Volume Two

Watershed Assessment Report

Chapter 4
Assessment of Guadalupe Watershed

SANTA CLARA BASIN WMI WATERSHED MANAGEMENT INITIATIVE

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by

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Chapter 4: Assessment of Guadalupe Watershed

List of Authors

REPORT PREPARATION TEAM

Sarah Young, Santa Clara Valley Water District
Richard McMurtry, Regional Water Quality Control Board
Michael Stanley-Jones, Silicon Valley Toxics Coalition
Alice Ringer, WMI Coordinator

with consultant support from

URS

Rob Carnachan, Senior Water Resources Scientist
Suzanne Loadholt, Soil Scientist
Raul Farre, Staff Scientist
Sandy Davidson, Database Manager
Terry Cooke, MUN and REC-1 Assessment Team
Usha Vedigiri, MUN and REC-1 Assessment Team
Phil Mineart, PFF Assessment Team
Senarath Ekanayake, PFF Assessment Team
Francesca Demgen, RARE Assessment Team
Jon Stead, COLD and RARE Assessment Team

And

Entrix, Inc.

Jerry Smith, San Jose State University, COLD Assessment Team

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4.1 General Overview and Setting

The Guadalupe River watershed is the second largest of the 13 major watersheds that comprise the Santa Clara Basin (the Basin). The watershed drains the north- and east-facing slopes of the Santa Cruz Mountains above the cities of Los Gatos and San Jose. The Guadalupe River watershed has a total drainage area of approximately 170 square miles. The main stem Guadalupe River has six major tributaries, each of which is described in Section 4.1.1.

There are six major reservoirs in the Guadalupe River watershed that were built for water conservation and storage purposes, but can provide flood control benefits depending on the size of the upstream drainage areas and the available water storage capacity. They are Calero Reservoir on Arroyo Calero, Guadalupe Reservoir on Guadalupe Creek, Almaden Reservoir on Alamitos Creek, and Vasona Reservoir, Lexington Reservoir, and Lake Elsman on Los Gatos Creek. Two smaller reservoirs, Lake Ranch Reservoir and Williams Reservoir, are also located within the Los Gatos Creek subwatershed.

The southern portion of the watershed is largely comprised of steep-sided mountains and deep canyons. The tributary headwaters of the watershed are located near the northern slopes of Loma Prieta in the Santa Cruz Mountains, elevation 3,790 feet. This section of the watershed is largely undeveloped open space, though some rural residential development is located along the canyon bottoms of the major tributary streams. The northern portion of the watershed is located on the San Francisco Bay plain and is heavily urbanized. Most of the large reservoirs in the watershed are located in the tributary canyons just above the transition zone from Bay plain to mountain slopes.

4.1.1 Waterbodies in the Watershed

This section provides a general description of each of the 52 waterbodies in the Guadalupe River watershed. A more extensive discussion of the natural characteristics of the Santa Clara Basin in general is contained in Chapter 7 of the Watershed Characteristics Report (Volume One). The descriptions in this section are, in part, based on the information in the Watershed Characteristics Report.[1] These brief descriptions are included here in order to place the pilot assessment results in context and are not meant to provide the definitive characterization of each stream or reservoir. Additional detail

[1] Because the Watershed Characteristics Report (WCR) itself contains voluminous references to various sources, sections of this chapter that contain information from the WCR are cited with the notation (Santa Clara Basin WMI, 2001). Readers are directed to the references in Chapter 7: Natural Setting of the WCR to determine the original source of the information.

concerning stream channel characteristics and riparian vegetation may be found in the individual stream assessment result discussions in Section 4.3.

4.1.1.1 Guadalupe River

The Guadalupe River begins at the confluence of Alamitos Creek and Guadalupe Creek, which is just downstream of Coleman Road in San Jose. The Guadalupe River has a channel length of 19.78 miles from this location north to its mouth at San Francisco Bay via Alviso Slough. The river flows through heavily urbanized portions of San Jose, including the city's downtown core. Three tributaries join the Guadalupe River as it flows north: Los Gatos Creek, Canoas Creek, and Ross Creek.

The Guadalupe River played an important role in the settlement of San Jose. As a result, it has been subject to considerable modification. The first major modification of the stream channel occurred in 1866 when a canal was dug to alleviate flooding and to improve conditions for rapidly expanding orchards. More recently, in the early 1960s, Canoas Creek and Ross Creek were realigned for the second time (an earlier realignment had moved the Canoas Creek confluence farther upstream). As part of the 1975 Almaden Expressway construction project, about 3,000 feet of the Guadalupe channel were widened and moved eastward. The original stream channel was filled to allow the construction of the northbound expressway (Santa Clara Basin WMI, 2001). An additional major relocation of the river channel was performed around the San Jose Airport. Reservoirs, passage barriers, flood control projects and other channel modifications have significantly altered riparian and aquatic habitats along the Guadalupe River.

Due to the watershed's topography, flooding has long been associated with the Guadalupe River. Rainfall occurs mainly during the winter. Portions of the Basin in the Santa Cruz Mountains receive 40 to 60 inches per year, while the central Santa Clara Valley receives an average between 13 and 14 inches. The steep slopes of the mountains swiftly convey the water in rain-swollen tributaries to the Bay plain where the waters historically spread out across a much larger floodplain. Today, most of this floodplain has been covered with urban and residential development and the river channel itself has been modified to provide flood protection. Nonetheless, major flood incidents have occurred in the past, most recently during the winters of 1980, 1982, 1983, and 1995.

The Guadalupe River has also been identified as a significant mercury source to the Bay. Mercury mining occurred between 1845 and 1975 in what is now the present location of the Almaden Quicksilver County Park. In 1975, the former mining district was purchased by Santa Clara County for use as a recreational park. The principal mercury ore in the area is cinnabar (mercury sulfide), which is situated within a host silica-carbonate rock. The cinnabar is processed by crushing the ore and reducing the ore to elemental mercury in retorts or furnaces. The burned rocks, referred to as calcines, typically were dumped in piles near the processing areas or used as road base material. Generally, the calcines are sandy or silty gravel materials. The calcine piles still remain at the site and vary in area, steepness, mercury concentration, and particle size distribution. Erosion and runoff from calcine piles, waste rockpiles (unprocessed rock), and road material cause mercury-laden sediment to be transported into nearby surface waterbodies that are tributary to the Guadalupe River (Santa Clara Basin WMI, 2001).

4.1.1.2 Los Gatos Creek Subwatershed

Los Gatos Creek has a drainage area of about 55 square miles and joins the Guadalupe River in downtown San Jose. The Los Gatos Creek subwatershed is located on the north-facing slopes of the Santa Cruz Mountains and varies in elevation from 3,483 feet at the peak of Mt. Thayer to about 90 feet at the Creek's confluence with the Guadalupe River. Vasona Reservoir is located on Los Gatos Creek approximately 7.9 miles upstream of its confluence with the Guadalupe River. The watershed above Vasona Dam encompasses about 44 square miles. Lexington Reservoir is located on Los Gatos Creek about 11 miles upstream of its confluence with the Guadalupe River. Lake Elsman and Williams Reservoir are both located on the creek upstream of Lexington Reservoir. There are a total of 15 named tributaries to Los Gatos Creek, as well as several other unnamed tributaries. Lake Ranch Reservoir is located on one such tributary, Lyndon Canyon Creek.

In the upper watershed, the creek's course is through steep, largely undeveloped terrain and the width of the riparian corridor is narrow. In the lower watershed, Los Gatos Creek passes through relatively flat urban areas (Cities of Los Gatos, Campbell, and San Jose), and much of the riparian corridor has been fragmented by bank stabilization for flood control purposes. As with the Guadalupe River, reservoirs, passage barriers, flood control projects and other channel modifications have significantly altered riparian and aquatic habitats along the creek.

Dry Creek

Dry Creek is an ephemeral channel that flows through a heavily urbanized portion of San Jose and empties into Los Gatos Creek approximately 2.5 miles above its confluence with the Guadalupe River. Dry Creek flows northeast and drains an area between Los Gatos Creek on the west and the Guadalupe River on the east. The channel is fully modified, with portions rock-lined, concrete-lined, and encased by an earthen levee.

Daves Creek

Daves Creek is an ephemeral tributary to Los Gatos Creek, rising along the western boundary of the watershed and flowing for just over two miles through urbanized portions of Los Gatos and San Jose before emptying into Los Gatos Creek downstream of Vasona Dam. Daves Creek's channel has been lined with concrete to expedite the drainage of flood flows into Los Gatos Creek downstream.

Almendra Creek

Almendra Creek is an ephemeral stream that rises on the northeast side of the foothills above Los Gatos, flows northeastward into Los Gatos, then turns eastward through the downtown area to empty into Los Gatos Creek approximately halfway between the head of Vasona Reservoir and Lenihan Dam (Lexington Reservoir). The channel is largely rock- or concrete-lined through the urbanized portion of its drainage.

Trout Creek

Trout Creek is a perennial to intermittent tributary to Los Gatos Creek, joining it just downstream of Lenihan Dam (Lexington Reservoir). Trout Creek flows eastward into Los Gatos Creek along a natural channel draining the northern foothills of the Santa Cruz Mountains above Los Gatos and Campbell. Little detailed information is available regarding Trout Creek's drainage area.

Lyndon Canyon Creek

Lyndon Canyon Creek is an intermittent tributary to Lexington Reservoir on Los Gatos Creek, joining it on its western shore approximately one-third of the distance uplake from Lenihan Dam. The creek's headwaters are impounded by Lake Ranch Reservoir. The creek flows slightly southeastward along a natural channel. Little detailed information is available regarding Lyndon Canyon Creek's drainage area.

Black Creek

Black Creek is an intermittent tributary to Lexington Reservoir on Los Gatos Creek, joining it on its western shore approximately one-half of the distance uplake from Lenihan Dam. The creek flows slightly northeastward along a short natural channel. Little detailed information is available regarding Black Creek's drainage area other than that it is steep and rugged with little or no development.

Dyer Creek

Dyer Creek is a short intermittent tributary to Briggs Creek that flows eastward into Lexington Reservoir, joining it on its western shore approximately two-thirds of the distance uplake from Lenihan Dam. The creek flows slightly northeastward along a short natural channel. Little detailed information is available regarding Dyer Creek's drainage area other than that it is steep and rugged with little or no development.

Briggs Creek

Briggs Creek flows eastward into Lexington Reservoir, joining it on its western shore approximately two-thirds of the distance uplake from Lenihan Dam. The intermittent creek flows slightly southeastward along a natural channel, absorbing the flow of Dyer Creek from the southwest approximately one-half of the distance to the reservoir. Little detailed information is available regarding Briggs Creek's drainage area other than that it is steep and rugged with little or no development.

Aldercroft Creek

Aldercroft Creek flows northeastward into Lexington Reservoir, joining it on its western shore approximately four-fifths of the distance uplake from Lenihan Dam. The intermittent creek flows along a natural channel nearly due north from the summit ridge of the Santa Cruz Mountains, then turns east toward Lexington Reservoir, passing under State Highway 17. Little detailed information is available regarding Aldercroft Creek's drainage area other than that it is steep and rugged with little or no development.

Moody Gulch

Moody Gulch flows northeastward into Los Gatos Creek, joining it from the west just upstream of the head of Lexington Reservoir. The intermittent creek flows along a short natural channel for approximately 1.3 miles through steep rugged terrain. Rural residential development is scattered through the Moody Gulch drainage.

Limekiln Creek

Limekiln Creek is a longer intermittent stream that rises on the northwest side of the Sierra Azul and flows through a natural channel westward into Lexington Reservoir. The creek joins the reservoir on its eastern shore approximately one-fifth of the distance uplake from Lenihan Dam. Little is known about the drainage area of Limekiln Creek other than that it is rugged with little or no development.

Soda Springs Canyon Creek

Soda Springs Canyon Creek is a long perennial to intermittent stream that rises on the northwest side of the Sierra Azul and flows through a natural channel westward into Lexington Reservoir. The creek joins the reservoir on its eastern shore approximately one-half of the distance uplake from Lenihan Dam. Little is known about the drainage area of Soda Springs Canyon Creek other than that it is rugged with little or no development.

Hendrys Creek

Hendrys Creek is a shorter intermittent stream that rises on the west side of the Sierra Azul and flows through a natural channel westward into Los Gatos Creek at the head of Lexington Reservoir. Little is known about the drainage area of Hendrys Creek other than that it is rugged with little or no development.

Hooker Gulch

Hooker Gulch is an intermittent stream that rises on the west side of the Sierra Azul and flows through a natural channel westward into Los Gatos Creek approximately halfway between the head of Lexington Reservoir and Lake Elsman. Little is known about the drainage area of Hooker Gulch other than that it is rugged with little or no development.

Austrian Gulch

Austrian Gulch is an intermittent stream that rises on the southwest side of the Sierra Azul and flows through a natural channel southwestward into Lake Elsman, just upstream from the dam along its north shore. Little is known about the drainage area of Austrian Gulch other than that it is rugged with little or no development.

Vasona Reservoir

Vasona Reservoir is owned and operated by the Water District and is located within Vasona Lake County Park in Los Gatos near the intersection of State Highway 17 and State Highway 85. Vasona Dam is located on Los Gatos Creek approximately two miles downstream (northeast) of Lenihan Dam. The watershed drainage area downstream of Lexington Reservoir is approximately 6.46 square miles. Vasona Reservoir was completed in 1935. It has an average surface area of 58 acres and a capacity of 400 acre-feet (Santa Clara Basin WMI, 2001).

The upper part of the drainage area above Vasona Reservoir (excluding the Lexington Reservoir drainage area) is located on the eastern slopes of El Sereno and the northern slopes of St. Joseph's Hill. The lower part of the drainage area consists of the mainly flat Los Gatos area north of the upper part of the watershed. The lower part of the watershed is well developed and urbanized. The upper part is less urbanized in the steeper portions. The Town of Los Gatos and City of Monte Sereno lie within the lower portion of the watershed (Santa Clara Basin WMI, 2001).

Vasona Reservoir is located in the alluvial floodplain formed by Los Gatos Creek prior to its channelization. The Water District uses the reservoir to store and release recharge waters to percolation ponds further downstream on Los Gatos Creek. Park visitors actively use the reservoir and surrounding parklands. Since the capacity of Vasona Reservoir is small, water released from Lexington Reservoir is just momentarily detained in Vasona Reservoir before passing through.

Lexington Reservoir

Lexington Reservoir is owned and operated by the Water District and is located adjacent to State Highway 17 in unincorporated western Santa Clara County approximately one mile south of Los Gatos. Lexington Reservoir was completed in 1952. It has an average surface area of 475 acres and a capacity of 19,834 acre-feet. The James J. Lenihan Dam impounds Los Gatos Creek and numerous other drainages within the surrounding watershed. Los Gatos Creek enters the south end of the reservoir, while Limekiln Creek and Soda Springs Canyon Creek drain into the reservoir from the east, Aldercroft Creek, Black Creek and Briggs Creek from the west, and Moody Gulch and Hendrys Creek from the south. Hendrys Creek, Los Gatos Creek (with Lake Elsman), and Aldercroft Creek contribute water most of the year. Briggs Creek and Black Creek contribute water only part of the year during the wet season (Santa Clara Basin WMI 2001).

