presently does not support *O. mykiss* populations (J. Smith, San Jose State University pers. comm.).

Assessment: Steelhead historically occurred throughout the Coyote Creek system. Human activities, primarily between the early-to-mid 1900s and the present, have substantially disrupted salmonid migration and degraded spawning and rearing habitats. Coyote and Anderson reservoirs, constructed in 1936 and 1950, respectively, block access to approximately 200 square miles of the upper Coyote Creek watershed, or approximately 56 percent of the total drainage (SCBWMI 2001). Although steelhead were known to use lower Coyote Creek for spawning and rearing, minimum instream flow requirements were never established following construction of Anderson Dam (Anderson 1978). The Coyote Canal bypasses and seasonally dewaters an approximately five-mile reach of Coyote Creek beginning at Coyote Diversion Dam approximately 1.2 miles downstream from Anderson Reservoir.

Extensive gravel mining downstream from Anderson Dam has altered natural streamflow and sediment transport patterns in Coyote Creek. Many of the larger remaining in-channel gravel mining ponds are now used for groundwater percolation, and their operation often creates seasonal barriers to the migration of salmonids (Smith 1998).

Urban development in the Santa Clara Valley and adjacent foothills has changed stream discharge patterns and degraded water quality in Coyote Creek. Urbanization also has fostered flood control projects for many of the smaller tributaries entering lower Coyote Creek, typically leading to a virtual lack of habitat function in post-project configurations.

Steelhead are now relatively rare in the Coyote Creek system (Smith 1998). The most important spawning and rearing habitat resources remaining in the watershed are Upper Penitencia Creek and Arroyo Aguague. Portions of these creeks are protected by their location in Alum Rock Park, where they join to flow into Coyote Creek near San Jose (RM 10) (Smith 1998). A resident *O. mykiss* population is believed to occur in this area, and observation of *O. mykiss* smolts in Upper Penitencia Creek suggests anadromy (Smith 1997). As stocking of both hatchery and wild (from Uvas Creek) *O. mykiss* has occurred sporadically throughout the Coyote Creek system since at least 1938, the Coyote Creek population may reflect particularly complex ancestry.

Guadalupe River Watershed

The Guadalupe River is formed by the confluence of Alamitos Creek and Guadalupe Creek at the location presently inundated by Lake Almaden. In addition to these two streams, direct tributaries to the Guadalupe River include Los Gatos, Canoas, and Ross creeks. These tributaries originate on the eastern side of the Santa Cruz Mountains and enter the Guadalupe River as it flows through the Santa Clara Valley. The Guadalupe River consists of approximately 20 miles of main channel, and its watershed area is about 170 square miles. The river enters the San Francisco Estuary north of Sunnyvale (SCBWMI 2001).

Guadalupe River

According to a stakeholder group's report on the Guadalupe River, "Early written documents record the local presence of migrating salmon in the 'Rio Guadalupe' dating as far back as the 1700s…" (SCBWMI 2001, p. 7-131). A 1905 report notes *O. mykiss* in this stream (named "Guadalupe Creek" in this source)(Snyder 1905). In 1936, Fry surveyed part of the Guadalupe River in the hills approximately two miles north of the town of Almaden. He noted that in approximately May streamflow stopped until the start of winter rains, and that only occasional pools were present in the stream in the dry season (Fry 1936). Salmonids were not found in Fry's survey of the Guadalupe River.

A July 1953 survey identified *O. mykiss* 1.4-1.5 miles by road upstream from the intersection of Hicks and Shannon Roads and "salmonids" 0.3 miles by road upstream from the same intersection (Merkel 1953). A 1959 DFG memorandum stated that no steelhead run had existed for many years. According to a game warden for the region, resident rainbow trout were found in the section of stream from Guadalupe Dam to a point three miles downstream (on Guadalupe Creek) (Schreiber 1959).

In a 1962 report, Skinner indicated the Guadalupe River as an historical migration route and habitat for steelhead (Skinner 1962). At that time, the creek was said to be "lightly used" as steelhead habitat (Skinner 1962).

The Department of Fish and Game electrofished five Guadalupe River stations between Brokaw Road and Willow Glenn Way in September 1975. No salmonids were found and the survey report noted that poor water quality might have been a major factor depressing fishery resources (Curtis and Anderson 1975).

In August 1981, Leidy sampled the Guadalupe River at the USGS gauging station on Hicks Road. He caught four *O. mykiss* (96-167 mm FL) (Leidy 1981-1984, 1984). A 1987 DFG correspondence stated that in the previous five years, runs of steelhead trout were reported on the Guadalupe River up to the drop structure near Blossom Hill Road (Hunter 1987).

In December 1987, DFG observed two adult salmonids 500 feet downstream of this location (Ulmer 1988). According to a DFG report, salmonids were able to migrate up to the confluence of Canoas Creek, a constructed, concrete-lined drainage channel (Ulmer 1988). The report stated that DFG observed 248 apparent salmonid redds in 1987 in the Guadalupe River.

The Santa Clara Valley Water District routinely constructs seasonal spreader dams in the Guadalupe River channel to increase percolation. As part of a five-year study (1989-1994) of the impact of spreader dams on fisheries, SCVWD monitored habitat and passage conditions in the Guadalupe River from 1990 to 1994. Passage observations by SCVWD during 1993 to 1994 winter low-flow conditions found the weirs at Hillsdale, Foxworthy and St. John Streets passable only during major storm events (>50-200 cfs) (HRG 1995). In addition, the drop structure upstream from Blossom Hill Road was impassable under all flow conditions. Electrofishing, and gillnet and seine sampling upstream and downstream from the spreader dams between Branham Avenue and the confluence of Alamitos Creek revealed no *O. mykiss* during the course of this study (HRG 1995).

The district sponsored additional monitoring as part of the spreader dam studies that was summarized in 1994. Electrofishing was conducted in the winter of 1992-1993 at two sites in the vicinity of percolation ponds near Blossom Hill Road. A few (two to five) *O. mykiss* were found (HRG 1994). The 1994 report also noted the presence of approximately six steelhead redds in lower Guadalupe River in April 1993. No juvenile salmonids were captured in the vicinity of the redds during subsequent electrofishing (HRG 1994).

In comments on a Guadalupe River flood control project, a canoe club submitted photographs of fish caught in the river in October 1993. Materials accompanying the photos indicated that a 305 mm *O. mykiss* was collected between Interstate 880 and the Airport Parkway Bridge. The fish apparently was fin-clipped, and resulting genetic analysis identified it as a "Pacific steelhead" (Johmann 1995).

Leidy found *O. mykiss* at three locations in May and June 1994 (Leidy 2002). In a 30-meter reach at the end of Pam Lane off Coleman Road, he observed approximately 50 *O. mykiss*, 25 of which ranged from 50-210 mm FL (Leidy 2002). Downstream from the Guadalupe Reservoir, at Pheasant Valley and Hicks Roads, he caught 17 *O. mykiss* (38-165 mm) in a 30-meter reach. While upstream from the first Hicks Road crossing upstream from the reservoir, a 30-meter reach yielded 12 *O. mykiss* (32-169 mm).

