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Central Coast Watershed Studies

CCoWS

2017 Photo Monitoring

Santa Lucia Preserve, Monterey County, California

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Preface

This report has been prepared for the Santa Lucia Conservancy and presents the 2017 photo monitoring results of four major streams flowing through Santa Lucia Preserve- Las Garzas, Potrero, San Jose, and San Clemente Creek. These data are part of a long-term dataset, and will serve to assess geomorphic changes in the channels.

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1 Introduction

The Santa Lucia Preserve (SLP) is a 20,000 acre low density development in Monterey County, CA. The Santa Lucia Conservancy (SLC) is a non-profit organization established to manage 18,000 undeveloped acres of the SLP. Four streams within the SLP are monitored by the SLC: Las Garzas Creek, San Jose Creek, Potrero Creek and San Clemente Creek (Figure 1). Since the formation of the SLC in 1995, photo monitoring data have been collected intermittently by various organizations. This report presents photo monitoring images collected from eight monitoring sites (Figure 1).

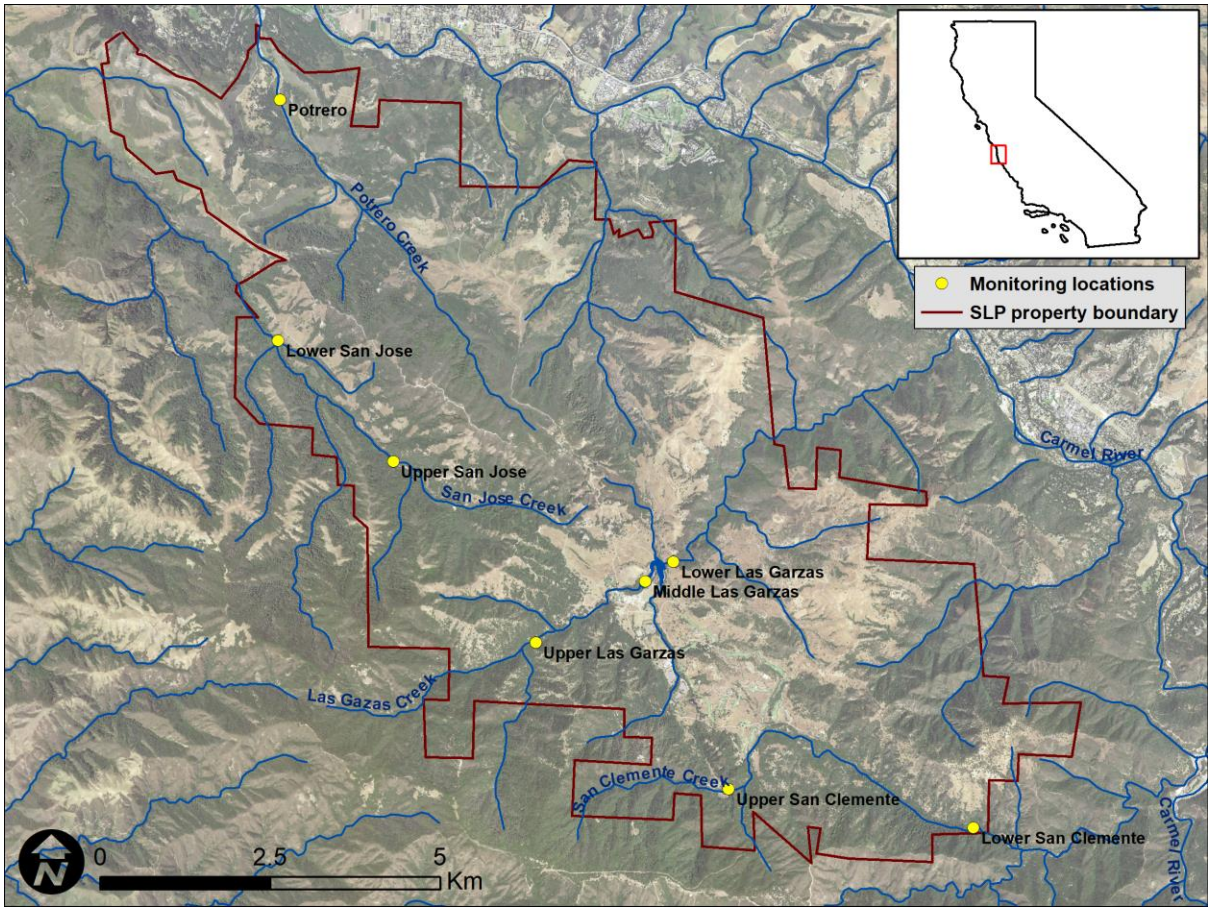

Figure 1: Map of Santa Lucia Preserve showing eight monitoring sites on four streams within the property boundary.

In 2016, the Soberanes Fire burned a total of 206 square miles over the course of four months. The SLP was widely burned by both wildfire and backfires, and was also a major center for fire-fighting and containment activities. These fire-related disturbances have the potential to impact stream water quality and channel morphology (Merrill and Casaday 2003).

In early 2017, heavy storm flows removed or damaged reference markers at several sites (San Clemente Creek, Upper San Clemente Creek, San Jose Creek, Upper Las Garzas Creek), pictured in figures 3, 5, 7, 9, 11, 13, 15, 17, 27 and 29, respectively. The most recent photo monitoring images (taken in September 2017) are compared to both the oldest available corresponding images and the most recent previous photos taken in November 2016 to assess impacts from the recent 2016 fire and 2017 flooding, such as erosion, deposition and debris flows. All additional historical photographs of the SLP beginning in 1998 are available in the SLC office and in Paddock et al. (2011).

1.1 Photo Monitoring