The drainage area upstream of Lexington Reservoir is 36.9 square miles. Lexington Reservoir discharges to Los Gatos Creek at the base of the Sierra Azul. Lexington Reservoir is roughly 2.5 miles long and 3,000 feet wide at the northern end near the dam. The primary purpose of the Lexington Reservoir is to store water for scheduled releases to replenish groundwater at recharge facilities further downstream on Los Gatos Creek (Santa Clara Basin WMI 2001).

Of the reservoir watersheds in the county, Los Gatos Creek above Lexington Reservoir is the most highly developed. Aldercroft Heights, Chemeketa Park, Holy City, Redwood Estates, and a development above Lexington Reservoir on the Monte Vina arm are clusters of development within the watershed above Lexington Reservoir. In addition, there are individual houses and estates outside the relatively densely populated areas, and also schools and recreational camps.

Lake Elsman

Lake Elsman is a smaller reservoir located upstream of Lexington Reservoir on Los Gatos Creek. Lake Elsman has a storage capacity of 6,200 acre-feet and is owned and operated by San Jose Water Company. Water released from Lake Elsman flows through a reach of Los Gatos Creek to Lexington Reservoir downstream. The primary purpose of Lake Elsman is to provide water supply for the San Jose Water Company's customers. Most of the watershed above Lake Elsman is undeveloped.

Williams Reservoir

Williams Reservoir is a small impoundment on Los Gatos Creek immediately upstream of Lake Elsman. The two reservoirs adjoin one another. Williams Reservoir is privately owned and operated.

Lake Ranch Reservoir

Lake Ranch Reservoir is a small impoundment near the headwaters of Lyndon Canyon Creek. Lake Ranch Reservoir is within Sanborn-Skyline County Park and is owned and operated by the Santa Clara County Parks Department.

4.1.1.3 Canoas Creek Subwatershed

Canoas Creek is a perennial 7.4-mile long channel that drains a heavily urbanized portion of San Jose east of the Guadalupe River and west of the neighboring Coyote Creek. Canoas Creek has a drainage area of approximately 19 square miles and joins the Guadalupe River just upstream of Curtner Avenue. The creek's channel has been entirely modified, with most of it being concrete-lined. Canoas Creek flows west along the northern base of the Santa Teresa Hills, then turns north/northwest before reaching the Guadalupe River.

4.1.1.4 Ross Creek Subwatershed

Ross Creek extends from Blossom Hill Road near the northern base of the Sierra Azul east of Los Gatos through urbanized portions of San Jose to the Guadalupe River just downstream of Branham Lane, joining it from the west. Ross Creek drains an area of about 10 square miles and is fed by two tributaries: Short Creek and Lone Hill Creek. Ross Creek is intermittent and flows through a concrete-lined channel.

Lone Hill Creek

Lone Hill Creek is an intermittent stream that rises on the northern side of the Sierra Azul and flows north for a short distance into Ross Creek. Most of the creek's channel is concrete-lined as it flows through an urbanized area; however, its upper portion is in a relatively undeveloped foothill area.

Short Creek

Short Creek is essentially the uppermost portion of Ross Creek (above Blossom Hill Road). Short Creek is an intermittent stream that rises on the northern side of the Sierra Azul and flows northwest and then curves north for a short distance into Ross Creek. Most of the creek's channel is natural as it flows from undeveloped foothill areas down into a more urbanized area.

4.1.1.5 Guadalupe Creek Subwatershed

The Guadalupe Creek subwatershed drains the northern side of the Sierra Azul and flows northwest, then northeast to join with Alamitos Creek in forming the Guadalupe River downstream of Coleman Road and Almaden Expressway. Guadalupe Reservoir is located on Guadalupe Creek in the mountainous area southeast of Los Gatos, approximately 5.9 miles upstream of the creek's confluence with the Guadalupe River. There is a total of six named tributary streams, as well as several unnamed tributaries, that drain the surrounding mountainsides.

In the upper watershed, the creek's course is through steep, largely undeveloped terrain and the width of the riparian corridor is narrow. In the lower watershed, Guadalupe Creek passes through relatively flat urban areas (City of San Jose) and much of the riparian corridor has been fragmented by bank stabilization for flood control purposes. As with the Guadalupe River and Los Gatos Creek, reservoirs, passage barriers, flood control projects, gravel mining, percolation pond construction and other channel modifications have significantly altered riparian and aquatic habitats along the creek. Above Guadalupe Reservoir, however, the stream is relatively natural.

Pheasant Creek

Pheasant Creek is a perennial to intermittent stream that rises on the northeasternmost side of the Sierra Azul and flows through a natural channel northeastward into Guadalupe

Creek near its sharp bend to the northeast. There is some rural residential development on the hillsides above the creek, though most of the creek's drainage area is steep and undeveloped.

Shannon Creek

Shannon Creek is an intermittent stream that rises on the northeastern side of the Sierra Azul and flows through a natural channel northeastward into Guadalupe Creek near its sharp bend to the northeast. There is some rural residential development along the lower part of the creek, though most of the creek's drainage area is steep and undeveloped.

Rincon Creek

Rincon Creek is an long perennial stream that rises on the northeastern side of the Sierra Azul and flows through a natural channel northeastward into Guadalupe Creek just above the head of Guadalupe Reservoir. Little is known about the creek's drainage area other than that it is steep and undeveloped.

Los Capitancillos Creek

Los Capitancillos Creek is an intermittent stream that rises on the northwest side of "Mine Hill" in the former New Almaden Mining District. The creek flows through a natural channel northwestward into Guadalupe Creek just above the head of Guadalupe Reservoir but just downstream of the confluence of Rincon Creek on the opposite bank. Little is known about the creek's drainage area other than that it is steep and undeveloped.

Reynolds Creek

Reynolds Creek is a perennial stream, fed by Cherry Springs, that rises on the northeastern side of the Sierra Azul and flows through a natural channel northeastward into Guadalupe Creek downstream of Guadalupe Reservoir. Little is known about the creek's drainage area other than that it is steep and undeveloped. One named tributary, Hicks Creek, flows into Reynolds Creek from the southwest.

Hicks Creek

Hicks Creek is a short, perennial tributary of Reynolds Creek stream that rises on the northern side of El Sombroso in the Sierra Azul and flows through a natural channel north into Reynolds Creek. Little is known about the creek's drainage area other than that it is steep and undeveloped.

Guadalupe Reservoir

Guadalupe Reservoir is located on Guadalupe Creek nearly six miles above its confluence with the Guadalupe River. The reservoir is located on the southern boundary of Almaden Quicksilver County Park on Hicks Road. Guadalupe Creek provides perennial flow to the reservoir from its upper drainage area, which includes Rincon and Los Capitancillos Creeks as well. The reservoir was completed in 1935 and has an average surface area of 79 acres and a capacity of 3,228 acre-feet. Its principal purpose is to provide staged releases of impounded water for groundwater recharge purposes in the Guadalupe Creek and Guadalupe River channels and in the Los Capitancillos, Alamitos, and Guadalupe recharge ponds. The Water District owns and operates this reservoir for water conservation purposes (Neudorf, pers. comm., 2002).

The watershed above Guadalupe Reservoir is steep, rugged, and features very little development of any kind.

4.1.1.6 Alamitos Creek Subwatershed

Alamitos Creek and its major tributary Arroyo Calero (often referred to as Calero Creek) are located in the Almaden Valley, a northwest-trending valley located within the larger Santa Clara Valley but separated from it by the Santa Teresa Hills. The Alamitos Creek subwatershed (including the Arroyo Calero subwatershed) is approximately 38 square miles. Alamitos Creek originates in the Santa Cruz Mountains at an elevation of around 3,800 feet. With other tributaries, Alamitos Creek flows northwesterly to Almaden Reservoir. From Almaden Reservoir, Alamitos Creek flows in a northeast direction to its confluence with Arroyo Calero. Along this stretch, the stream gradient is moderately steep. At the Arroyo Calero confluence, Alamitos Creek turns slightly more westward and continues along a moderately steep gradient to the point of confluence with Guadalupe Creek near Blossom Hill Road and Almaden Expressway in San Jose, where the resultant stream becomes known as the Guadalupe. Lake Almaden is located just above this confluence on Alamitos Creek. A total of 10 named tributaries (excluding Arroyo Calero and its tributaries) feed Alamitos Creek (Santa Clara Basin WMI, 2001).

In the upper watershed, the creek's course is through steep, largely undeveloped terrain and the width of the riparian corridor is narrow. In the lower watershed, Alamitos Creek passes through relatively flat urban areas (City of San Jose), though its gradient through this area is steeper than that of either Guadalupe or Los Gatos Creeks. Though they do exist along Alamitos Creek, reservoirs, passage barriers, flood control projects and other channel modifications have altered riparian and aquatic habitats along the creek to a lesser extent than along either Guadalupe or Los Gatos Creeks. There have been several major floods in the Alamitos Creek subwatershed, some of which have caused significant damage. Alamitos Creek was widened and levees were constructed from McKean Road downstream to its confluence with Guadalupe Creek in the late 1970s (Santa Clara Basin WMI, 2001 and Neudorf, pers. comm., 2002).

Golf Creek

Golf Creek is a 3.3 mile-long intermittent stream that rises on the north slope of the ridgeline separating Guadalupe Creek and Alamitos Creek. This ridge is the location of the former New Almaden Mining District. The creek flows through a natural channel north into the flatter valley area north of the mountains. This area has been urbanized in recent years and the creek is encased in a concrete-lined channel as it curves to the northeast toward its confluence with Almaden Creek a short distance upstream of Lake Almaden. McAbee Creek is a short tributary to Golf Creek.

McAbee Creek

McAbee Creek is a short intermittent tributary to Golf Creek, rising on the northeastern side of the ridgeline separating the Guadalupe Creek and Alamitos Creek subwatersheds. The creek flows through a natural channel north into the flatter valley area north of the mountains. This area has been urbanized in recent years and the creek is encased in a concrete-lined channel in its lower portion before it discharges into Golf Creek from the southwest.

Greystone Creek

Greystone Creek is a two mile-long intermittent stream that rises on the north slope of the ridgeline separating Guadalupe Creek and Alamitos Creek. This ridge is the location of the former New Almaden Mining District. The creek flows through a natural channel north into the flatter valley area north of the mountains. This area has been urbanized in recent years and the creek is encased in a concrete-lined channel as it continues north toward its confluence with Almaden Creek downstream of the Arroyo Calero confluence.

Randol Creek

Randol Creek is a 2.9 mile-long perennial to intermittent stream that rises on the northwestern slope of Church Hill in the former New Almaden Mining District. The creek flows through a natural channel north into the flatter valley area north of the mountains. This area has been urbanized in recent years and the creek is encased in a concrete-lined channel as it curves to the northeast toward its confluence with Almaden Creek a short distance downstream of the Arroyo Calero confluence.

Jacques Gulch

Jacques Gulch is an intermittent stream that rises on the northeast side of Bald Mountain in the Sierra Azul. The creek flows through a natural channel northeastward into Almaden Reservoir, joining it on its northern shore approximately two-thirds of the distance uplake from Almaden Dam. Little is known about the creek's drainage area other than that it is steep and undeveloped.

Herbert Creek

Herbert Creek is a 3.1 mile-long perennial stream that rises on the northeast side of the Sierra Azul crest and flows through a natural channel northeastward into the upper end of Almaden Reservoir. Little is known about the creek's drainage area other than that it is steep and undeveloped. Barrett Canyon Creek flows into Herbert Creek in its lowermost segment, just above the head of Almaden Reservoir.

Barrett Canyon Creek

Barrett Canyon Creek is a 3.5 mile-long perennial stream that rises on the north slope of Loma Prieta. The creek flows through a natural channel north into Herbert Creek just above the head of Almaden Reservoir. Little is known about the creek's drainage area other than that it is steep and undeveloped.

Larabee Gulch

Larabee Gulch is a shorter intermittent stream that rises on the northwest slopes of Fern Peak in the Bald Peaks area. The creek flows through a natural channel northwest into Almaden Reservoir approximately one-fourth of the distance uplake from Almaden Dam. Little is known about the creek's drainage area other than that it is steep and undeveloped.

Chilanian Gulch

Chilanian Gulch is an intermittent stream that rises on the northwest slope of the ridge dividing Almaden Creek from Cherry Canyon Creek in the Arroyo Calero subwatershed to the east. The creek flows through a natural channel northwest into Almaden Creek just below the town of New Almaden. Little is known about the creek's drainage area other than that it is steep and undeveloped.

Deep Gulch

Deep Gulch is an intermittent stream that rises on the southeast slope of "Mine Hill" in the former New Almaden Mining District. The creek flows through a natural channel east into Almaden Creek just above the town of New Almaden. The Deep Gulch drainage area was formerly the location of active mercury mining and is now part of Almaden Quicksilver County Park. Several old miner cemeteries and remnants of mining development are scattered through and adjacent to the Deep Gulch drainage.

Lake Almaden

Lake Almaden is a small impoundment on Alamitos Creek a short distance upstream of its confluence with Guadalupe Creek at the head of the Guadalupe River, at Coleman Avenue and Almaden Expressway in San Jose. The lake is the centerpiece of the 65-acre Almaden Lake Park and is owned and operated by the San Jose Conventions, Arts & Entertainment Department in cooperation with the Water District. The lake itself was progressively formed as a result of a rock quarry operation which began in the late 1940s. Excavation for the quarry started at the center of Alamitos Creek and moved outward, transforming what was once a meadow where dairy cows grazed into a lake. In recent years, the lake has been operated by the Water District as a groundwater recharge facility and was first opened for public use as a park in the spring of 1982 (San Jose Regional Parks website, 2002).

Almaden Reservoir

Almaden Reservoir is located on Alamitos Creek south of San Jose. The southeastern end of Almaden Quicksilver County Park is opposite Almaden Reservoir on the north side of Alamitos Road. Almaden Reservoir was completed in 1935. It has an average surface area of 59 acres and a capacity of 1,586 acre-feet. The reservoir is located in a 12-square-mile drainage area of hilly terrain covered with range grass, low bushes, and trees. Almaden Reservoir collects runoff from the surrounding watershed that includes Herbert and Barrett Canyon Creeks flowing into the southwest end of the reservoir near the small community of Twin Creeks. Barrett Canyon Creek and Herbert Creek flow all year. Jacques Gulch feeds the western side of the reservoir and flows most of the year, while Larabee Gulch contributes to the eastern side of the reservoir during high peak flows, then drops off quickly. The reservoir releases water to Alamitos Creek for groundwater recharge. During the rainy season, storms or long wet periods often produce more runoff than the reservoir can contain. Excess runoff is directed to Calero Reservoir via the Almaden-Calero Canal. The Water District owns and operates this reservoir for water conservation purposes only; however, there some incidental flood control benefits (Santa Clara Basin WMI, 2001).