A few *O. mykiss* juveniles were found near Woz downstream of Interstate 280 during dewatering of the channel in 1998 (J. Abel pers. comm.). A San Jose State University classroom exercise led by Dr. Jerry Smith noted that in 2000, approximately 24 steelhead smolts were gillnetted in Lake Almaden (J. Smith, San Jose State University pers. comm.).

In March 2002, a consulting fisheries biologist reported four *O. mykiss* (2: 250-300 mm; 1: ~300 mm; 1: ~600-700 mm) near the Los Gatos Creek confluence (Kozlowski 2002). The four fish had intact adipose fins but their genetic make-up was undetermined.

Los Gatos Creek

Los Gatos Creek drains an area of approximately 55 square miles and consists of approximately 24 miles of channel (SCBWMI 2001). It has four major impoundments: Vasona Reservoir, Lexington Reservoir, Lake Elsman (built in the late 1940s) and Williams Reservoir (built pre-1938). Major tributaries include Briggs Creek, which enters Lexington Reservoir, and Austrian Gulch, which enters Lake Elsman.

Based on the locations of fish collections made in 1895 by Snyder (Snyder 1905) and historical habitat condition suitable for salmonids, Smith (Smith 1998) concluded that Los Gatos Creek likely supported heavy steelhead use throughout. In November 1948, correspondence regarding responsibility for repair of an inadequate fish ladder at Page Dam (located downstream from Lexington Reservoir) suggested that steelhead attempted passage at the ladder (McCaulay 1948). Department of Fish and Game correspondence from 1950 regarding the pending construction of Lexington Reservoir indicated that large numbers of presumably wild trout were present in Los Gatos Creek upstream from the dam site (CDFG 1950).

A 1952 DFG document stated that substantial steelhead runs had not been seen in Los Gatos Creek since 1937, when agricultural pumps lowered the water table throughout the Santa Clara Valley and dewatered the lower reach (Evans 1952). The document also noted that resident trout populations had remained in the portions of the creek maintaining permanent flow (Evans 1952). In March 1953, DFG determined that no repair of the inadequate fish ladder at Page Dam would be necessary because no steelhead run had occurred in Los Gatos Creek since 1937 (Jones 1953). In April 1953, DFG observed "thousands" of steelhead massing at the base of Ryland Diversion Dam, with many attempting to jump at the overflow (Johnson 1953a). (Ryland Dam replaced Jones diversion dam, which was inundated by Lexington Reservoir).

In a 1962 survey of the probable distribution of steelhead in the San Francisco Bay Area, Skinner noted Los Gatos Creek as serving as historic habitat for this species (Skinner 1962). The survey shows the 1962 distribution of steelhead in this creek as the reaches immediately downstream and upstream from Lexington Reservoir.

In June 1962, DFG visually surveyed the remote reach of Los Gatos Creek upstream from Austrian Reservoir after a forest fire. In 400 meters of stream, eight *O. mykiss* (100-200 mm) were observed (Hinton 1962b). Surviving native *O. mykiss* were deemed adequate for propagation and re-population of reaches affected by the fire (Hinton 1962b). Electrofishing in Lexington Reservoir in June 1970 found two *O. mykiss* (Wood 1970).

In September 1981, seining produced three *O. mykiss* (57, 151, 203 mm FL) immediately upstream of Wrights Station Road (between Lexington Reservoir and Lake Elsman). Approximately 0.15 miles further upstream, two additional *O. mykiss* (56, 58 mm) were found at the confluence with a southwest running tributary (Leidy 1981-1984, 1984).

Prior to 1996, SCVWD routinely constructed seasonal spreader dams in the Los Gatos Creek channel to increase percolation. As part of a five-year study (1989-1994) of the impact of spreader dams on fisheries, SCVWD sponsored a study of habitat and passage conditions in Los Gatos Creek from 1990 to 1994. It was concluded that spreader-dam removal at three sites immediately upstream and downstream from the Hamilton Road crossing resulted in wide, shallow riffles that presented passage problems

during the low winter flow conditions of 1993 to 1994 (HRG 1995). Electrofish, gillnet and seine sampling upstream and downstream from spreader dams revealed no *O. mykiss* in Los Gatos Creek during the course of the study (HRG 1995).

In 1998, *O. mykiss* were observed spawning in Los Gatos Creek near Hamilton and Meridian Avenues (J. Abel pers. comm.). In summer 2001, two juvenile *O. mykiss* were collected in Los Gatos Creek at Leigh Avenue.

Both Williams Dam and Austrian Dam represent complete barriers to upstream migration of fish (but still allow out-migration over spillways) (Evans 1952). We found only one report of *O. mykiss* stocked upstream from Williams Reservoir: 10,000 steelhead fingerlings planted in July 1938 (CDFG 1938a). Department of Fish and Game studies have shown that survival of planted hatchery fingerling trout in competition with wild fish that are already present is extremely low (Greenwald 1962).

Briggs Creek

Briggs Creek is tributary to Los Gatos Creek via Lexington Reservoir and contains approximately one mile of channel (SCBWMI 2001). It drains the area immediately west of the reservoir.

In September 1981, a fish survey recorded "great" fish habitat at Bear Creek Road, but found no fish. The surveyor hypothesized that a barrier may limit fish migration in this creek (Leidy 1981-1984, 1984).

Hooker Gulch Creek

Hooker Gulch Creek is tributary to Los Gatos Creek between Lexington Reservoir and Lake Elsman. It drains the west slope of Mt. Thayer.

In September 1981, dip-net sampling was conducted adjacent to Aldercroft Heights Road, immediately upstream from the confluence with Los Gatos Creek. Eleven *O. mykiss* (37-72mm FL) were collected (Leidy 1981-1984, 1984).

Austrian Gulch Creek

Austrian Gulch Creek is tributary to Los Gatos Creek via Lake Elsman and includes approximately 1.4 miles of channel (SCBWMI 2001). It drains the hills of the Sierra Azul east of the lake.

In September 1981, a fish survey including dip netting was conducted immediately upstream from Cathermola Road (and Lake Elsman). The surveyor observed approximately 200 *O. mykiss* and collected 75 that ranged in size from 32-60 mm FL (Leidy 1981-1984, 1984).

Staff from SCVWD sampled Austrian Gulch Creek in March 2005. The presence of multiple year classes of *O. mykiss* observed during the survey indicates that reproduction is occurring (D. Salsbery pers. comm.).

Ross Creek

Ross Creek originates in the lower Santa Cruz mountain foothills near the town of Blossom Hill. It drains a primarily urbanized area of approximately ten square miles between Los Gatos Creek and the Guadalupe River main stem, and includes 6.2 miles of channel (SCBWMI 2001).

In April 2001, an adult steelhead was found stranded in Ross Creek. The fish was moved to more suitable spawning habitat in the Guadalupe River (J. Abel pers. comm.). Ross Creek does not appear to support an *O. mykiss* population currently (D. Salsbery pers. comm.).