Photo monitoring is a method used to record long term qualitative changes in stream channels. Photographs are used to analyze potential changes in channel substrate, channel morphology, and vegetation. Photographs are collected annually in low flow conditions because the channel is more exposed. Positioning of the photographer, distance from an established point, height above ground, inclination angle, bearing, and focal length are all factors that should be held constant (CARCD 2001).

From 1998 to 2003 several photo monitoring sites were established by installing white PVC pipe vertically in the stream bed. In 2009 and in 2011, two additional sites were included for a total of eight monitoring sites. After heavy rains in early 2017, the PVC markers at five photo monitoring sites were washed away or damaged (see above). Photos were recreated as closely as possible using photos from previous years for reference.

1.2 Monitoring Locations

This report presents photo monitoring images collected from eight monitoring sites (Appendix A). There are two monitoring sites on San Clemente Creek. The site named “San Clemente” is 30 meters upstream from the gage, a half mile upstream from the property line. The site named “Upper San Clemente” is 50 meters downstream from the intersection of Robinson Canyon Road and San Clemente Creek, 5 meters upstream of the footbridge.

There are two monitoring sites on San Jose Creek. The site named “San Jose” is the downstream site located upstream of a cement weir. The site named “Upper San Jose” is located near Lot 46, near Rancho San Carlos Road.

There are three monitoring sites on Las Garzas Creek. The site named "Lower Garzas" is 50 meters downstream from Moore's Lake. The site named "Middle Garzas" is upstream of Moore's Lake, upstream of the culvert. The site named "Upper Garzas" is 50 meters upstream of the intersection of Las Garzas Trail Road and Las Garzas Creek.

There is one monitoring site on Potrero Creek. The site is located in the lower reach of the creek, 50 meters downstream of the gage.

2 Methods

Photographs of eight monitoring sites were taken in September 2017 with cellular phones. A photo was taken downstream of the PVC pipe looking upstream. Another photo was taken upstream of the PVC pipe looking downstream. Photographs from 8 monitoring sites were compared with previous photos taken 2 and 15 years in the past. If the PVC pipe was dislodged or broken, it was replaced and located as closely as possible to the original location. All references to "left" or "right" bank are from the perspective of the downstream view, independent of the direction of the photograph.