The watershed above Almaden Reservoir is very lightly developed; most is rugged mountainous terrain. Vestiges of historic mercury mining remain within Almaden Quicksilver County Park bordering the reservoir on the northwest.

4.1.1.7 Arroyo Calero Subwatershed

Arroyo Calero (commonly referred to as Calero Creek) is the major tributary to Alamitos Creek, joining it from the east approximately 3.1 miles upstream of Lake Almaden. Of the 12.5 square miles comprising the Arroyo Calero subwatershed, seven are located in the hills above Calero Reservoir. Two named tributaries flow into Calero Reservoir. From Calero Reservoir, Arroyo Calero flows northwest to its confluence with Alamitos Creek. Santa Teresa Creek joins Arroyo Calero from the east just before the confluence with Alamitos Creek.

Arroyo Calero passes through relatively flat urban and open space areas (City of San Jose) for its entire length, though its gradient through this area is steeper than that of either Guadalupe or Los Gatos Creeks. There have been some major floods in the Arroyo Calero subwatershed.

Santa Teresa Creek

Santa Teresa Creek begins in the Santa Teresa Hills and flows northwest, parallel to and about 1,000 feet north of Arroyo Calero for nearly 2.9 miles. Santa Teresa Creek outfalls into Arroyo Calero just below Harry Road. A section of Santa Teresa Creek was widened in the late 1970s. The stream is intermittent and flows through largely developed areas, particularly in its lower segment.

Cherry Canyon Creek

Cherry Canyon Creek is an intermittent stream that rises on the northeast side of Fern Peak and flows through a natural channel northeastward into the southwestern side of Calero Reservoir. Little is known about the creek's drainage area other than that it is steep and undeveloped.

Pine Tree Canyon Creek

Pine Tree Canyon Creek is an intermittent stream that rises on the eastern side of the Bald Peaks and flows through a natural channel eastward and then north into the upper end of Calero Reservoir. Little is known about the creek's drainage area other than that it is steep and undeveloped. Mud Springs is located near the upper end of the creek.

Calero Reservoir

Calero Reservoir is located on Arroyo Calero just south of the Santa Teresa Hills section of San Jose and east of the community of New Almaden and Almaden Reservoir. Calero Reservoir was completed in 1935 and has a surface area of 347 acres and a capacity of 10,050 acre-feet. Calero Reservoir collects runoff from a seven square-mile drainage area drained by Cherry Canyon and Pine Tree Canyon Creeks and also receives surplus surface water from Almaden Reservoir via the Almaden-Calero Canal. Excess runoff from Almaden Reservoir is transferred to Calero Reservoir, which has a storage capacity five times greater than that of Almaden. The area surrounding the reservoir is predominantly grasslands and oak savannah (Santa Clara Basin WMI, 2001).

The primary purpose for Calero Reservoir is the controlled release of surface runoff for downstream groundwater recharge. Recharge waters are released either directly to Arroyo Calero or to the Almaden Valley Pipeline that delivers raw water to the Vasona Pumping Station, approximately one mile north of Vasona Reservoir. The Water District owns and operates Calero Reservoir for water conservation purposes; however, there may be some incidental flood control benefits.

The watershed above Calero Reservoir is very lightly developed; most is rugged mountainous terrain.

4.1.2 Current Beneficial Use Designations for Watershed Waterbodies

The San Francisco Bay Regional Water Quality Control Board (Regional Board) has designated waterbodies for specific beneficial uses in the Water Quality Control Plan (Basin Plan) for the region. Four of these uses were evaluated by the WMI in the pilot watershed assessments. Prior to the assessments, WMI stakeholders identified some corrections and potential changes to the beneficial use designations in the Basin Plan. These recommendations were based on stakeholder understanding of stream and watershed characteristics. After the pilot assessments were completed, both the existing use designations and the initial WMI stakeholder recommendations for revisions to these designations were reviewed against the assessment results in order to identify any additional revisions that should be highlighted.

Table 4-1 presents the findings of this analysis. Basin Plan beneficial use designations for the four uses evaluated in the pilot assessment are shown, as are the additional use designations recommended by WMI stakeholders prior to the assessment and potential changes based on the pilot assessment findings. Blanks indicate that no designations have been made or proposed. Streams or reservoirs not listed in the Basin Plan are shown in italics. No column is shown for the Protection from Flooding (PFF) interest as it is not a beneficial use identified by the Regional Board.

As not all of the existing data was made available for use in the pilot assessment, this evaluation is limited. Review of other data in the possession of watershed stakeholders should be completed prior to the formal proposal of any beneficial use designation revisions. WMI stakeholders submitted a series of alternative use support determinations for several stream segments in the Guadalupe watershed. These opinions are referenced in Appendix 4-A and shown on Figure 2-2.

Table 4-1
Beneficial Use Designations in the Guadalupe River Watershed

WATERBODY	***BENEFICIAL USE***			
	Cold Freshwater Habitat (COLD)	***Municipal and Domestic Supply (MUN)***	***Preservation of Rare and Endangered Species (RARE)***	***Water Contact Recreation (REC-1)***
Guadalupe River	WE		WE	P
Guadalupe Creek	WE		WP	
Pheasant Creek	WP		WP	
Shannon Creek				
Guadalupe Reservoir	E	E		E
Rincon Creek				
Los Capitancillos Creek				
Reynolds Creek	WE		WP	
Hicks Creek				
Los Gatos Creek	E	E	WE	
Vasona Reservoir	E/WL			E
Lexington Reservoir	E	E		E
Lake Elsman	E	E		
Williams Reservoir				
Trout Creek				
Lyndon Canyon Creek				
Lake Ranch Reservoir				
Daves Creek				
Black Creek				
Dyer Creek				
Briggs Creek				
Aldercroft Creek				
Moody Gulch	AP			

WATERBODY	BENEFICIAL USE			
	Cold Freshwater Habitat (COLD)	Municipal and Domestic Supply (MUN)	Preservation of Rare and Endangered Species (RARE)	Water Contact Recreation (REC-1)
Limekiln Creek				
Soda Springs Canyon Creek				
Hendrys Creek				
Hooker Gulch				
Austrian Gulch				
Almendra Creek				
Dry Creek				
Lake Almaden				
Alamitos Creek	WE		WP	
Almaden Reservoir	E	E		E
Jacques Gulch				
Herbert Creek	WE			
Barrett Canyon Creek				
Larabee Gulch				
Chilanian Gulch				
Deep Gulch				
Greystone Creek				
Golf Creek				
Randol Creek				
McAbee Creek				
Arroyo Calero	WE		WP	
Calero Reservoir	E	E	AP	E
Cherry Canyon Creek				
Pine Tree Canyon Creek				
Santa Teresa Creek				
Canoas Creek				
Ross Creek				
Lone Hill Creek				
Short Creek				

Legend: E = Existing Beneficial Use; P = Potential Beneficial Use; WE = WMI stakeholder pre-assessment recommendation for existing beneficial use designation; WL = WMI stakeholder pre-assessment recommendation for limited beneficial use designation; AP = WMI pilot assessment results recommendation for potential beneficial use designation.
Note: Waterbodies in italics are not listed in the Basin Plan.
Source: San Francisco Bay Regional Water Quality Control Board, 1995. San Francisco Regional Water Quality Control Plan, Table 2-5.

The results of the pilot assessment generally confirmed the pre-assessment recommendations of WMI stakeholders regarding beneficial use designations for Guadalupe River watershed waterbodies. Only in two cases did the available data provide enough confidence to propose additional potential use designations based on the pilot assessment results: cold freshwater habitat (COLD) in Moody Gulch and preservation of rare and endangered species (RARE) in Calero Reservoir. However, as the pilot assessment was based on the review of existing, available data and did not involve a field-checking component, it is recommended that additional focused data collection and review be conducted before any new use designations are adopted.

In general, the major streams in the Guadalupe River watershed have diverse characteristics and support different beneficial uses in different locations. As a result, the Basin Plan beneficial use designations should either reflect this diversity by applying only to specific sections of each stream or should be coupled with an understanding that the entire length of the stream will not provide the same level of support for the designated use (Santa Clara Basin WMI, 2001).

4.1.3 Stream Segmentation for Assessment

In order to organize the review of data during the pilot assessment, the Guadalupe River watershed was divided into a total of 63 stream segments (or reaches). Most of the segments consist of individual tributary streams and watershed reservoirs. In the lower portion of the watershed, however, it was necessary to divide the longer streams (Los Gatos, Guadalupe, and Alamitos Creeks) and the Guadalupe River into multiple segments in order to facilitate data evaluation. In such cases, stream reaches were delineated based on common channel type, flow regime, and adjacent land use. It should be noted that the segmentation approach used for the pilot assessment was consistent with and useful for the robustness of the available data but is not based on a detailed study of stream geomorphology or riparian zone condition. WMI stakeholders have noted that a few stream reaches are comprised of individual segments that are quite dissimilar in a number of significant ways. Suggestions for further sub-dividing these reaches were received and are described under the relevant stream in Section 4.3. Additional detail on the stream segmentation approach used for the pilot assessments may be found in Appendix A4, "Stream Segmentation Approach for Assessments."

The stream segments defined for the Guadalupe River watershed are shown on Figures 2-2a through 2-2e. The individual reaches are grouped and designated within the six major subwatersheds. The Guadalupe River itself accounts for five reaches (GR-1 through GR-5). The Guadalupe Creek subwatershed contains 10 reaches (GR/GC-1 through GR/GC-9), including Guadalupe Reservoir (GR/GC/GR). The Los Gatos Creek subwatershed contains 25 reaches (GR/LG-1 through GR/LG-20), including the five reservoirs in the subwatershed. The Alamitos Creek subwatershed contains 14 reaches (GR/AL-1 through GR/AL-12), including two reservoirs. The Arroyo Calero subwatershed contains four reaches (GR/AC-1 through GR/AC-4), including Calero Reservoir (GR/AC/CR). Canoas Creek represents one reach (GR/CC) while the Ross Creek drainage is comprised of three reaches (GR/RC-1 through GR/RC-3).

4.2 General Assessment Results

The methodology and approach used for the pilot assessments is described in Chapter 3. The remainder of this chapter presents and interprets the results of the pilot assessment for the Guadalupe River watershed. Due to its reliance on existing data and the unavailability of some key data sets, the pilot assessment contains inherent limitations. As described in Chapter 2, caution is advised when interpreting the results of the pilot assessment. It is recommended that additional data in the possession of various stakeholders be reviewed in order to confirm or, where appropriate, revise the assessment results to fully reflect all relevant existing data. For additional detail concerning the results of the pilot assessments, please see the following:

- Figures 2-1 and 2-2a through 2-2e for a series of maps illustrating the assessment results for the Guadalupe River watershed
- Appendix 4-A, Tables 1-6 for a series of bar graphs illustrating the assessment results for the Guadalupe River watershed
- Appendix 4-B for a series of tables summarizing the assessment results for the Guadalupe River watershed and containing information on limiting factors, suspected causes, data gaps, and local knowledge comments from WMI stakeholders
- Appendix 4-C for a detailed list of the data sets used in the assessment for the Guadalupe River watershed
- Appendix B to this report describing the lessons learned from the pilot assessments
- Appendix C to this report describing the data sufficiency evaluation and the data gaps identified for each stream reach
- Appendix D to this report describing the factors limiting full use support as discerned by the pilot assessment as well as some suspected causes for these factors

4.2.1 Data Sufficiency

Prior to evaluating the data itself, a data sufficiency review was conducted in order to identify data sets that would be of use in the assessment. This review identified data gaps on a reach-by-reach basis for each of the five beneficial uses and stakeholder interests being evaluated. A summary of the data sufficiency analysis for the Guadalupe River watershed is presented in Table 4-2. A more detailed explanation of the data sufficiency evaluation process and the types of data gaps identified is provided in Appendix C. It should be noted that some data initially identified as useful for the analysis were not made available to the assessment team and, therefore, were not included in the pilot assessment process.

Table 4-2
Guadalupe Watershed Data Sufficiency Summary

Use/ Interest	*Stream Reaches With Insufficient Data*	*Miles of Stream Reaches With Insufficient Data*	*% of Watershed*	*Stream Reaches With Sufficient But Limited Data**	*Miles of Stream Reaches With Sufficient But Limited Data**	*% of Watershed*	*Stream Reaches With Sufficient Data***	*Miles of Stream Reaches With Sufficient Data***	*% of Watershed*
COLD	40	69.7	*48*	9	23.9	*17*	14	48.6	*35*
MUN	46	99.1	*69*	13	38.8	*28*	4	4.3	*3*
REC-1	43	91.4	*63*	16	34.8	*25*	4	16.1	*12*
PFF	28	46.4	*31*	5	0.0	*0*	30	95.9	*69*
RARE	43	78.0	*54*	9	27.8	*20*	11	36.4	*26*

* Includes uncertainty levels of C and D
** Includes uncertainty levels of A and B

As is illustrated in Table 4-2, the data gaps in the Guadalupe River watershed were significant. Support statements with relatively high levels of certainty (rated either A or B) were only developed for between 3 and 69% of the reaches in the watershed, depending on the use being evaluated. While support statements were also developed for other reaches, data deficiencies demanded that these conclusions be qualified with a high level of uncertainty (rated either C or D). For this second group of reaches, no suspected causes were identified for the limiting factors due to the general lack of confidence in the support statements.

4.2.2 Overall Conclusions by Use

This section discusses the results of the pilot beneficial use/stakeholder interest assessments for the Guadalupe River watershed on a use-by-use basis. Results for individual waterbodies are described in greater detail in Section 4.3. Local knowledge comments on the assessment results from WMI stakeholders are presented in Section 4.3 as well. The detailed results for each of the 63 stream segments in the watershed are shown in Figures 2-2a through 2-2e (in map form) and in Appendix 4-A, Tables 1-6 (in bar chart form). Individual summary tables containing the assessment results for each reach are presented in Appendix 4-B. The list of data sets used in the assessment (in Appendix 4-C) may be cross-referenced with the data set identification numbers in the tables of Appendix 4-B to inform the reader of the specific data sets used to reach the conclusions for each stream reach and use. Given the lack of consistent data from reach to reach for each use/interest, it is critical that all statements of use support be viewed in light of the attached level of uncertainty.

4.2.2.1 Cold Freshwater Habitat (COLD)

Twenty-three stream reaches examined for the cold freshwater habitat (COLD) use did not have adequate data to make a support statement determination, commonly due to the lack of sufficient data on primary (fish assemblage and indicator macroinvertebrate) and secondary (temperature and other habitat requirements) indicators. All but two of the reservoirs within the Guadalupe watershed were included in the 23 reaches with insufficient data. Stream reaches in the "insufficient data" category are located throughout the Guadalupe subwatersheds and include the upper, rural reaches of Guadalupe Creek, a majority of the stream reaches and all of the reservoirs in the Los Gatos Creek subwatershed, most of the tributaries to Alamitos Creek, the tributaries to Arroyo Calero and Calero Reservoir, and two reaches of Ross Creek.