Guadalupe Creek

Guadalupe Creek has one major impoundment, Guadalupe Reservoir, and drains an area of approximately 15 square miles. The creek consists of approximately 28 miles of channel (SCBWMI 2001). The confluence of Guadalupe Creek and Alamitos Creek at Lake Almaden forms the Guadalupe River.

In July 1953, DFG sampled several locations on Guadalupe Creek with a one-man braile seine. A 125 mm *O. mykiss* was caught approximately 1.5 miles upstream from the junction of Hicks and Shannon roads, while fingerling salmonids were seen, but not captured, approximately 0.25 miles upstream from the same junction (Merkel 1953).

In July 1956, DFG visually surveyed Guadalupe Creek from the bridge crossing at Hicks Road and Coleman Avenue upstream to the Guadalupe Dam. Many steelhead juveniles (25-125 mm) were observed in pools near riffles (Thassalt 1956). The survey report noted apparently "good" natural propagation in the creek.

In April 1958, a DFG document commenting on a proposed spreader dam on Guadalupe Creek characterized the steelhead resource of the creek as of minor importance due to its apparently intermittent nature (Smedley 1958). In October 1959, DFG correspondence stated that resident rainbow trout were found from the Guadalupe Dam to a point three miles downstream (Schreiber 1959).

In November 1975, USFWS electrofished sites two miles and three miles downstream from Guadalupe Dam. Both sites produce 50-330 mm *O. mykiss* as well as numerous YOY (Michny and Ging 1975).

Prior to 1996, SCVWD routinely constructed seasonal spreader dams in the Guadalupe Creek channel to increase percolation. As part of a five-year study (1989-1994) of the impact of spreader dams on fisheries, SCVWD monitored habitat and passage conditions in Guadalupe Creek in 1993 and 1994. In addition to barriers located downstream in the Guadalupe River, SCVWD identified a potential barrier to migration at the Masson Dam Diversion. Electrofishing, and gillnet and seine sampling upstream and downstream from spreader dams in 1993 revealed a few *O. mykiss* (two to five individuals) upstream of Capitancillos Drive and upstream of the diversion (HRG 1995). Also, one *O. mykiss* was found in an off-channel pond and one in the spreader dam pond upstream of Meridian. Sampling in 1994 found no *O. mykiss* (HRG 1995).

Leidy surveyed about 1,200 meters of Guadalupe Creek between the Hicks Road crossing (upstream from the Guadalupe Reservoir) and an impassable natural falls in October 1999. He observed adult *O. mykiss* to 254 mm TL in pools, and juveniles in a reach upstream from Hicks Road (10-15 per 30 m) and in a reach downstream of the falls (25-30 per 30 m) (Leidy 2002).

In 1999, *O. mykiss* were observed throughout Guadalupe Creek downstream from Guadalupe Reservoir (J. Abel pers. comm.). Ladder construction was completed in 2000. In summer 2001, approximately 30 *O. mykiss* were rescued from a degraded reach of Guadalupe Creek that was dewatered for rehabilitation (J. Abel pers. comm.).

Pheasant Creek

Pheasant Creek drains an area of 1.4 square miles and consists of approximately one mile of channel (SCBWMI 2001). The creek is tributary to Guadalupe Creek downstream from the Guadalupe Reservoir.

In July 1956, DFG visually surveyed a 0.25-mile reach of Pheasant Creek one mile upstream from its confluence with Guadalupe Creek. Large numbers of young steelhead were observed in pools that a landowner said persisted throughout the dry season when the stream became intermittent (Thassalt 1956). A 1958 DFG comment regarding a proposed watershed project indicated that steelhead use Pheasant Creek as a spawning stream (Smedley 1958). Pheasant Creek presently supports a reproducing resident *O. mykiss* population (J. Smith pers. comm.).

Hicks Creek

Hicks Creek consists of approximately two miles of channel and is tributary to Guadalupe Creek downstream from the Guadalupe Reservoir (SCBWMI 2001). In July 1956, DFG visually surveyed a 200-meter reach of Hicks Creek upstream from the mouth. The Department of Fish and Game observed *O. mykiss* between 50 and 75 mm in almost every pool and riffle in the surveyed reach (Thassalt 1956). A 1958 DFG comment regarding a proposed watershed project indicated that steelhead used Hicks Creek as a spawning stream (Smedley 1958).

Rincon Creek

Rincon is tributary to Guadalupe Creek upstream from the Guadalupe Reservoir. The creek drains a portion of the eastern slopes of the Sierra Azul.

In April 1962, DFG did not find *O. mykiss* in a survey at Hicks Road Bridge (Hinton 1962a). As part of a fish distribution study, Rincon Creek was sampled in August 1981. Six *O. mykiss* (60-172 mm FL) were found in a series of isolated pools just upstream from the confluence with Guadalupe River (Leidy 1981-1984, 1984).

Leidy surveyed a 100-meter reach of Rincon Creek upstream from the Hicks Road crossing (upstream from the Guadalupe Reservoir) in October 1999. He observed adult *O. mykiss* to 305 mm TL in pools, and juveniles at a density of about 15-20 per 30 meters (Leidy 2002).

Alamitos Creek

Alamitos Creek has one major impoundment, Almaden Reservoir (different from Lake Almaden), drains an area of approximately 38 square miles, and contains approximately nine miles of channel (SCBWMI 2001). The confluence of Guadalupe Creek and Alamitos Creek at Lake Almaden forms the Guadalupe River.

According to a 1978 DFG letter, Alamitos Creek once supported runs of steelhead. Dam construction, streamflow regulation, channelization, and urban development during the previous 50 years was said to have eliminated self-sustaining *O. mykiss* populations (Yoshioka 1987b).

In July and August 1997, SCVWD electrofished sites on Alamitos Creek from the confluence with Golf Creek to the McKean Road crossing. Five *O. mykiss* were found in the 200-meter reach upstream of the confluence, and 21 *O. mykiss* were found in the 120-meter reach downstream of the crossing (Abel 1997).

Arroyo Calero

Arroyo Calero is tributary to Alamitos Creek, and has one major impoundment, Calero Reservoir. The creek drains an area of approximately 12.4 square miles and includes approximately six miles of channel (SCBWMI 2001).

No historical records were found for this Pheasant Creek. However, the creek presently supports a reproducing resident *O. mykiss* population (J. Smith pers. comm.). Recent modifications to downstream channel areas have opened the system to anadromous fish migration.

Barret Creek

Barret Creek drains Barrett Canyon, which located upstream from, and south of, Almaden Reservoir. Leidy reported speaking with local fishermen who stated that *O. mykiss* are regularly caught in Barrett Creek (Leidy 2002).

Herbert Creek

Herbert Creek drains into Almaden Reservoir from the southwest. Leidy reported speaking with local fishermen who stated that *O. mykiss* are regularly caught in Herbert Creek (Leidy 2002).

Assessment: The Guadalupe River system formerly hosted a steelhead run, although the aridity of the watershed probably limited its size. Substantial alteration of the lower watershed stream channels for flood control as well as construction of dams and other passage barriers has restricted anadromous salmonid habitat in the drainage to a fraction its original extent. “The steelhead population had declined significantly by 1962 following construction of reservoirs on all main tributaries (Los Gatos, Guadalupe, Alamitos creeks and Arroyo Calero creeks) and the construction of a drop structure upstream of Blossom Hill Road” (SCBWMI 2001, p. 7-131).