Only three stream reaches were evaluated as having full support for COLD, two of these in the upper, rural reaches of Guadalupe Creek, and the third on Los Gatos Creek between Lake Elsman and Lexington Reservoir. These conclusions were characterized by good data quality and high certainty.

Partial support was the most common designation of reaches for COLD, with 10 of 63 stream reaches in the Guadalupe watershed being designated as such. The determinations were made with varying levels of uncertainty from very low to moderately high, and seven of the 10 reaches were located in either rural-to-urban transition or urban areas. Only one reservoir, Lake Almaden, was determined to partially support COLD.

Under the COLD assessment, a support status of potential/seasonal support was available. Seven reaches were categorized as having potential/seasonal support, most of these in the lower reaches of Guadalupe River (GR-1 through GR-4) and the Los Gatos Creek main stem from Vasona Reservoir to Lexington Reservoir (GR/LG-2 and GR/LG-3). Also included in this designation, but with a very high level of uncertainty is Almaden Reservoir.

Two urban reaches, the main stem of Ross Creek and Canoas Creek, were characterized as being in non-support of the COLD use. The two reaches contained COLD data of fair quality with moderately high and very high uncertainty levels, respectively.

A total of 141 data sets were reviewed for potential use in the COLD use assessment for the Guadalupe River watershed. Of these, 73 contained data that could be used to develop the assessment results.

Subsequent to completion of the pilot assessment, a significant new data set became available from the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE). Though this study was completed in early 2000, the findings were not released to the assessment team until after the pilot assessment had been completed. While a small portion of this data was used in the assessment (fish habitat mapping, streamflow, and stream temperature), most of the FAHCE project's conclusions concerning limiting factors and habitat quality are contained in the documents that were not available at the time of the pilot assessments. Due to the significance of this information, some of the key conclusions of the FAHCE project regarding the COLD use are described in Section 4.3 under each individual waterbody.[2] This additional data was not used to modify the pilot assessment results in any way but should eventually be incorporated into future reach-specific assessment work undertaken by WMI stakeholders.

Detailed comments and suggestions on the COLD assessment were received from WMI stakeholders and are described in Section 4.3 for each applicable waterbody. Again, this information was not used to modify the pilot assessment results but should, where warranted, be addressed as part of future reach-specific assessment work undertaken by WMI stakeholders. Some of this information is based on data that was not made available to the assessment team for use in the pilot assessment. Appendix 4-A describes

[2] FAHCE collected data and developed its conclusions based on the existing habitat. Their charge was not to re-engineer the entire watershed, but rather optimize the management of existing resources. The study area for the FAHCE Limiting Factors Analysis didn't extend into the tidally influenced zone of the stream as water supply operations have minimal impact in this reach. The WMI Assessment Framework and FAHCE did not share the same criteria for cold freshwater habitat suitability. The WMI adopted a more liberal criteria that allows more habitat to be described as suitable for coldwater resources. FAHCE had to accept the criteria that was set by the National Marine Fisheries Service and the California Department of Fish and Game (Akin, pers. comm., 2002).

alternate support conclusions for the COLD use presented by WMI stakeholders based on other data not available for the pilot assessment.

4.2.2.2 Municipal and Domestic Water Supply (MUN)

Nineteen of 63 stream reaches in the Guadalupe River watershed were found to have enough data to make conclusions on the support status for the beneficial use of municipal and domestic water supply (MUN). Approximately half of the reaches without data are in rural/undeveloped areas of the watershed, with the data gaps being spread over most of the subwatersheds including Guadalupe Creek, Los Gatos Creek, Arroyo Calero, and Alamitos Creek.

The only part of the Guadalupe watershed that fully supports MUN is the lowest (most downstream) portion of Alamitos Creek (from Lake Almaden to Arroyo Calero), but this conclusion of full support was made with a moderately high level of uncertainty.

Two non-urban areas of the Guadalupe watershed indicate partial support for MUN. These are Guadalupe Reservoir and a downstream portion of Alamitos Creek (GR/AL-2) with moderately low and very high levels of uncertainty, respectively.

Thirteen reaches, varying from urban to rural, do not support MUN. These include the urbanized lower reaches of the Guadalupe River from its mouth to Alamitos Creek, excluding reach GR-2 where there was insufficient data. However, the data for the Guadalupe River reaches was identified as old and did not distinguish between wet and dry weather sampling, leading to a moderately high level of uncertainty for this area. The main stem of Guadalupe Creek (GR/GC-1 and GR/GC-2) and the majority of Los Gatos Creek from its mouth up to Lake Elsman, including Vasona and Lexington Reservoirs, also do not support MUN. The uncertainty of the data in most of these reaches was moderately high due to older data and lack of a full suite of parameters, except for the rural reaches of Los Gatos Creek and Lexington Reservoir where uncertainty was very high. The lowest reach of Alamitos Creek (GR/AL-1) and the two reservoirs that drain to it, Calero Reservoir and Almaden Reservoir, do not appear to support MUN, though uncertainty over this varies from moderately low to moderately high, mostly due to lack of data on the full suite of parameters and an inability to distinguish between wet and dry weather sampling.

A total of 32 data sets were reviewed for potential use in the MUN use assessment for the Guadalupe River watershed. Of these, 15 contained data that could be used to develop the assessment results.

Subsequent to completing the initial data review, additional data for a few other reservoirs were obtained and used to revise initial conclusions regarding use support. Data for other reservoirs (Lake Elsman, Williams Reservoir) was sought but not obtained and so no changes were made to their support status.

Detailed comments and suggestions on the assessment of MUN were received from WMI stakeholders and are described in Section 4.3 for each applicable waterbody. This information was not used to modify the pilot assessment results but should, where warranted, be addressed as part of future reach-specific assessment work undertaken by WMI stakeholders.

4.2.2.3 Protection From Flooding (PFF)

Thirty-five of 63 stream reaches in the Guadalupe watershed had adequate data to make a determination of support for the PFF interest. All but three of the 26 reaches with insufficient data were located in rural parts of the watershed, and the three non-rural reaches without enough data to make a determination on support status are small tributary segments where no data has been collected on flooding.

A spatially variable mix of urban to rural stream reaches, a total of 27, were determined to be fully supporting PFF. The range in uncertainty associated with the support determinations was from very low to very high, indicative of the variation in detailed, current data among the subwatersheds.

Eight stream reaches, all located in urban areas of the Guadalupe watershed, were determined to be non-supporting of PFF. Five of the eight are located in the lowermost portion of the Guadalupe River (GR-1 through GR-5) where channel capacity is not adequate to contain the 100-year flood. The other three reaches occur in Canoas Creek (GR/CC-1), the lowermost portion of Ross Creek (GR/RC-1), and Randol Creek, a tributary to the lower portion of Alamitos Creek. All support determinations were made with a very low level of uncertainty due to recent, reliable data on channel capacities.

A total of 31 data sets were reviewed for potential use in the PFF interest assessment for the Guadalupe River watershed. Of these, 19 contained data that could be used to develop the assessment results.

The logic diagram in the Assessment Framework for the PFF interest required that this evaluation be conducted for "current" development conditions as well as "future" development conditions. Future conditions were defined in the framework as being consistent with the future development assumptions incorporated in the Water District's Waterways Management Model (WMM). Output from the WMM was the primary data set used to determine the support status for this interest in reaches where the data was available. In reviewing this data, it was difficult to determine exactly how future development was accounted for in the WMM and what assumptions were made. In addition, it was noted that, as flood return intervals increase, the corresponding importance of the amount of impervious area in a watershed on surface runoff decreases. For lower frequency flood events, the amount of imperviousness in a watershed will have a large impact on the amount of runoff that is generated. However, at high return interval floods (such as the 100-year), it makes little difference whether a watershed is fully or partially developed with urban uses (impervious surfaces). Virtually all of the precipitation is going to generate surface runoff due to ground saturation (Hollis, 1975).

Therefore, the distinction between current and future development in Santa Clara Basin watersheds for the purpose of evaluating 100-year flooding may be relatively moot. Given these findings and the uncertainty over the level of future development assumed in the WMM data, the team decided to simply use the Water District's designed channel capacity data as the benchmark for determining the adequacy of each reach to convey the 100-year flow.

For some reaches, however, use of the WMM data yielded initial assessment conclusions that were clearly inaccurate based on input from WMI stakeholders. Additional data was sought concerning these reaches and the initial assessment results were revised accordingly, where data were available for review.

Detailed comments and suggestions on the assessment of PFF were received from WMI stakeholders and are described in Section 4.3 for each applicable waterbody. This information was not used to modify the pilot assessment results but should, where warranted, be addressed as part of future reach-specific assessment work undertaken by WMI stakeholders. Some of this information is based on data that was not made available to the assessment team for use in the pilot assessment. Appendix 4-A describes alternate support conclusions for the PFF interest presented by WMI stakeholders based on other data not available for the pilot assessment.

4.2.2.4 Preservation of Rare and Endangered Species (RARE)

Sufficient data for assessing support of the RARE beneficial use was limited to approximately one-third (21 of 63) of the stream reaches in the Guadalupe River watershed. Data gaps were generally due to three different reasons: (1) a lack of special status species data, (2) outdated data, and (3) current data sets being too general to be useful. The majority of the stream reaches with data gaps were rural.

Those reaches fully supporting RARE were all characterized with moderately high levels of certainty. A total of nine reaches, occurring in both urban and rural parts of the Guadalupe River watershed were determined to fully support the RARE use. The first five reaches of the Guadalupe River are included, primarily based on the presence of special status fish species (steelhead). An upper, rural tributary of Guadalupe Creek (GR/GC-5, above Guadalupe Reservoir), Calero Reservoir, and the first two reaches of Alamitos Creek are the remaining reaches classified as full support.

No reaches were classified as partial support. However, 11 reaches were classified with a statement of potential support, meaning there is existing habitat suitable to support special status species within the reach. These reaches occurred within a mix of urban and rural environments, and varied spatially across the watershed. The majority of these were classified with moderately high to very high levels of uncertainty due to limited data and a concern with the data quality.

Only one stream reach, GR/AC-4, was characterized as non-support for RARE. This reach, Santa Teresa Creek, is a tributary to Arroyo Calero, flows through a rural-to-urban transition environment, and is subject to a very high level of uncertainty based on the expectation that red legged frogs should be found in the reach.

A total of 64 data sets were reviewed for potential use in the RARE use assessment for the Guadalupe River watershed. Of these, 29 contained data that could be used to develop the assessment results.

More so than perhaps any of the other uses/interests, the RARE assessment was hampered by the reliance on existing data. Biological field surveys are really needed to assess habitat conditions within the watershed for the species on the list. Very few of these types of surveys were included in the data compiled for the assessment. As a result, most of the support statements for RARE were based on species observations rather than habitat conditions.

Subsequent to completion of the pilot assessment, a significant new data set became available from the FAHCE project. Though this study was completed in early 2000, the findings were not released to the assessment team until after the pilot assessment had been completed. While a small portion of this data was used in the assessment (fish habitat mapping, streamflow, and stream temperature), most of the FAHCE project's conclusions concerning limiting factors and habitat quality are contained in the documents that were not available at the time of the pilot assessments. Due to the significance of this information, some of the key conclusions of the FAHCE project regarding the RARE use are described in Section 4.3 under each individual waterbody. This additional data was not used to modify the pilot assessment results in any way but should eventually be incorporated into future reach-specific assessment work undertaken by WMI stakeholders.

Detailed comments and suggestions on the assessment of RARE were received from WMI stakeholders and are described in Section 4.3 for each applicable waterbody. This information was not used to modify the pilot assessment results but should, where warranted, be addressed as part of future reach-specific assessment work undertaken by WMI stakeholders. Some of this information is based on data that was not made available to the assessment team for use in the pilot assessment. Appendix 4-A describes alternate support conclusions for the RARE use presented by WMI stakeholders based on other data not available for the pilot assessment.

4.2.2.5 Water Contact Recreation (REC-1)

Sufficient data was available for only 20 of the 63 stream reaches in the Guadalupe River watershed to make a determination of the support status for water contact recreation (REC-1). Many of the reaches contained some data on the tertiary (least preferred) aesthetics, water depth, and access indicators for assessing REC-1 support, but 41 reaches did not have adequate primary (pathogens in water) or secondary (other water quality) data available, thus support determinations could not be made.

Only five stream reaches were found to fully support REC-1, and these five are spread spatially throughout the Guadalupe River watershed. They include Guadalupe Reservoir, parts of the Los Gatos Creek subwatershed including Lexington Reservoir, and Arroyo Calero from its origin to Calero Reservoir. However, these reaches were identified as fully supporting only with moderately high and very high levels of uncertainty due to lack of data and old data.

Three partially supporting reaches were identified within the Guadalupe River watershed, although two of these reaches (GR/LG-3 and GR/AL-1) had different levels of support based on the different types of REC-1 indicators. For example, if the support determination was based solely on tertiary indicators and it indicated partial support, but other secondary data parameters indicated the reach was non-supporting of REC-1, then the reach was classified as both partial and non-support. All three of these reaches were associated with moderately high levels of uncertainty due to significant data gaps (i.e., no primary or secondary data available).

Non-support for REC-1 was identified in 10 reaches, with seven of these comprising the lower, urbanized portion of the Guadalupe River watershed, including the two lowest reaches of Guadalupe Creek. These reaches were associated with moderately high to moderately low levels of uncertainty in the support determination, again due to data gaps or limited data sets. The other three non-supporting reaches occurred in urban and rural areas of the Los Gatos Creek, Alamitos Creek, and Arroyo Calero subwatersheds and have moderately high levels of uncertainty associated with them.

A total of 54 data sets were reviewed for potential use in the REC-1 use assessment for the Guadalupe River watershed. Of these, 23 contained data that could be used to develop the assessment results.

As outlined in the Assessment Framework, the REC-1 assessment was to include a fish consumption component. Based on concern expressed by WMI stakeholders, the Regional Board reviewed this issue and determined that fish consumption should not be evaluated as part of the REC-1 use. Therefore, the results of the fish consumption portion of the pilot assessment have been removed from this report. A different set of criteria was used for this evaluation; these criteria have been removed from the report as well. The remaining criteria were identified in the Assessment Framework as being important for the REC-1 evaluation.

Subsequent to completion of the initial data review, additional data was obtained for Lake Almaden, and the support statement revised accordingly. Additional data concerning other reservoirs was also sought at this time, but no data was obtained.

Detailed comments and suggestions on the assessment of REC-1 were received from WMI stakeholders and are described in Section 4.3 for each applicable waterbody. This information was not used to modify the pilot assessment results but should, where warranted, be addressed as part of future reach-specific assessment work undertaken by WMI stakeholders. Some of this information is based on data that was not made available to the assessment team for use in the pilot assessment. Appendix 4-A describes alternate support conclusions for the REC-1 use presented by WMI stakeholders based on other data not available for the pilot assessment.