The Guadalupe system currently supports a reproducing steelhead population (SCBWMI 2001, p. 7-131). Non-migratory *O. mykiss* also persist in upper portions of the watershed. “From the time dams were installed in the river up until 1999, steelhead

were confined to the main stem of the Guadalupe River and lower Los Gatos Creek, where limited spawning and rearing habitat occur" (SCBWMI 2001, p. 7-131). The Santa Clara Valley Water District modified the Alamitos drop structure on the Guadalupe River to provide access to upstream habitat areas. Additional "smaller barriers and passage obstructions that occur on Guadalupe and Alamitos creeks" must be modified to open additional habitat areas (SCBWMI 2001, p. 7-132). Further surveys are needed to determine the extent to which steelhead use habitat made available by construction of the fish ladder at Lake Almaden, and to determine *O. mykiss* status in tributaries with little or no previous documentation, including Arroyo Calero, and tributaries upstream from Guadalupe and Almaden Reservoirs. Genetic analysis of *O. mykiss* occurring upstream from Austrian Dam in the headwaters of Los Gatos Creek could be useful in determining whether this population is closely related to wild, coastal stocks.

San Tomas Aquino Creek/Saratoga Creek Watershed

San Tomas Aquino Creek originates in the foothills of the Santa Cruz Mountains and drains a primarily urbanized area of the Santa Clara Valley. The headwaters area drained by the tributary Saratoga Creek is less urbanized. Other direct tributaries are Smith Creek and Wildcat Creek. The overall watershed area is about 39 square miles. A barrier at the confluence of San Tomas Aquino Creek and Saratoga Creek prevents passage into the upstream reaches of both creeks (SCBWMI 2001).

San Tomas Aquino Creek

San Tomas Aquino Creek consists of approximately 16.5 miles of channel and enters the San Francisco Estuary near via Guadalupe Slough (SCBWMI 2001). It flows generally north from its headwaters area upstream of the town of Saratoga.

In August 1981, three locations on upper San Tomas Aquino Creek between Virginia Avenue and the junction of Old Adobe and Quito roads were surveyed as part of a fish distribution study. One location was also sampled on San Tomas Aquino Creek downstream from the confluence of Saratoga Creek. No *O. mykiss* were found (Leidy 1981-1984, 1984).

A 1985 DFG survey of Saratoga Creek noted "a major steelhead and king salmon spawning area" on San Tomas Aquino Creek located approximately 200 yards downstream of the Saratoga and San Tomas Aquino creeks confluence (Bordenave and Ford 1985). Based on informal survey of the creek, it is believed not to support use by *O. mykiss* currently (J. Abel pers. comm.).

Saratoga Creek (Campbell Creek)

Saratoga Creek consists of approximately 15 miles of main channel and drains an area of approximately 16.5 square miles, including tributaries Bonjetti Creek and Booker Creek that originate in the Santa Cruz Mountains (SCBWMI 2001). A 1905 report notes *O. mykiss* in this stream (named "Cambell Creek" in this source) (Snyder 1905).

Stocking records indicate that steelhead from the Brookdale Hatchery were stocked in Saratoga Creek in 1938 and in 1939 (CDFG 1939). A 1953 DFG field note conveyed Santa Clara County workers' reports that steelhead had not ascended Saratoga Creek for the previous 15 years (Johnson 1953b). Saratoga Dam is described as a complete barrier to upstream migration with a non-functioning fish ladder. The Department of Fish and Game reported observing trout upstream and downstream from the dam, and concluded that the fish were resident (Johnson 1953b). Another DFG field note from July 1953 records *O. mykiss*

fingerlings in Saratoga Creek, citing the likely source as migration downstream from the water company's property (Shapovalov 1953). The note stated that sizable runs had not occurred for the previous eight to ten years.

Oncorhynchus mykiss were found at three of six locations sampled in August 1981 as part of a fish distribution study (Leidy 1981-1984, 1984). Six *O. mykiss* (46-62 mm FL) were collected by dip net in a 15 meter reach 0.25 miles upstream from the confluence of Booker Creek; 15 *O. mykiss* (61-170 mm) were found in a 20 meter reach at 4th St. in the town of Saratoga (Wildwood Park); and at Crestbrook Drive (off Saratoga Avenue), four *O. mykiss* (56, 64, 151, 226 mm) were collected by pole seine from a 20 meter reach. No *O. mykiss* were found downstream from the town of Saratoga (Leidy 1981-1984, 1984).

In early October 1985, DFG interviewed the owner of land adjacent to the upper perennial headwaters of Saratoga Creek who reportedly caught *O. mykiss* up to 230 mm in length upstream and downstream from the Booker Creek confluence (Gray 1985). In October and November 1985, DFG followed up the interview with a survey of Saratoga Creek between the headwaters and the confluence with San Tomas Aquino Creek. The resulting report stated that Saratoga Creek did not have a steelhead run, citing a large barrier at the first entry point of Saratoga Creek into San Tomas Aquino Creek (Bordenave and Ford 1985). Some *O. mykiss* (to 150 mm) were observed (Bordenave and Ford 1985).

Prior to 1996, SCVWD routinely constructed seasonal spreader dams in the Saratoga Creek channel to increase percolation. As part of a five-year study (1989-1994) of the impact of spreader dams on fisheries, SCVWD sponsored a study of habitat and passage conditions in Saratoga Creek in 1993 and 1994. The Santa Clara Valley Water District identified a drop structure located at the confluence with San Tomas Aquino Creek as a complete barrier to upstream migration, which precluded use of Saratoga Creek by anadromous salmonids (HRG 1995). Electrofishing, gillnet and seine sampling upstream and downstream from spreader dams found *O. mykiss* "abundant" (30+ individuals sampled) in 1993 and "common" (15-29 individuals) in 1994 at Herriman Avenue upstream of the spreader dams. Monitoring of dam removal in August 1993 found *O. mykiss* (85-225 mm SL) both upstream and downstream of the dam, which had been stranded when the percolation pond was drained (HRG 1995). Also, one *O. mykiss* was found in the spreader dam ponds upstream of Cox Avenue and one in the area upstream of Prospect Road in 1994.

In 1996, Saratoga Creek at McLellan Ranch Park was said to contain abundant *O. mykiss* (J. Abel pers. comm.). In summer 2000, a few *O. mykiss* were rescued near Homestead Road by SCVWD when the channel was dewatered. Also, unexplained fish kills during recent years in Saratoga Creek from the Lawrence Expressway to Prospect Road revealed *O. mykiss* (J. Abel pers. comm.).

In April 1996, Leidy electrofished two sites on Saratoga Creek. Immediately downstream of the Fourth Street Bridge in Saratoga he caught 12 *O. mykiss* from 89-160 mm FL, with an estimated density of 20 per 30 meters (Leidy 2002). From Via Monte Drive downstream, Leidy caught 18 *O. mykiss* (110-200 mm), with an estimated density of 30 per 30 meters of stream (Leidy 2002). Recent smolt trapping in Saratoga Creek (reported in 1997) did not collect *O. mykiss* (Smith 1997).