4.3 Detailed Assessment Results by Waterbody

This section discusses the results of the pilot beneficial use/stakeholder interest assessments for the Guadalupe River watershed on a waterbody-by-waterbody basis. The methodology and approach used for the pilot assessments is described in Chapter 3. Information regarding data sufficiency for the Guadalupe River watershed is provided in Section 4.2.1. Overall results for each beneficial use/stakeholder interest are described in Section 4.2.2.

The detailed results for each of the 63 stream segments in the watershed are shown in Figures 2-2a through 2-2e (in map form) and in Appendix 4-A, Tables 1-6 (in bar chart form). Alternative conclusions regarding use support in several stream reaches have been presented by WMI stakeholders based on data that was not made available to the assessment team. These conclusions are also shown on Figures 2-2a through 2-2e and in Appendix 4-A. Individual summary tables containing the assessment results for each reach are presented in Appendix 4-B. These tables include information on limiting factors, suspected causes, as well as "local knowledge comments" from WMI stakeholders. The primary messages contained in this information are also summarized in the text of this section for each waterbody in the watershed. The final page of Appendix 4-B contains a listing of the stream reaches in the Guadalupe River watershed for which insufficient data was available for all five uses.

The list of data sets used in the assessment (in Appendix 4-C) may be cross-referenced with the data set identification numbers in the tables of Appendix 4-B to inform the reader of the specific data sets used to reach the conclusions for each stream reach and use. Given the lack of consistent data from reach to reach for each use/interest, it is critical that all statements of use support be viewed in light of the attached level of uncertainty. For additional detail concerning the results of the pilot assessments, please see the following:

- Appendix B to this report describing the lessons learned from the pilot assessments
- Appendix C to this report describing the data sufficiency evaluation and the data gaps identified for each stream reach
- Appendix D to this report describing the factors limiting full use support as discerned by the pilot assessment as well as some suspected causes for these factors

Subsequent to completion of the pilot assessment, a significant new data set became available from the FAHCE project. While a small portion of this data was used in the assessment (fish habitat mapping, streamflow, and stream temperature), most of the FAHCE project's conclusions concerning limiting factors and habitat quality are contained in the documents that were not available at the time of the pilot assessments.

Due to the significance of this information, some of the key conclusions of the FAHCE project regarding factors limiting the COLD and RARE uses are described in this section and in the "Suspected Causes" boxes in Appendix 4-B. This additional data was not used to modify the pilot assessment results in any way but should eventually be incorporated into future reach-specific assessment work undertaken by WMI stakeholders.

4.3.1 Guadalupe River (GR-1 through GR-5)

COLD: The COLD use was found to be potentially/seasonally supported in the first four reaches and partially supported in the upper portion of the Guadalupe River. Indicator macroinvertebrates were generally not present along the river where the data were available. The Guadalupe River is characterized by relatively high, but variable, water temperatures in winter, spring and summer. While these temperatures exceed the criteria for support, they may support Chinook rearing in some years. Spring and summer streamflows are dependent upon regulated releases from upstream reservoirs for groundwater percolation, though the required release to the lower reaches of the river (GR-1 through GR-4) is only 1 cubic foot per second. The channel is largely lightly shaded, resulting in water warming during sunny periods. No winter or spring sampling data is available to indicate whether successful Chinook spawning and rearing occurs in GR-1. However, Chinook smolts have been produced in some years from somewhere in the Guadalupe River or in Los Gatos Creek, despite failure to meet the temperature criteria in the Guadalupe River. Conditions may be suitable for Chinook spawning in GR-2, GR-3, and GR-4 in some years. During wet periods (1995-1999), cool groundwater inflows may be present in GR-2, GR-3, and GR-4. High storm flows resulting from urban runoff may degrade habitat in all reaches but GR-1. The upper reach of the river (GR-5) is within the recharge zone where streamflows are higher. However, flows rapidly decline and temperatures increase downstream within this reach and suitable fast-water feeding habitat is scarce within the reach, so summer steelhead rearing is usually limited in GR-5 but variable among years. GR-5 is lightly shaded and the channel is generally wide.

The FAHCE data that became available subsequent to completion of the assessment notes that habitat in the downstream reaches of the Guadalupe River (generally corresponding to GR-2 through GR-5) is typified by long, deep, slackwater pools separated by an occasional short run or riffle. Baseflow velocities are very low and water quality poor in these reaches. The lack of food production areas and food transport are probably major factors limiting production. The reaches below Alamitos Creek serve primarily as a migration corridor for steelhead and have either no or poor rearing habitat (FAHCE, 1999).

Stakeholder comments have provided the following information regarding COLD use support in the Guadalupe River (alternate conclusions on use support are also shown in Appendix 4-A):

- GR-1: The support status should either be supported, partially supported or not applicable. Channel morphology, river flow rates, debris, trash and pollution should be listed as limiting factors (Johmann, pers. comm., 2002).

- GR-2: This reach should be split into two parts - above and below Trimble Avenue. Below Trimble, support status should be Limited Support. The primary limiting factors are channel morphology, flow rates, and pollution. Above Trimble Ave., support status should be Limited Support. Limiting factors should be channel flow rates, morphology, temperature, lack of shade or hide cover, lack of good riparian zone, and pollution (Johmann, pers. comm., 2002).

- GR-3 and GR-4: Support status should be Limited Support. Limiting Factors should be channel flow rates, morphology, temperature, lack of shade or hide cover (marginal in GR-4), marginal riparian zone, pollution, barriers in GR-4, and poaching (Johmann, pers. comm., 2002).

- GR-5: This reach should be split into four parts - (A) from lower end to Curtner Ave; (B) Curtner to Gage Station 23B; (C) Gage Station 23B to Branham Lane; and (D) Branham to Lake Almaden. In Segment A, support status should be Limited Support. Limiting factors should be channel flow rates, morphology, water temperature, pollution, debris and rubble. In Segment B, support status should be Limited Support. Limiting Factors should be channel flow rates, morphology, water temperature, marginal shade/hide cover, gabions, pollution, and poaching. In Segments C and D, support status should be Limited Support. Limiting factors should be channel flow rates, morphology, water temperature, marginal shade/hide cover, pollution, 15-foot high dam in Segment D, and poaching (Johmann, pers. comm., 2002).

MUN: The MUN use is generally not supported in the Guadalupe River (one reach, GR-2, had insufficient data). Fecal coliform, DDT, turbidity, mercury, nickel, selenium, and copper all have exceeded criteria for drinking water. Natural sources and urban runoff may contribute to nickel. Historic mining waste in stream contributes to elevated concentrations of mercury in water samples. The sources of fecal coliform and turbidity are not clear from the data.

PFF: The PFF interest is not supported in the Guadalupe River. Data indicates that the river channel does not currently have adequate capacity to convey the expected 100-year flow throughout the entire length of the river. Urban commercial and residential development has encroached into the natural channel floodplain and the river has been straightened and channelized through much of this area. In GR-3, a major flood control project designed to add capacity to the river channel is underway. However, only Contract 1 is completed to date. Therefore, this reach of the river cannot be considered "protected" from large flood events such as the 100-year flood until all portions of the project are completed. Once all the portions are completed the support status can be revised to full support.

Stakeholder comments have provided the following information regarding PFF interest support in the Guadalupe River (alternate conclusions on use support are also shown in Appendix 4-A):

- GR-1: This reach is really a modified, straightened earth channel - when first excavated, it was far wider and probably deeper than at present but the stream is attempting to regain its natural form; the active river channel is not confined by levees, though the corridor is. The channel is not rock or concrete lined except in very limited segments around bridges or outfall pipes (Johmann, pers. comm., 2002).

- GR-2: This reach should be split into two parts - above and below Trimble Avenue. The lower part of the reach contains a river channel that for the most part is above tidewater. A steep berm has been constructed on the east side of the river but both sides of the channel are well vegetated. Except for a short stretch just below Trimble Ave. there is good riparian habitat and Shaded Riverine Aquatic (SRA) cover. An overflow channel has also been constructed down the right side of the river and the area between the river and overflow channel was planted as a mitigation site for the 1983 Lower Guadalupe Flood Control Project. This site failed as the river has broken through the berm in a number of areas and washed out the mitigation plantings. It has also deposited tons of sediment in the overflow area as it attempts to regain its natural form and build a flood plain. There is no overflow channel, right side channel berm, or dense riparian area downstream of this segment or in the segment immediately upstream. This should be listed as a Quasi-Natural Modified (East Side Berm with a overflow passage) channel. The upper part of the reach should be designated a Modified, Straightened channel. The entire river channel has been moved to the east in the area of San Jose Airport. The channel used to flow through the airport area but it has been substantially straightened and the riverine corridor has been confined by levees on both sides. For the most part, there is little to no shade cover in this segment. There are a few established trees in the riparian areas bordering the river but only a few are close enough to provide shade cover and these are in a few small patches downstream of Airport Blvd. and US 101 (Johmann, pers. comm., 2002).

- GR-3: Support status should be full support after completion of the Downtown Flood Control Project (Contract 2); channel type should be Quasi-Natural Straightened, Incised (berms on both sides of main channel). The main channel is down cutting (about a foot per year since 1996) as a direct result of the recently constructed flood control project. Areas of the bypass channel are eroding and in other areas there is severe deposition. The berm on the west side of the channel was breached a number of times soon after project construction and has since been armored with rocks and log crib walls in areas which are now being undercut. The low flow channel weirs just downstream of Coleman Ave. that were installed to guarantee fish passage have for the most part been buried by sediment (Johmann, pers. comm., 2002).

- GR-4: Channel type should be Quasi-Natural Widened, Straightened and Incised. The upper part of this segment has a concrete bypass channel, which is not operational as yet. At least two more bypass channels are slated for construction downstream. Much of the channel has been lined with rock gabions and is down-cutting (Johmann, pers. comm., 2002).

- GR-5: Reach should be split into four parts - (A) from lower end to Curtner Ave; (B) Curtner to Gage Station 23B; (C) Gage Station 23B to Branham Lane; and (D) Branham to Lake Almaden. Segment A is a Quasi-Natural, Incised channel with a decent riparian zone but the channel is deeply incised. It contains a lot of construction rubble that is sliding off the banks where it has been dumped in the past. The channel has very limited access. Water temperatures start to cool down in this area as a result of the shade cover. Segment B should be listed as Widened, Straightened and Gabion Contained. The river channel was relocated in this segment when Almaden Expressway was constructed. This segment of channel has little, if any, SRA cover and the riparian vegetation is poor. The designed channel was overly widened and gabion-lined on both sides but the stream has since constructed a narrower channel. Segment C should be listed as Quasi-Natural Straightened, Incised. The channel is overly wide in areas but has natural but steep banks in most areas. This segment also has two areas where drop structures have been removed and replaced with a series of rock weirs. While the weirs have improved conditions greatly they were not properly designed which is causing some erosion problems in both areas. This area has a fair but narrow riparian area and provides fair SRA cover. Segment D should be listed as Modified Straightened. However, a new Quasi-Natural Meandering channel is starting to develop in this segment. The channel's width/depth ratio is substantially decreasing and it is starting to meander within the corridor levees. Riparian vegetation is taking hold, riffles and pools are developing in the new channel and spawning gravel is being recruited. Towards the top of this segment there is a 15 foot-high dam that blocked fish migration up until several years ago when a fish ladder was installed. In the recent past, the channel in this area was wide and shallow due to a series of instream dirt spreader dams that were constructed every year and gabions line a good portion of the channel. There was virtually no riparian habitat or shade cover as the dams would drown upstream vegetation and deprive downstream vegetation of any water. Water temperatures in this area were elevated due to the lack of shade cover, the wide shallow channels, and water coming from Lake Almaden and the creeks upstream (Johmann, pers. comm., 2002).

RARE: The RARE use is fully supported in the Guadalupe River, though uncertainty is relatively high in one reach (GR-2) due to limited data. Support is based on the presence or potential presence of Chinook salmon, Alameda song sparrow, steelhead, sharp shinned hawk, Cooper's hawk, yellow warbler, merlin, loggerhead shrike, and burrowing owl.

Stakeholder comments have provided the following information regarding RARE use support in the Guadalupe River (alternate conclusions on use support are also shown in Appendix 4-A):

- GR-1: Although rare species such as the clapper rail, harvest mouse, and steelhead are supported they certainly are not fully supported. They are supported on a very limited level. In the case of fish, channel morphology and water flow rates and temperature are certainly limiting factors for this use (Johmann, pers. comm., 2002).

- GR-2: Below Trimble Ave., support status should be Limited Support. Channel morphology, flow rates, and water temperatures are limiting factors for this use. Above Trimble Ave., support status should be Limited Support. Channel morphology, flow rates, water temperature, lack of a mature riparian zone and SRA cover are limiting factors for this use (Johmann, pers. comm., 2002).

- GR-3: Support Status should be Limited Support. Channel morphology, flow rates, and water temperatures are limiting factors for this use (Johmann, pers. comm., 2002).

- GR-4: Support Status should be Limited Support. Channel morphology, flow rates, water temperature, and instream barriers are limiting factors for this use (Johmann, pers. comm., 2002).

- GR-5: Reach should be split into four parts - (A) from lower end to Curtner Ave; (B) Curtner to Gage Station 23B; (C) Gage Station 23B to Branham Lane; and (D) Branham to Lake Almaden. In Segment A, support status should be Limited Support. Channel morphology, flow rates, water temperature, and instream barriers are limiting factors for this use. In Segment B, support status should be Limited Support. Channel morphology, flow rates, water temperature, and the gabion confined channel are limiting factors for this use. In Segments C and D, support status should be Limited Support. Channel morphology, flow rates, and water temperature, are limiting factors for this use (Johmann, pers. comm., 2002).

REC-1: The REC-1 use is non-supported in the Guadalupe River as measured against primary (data available for one reach only) and secondary indicators (pathogens and general water quality constituents, respectively). Tertiary indicators on aesthetics and recreational access indicate partial support for REC-1 in some reaches of the river, though uncertainty is generally high due to spotty data. The presence of historic mining waste in the river contributes to mercury. Copper, nickel, and PCB exceedences are possibly linked to historic urban stormwater discharges and/or elicit direct discharges to stream. Chlordane and dieldrin are components of commonly used pesticides/herbicides and are present in urban stormwater. Trash is common in urban stream corridors while algae is the product of excessive nutrient inputs, possibly yard or landscaping waste from upstream or detergents and human or animal waste.

Stakeholder comments have provided the following information regarding REC-1 use support in the Guadalupe River (alternate conclusions on use support are also shown in Appendix 4-A):

- GR-1: Status should be limited support. The limiting factors for water contract recreation are access, flow levels, channel morphology, waterborne pathogens, and trash/debris (Johmann, pers. comm., 2002).

- GR-2: Support status should be Limited Support. The primary limiting factors for this use are water flow levels, access, pollution, waterborne pathogens and debris (Johmann, pers. comm., 2002).

- GR-3 and GR-4: Support status should be Limited Support. The primary limiting factors for this use are water flow levels, access, pollution, debris, waterborne pathogens and vagrant encampments and human waste (Johmann, pers. comm., 2002).

- GR-5: Reach should be split into four parts - (A) from lower end to Curtner Ave; (B) Curtner to Gage Station 23B; (C) Gage Station 23B to Branham Lane; and (D) Branham to Lake Almaden. In Segment A, support status should be Limited Support The primary limiting factors for this use are water flow levels, access, pollution, debris, waterborne pathogens and rubble. In Segment B, support status should be Limited Support. The primary limiting factors for this use are water flow levels, pollution, debris, waterborne pathogens and vagrant encampments. In Segment C, support status should be Limited Support. The primary limiting factors for this use are water flow levels, access, pollution, debris, waterborne pathogens and vagrant encampments. In Segment D, support status should be Limited Support. The primary limiting factors for this use are water flow levels, access, pollution, waterborne pathogens, and the dam (Johmann, pers. comm., 2002).

4.3.2 Los Gatos Creek Subwatershed

Assessment results for waterbodies in the Los Gatos Creek subwatershed are discussed by individual waterbody in this section.

4.3.2.1 Los Gatos Creek (GR/LG-1, GR/LG-2, GR/LG-4, and GR/LG-5)

COLD: The entire main stem was designated as either partial/potential or full support for COLD though there is moderately high uncertainty associated with the potential support designations in GR/LG-2 and GR/LG-5 due to limited recent data. In general, the support level for COLD improved with distance up Los Gatos Creek. In the lower section of the creek (below Vasona Dam), spring and summer streamflows are dependent upon releases from Lexington and Vasona Reservoirs, with substantial water heating through the percolation zones upstream of Meridian Avenue. Some augmentation from groundwater has occurred during in wet periods (1995-1999). Low streamflows and high water temperatures restrict summer steelhead rearing to scarce fast-water habitats. Winter and spring water temperatures are likely to exceed Chinook spawning and rearing criteria due to limited shading in portions of this reach; however, temperature data and winter/spring fish sampling data are absent. High storm flows resulting from urban runoff may degrade habitat in the lower part of the creek.

Stakeholder comments have provided the following information regarding COLD use support in Los Gatos Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/LG-1: This reach should be split into six segments - (A) Guadalupe River to Auzerais; (B) Auzerais to Lincoln; (C) Lincoln to Leigh; (D) Leigh to Camden; (E) Camden to Lark; and (F) Lark to Vasona Dam. Segments A-D should be Limited Support. Limiting factors should be channel flow rates, morphology, water temperature, shade/hide cover, pollution and poaching. Segment E should be Not Supported. Temperatures are high in this segment as the water backs up behind the dams and bakes in the sun, as there is no shade cover. Segment F should be Limited Support. Limiting factors should be channel flow rates, morphology, water temperature, dams shade/hide cover, and pollution (Johmann, pers. comm., 2002).

- GR/LG-2 and GR/LG-3: Should be Limited Support. Limiting factors should be channel flow rates, morphology, water temperature, dams shade/hide cover, and pollution (Johmann, pers. comm., 2002).

MUN: The MUN use is not supported in the portions of Los Gatos Creek where sufficient data were available, though uncertainty over these conclusions is high due to significant data gaps. Fecal coliform and total dissolved solids exceeded the applicable drinking water criteria.

PFF: The PFF interest is fully supported in all reaches of Los Gatos Creek except the portion below Vasona Dam (GR/LG-1) where the channel cannot safely convey the expected 100-year flow in two specific segments. Land uses adjacent to the channel in these segments consist of urban residential and/or commercial uses where the likelihood of property damage during a 100-year event is high.

Stakeholder comments have provided the following information regarding PFF interest support in Los Gatos Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/LG-1: Reach should be split into six segments - (A) Guadalupe River to Auzerais; (B) Auzerais to Lincoln; (C) Lincoln to Leigh; (D) Leigh to Camden; (E) Camden to Lark; and (F) Lark to Vasona Dam. Segment A always has a flow of water from groundwater pump discharges and upwelling and has a good but narrow riparian habitat. Should be listed as Quasi Natural, Straightened, Incised. The channel has very steep banks along most of its length and very limited access. Segment B usually dries out in the summer and has a narrow marginal riparian area with little SRA cover. Should be listed as Quasi Natural, Straightened, Widened, Incised. The riverine corridor has very steep banks along most of its length. Segment C usually has water in it unless the water is shut off by the Water District. The segment has a fairly good riparian area with good SRA cover. It also has some very deep pools, which are good holding areas for salmonids. Should be Quasi Natural, Incised. The riverine corridor has very steep banks along most of its length. Segment D always has water in it but the riparian area is marginal because much of this segment had dirt instream spreader dams installed yearly until 1995 when the permits for such dams were not renewed. For the first few years after construction of the spread dams was prohibited, the channel was devoid of vegetation and was overly wide and shallow. In the past few years the channel has narrowed, started to meander and vegetation has established itself in the newly forming flood plain. There is a substantial drop structure at Campbell Ave. that salmonids can only jump at high flows. There is an impassable 20 foot-high dam at Camden Ave/San Tomas Expressway, which blocks fish passage and navigation. Should be listed as Quasi Natural, Straightened, Widened, Incised. The riverine corridor has very steep banks along most of its length. Segment E always has water in it but there is little to no riparian area. The channel and corridor are straight and there are a series of impassable dams in this section. The 20-foot high Camden Ave./San Tomas Expressway dam blocks fish migration and navigation at the lower end of this segment. Should be listed as Modified, Straightened, Widened. The riverine corridor has very steep banks and a series of dams used for water percolation and diversion, which elevates water temperatures, limits downstream flows and block fish migration. Segment F always has water in it. There is a quasi-natural channel and fair to good riparian area. Should be listed as Quasi Natural. The river channel is fairly natural and has attempted to restore itself after the construction of the Vasona Dam at the upstream end of this segment (Johmann, pers. comm., 2002).

RARE: The RARE use is potentially supported in three reaches of Los Gatos Creek, though uncertainty is high for Yellow warbler support in GR/LG-2 due to limited data. Support is based on the potential presence of Yellow warbler, western pond turtle, red legged frog, double crested cormorant, and salmonids.

Stakeholder comments have provided the following information regarding RARE use support in Los Gatos Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/LG-1: Reach should be split into six segments - (A) Guadalupe River to Auzerais; (B) Auzerais to Lincoln; (C) Lincoln to Leigh; (D) Leigh to Camden; (E) Camden to Lark; and (F) Lark to Vasona Dam. Segment A should be Limited Support. No rare species animal or bird species are known in this area. Channel morphology, flow rates, water temperatures, and lack of a wide riparian zone and steep eroding banks are limiting factors for this use. Segment B should be Limited Support. Chinook salmon and steelhead are known to migrate through and probably spawn in this segment. Channel morphology, flow rates, water temperatures, and lack of a wide riparian zone and steep eroding banks are limiting factors for this use. Segment C should be Limited Support. Chinook salmon and steelhead are known to migrate through and spawn in this segment. Channel morphology, flow rates, water temperatures, and steep eroding banks are limiting factors for this use. Segment D should be Limited Support. Chinook salmon and steelhead are known to migrate through and spawn in this segment. Channel morphology, flow rates, water temperatures, and lack of a mature riparian zone and steep eroding banks are limiting factors for this use. Segment E should be Non-Support. There is no riparian habitat in the area and no rare species are known to exist in or frequent the area. Segment F should be Potential Support. This segment has good riparian habitat in the area and could easily support rare species. Channel morphology, flow rates, water temperatures, and dams are limiting factors for this use (Johmann, pers. comm., 2002).

- GR/LG-2: Support status should be Limited Support. If there was a special status species observed using the area there must be limited support. Channel morphology, flow rates, water temperatures, good riparian areas and dams are limiting factors for this use (Johmann, pers. comm., 2002).

- GR/LG-3: Channel morphology, flow rates, water temperatures, good riparian areas and dams are limiting factors for this use (Johmann, pers. comm., 2002).

REC-1: The REC-1 use is non-supported in Los Gatos Creek below Vasona Dam but is fully supported in the reach above Vasona Reservoir. The reach below Lexington Reservoir (GR/LG-3) exhibits partial support based on against primary indicators (pathogens) and partial support based on tertiary indicators (aesthetics and recreational access). However, uncertainty is moderately high to very high with respect to all of these conclusions due to spotty data.

Stakeholder comments have provided the following information regarding REC-1 use support in Los Gatos Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/LG-1: Reach should be split into six segments - (A) Guadalupe River to Auzerais; (B) Auzerais to Lincoln; (C) Lincoln to Leigh; (D) Leigh to Camden; (E) Camden to Lark; and (F) Lark to Vasona Dam. Segments A and B should be Limited Support. The primary limiting factors for this use are water flow levels, access, pollution, debris, waterborne pathogens and vagrant encampments. Segments C and D should be Limited Support. The primary limiting factors for this use are water flow levels, access, pollution, debris, and waterborne pathogens. Segment E should be Potential Limited Support. This area could provide limited support for fishing. It is possible for warm water fish, such as carp, to live in this area if they are washed over the dams or through the diversion gates. Segment F should be Limited Support. The primary limiting factors for this use are water flow levels, access, and waterborne pathogens (Johmann, pers. comm., 2002).

- GR/LG-2 and GR/LG-3: Support status should be Limited Support. The primary limiting factors for this use are water flow levels, access, and waterborne pathogens (Johmann, pers. comm., 2002).

4.3.2.2 Trout Creek (GR/LG-6)

Insufficient data were available to assess any of the uses/interests in this reach.

Stakeholder comments have provided the following information regarding use/interest support in Trout Creek:

- COLD: Support status should be limited support. Limiting factors should be channel flow rates, morphology, water temperature, downstream dams, shade/hide cover, and pollution. Trout Creek is reported to support good populations of rainbow trout (Johmann, pers. comm., 2002).

- RARE: Channel morphology, flow rates, water temperatures, good riparian areas and downstream dams are limiting factors for this use (Johmann, pers. comm., 2002).

- REC-1: Support Status should be limited support. The primary limiting factors for this use are water flow levels, access, and waterborne pathogens (Johmann, pers. comm., 2002).

4.3.2.3 Lyndon Canyon Creek (GR/LG-7)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.4 Daves Creek (GR/LG-8)

Sufficient data were available to assess only the PFF interest, which is fully supported in this reach.

4.3.2.5 Black Creek (GR/LG-9)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.6 Dyer Creek (GR/LG-10)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.7 Briggs Creek (GR/LG-11)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.8 Aldercroft Creek (GR/LG-12)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.9 Moody Gulch (GR/LG-13)

Sufficient data were available to assess only the COLD use, which is partially supported in this reach. No indicator macroinvertebrate data were available to allow a finding of full support. No limiting factors were identified.

4.3.2.10 Limekiln Creek (GR/LG-14)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.11 Soda Springs Canyon Creek (GR/LG-15)

Insufficient data were available to assess any of the uses/interests in this reach.

Stakeholder comments have provided the following information regarding use/interest support in Soda Springs Canyon Creek:

- COLD: Limiting factors should be channel flow rates, morphology, water temperature, downstream dams, shade/hide cover, and pollution (Johmann, pers. comm., 2002).

- RARE: Channel morphology, flow rates, water temperature, good riparian areas and downstream dams are limiting factors for this use (Johmann, pers. comm., 2002).

- REC-1: Support Status should be Supported. The primary limiting factors for this use are water flow levels, access, and waterborne pathogens (Johmann, pers. comm., 2002).

4.3.2.12 Hendrys Creek (GR/LG-16)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.13 Hooker Gulch (GR/LG-17)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.14 Austrian Gulch (GR/LG-18)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.15 Almendra Creek (GR/LG-19)

Sufficient data were available to assess only the PFF interest, which is fully supported in this reach.

4.3.2.16 Dry Creek (GR/LG-20)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.17 Vasona Reservoir (GR/LG/VR)

Vasona Reservoir appears to be in non support of MUN (fecal coliform and turbidity exceed drinking water criteria), full support of PFF, and potential support of RARE based on very limited western pond turtle data. Uncertainty is high for all of these conclusions, however, due to limited data.

Stakeholder comments have provided the following information regarding use/interest support in Vasona Reservoir (alternate conclusions on use support are also shown in Appendix 4-A):

- COLD: Support status should be Limited Support. The primary limiting factors for this use are waterborne pathogens (Johmann, pers. comm., 2002).

4.3.2.18 Lexington Reservoir (GR/LG/LR)

Lexington Reservoir appears to be non-supportive of the MUN use based on fecal coliform and turbidity exceedences. The PFF interest appears to be fully supported as does the REC-1 use, though data on tertiary (aesthetics and recreational access) indicators was not available. Uncertainty for each of these conclusions is moderately high to very high due to limited data.

Stakeholder comments have provided the following information regarding use/interest support in Lexington Reservoir (alternate conclusions on use support are also shown in Appendix 4-A):

- COLD: Should be Supported. There are many reports that the reservoir supports rainbow trout. Limiting Factors should be water temperature, dams and pollution. The dam itself, however, in conjunction with 13 San Jose Water Company diversions upstream of the reservoir, eliminates salmonid access to the tributary headwaters of Los Gatos Creek which feature some of the best habitat in the watershed (Johmann, pers. comm., 2002 and Akin, pers. comm., 2002).

- RARE: Should be Limited Support. It is almost certain that Lexington Reservoir supports trout. Water temperature, well-vegetated perimeter areas, access and dams are limiting factors for this use watershed (Johmann, pers. comm., 2002).

- REC-1: This area supports fishing, wading and boating. The primary limiting factors for this use are water levels, access, pollution and waterborne pathogens watershed (Johmann, pers. comm., 2002).

4.3.2.19 Lake Elsman (GR/LG/LE)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.20 Williams Reservoir (GR/LG/WR)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.2.21 Lake Ranch Reservoir (GR/LG/LA)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.3 Canoas Creek

Canoas Creek was found to be non-supportive of the COLD use due to elevated temperatures and the lack of documented fish presence. Uncertainty is very high, however, due to limited data. The PFF interest is also not supported in Canoas Creek due to an undersized channel throughout most of the stream reach. Land uses in these area are urban commercial and residential where the potential for property damage during the 100-year flood event is very high. The RARE use is potentially supported in Canoas Creek due to sightings of burrowing owl, western pond turtle, and Chinook salmon, though habitat for the latter appears to be very poor.

Stakeholder comments have provided the following information regarding use/interest support in Canoas Creek:

- COLD: Limiting factors should be channel flow rates, morphology, water temperature, concrete culvert drop structure, no riparian area, lack of spawning gravel shade/hide cover, and pollution (Johmann, pers. comm., 2002).

- RARE: Support level should be Non Support. Salmonids normally wouldn't have access to this area, except at very high flows, due to the concrete culvert drop structure, which may be as high as 4 feet, depending on the water levels at the confluence with the Guadalupe River. There is little, if any habitat for salmonids once they gain access to the channel. Channel morphology, flow rates, water temperature, no riparian area, drop structure, lack of natural channel, lack of spawning gravel and pollution are limiting factors for this use (Johmann, pers. comm., 2002).