Fish salvage activities were conducted in Saratoga Creek on at least two occasions in 1999, during March and August (J. Abel pers. comm.). Salvaged *O. mykiss* were transferred to DFG staff.

Bonjetti Creek

Bonjetti Creek consists of approximately 0.14 miles of main channel. As part of a fish distribution study, two Bonjetti Creek locations were sampled by dip net in August 1981. At a site approximately 0.2 miles upstream from the confluence with Saratoga

Creek, four *O. mykiss* (37-56 mm FL) were found (Leidy 1981-1984, 1984). A single *O. mykiss* (178 mm) was collected on the southeast branch of Bonjetti Creek under the most upstream Sanborn Road crossing (Leidy 1981-1984, 1984).

In April 1996, Leidy electrofished a 30 meter reach in Sanborn Regional Park, approximately a 0.5 miles upstream from Saratoga Road. Two *O. mykiss* (126, 250 mm FL) were found (Leidy 2002).

McElroy Creek

McElroy Creek is the western-most tributary of Bonjetti Creek. As part of a fish distribution study, a single McElroy Creek site was sampled by dip net in August 1981 approximately 0.2 miles upstream from the confluence of Bonjetti and Saratoga Creeks. Three *O. mykiss* (32, 49, 59 mm FL) were found in a 15-meter reach (Leidy 1981-1984, 1984).

Vasona Creek

Vasona Creek is a primary tributary of San Tomas Aquino Creek. It drains an area of approximately 1.4 square miles, and includes approximately 0.5 miles of channel (SCBWMI 2001). Vasona Creek mainstem and the western fork (Sobey Creek) were each sampled at one location in August 1981 as part of a fish distribution study. *Oncorhynchus mykiss* was not found (Leidy 1981-1984, 1984). Based on informal survey of the creek, it is believed not to support use by *O. mykiss* currently (J. Abel pers. comm.).

Wildcat Creek

Wildcat Creek is tributary to Vasona Creek. Its drainage area is approximately four square miles, and the creek consists of about four miles of channel (SCBWMI 2001). No records regarding fisheries of Wildcat Creek were found. Wildcat Creek does not appear to support an *O. mykiss* population currently (D. Salsbery pers. comm.).

Smith Creek

Smith Creek is the headwater tributary of San Tomas Aquino Creek and drains an area of 2.6 square miles. It consists of 3.4 miles of channel (SCBWMI 2001).

A site on Smith Creek within a new housing development was sampled as part of a fish distribution study in August 1981. No fish of any kind were found (Leidy 1981-1984, 1984). According to SCVWD staff, *O. mykiss* are not found in the creek currently (J. Abel pers. comm.).

Assessment: Saratoga Creek historically hosted a steelhead run, and resident *O. mykiss* exist in the watershed that may have recent anadromous ancestry (K. Anderson, pers. comm. cited in SCBWMI 2001, p. 7-124). However, an impassable barrier at the confluence of San Tomas Aquino Creek and Saratoga Creek currently prevents anadromous fish passage to upstream portions of both creeks (SCBWMI 2001).

Calabazas Creek Watershed

Calabazas Creek drains a 21 square mile area of the Santa Clara Valley that is mostly urbanized in its lower portions. The headwaters are in rural and/or relatively undeveloped areas on the eastern slopes of the Santa Cruz Mountains. The creek consists of approximately 13 miles of channel that enters the San Francisco Estuary via Guadalupe Slough (SCBWMI 2001). According to a 1987 DFG memo, four substantial fish barriers are found downstream of Comer Drive on Calabazas Creek (Ulmer 1987). Drop structures at Bollinger Road and Rainbow Drive are believed to be absolute barriers to upstream fish movement, as is a 12 foot inclined dam downstream of Comer Drive (HSA and Smith 1987).

Calabazas Creek

According to an account by Ian Gilroy, *O. mykiss* were present in Calabazas Creek in the early 1970s (J. Abel pers. comm.). As part of a fish distribution study, four Calabazas Creek sites were sampled between the Bayshore Freeway and Cox Avenue in August 1981. No *O. mykiss* were found (Leidy 1981-1984, 1984). A survey of the creek performed on behalf of SCVWD in May and August 1987 found no native fish (HSA and Smith 1987).

Prospect Creek

Prospect Creek is the uppermost tributary of Calabazas Creek and drains an area of approximately 1.4 square miles. It contains approximately with 1.4 miles of channel (SCBWMI 2001).

Prospect Creek was sampled by dip net upstream from Prospect Road in August 1981 as part of a fish distribution study. No fish of any kind were encountered (Leidy 1981-1984, 1984).

Assessment: The lower portion of Calabazas Creek was extensively altered for flood control purposes between the 1960s and the early 1980s, leaving most of the channel in the form of box culvert or earthen constructed channel. According to a study of fisheries values of Calabazas Creek, the stream is unsuitable for steelhead because of a lack of pools, good hiding cover, and suitable streamflows (HSA and Smith 1987).

Stevens Creek Watershed

Stevens Creek drains an area of about 29 square miles and originates in the Santa Cruz Mountains. The creek drops into the western edge of the Santa Clara Valley where it drains into the South San Francisco Bay. There is one major impoundment, Stevens Creek Reservoir. Several tributaries including Gold, Deer and Indian creeks were surveyed by DFG in 1946 and were found to be too steep to support trout (Shapovalov 1946c). During periods of high runoff, water from Permanente Creek is diverted into Stevens Creek.

Stevens Creek

Stevens Creek consists of approximately 20 miles of channel, and enters the San Francisco Estuary near Long Point, north of Moffett Field Naval Air Station (SCBWMI 2001). A 1905 report notes *O. mykiss* in Stevens Creek (Snyder 1905).

In 1947, no hatchery origin *O. mykiss* were identified in angler catch reports from Stevens Creek Reservoir, although 3,520 were planted the previous summer. The Department of Fish and Game concluded that hatchery *O. mykiss* showed negligible survival in this system (CDFG 1947).

According to a DFG summary report, 6,865 fingerling steelhead were rescued from Stevens Creek in 1954 (Pintler 1956). Rescued fish apparently were moved to other areas within the Stevens Creek watershed that had wetted stream channel throughout the dry season.

Sampling as part of a fish distribution study found *O. mykiss* at four of eight Stevens Creek locations in August 1981. Four *O. mykiss* (65-110 mm FL) were caught in a ten-meter reach downstream from Stevens Creek Road and two *O. mykiss* (60, 192 mm) were caught in a 30.3-meter reach in Stevens Creek County Park downstream from Stevens Creek Reservoir (Leidy 1981-1984, 1984). Upstream from Stevens Creek Reservoir, two *O. mykiss* (48, 58 mm) were caught in a seven-meter reach at the first bridge upstream from Mount Eden Road and 15 *O. mykiss* (58-72 mm) were found in a ten-meter reach approximately 5.9 miles upstream from the reservoir (Leidy 1981-1984, 1984).