4.3.4 Ross Creek Subwatershed

Assessment results for waterbodies in the Ross Creek subwatershed are discussed by individual waterbody in this section.

4.3.4.1 Ross Creek

Ross Creek was found to be non-supportive of the COLD use due to the presence of poor habitat, stream cover, and riparian vegetation and the lack of documented fish presence. Uncertainty is moderately high, however, due to limited data. The PFF interest is also not supported in Ross Creek due to an undersized channel throughout most of the stream reach. Land uses in these area are urban commercial and residential where the potential for property damage during the 100-year flood event is very high. The RARE use is potentially supported in Ross Creek due to sightings of Cooper's hawk and potential rainbow trout observations. Uncertainty is moderately high, however.

4.3.4.2 Lone Hill Creek

Sufficient data were available to assess only the PFF interest, which is fully supported in this reach.

4.3.4.3 Short Creek

Sufficient data were available to assess only the PFF interest, which is fully supported in this reach.

4.3.5 Guadalupe Creek Subwatershed

Assessment results for waterbodies in the Guadalupe Creek subwatershed are discussed by individual waterbody in this section.

4.3.5.1 Guadalupe Creek (GR/GC-1, GR/GC-2, and GR/GC-5)

COLD: The entire main stem was designated as either partial or full support for COLD with high certainty. In general, the support level for COLD improved with distance up Guadalupe Creek. Releases from Guadalupe Reservoir and the Trans-Valley Pipeline for percolation support summer streamflow in GR/GC-1, but flow declines and temperatures increase within the lower reach. The amount and quality of fast-water feeding habitat therefore declines with the reach, and conditions change with year to year variation in the amount of releases. The upper half of the lower reach below Camden Avenue, with higher flows and lower temperatures, is likely to be suitable, but the lower half of the reach may usually be too warm and slow. High storm flows resulting from urban runoff may degrade habitat.

The FAHCE data that became available subsequent to completion of the assessment notes that the riparian zone in GR/GC-1 is very sparse, the channel incised, and the substrate compacted, resulting in a fair to poor rating for salmonid habitat. However, above this reach in GR/GC-2, a moderate to well-developed riparian zone exists with a suitable combination of pools, riffles and runs with good quality habitat and relatively good complex shelter for salmonids. Small localized deposits of suitable spawning substrate are found through this reach (FAHCE, 1999).

Stakeholder comments have provided the following information regarding COLD use support in Guadalupe Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/GC-1: Below Masson Dam, status should be currently not supported but high potential support for steelhead. Limiting Factors should be channel flow rates, morphology, water temperature, marginal shade/hide cover, and dam. Above Masson Dam, support status should be supported. Limiting Factors should be flow levels (Johmann, pers. comm., 2002).

- GR/LG-2: Support status should be supported. Rainbow trout are known to inhabit this stream segment and since the Masson Dam has been laddered there is potential for steelhead and perhaps even coho to return (Johmann, pers. comm., 2002).

MUN: The MUN use is not supported in the portions of Guadalupe Creek where sufficient data were available (below Guadalupe Reservoir), though uncertainty over these conclusions is high due to significant data gaps. Fecal coliform, turbidity, DDT, and total dissolved solids exceeded the applicable drinking water criteria.

PFF: The PFF interest is fully supported in all reaches of Guadalupe Creek.

Stakeholder comments have provided the following information regarding PFF interest support in Guadalupe Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/GC-1: Reach should be split into two parts - above and below Masson Dam. Below Masson Dam, the channel is relatively wide and shallow due to a series of instream dirt spreader dams that were constructed every year up until 1995. There is little mature riparian habitat or shade cover as the dams would drown upstream vegetation and deprive down stream vegetation of any water. Water temperatures in this area are extremely elevated due to the lack of shade cover and the wide shallow channels. The channel should be listed as Quasi-Natural, Modified. A restoration project has just been completed in this segment which should reduce channel width and provide shade cover for the stream which should improve flows, increase habitat and decrease temperatures. Above Masson Dam, the channel is a typical meandering C-type channel. There is a good riparian area on both sides of the channel and there is a broad flood plain on the south side (Johmann, pers. comm., 2002).

- GR/GC-2: The creek channel in this segment is a typical B-type channel. There is a good riparian area on both sides of the channel with a narrow flood plain (Johmann, pers. comm., 2002).

RARE: The RARE use is potentially supported in Guadalupe Creek below Guadalupe Reservoir, based on Yellow warbler, red legged frog, double crested cormorant, yellow leged frog, western pond turtle, steelhead, and Chinook salmon. Uncertainty, however, is very low in GR/GC-2 due to limited data. Below Camden Avenue, red-legged frog is not thought to be present due to lack of suitable habitat and the presence of aquatic predators. Habitat is also marginal in this reach for salmonids as flow declines and temperatures increase within the reach. The amount and quality of fast-water feeding habitat therefore declines with the reach, and conditions change with year to year variation in the amount of releases. The upper half of GR/GC-1, with higher flows and lower temperatures is likely to be suitable, but the lower half may usually be too warm and slow. Above the reservoir, the RARE use is fully supported based on the presence of native rainbow trout.

Stakeholder comments have provided the following information regarding RARE use support in Guadalupe Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/GC-1: Below Masson Dam, support status should be Non Support but High Potential. No rare species are known in this area. Channel morphology, flow rates, water temperatures, and lack of mature riparian vegetation are limiting factors for this use. Above Masson Dam, support status should be Full Support. The limiting factors should be flow levels and the dam. The Water District has conducted a specific survey in this reach for red legged frogs and found none (Johmann, pers. comm., 2002).

- GR/GC-2: Support status should be Full Support (Johmann, pers. comm., 2002).

REC-1: The REC-1 use is non-supported in Guadalupe Creek below Guadalupe Reservoir due to exceedences of primary (pathogen) and secondary (other water quality) indicator criteria as well as poor aesthetics. However, uncertainty is moderately high to very high with respect to these conclusions due to spotty data.

Stakeholder comments have provided the following information regarding REC-1 use support in Guadalupe Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/GC-1: Below Masson Dam, support status should be Limited Support. The primary limiting factors for this use are water flow levels, access, and the dam.

Above Masson Dam, support status should be Limited Support. The primary limiting factors for this use are water flow levels, access, debris and the dam (Johmann, pers. comm., 2002).

- GR/GC-2: Support status should be Limited Support. The primary limiting factors for this use are water flow levels, debris and access (Johmann, pers. comm., 2002).

4.3.5.2 Pheasant Creek (GR/GC-3)

Sufficient data were available to assess only the COLD use (partial support) and PFF interest (full support). No indicator macroinvertebrate data was available to allow for a finding of full support for COLD and uncertainty is moderately high due to very limited data.

The FAHCE data made available after completion of the pilot assessment indicates that Pheasant Creek sustains baseflows throughout the early summer, with depth of flow identified as the constraint limiting the quality of salmonid habitat. Several streamside wells probably deplete baseflow in the creek (FAHCE, 1999).

Stakeholder comments have provided the following information regarding use/interest support in Pheasant Creek:

- COLD and RARE: Pipe culvert, waterfall and stream down cutting block anadromous fish migration and are limiting factors affecting these uses (Johmann, pers. comm., 2002).

- PFF: The channel enters Guadalupe Creek via an inadequate elevated pipe culvert under Hicks Road. This culvert is causing erosion both up and downstream of the pipe and due to the large amount of scour below the pipe, a waterfall has developed which blocks fish up-migration opportunities (Johmann, pers. comm., 2002).

4.3.5.3 Shannon Creek (GR/GC-4)

Sufficient data were available to assess only the PFF interest, which is fully supported in this reach.

Stakeholder comments have provided the following information regarding use/interest support in Shannon Creek:

- COLD and RARE: Pipe culvert, waterfall and stream down cutting block anadromous fish migration and are limiting factors affecting these uses (Johmann, pers. comm., 2002).

- PFF: The channel enters Guadalupe Creek via an elevated culvert under Hicks Road and the creek has been buried by the property owner on the west side of the road. This culvert is causing erosion downstream of the pipe and due to the large amount of scour below the pipe, a waterfall has developed which blocks fish up-migration opportunities (Johmann, pers. comm., 2002).

4.3.5.4 Rincon Creek (GR/GC-6)

Insufficient data were available to assess any of the uses/interests in this reach.

Stakeholder comments have provided the following information regarding use/interest support in Rincon Creek:

- COLD: Field observations show Rincon Creek to be larger and have higher flow rates than Guadalupe Creek in late summer and the water temperature has always been measured as being below 60 degrees, even in late summer. Fish have been observed in the creek and there have been many reports it supports rainbow trout (Johmann, pers. comm., 2002).

4.3.5.5 Los Capitancillos Creek (GR/GC-7)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.5.6 Reynolds Creek (GR/GC-8)

Insufficient data were available to assess any of the uses/interests in this reach.

The FAHCE data made available after completion of the pilot assessment indicates that Reynolds Creek sustains baseflows throughout the early summer, with depth of flow identified as the constraint limiting the quality of salmonid habitat. Several streamside wells probably deplete baseflow in the creek (FAHCE, 1999).

Stakeholder comments have provided the following information regarding use/interest support in Reynolds Creek:

- COLD: Reach is reported to have populations of rainbow trout; mainstem feeds into Guadalupe Creek in a natural manner as the creek passes under an adequate bridge, so fish have easy access to the creek (Johmann, pers. comm., 2002).

4.3.5.7 Hicks Creek (GR/GC-9)

Insufficient data were available to assess any of the uses/interests in this reach.

Stakeholder comments have provided the following information regarding use/interest support in Hicks Creek:

- COLD: Reach is reported to have populations of rainbow trout; mainstem feeds into Guadalupe Creek in a natural manner as the creek passes under an adequate bridge, so fish have easy access to the creek (Johmann, pers. comm., 2002).

4.3.5.8 Guadalupe Reservoir (GR/GC/GR)

Guadalupe Reservoir was found to partially support the MUN use as several turbidity criteria exceedences were noted, generally during the winter and spring months. The PFF interest is fully supported, though uncertainty is very high. The REC-1 use is fully supported but uncertainty is moderately high due to limited data. Alternate conclusions on use support are also shown in Appendix 4-A.

4.3.6 Alamitos Creek Subwatershed

Assessment results for waterbodies in the Alamitos Creek subwatershed are discussed by individual waterbody in this section.

4.3.6.1 Alamitos Creek (GR/AL-1 and GR/AL-2)

COLD: The entire creek was designated as partial support for COLD with high certainty. Releases from Almaden and Calero Reservoirs for percolation provide summer streamflow to GR/AL-1 but flows decline and temperatures increase within the reach. Fast-water feeding habitat declines downstream within the reach. The channel is less shaded downstream within the reach increasing temperature effects. High storm flows resulting from urban runoff may degrade habitat here. Above the Arroyo Calero confluence, releases from Almaden Reservoir for percolation in downstream reaches maintain relatively high and cool streamflows for most of summer in most years. Outlet structures at Almaden Dam require periodic maintenance and reservoir draining, which may impact the availability of streamflow and could affect indicator macroinvertebrate presence.

The FAHCE data that became available subsequent to completion of the assessment notes that Alamitos Creek contains a suitable combination of pools, riffles, and runs with good quality habitat and relatively good complex shelter for salmonids (FAHCE, 1999).

Stakeholder comments have provided the following information regarding COLD use support in Alamitos Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/AL-1: Below Greystone Creek, should probably be either Not Supported or Very Limited Support. Water temperatures in this segment are high due to wide channel width and lack of riparian area and shade cover. Limiting Factors should be channel flow rates, morphology, water temperature, drop structures, downstream, the lake and dam, poor riparian area, shade/hide cover, and pollution. Above Greystone Creek, should be Limited Support. Rainbow trout have been reported in this segment of creek. Limiting Factors should be channel flow rates, morphology, water temperature, drop structures, downstream lake and dam, poor riparian area, shade/hide cover, and pollution (Johmann, pers. comm., 2002).

- GR/AL-2: Limiting factors should be channel flow rates, morphology, water temperature, drop structures, downstream lake and dam, poor riparian area, shade/hide cover, and pollution (Johmann, pers. comm., 2002).

MUN: The MUN use is not supported in GR/AL-1 due to documented exceedences of the total dissolved solids criterion and is partially supported in GR/AL-2 due to total dissolved solids exceedences during wet weather. However, as data is very limited, uncertainty is high.

PFF: The PFF interest is fully supported in all reaches of Alamitos Creek.

Stakeholder comments have provided the following information regarding PFF interest support in Alamitos Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/AL-1: The creek is affected by the flood control project where it was over-widened from Lake Almaden upstream. This reach should be split into two segments - above and below Greystone Creek. Below Greystone Creek, it should be listed as a Modified Straightened channel. Just upstream of Golf Creek there is a drop structure and an overflow channel and a very wide corridor. There is another drop structure where the creek empties into Lake Almaden. These drop structures inhibit fish migration except at high flows. Above Greystone Creek, it should be listed as a Quasi Natural, Modified channel. There is more riparian habitat and shade cover and the creek channel starts to meander and is far less incised (Neudorf, pers. comm., 2002 and Johmann, pers. comm., 2002).

- GR/AL-2: The creek is affected by the flood control project where it was over-widened from the confluence with Arroyo Calero upstream to McKean; above McKean it appears much more natural; the creek re-routed itself near New Almaden per some storm flow action, resulting in some stream meander (Neudorf, pers. comm., 2002).

RARE: The RARE use is fully supported in Alamitos Creek based on native rainbow trout observations. Potential support exists for western pond turtle and red legged frog above Arroyo Calero. Habitat appears marginal to poor for salmonids below Arroyo Calero but marginal to good above it, with conditions improving with distance upstream toward Almaden Dam.

Stakeholder comments have provided the following information regarding RARE use support in Alamitos Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/AL-1: Below Greystone Creek, should be limited support. Riparian and channel habitat is poor in this area, water temperatures are warm and drop structures impede movement. Channel morphology, flow rates, water temperature, poor riparian area drop structures and downstream lake and dam are limiting factors for this use. Above Greystone Creek, channel morphology, flow rates, water temperature, poor riparian area drop structures and downstream lake and dam are limiting factors for this use (Johmann, pers. comm., 2002).

- GR/AL-2: Support level should be limited support. Salmonids normally wouldn't have access to this area except at very high flows due to downstream drop structures. Channel morphology, flow rates, water temperature, poor riparian area drop structures and downstream lake and dam are limiting factors for this use (Johmann, pers. comm., 2002).

REC-1: The REC-1 use is partially supported based on access and aesthetics below Arroyo Calero but is not supported above it. Water quality data indicates full support of REC-1 based on the secondary criteria above Arroyo Calero. However, uncertainty is moderately high with respect to these conclusions due to spotty data.

Stakeholder comments have provided the following information regarding REC-1 use support in Alamitos Creek (alternate conclusions on use support are also shown in Appendix 4-A):

- GR/AL-1 and GR/AL-2: Status should be limited support. This area supports fishing and wading and small watercraft boating. The primary limiting factors for this use are water flow levels, access, and waterborne pathogens (Johmann, pers. comm., 2002).