The Department of Fish and Game surveyed Stevens Creek for migrating salmonids in December 1985. One steelhead (650 mm) was seen at the base of the fishway 100 yards upstream of the Highway 101 bridge (Bordenave 1986). Scale analysis indicated that the fish was age 6+ and had previously spawned and returned to the ocean.

Prior to 1996, SCVWD routinely constructed seasonal spreader dams in the Stevens Creek channel to increase percolation. As part of a five-year study (1989-1994) of the impact of spreader dams on fisheries, SCVWD sponsored a study of habitat and passage conditions in Stevens Creek from 1990 to 1994. In 1994, SCVWD found fish ladders at the Central Expressway and Highway 101 often had insufficient flow and/or were clogged with debris and sediment (HRG 1995). In addition, the drop structure at L'Avenida Avenue was impassable in all five years of the study. Electrofish, gillnet and seine sampling upstream and downstream from spreader dams and downstream from the Stevens Creek Reservoir is reported in Table V-3.

Table V-3. Number of O. mykiss sampled on Stevens Creek, 1990-1994

Location	**1990**	**1991**	**1992**	**1993**	**1994**
Stevens Ck. Country Park	*	6-14	2-5	6-14	1
Downstream Stevens Ck. Blvd.	*	*	2-5	30+	*
Spreader-dam pond downstream I-280	*	*	2-5	*	*
Homestead Rd.	*	*	0	0	6-14
Dam pond upstream Fremont Ave.	*	0	0	2-5	6-14
Downstream Fremont Ave. Dam	0	*	0	0	*
L'Avenida Ave.	0	*	0	0	0

(Source: HRG 1995)

*Not sampled.

Additional monitoring conducted as part of the SCVWD spreader dam studies was summarized in 1994. Of five locations electrofished in 1992-1993 surveys, *O. mykiss* were found to be "abundant" (30 or more individuals) near Stevens Creek Boulevard and "common" (15-30 individuals) at Stevens Creek County Park (HRG 1994). Fish ladders at Central Expressway and Moffett Boulevard were checked as part of the monitoring program and were found to be non-functional due to maintenance and flow issues.

Leidy electrofished Stevens Creek between McClellan Ranch Park and Monte Bello Preserve in September 1994, finding *O. mykiss* at all four locations sampled (Leidy 2002). He caught 23 *O. mykiss* (55-240 mm FL) in a 30-meter reach within McClellan Ranch Park, and seven *O. mykiss* (140-235 mm) in the Chestnut Picnic Area just downstream from the reservoir (Leidy 2002). Just upstream from the reservoir, he caught 12 *O. mykiss* (50-140 mm) in the Cooley Picnic Area. Further upstream, at the end of Stevens Creek Canyon Road, Leidy caught 16 *O. mykiss* (46-170 mm) (Leidy 2002). In April 1996, Leidy electrofished Stevens Creek downstream of East Middlefield Road and found no *O. mykiss* (Leidy 2002).

In 1996, sampling for a genetic study found *O. mykiss* in the lower reach of Stevens Creek (J. Abel pers. comm.). The study found these *O. mykiss* to be primarily of hatchery origin, although some native, Central Coast ESU steelhead were present. In 1997, steelhead smolts and YOY were rescued by SCVWD staff from reaches of the stream where it was drying due to seasonal releases rates and stream flow conditions (J. Abel pers. comm.). In 1998 and 1999, SCVWD electrofishing surveys found *O. mykiss* throughout the entire reach from the Central Expressway to Fremont Road. Staff noted the presence of *O. mykiss* to be atypical since the lower reach was usually dry during the season (when sampling occurred). Also in 1998 and 1999, out-migrant traps caught steelhead smolts in Stevens Creek (J. Abel pers. comm.).

As of 2001, SCVWD had identified multiple potential passage barriers on Stevens Creek of which zero completely precluded passage. Five were rated passable only under a small range of flow conditions and included: the gaging station between Central Avenue and Hwy 85 with its three associated drop structures; the Moffett fish ladder downstream of the gaging station; fish ladders at Evelyn and Fremont Avenues; and a low-flow vehicle crossing at Blackberry Farm (Entrix Inc. 2001).

Swiss Creek

Swiss Creek is tributary to Stevens Creek Reservoir. It consists of approximately 1.7 miles of channel (SCBWMI 2001).

In August 1981, two Swiss Creek locations were sampled as part of a fish distribution study. No *O. mykiss* were found (Leidy 1981-1984, 1984). According to SCWVD staff, the creek rarely maintains sufficient water throughout the dry season to support an *O. mykiss* population (J. Abel pers. comm.).

Assessment: Stevens Creek historically supported a steelhead run, though the population has been reduced by alterations to the watershed, particularly construction of Stevens Creek Reservoir. Stevens Creek currently supports resident *O. mykiss* that appears to produce smolts (SCBWMI 2001; Smith 1997). A 1994 DFG memo stated that Stevens Creek had good potential for sustaining steelhead (Roper 1994).

Permanente Creek Watershed

Permanente Creek drains an area on the northeast-facing slopes of the Santa Cruz Mountains and drops into the western edge of the Santa Clara Valley. It flows through the Cities of Los Altos and Mountain View and enters the South San Francisco Bay via the Mountain View Slough (SCBWMI 2001). The creek consists of approximately 13 miles of channel draining a watershed area of 17 square miles. High flows are diverted into Stevens Creek via the Permanente Creek Diversion, constructed in 1959.

Permanente Creek

A 1905 report notes *O. mykiss* in Permanente Creek (named "San Antonio Creek" in this source) (Snyder 1905). In 1940, a DFG stream survey noted a resident's account of Permanente Creek as formerly a "fine" trout stream from which anglers caught large fish (Shapovalov 1940c).

As part of a fish distribution study, six Permanente Creek sites between Charleston Road and Interstate 280 were sampled in August 1981. No *O. mykiss* were found (Leidy 1981-1984, 1984).

In April 1996, Leidy electrofished Permanente Creek at two sites, a 50-meter reach upstream from Charleston Road (downstream from Highway 101), and a 100-meter reach upstream from Interstate 280. No *O. mykiss* were found (Leidy 2002).

Hale Creek

Hale Creek drains an area of approximately five square miles, and contains approximately with 3.2 miles of channel (SCBWMI 2001). A fish distribution study found no *O. mykiss* at two locations sampled in August 1981 (Leidy 1981-1984, 1984).

Assessment: Permanente Creek appears to have supported *O. mykiss* historically. A cement company operating in the upper part of the watershed has discharged sediment-laden water into Permanente Creek and has undertaken corrective actions as directed by the RWQCB (SCBWMI 2001).

Adobe Creek Watershed

Adobe Creek consists of approximately 14 miles of channel originating southwest of Foothill College, and enters the San Francisco Estuary via the Palo Alto Flood Basin. The watershed area consists of about 11 square miles. Operations of the tidal gates at the mouth of Adobe Creek can preclude the passage of anadromous fish (D. Salsbery pers. comm.). A culverted section of the creek is found in the city of Los Altos approximately three miles from the mouth. Box culverts at the road crossings of El Camino Real and Highway 280 are probably impassable to in-migrating salmonids (HRG 1989).

Adobe Creek (San Antonio Creek)

The Sportsman Gazetteer for 1877 reported rainbow trout in Adobe Creek (Hallock 1877). Snyder documented the occurrence of *Salmo irideus* (*O. mykiss*) from collections likely made in 1898 from Adobe Creek (Snyder 1905). Adobe Creek was sampled

as part of a fish distribution study at Highway 101 and at Wilkie Way in August 1981. No *O. mykiss* were found (Leidy 1981-1984, 1984).

Staff from DFG sampled Adobe Creek in February 1988 and did not encounter salmonids (HRG 1989). Consultants to SCVWD surveyed Adobe Creek between El Camino Real and Hidden Villa in October, November and December of 1988. Again, no salmonids were seen. The Department of Fish and Game surveyed Adobe Creek in May 2002 and found the channel to be dry in the vicinity of the city of Los Altos (Cleugh 2002).

Assessment: Based on the species' documented historical presence in proximate watersheds and anecdotal accounts, it is likely that steelhead used the Adobe Creek watershed in the past (HRG 1989). Salmonids have not been seen in the several surveys conducted since 1981, and probably are extirpated from the creek system. Channelization and other flood control projects in the watershed have drastically reduced fish habitat, and present impassable barriers to upstream migration (SCBWMI 2001). Some "excellent" fish habitat was noted in a 1988 assessment, however, in the reaches upstream of Hidden Villa (HRG 1989).

Matadero Creek/Barron Creek Watershed

Matadero Creek consists of approximately eight miles of channel and enters the San Francisco Estuary via the Palo Alto flood basin. Its drainage area is approximately 14 square miles, and is supplemented by flows from the approximately three-square mile watershed of Barron Creek. Operations of the tidal gates at the mouth of Matadero Creek can preclude the passage of anadromous fish (D. Salsbery pers. comm.).

Matadero Creek

A 1905 report notes *O. mykiss* in "Madera Creek," referring to Matadero Creek (Snyder 1905). A DFG field note from 1945 documents a fisherman's sighting of steelhead adults in Matadero Creek two years prior (1942/43 season) (Shapovalov 1945).

As part of a fish distribution study, seven Matadero Creek sites were surveyed in August 1981. No *O. mykiss* were found, although good habitat was observed immediately downstream of the Foothill Expressway and near El Camino Real (Leidy 1981-1984, 1984).

According to DFG, steelhead were caught by local fishermen during 1985, 1986 and 1987 in the slough that comprises the lower portion of Matadero Creek. At least six steelhead were noted passing the tidal gates in April 1987 (Yoshioka 1987a). Department of Fish and Game correspondence identifies Matadero Creek as an anadromous steelhead trout stream with winter spawning runs (Ulmer 1986).

In February 1997, Leidy electrofished Matadero Creek at three sites between Laguna Street and the third downstream bridge crossing on Old Matadero Creek Road. No *O. mykiss* were found (Leidy 2002). Based on informal survey of the creek, it is believed not to support use by *O. mykiss* currently (J. Abel pers. comm.).

Barron Creek

Barron Creek consists of approximately five miles of channel, with high flows diverted into Matadero Creek via a constructed channel (SCBWMI 2001). A fish distribution study found no fish of any kind when surveying a 100-meter reach on Barron Creek at Louie Road in August 1981 (Leidy 1981-1984, 1984).

Deer Creek

This creek is tributary to Purisma Creek, which in turn is tributary to Matadero Creek. Deer Creek drains an area of 1.6 square miles and comprises approximately 2.5 miles of channel.

In 1946, DFG visually surveyed Deer Creek and determined it was too steep and its flows too low in summer to support trout (Shapovalov 1946b) A fish distribution study found no *O. mykiss* at two locations surveyed on Deer Creek in August 1981 (Leidy 1981-1984, 1984).

Assessment: The Matadero Creek watershed probably supported a small steelhead run and anadromous *O. mykiss* continue to enter the system, according to local residents (SCBWMI 2001). Channelization, flood control projects, and barriers such as culverts have drastically reduced fish habitat (SCBWMI 2001).

Table V-4. Distribution status of O. Mykiss in San Francisco Estuary streams of Santa Clara County, California[a]

Watershed	Stream/ Tributary	Yrs. Surveyed/ Quant. Data	Max. Period of Record	Data Type	Life Hist. Stage/ No.Yrs. Data	Anad. Life-Cycle Possible	O. mykiss		Evidence of Pop. Decline	Current Pop. Status	References (Pers. Comm.)
							Hist.	Current			
Coyote Creek	Coyote	25/11	1898-2000	0, 1, 2, 3	J/5; S/4; R/7; M/2	Y	DF	DF	Y	1, 2, 3	2, 4, 8, 12, 32-36, 40, 44, 50, 53, 55, 56, 62, 67, 69, 70, 72, 74, 81, 83, 88, 92, 93, 96-98 (1)
	Lower Penitencia	1/0	0 **1975**	1	-	N	DF	NP	Y	0	17
	Berryessa	2/0	0 **1981**	1, 3	-	N	UNK	NP	-	0	20, 65, 66
	Calera	3/0	0 **1981**	1, 3	-	N	UNK	NP	-	0	65, 66, 70, 79
	Arroyo de los Coches	2/0	0 **1981**	1, 3	-	N	UNK	NP	-	0	19, 65, 66
	Upper Penitencia	13/6	1946-2000	0, 1, 2, 3	J/4; S/1; R/5	Y	DF	DF	Y	1, 2, 3	9, 17, 29, 39, 42, 53, 55, 56, 70, 81, 88, 93, 95, 102 (1)
	Arroyo Aguague	2/2	1974-1999	1, 2	J/1; R/1	Y	DF	DF	-	1, 2, 3	10, 80, 81
	Lower Silver	2/1	1999	1	R/1	N	DF	NP	Y	1	24, 33, 93 (3)
	North Babb	1/0	0 **1975**	1	-	N	UNK	NP	-	0	25
	South Babb	1/0	0 **1975**	1	-	N	UNK	NP	-	0	27

Watershed	Stream/ Tributary	Yrs. Surveyed/ Quant. Data	Max. Period of Record	Data Type	Life Hist. Stage/ No.Yrs. Data	Anad. Life-Cycle Possible	O. mykiss		Evidence of Pop. Decline	Current Pop. Status	References (Pers. Comm.)
							Hist.	Current			
	Flint	1/0	0 **1975**	1	-	N	UNK	NP	-	0	22
	Thompson	2/0	0 **1975**	1	-	N	UNK	NP	-	0	28, 46
	Quimby	1/0	0 **1975**	1	-	N	UNK	NP	-	0	26
	Fowler	1/0	0 **1975**	1	-	N	UNK	NP	-	0	23
	Yerba Buena	1/0	0 **1975**	1	-	N	UNK	NP	-	0	31
	Upper Silver	2/0	0 **1975**	1, 2	-	N	DF	NP	Y	0	30, 81, 93
	Fisher	1/0	0 **1975**	1	-	N	UNK	NP	-	0	21
	San Felipe	2/1	1961-1997	0, 1, 2	J/1; R/2	N	DF	DF	Y	1, 2, 3	47, 67
	Cow	1/1	1997	2	J/1; R/1	N	DF	DF	Y	1, 2, 3	67
	Packwood	1/0	1997	1	J/1; R/1	N	DF	DF	-	1, 2, 3	67
	Hoover	1/1	1997	2	J/1	N	DF	DF	Y	1, 2, 3	67
	Cañada de los Osos	1/0	1940	1	J/1	N	DF	UNK	Y	0	51, 85
	Hunting Hollow	1/0	0 **1940**	1	-	N	UNK	UNK	-	0	84