4.3.6.2 Jacques Gulch (GR/AL-3)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.6.3 Herbert Creek (GR/AL-4)

Herbert Creek was found to partially support the COLD use, though dissolved oxygen criteria were not met based on limited data and little fish presence data was available. Uncertainty, therefore, is moderately high. The PFF interest is fully supported in Herbert Creek.

4.3.6.4 Barrett Canyon Creek (GR/AL-5)

Sufficient data were available to assess only the PFF interest, which is fully supported in this reach.

4.3.6.5 Larabee Gulch (GR/AL-6)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.6.6 Chilanian Gulch (GR/AL-7)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.6.7 Deep Gulch (GR/AL-8)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.6.8 Greystone Creek (GR/AL-9)

Sufficient data were available to assess only the PFF interest, which is fully supported in this reach.

4.3.6.9 Golf Creek (GR/AL-10)

Sufficient data were available to assess only the PFF interest, which is fully supported in this reach.

4.3.6.10 Randol Creek (GR/AL-11)

Sufficient data were available to assess only the PFF interest, which is not supported in this reach. Two sections of Randol Creek do not have adequate capacity to convey 100-year flows. Land uses in these areas consist of urban residential development where flooding is likely to cause property damage.

Stakeholder comments have provided the following information regarding use/interest support in Randol Creek:

- The West Branch of Randol Creek has a very good riparian area and natural channel (Johmann, pers. comm., 2002).

4.3.6.11 McAbee Creek (GR/AL-12)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.6.12 Lake Almaden (GR/AL/LA)

Lake Almaden was found to partially support the COLD use, with high turbidity and high temperature at the surface being limiting factors. Data were limited, however, leading to a moderately high level of uncertainty regarding this conclusion. The REC-1 use appears to be fully supported based on the primary pathogen indicator but data was limited and no data on other REC-1 indicators was available, so uncertainty is moderately high.

Stakeholder comments have provided the following information regarding use/interest support in Lake Almaden (alternate conclusions on use support are also shown in Appendix 4-A):

- This lake most likely would not support cold water species. Water temperature is far too warm. Data loggers on lower parts of Guadalupe and Alamitos Creeks and one just downstream of the Alamitos Drop Structure all indicate high summer and winter temperatures not favored by salmonids. This lake supports swimming, wading, fishing and boating (Johmann, pers. comm., 2002).

4.3.6.13 Almaden Reservoir (GR/AL/AR)

Almaden Reservoir was found to potentially support the COLD use, but there is very high uncertainty about this due to the lack of recent data. Temperatures exceeded habitat suitability criteria. The MUN use was not supported due to elevated fecal coliform, MTBE, and turbidity in excess of drinking water criteria. Uncertainty is moderately high, however, due to recent data indicating improvements in water quality. If current trends continue, the MUN use may become fully supported. The PFF interest is fully supported based on very limited data with high uncertainty. Potential support for the RARE use was noted based on western pond turtle observations, but the uncertainty is high. The REC-1 use is not supported due to mercury exceedences in reservoir sediment but data is limited and uncertainty moderately high. Alternate conclusions on use support are also shown in Appendix 4-A.

4.3.7 Arroyo Calero Subwatershed

Assessment results for waterbodies in the Arroyo Calero subwatershed are discussed by individual waterbody in this section.

4.3.7.1 Arroyo Calero (GR/AC-1)

COLD: Arroyo Calero was designated as partial supporting the COLD use with high certainty. The stream substrate is dominated by fine sediment and summer streamflows are relatively turbid, which may affect insect abundance and presence of intolerant species. Summer streamflows depend upon releases from Calero Reservoir for groundwater percolation, primarily downstream of the reach. Releases vary seasonally and among years due to reservoir storage. Summer temperatures are relatively cool, but increase downstream within the reach. High storm flows resulting from urban runoff may degrade habitat.

The FAHCE data that became available subsequent to completion of the assessment notes that this reach contains a suitable combination of pools, riffles, and runs with good quality habitat and relatively good complex shelter for salmonids (FAHCE, 1999).

MUN: The MUN use is fully supported in Arroyo Calero, though data is relatively limited and therefore uncertainty moderately high.

PFF: The PFF interest is fully supported in Arroyo Calero.

RARE: The RARE use is potentially supported in Arroyo Calero based on California tiger salamander and red legged frog. The saltmarsh common yellowthroat is also assumed to be common because of the location and habitat. Potential support exists for burrowing owl, golden eagle, tricolored blackbird, Opler's longhorn moth, unsilvered frittilary, Horn's microblind harvestman, peregrine falcon, western pond turtle, and bay checkered butterfly.

Alternate conclusions on use support are also shown in Appendix 4-A.

REC-1: The REC-1 use is fully supported based on secondary water quality indicators though very limited data is available, resulting in a very high uncertainty level.

Stakeholder comments have provided the following information regarding REC-1 use support in Arroyo Calero (alternate conclusions on use support are also shown in Appendix 4-A):

- Wading and fishing may be supported but there are access problems (Johmann, pers. comm., 2002).

4.3.7.2 Santa Teresa Creek (GR/AC-4)

Santa Teresa Creek fully supports the PFF interest but does not support the RARE use (very high uncertainty) based on the lack of presence of red legged frogs. Data for other uses were insufficient.

4.3.7.3 Cherry Canyon Creek (GR/AC-2)

Cherry Canyon Creek potentially supports the RARE use based on red legged frog observations. Limited data does not reveal whether the population is reoccurring, however. Uncertainty is moderately high. Data for other uses were insufficient.

4.3.7.4 Pine Tree Canyon Creek (GR/AC-3)

Insufficient data were available to assess any of the uses/interests in this reach.

4.3.7.5 Calero Reservoir (GR/AC/CR)

Calero Reservoir does not appear to support the MUN use due to elevated fecal coliform, MTBE, and turbidity in excess of drinking water criteria. The MTBE is almost certainly due to use of personal watercraft on the reservoir. It should be noted that MTBE has not exceeded the criterion since the Water District developed an MTBE management strategy with the County Parks Department (Brewster, pers. comm., 2002). The PFF interest is fully supported based on very limited data with high uncertainty. Full support for the RARE use was noted based on golden eagles and tiger salamanders. The REC-1 use is not supported due to mercury exceedences in reservoir sediment but data is limited and uncertainty moderately high.

Stakeholder comments have provided the following information regarding use/interest support in Calero Reservoir (alternate conclusions on use support are also shown in Appendix 4-A):

- COLD: Most of the reservoir is quite warm; there is no opportunity for trout to move away from the heat during summer months; the deeper hole in front of the dam where the water may be cooler is often low in oxygen (Neudorf, pers. comm., 2002).

- REC-1: Support status should be Full Support. This reservoir supports fishing, wading and boating (Johmann, pers. comm., 2002).

4.4 Recommendations on Further Data Collection and Analysis

Future data collection in the Guadalupe River watershed will depend upon priorities established by the WMI. Some uses/interests may be prioritized over others, and this will identify the most important types of data for early collection. Additional detail regarding data gaps is provided in Appendix C. Also see Chapter 2 for a more comprehensive discussion of future data collection.

For the five uses/interests studied in the pilot assessment, the following represent the most significant data gaps:

COLD:

- Accurate data on stream temperature and channel morphology in the main stem of Guadalupe River is needed to evaluate the availability of appropriate habitat

- Fish assemblage and indicator macroinvertebrate presence data for Los Gatos Creek (excluding GR/LG-1) including all five reservoirs in the subwatershed, and for the Arroyo Calero main stem reaches (excluding GR/AC-1) including Calero Reservoir; and macroinvertebrate data for Lake Almaden and Almaden Reservoir in the Alamitos Creek subwatershed

MUN:

- Wet and dry weather data on a majority of parameters (of a total of 16 designated parameters) in all reaches of Guadalupe River (excluding GR-1), Guadalupe Creek, Los Gatos Creek, Alamitos Creek, and Arroyo Calero; especially the reservoirs within these subwatersheds used for drinking water supply

PFF:

Data was adequate in the main stem reaches of the subwatersheds

RARE:

- Data on special status species presence and/or habitat in most reaches of Los Gatos Creek (above GR/LG-1), Guadalupe Creek (not including GR/GC-1), and the stream reaches in Alamitos Creek not including GR/AL-1 and GR/AL-2

REC-1:

- Water quality data on pathogens (fecal coliform, e.coli) could be collected in the main stem of Guadalupe River, Guadalupe Creek, and the most frequently used reservoirs for water contact recreation including Guadalupe Reservoir, Vasona Reservoir, Lexington Reservoir, Almaden Reservoir, Lake Almaden, and Calero Reservoir to allow for complete support statements with high certainty. Data collection should be focused on the reaches where water contact recreation (swimming, wading, sport fishing) is known to occur.

4.5 References

Akin, Scott. 2002. Personal Communication. FAHCE Data Manager, Santa Clara Valley Water District.

FAHCE (Fisheries and Aquatic Habitat Collaborative Effort). 1999. Preliminary Report of Aquatic Habitat Survey Results of Santa Clara Valley Streams. Prepared by Entrix, Inc. for the November 9, 1999 Consensus Committee Meeting.

Hollis, G.E. 1975. The Effect of Urbanization on Floods of Different Recurrence

Intervals. Water Resources Research 11(3): 431-435.

Johmann, Larry. 2002. Personal Communication. WMI Guadalupe watershed Co-Captain. Guadalupe-Coyote Resource Conservation District.

Neudorf, Terry. 2002. Personal Communication. WMI Guadalupe watershed Co-Captain. Biologist, Santa Clara Valley Water District.

Regional Water Quality Control Board. 1975. Regional Water Quality Control Plan, San Francisco Bay Region.

San Jose Regional Parks. 2002. Lake Almaden Park Profile. SJRP website (www. www.ci.san-jose.ca.us/cae/parks/alp)

Santa Clara Basin WMI. 2001. Watershed Characteristics Report (Volume One), Chapter 7: Natural Setting.

Appendix 4-A
Pilot Assessment Result Charts

Appendix 4-A contains a series of six tables displaying bar charts which illustrate the conclusions of the pilot assessment for the Guadalupe River watershed. Table 1 summarizes the support status for each of the five beneficial uses/stakeholder interests within each of the 63 stream reaches in the watershed. Tables 2 through 6 display the same information, along with the associated uncertainty rating, for each individual use/interest. In instances where no bar is present above a stream reach identification code, sufficient data were not available to assess any of the uses/interests for that reach. A list of stream reaches, waterbodies, and identification codes is located in Appendix 4-B.

The tables in Appendix 4-A are organized as follows:

- Table 1: Overall Support Status by Reach (all uses)
- Table 2: Support Status and Uncertainty Ratings for COLD
- Table 3: Support Status and Uncertainty Ratings for MUN
- Table 4: Support Status and Uncertainty Ratings for PFF
- Table 5: Support Status and Uncertainty Ratings for RARE
- Table 6: Support Status and Uncertainty Ratings for REC-1

Notes have been placed on each of the tables in Appendix 4-A (excepting Table 3) to indicate where certain stakeholders are in disagreement with the findings of the pilot assessment. This disagreement is based on other data or information that was not provided to the assessment team.

Insert Appendix 4-A, Tables 1 through 6

Appendix 4-B
Reach Summary Tables

Appendix 4-B contains a series of tables summarizing the pilot assessment results for all of the reaches in the Guadalupe River watershed where sufficient data existed for at least one of the five uses/interests. Reaches with insufficient data for all uses/interests do not have individual tables but are instead compiled and listed on the last page of this appendix. A listing of all reaches in the watershed and the page number in this appendix where each reach can be found is provided below.

GR/LG-6	Trout Creek	Entire Creek	124
GR/LG-7	Lyndon Canyon Creek	Entire Creek	124
GR/LG/LA	Lake Ranch Reservoir	Entire Reservoir	124
GR/LG-8	Daves Creek	Entire Creek	70
GR/LG-9	Black Creek	Entire Creek	124
GR/LG-10	Dyer Creek	Entire Creek	124
GR/LG-11	Briggs Creek	Entire Creek	124
GR/LG-12	Aldercroft Creek	Entire Creek	124
GR/LG-13	Moody Gulch	Entire Creek	72
GR/LG-14	Limekiln Creek	Entire Creek	124
GR/LG-15	Soda Springs Canyon Creek	Entire Creek	124
GR/LG-16	Hendrys Creek	Entire Creek	124
GR/LG-17	Hooker Gulch	Entire Creek	124
GR/LG-18	Austrian Gulch	Entire Creek	124
GR/LG-19	Almendra Creek	Entire Creek	74
GR/LG-20	Dry Creek	Entire Creek	124
GR/AL/LA	Lake Almaden	Entire Reservoir	76
GR/AL-1	Alamitos Creek	Lake Almaden to Arroyo Calero confluence	78
GR/AL-2	Alamitos Creek	Arroyo Calero confluence to Almaden Reservoir	82
GR/AL/AR	Almaden Reservoir	Entire Reservoir	86
GR/AL-3	Jacques Gulch	Entire Creek	124
GR/AL-4	Herbert Creek	Entire Creek	89
GR/AL-5	Barrett Canyon Creek	Entire Creek	92
GR/AL-6	Larabee Gulch	Entire Creek	124
GR/AL-7	Chilanian Gulch	Entire Creek	124
GR/AL-8	Deep Gulch	Entire Creek	124
GR/AL-9	Greystone Creek	Entire Creek	95
GR/AL-10	Golf Creek	Entire Creek	97
GR/AL-11	Randol Creek	Entire Creek	99
GR/AL-12	McAbee Creek	Entire Creek	124
GR/AC-1	Arroyo Calero	Alamitos Creek confluence to Calero Reservoir	102
GR/AC/CR	Calero Reservoir	Entire Reservoir	106
GR/AC-2	Cherry Canyon Creek	Entire Creek	109
GR/AC-3	Pine Tree Canyon Creek	Entire Creek	124
GR/AC-4	Santa Teresa Creek	Entire Creek	111
GR/CC-1	Canoas Creek	Entire Creek	114

GR/RC-1	Ross Creek	Guadalupe River confluence to Blossom Hill Road	117
GR/RC-2	Lone Hill Creek	Entire Creek	120
GR/RC-3	Short Creek	Entire Creek	122

Insert Appendix 4-B reach summary tables

Insert Appendix 4-B "last page" listing of reaches with no data

Appendix 4-C
Data Sets Used in Assessment

Appendix 4-C contains a list of every data set that was ultimately used in developing the assessment conclusions in Appendix 4-B. Readers interested in knowing what data sets were used for a specific reach/use evaluation should first locate the reach and use of interest in the reach summary tables in Appendix 4-B. The data set identification numbers listed in those tables can be cross-referenced to the data set identification numbers in this appendix. Information about each data set (title, source, date) is presented in this appendix. This information is extracted from the metadata data base developed to support the WMI assessments.

Insert Appendix 4-C