Watershed	Stream/ Tributary	Yrs. Surveyed/ Quant. Data	Max. Period of Record	Data Type	Life Hist. Stage/ No.Yrs. Data	Anad. Life-Cycle Possible	O. mykiss		Evidence of Pop. Decline	Current Pop. Status	References (Pers. Comm.)
							Hist.	Current			
	Big Canyon	1/0	1999	1	J/1	N	DF	DF	-	1	67
	Middle Fork Coyote	3/2	1975-1997	1, 2	J/3; R/2	N	DF	DF	Y	1, 2, 3	44, 67
	East Fork Coyote	1/1	1995	2	R/1	N	DF	DF	Y	1, 2, 3	67
	Kelly Cabin	1/0	0 **1995**	2	-	N	PB	NP	Y	0	67 (4)
Guadalupe River	Guadalupe River	13/3	1898-2002	0, 1, 2, 3	J/3; S/1; R/2	Y	DF	DF	Y	1, 2, 3	18, 40, 54, 55, 58, 59, 64-67, 78, 93,102 (2, 4)
	Los Gatos	13/2	1937-2001	0, 1, 2, 3	J/3; R/2; M/4	Y	DF	DF	Y	1, 2, 3	11, 15, 38, 43, 49, 55, 60, 63, 65, 66, 93, 96, 98, 103 (1)
	Briggs	1/0	0 **1981**	1	-	N	UNK	UNK	-	0	65, 66
	Hooker Gulch	1/1	1981	3	J/1	N	DF	PB	Y	0	65, 66
	Austrian Gulch	1/1	1981-2005	3	J/1	N	DF	DF	Y	1,2,3	65, 66 (3)
	Ross	1/0	2001	3	M/1	N	DF	NP	Y	1	(1, 3)
	Guadalupe	7/2	1953-2001	1, 2, 3	J/3; R/1	Y	DF	DF	Y	1, 2, 3	55, 67, 70, 71, 94, 99 (1)

Watershed	Stream/ Tributary	Yrs. Surveyed/ Quant. Data	Max. Period of Record	Data Type	Life Hist. Stage/ No.Yrs. Data	Anad. Life-Cycle Possible	O. mykiss		Evidence of Pop. Decline	Current Pop. Status	References (Pers. Comm.)
							Hist.	Current			
	Pheasant	1/0	1956	1	J/1	Y	DF	DF	Y	1,2,3	94, 99 (4)
	Hicks	1/0	1956	1	J/1	UNK	DF	UNK	Y	0	94, 99
	Rincon	3/1	1981-1999	1, 3	J/2; R/2	N	DF	DF	Y	1, 2, 3	48, 65-67
	Alamitos	1/1	1997	2	-	Y	DF	DF	-	1	1, 105
	Arroyo Calero	0	0	1	-	Y	DF	DF	-	1,2,3	(4)
	Barrett	0	0	0	-	N	DF	DF	-	1	67
	Herbert	0	0	0	-	N	DF	DF	-	1	67
San Tomas Aquino Ck./ Saratoga Ck.	San Tomas Aquino	2/0	1983	0, 1, 3	R/1	N	DF	NP	Y	0	7, 65, 66 (2)
	Saratoga (Campbell)	9/3	1905-2002	0, 1, 2, 3	J/4; R/3	N	DF	DF	Y	1, 2, 3	7, 13, 55, 61, 41, 65-67, 91, 95 (1)
	Bonjetti	2/2	1981-1996	2, 3	J/2; R/2	N	DF	DF	Y	1, 2, 3	65-67
	McElroy	1/1	1981	3	J/1	N	DF	PB	Y	0	65, 66
	Vasona	1/0	0 **1981**	3	-	N	UNK	UNK	-	0	65, 66

Watershed	Stream/ Tributary	Yrs. Surveyed/ Quant. Data	Max. Period of Record	Data Type	Life Hist. Stage/ No.Yrs. Data	Anad. Life-Cycle Possible	O. mykiss		Evidence of Pop. Decline	Current Pop. Status	References (Pers. Comm.)
							Hist.	Current			
	Wildcat	0	0	-	-	N	UNK	NP	-	0	(3)
	Smith	1/0	0 **1987**	3	-	N	UNK	NP	-	0	65, 66 (2)
Calabazas Creek	Calabazas	2/0	1970s **1981**	0, 3	-	N	DF	NP	Y	0	57, 65, 66 (1)
	Prospect	1/0	0 **1981**	3	-	N	UNK	NP	-	0	65, 66
Stevens Creek	Stevens	11/5	1905-1999	1, 2, 3	J/3; S/3; R/2	Y	DF	DF	Y	1, 2, 3	6, 14, 37, 54, 55, 65-67, 73, 98 (1)
	Swiss	1/0	0 **1981**	1, 3	-	N	DF	NP	-	0	65, 66, 75, 95 (2)
Perma-nente Creek	Perma-nente	3/0	1898 **1996**	3	R/1	N	DF	NP	Y	0	65-67, 98
	Hale	1/0	0 **1981**	3	-	N	PB	NP	-	0	65, 66
Adobe Creek	Adobe	4/0	1877 **2002**	3	-	N	DF	NP	Y	0	16, 45, 52, 65, 66, 98 (1)
Barron / Matadero Creeks	Matadero	8/0	1905-1987 **1997**	0, 1, 2, 3	M/5	N	DF	NP	Y	0	65-67, 87, 100, 104 (2)
	Barron	1/0	0 **1981**	3	-	N	UNK	NP	-	0	65, 66
	Deer	2/0	0 **1981**	1, 3	-	N	UNK	NP	-	0	65, 66, 89

[a] Table headings and codes are defined in the Methods section of this report.

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Personal Communications

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2. Abel, J., e-mail correspondence with G. Becker, CEMAR, October 2, 2003, regarding distribution status of salmonids in Santa Clara County streams.
3. Salsbery, D., interview with G. Becker, CEMAR, May 25, 2005, in San Jose, CA, regarding distribution of *O. mykiss* in Santa Clara Valley streams.
4. Smith, J., San Jose State University, telephone conversation with G. Becker, CEMAR, October 1, 2003, regarding steelhead and rainbow trout distribution in streams of Santa Clara and San Mateo counties.

SANTA CLARA COUNTY MAPS

Historical status of *Oncorhynchus mykiss* in streams of Santa Clara County, Caliornia.

Current status of *Oncorhynchus mykiss* in streams of Santa Clara County, Caliornia.