3 Results

Photo Monitoring

The following descriptions of geomorphic change in the SLP creeks are drawn from cursory analysis of photographic pairs shot from approximately the same position and direction in 2017 as they were in various previous years. While some of the photo pairs represent decadal-scale changes, these changes do not necessarily indicate long-term continuous "trends." In all photo pairs, the differences might be trends, seasonal changes, or the results of a single geomorphically-important flood event that occurred sometime during the time span.

San Clemente

Much of the finer gravel has been washed away since 1998, leaving a coarse boulder lag deposit. The physical rearrangement of boulders in the photos indicates that large particles have been transported into place as well as being exhumed by the removal of finer sediment deposits. The left bank has built and vegetated since 1998. (Figures 2-5).

Upper San Clemente

The site was established in 2011. There have been minor changes in the channel from 2011 to 2016. The channel has widened and exposed the boulder bed, and there has been some erosion on the right bank. The photo monitoring marker was washed away, and there is dense vegetation and coarse woody debris (Figure 6-9).

San Jose

San Jose has widened significantly between 2016 and 2017, and has developed a minor side attached bar and central bar from gravel deposits in the channel. Since 1998, there has been a lot of riparian growth. Between 2016 and 2017 there has been a lot of large wood accumulation, and the tree fall on the right bank will eventually add more large wood to the stream. (Figures 10-13).

Upper San Jose

It is difficult to analyze potential change at Upper San Jose because of the sparse lighting of the photographs from 2000. There has been a large increase in vegetation and woody debris from 2000 to 2017. The woody debris accumulation in 2016 has washed away in 2017, but there remains too much vegetation to assess channel changes; no change. (Figures 14-17).

Lower Garzas

Lower Garzas has an increase in riparian forest growth and channel bank vegetation in 2017 compared to 1999. The channel has widened since 1999, but there is not much change between 2016 and 2017. (Figures 18-21).

Middle Garzas

The comparison of the photographs of Middle Garzas is difficult because of the dense vegetation that has accumulated along the channel banks since 2000, but there has been no change. Vegetation type also seems to have shifted from ferns and reeds to larger woody trees and shrubs. (Figures 22-25).

Upper Garzas

The oldest photograph available for Upper Garzas is from 2009. The rebar at this site has been washed away. There are minor attached side bars in 2017, and the stream has widened slightly between 2016 and 2017. (Figures 26-29).

Potrero

There has been an increase in dense riparian vegetation from 2003 and 2017. There have been no significant changes in the channel since 2003, and particle size appears to remain constant (Figures 30-33).

4 Discussion

Photo monitoring results indicate that there have been no unexpected changes in stream morphology for many years in the four streams in this study. All changes are in keeping with expected variation in natural streams, with no extreme incisions or evulsions. Fine material that had accumulated between 1998 and 2016 has been removed to expose boulder lag. Riparian vegetation continues to become denser. We recommend the continuation of annual photo monitoring to capture potential fire- and/or flood-related impacts to stream channel morphology.

5 Photo Monitoring Images

Figure 2: Downstream view of San Clemente Creek in March 1998

Figure 3: Downstream view of San Clemente Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 4: Upstream view of San Clemente Creek in March 1998

Figure 5: Upstream view of San Clemente Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 6: Upstream view of Upper San Clemente August 2011

Figure 7: Upstream view of Upper San Clemente on (A) November 4, 2016 and (B) September 17, 2017

Figure 8: Downstream view of Upper San Clemente August 2011

Figure 9: Downstream view of Upper San Clemente on (A) November 4, 2016 and (B) September 17, 2017

Figure 10: Downstream view of San Jose Creek in August 1999

Figure 11: Downstream view of San Jose Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 12: Upstream view of San Jose Creek in August 1999

Figure 13: Upstream view of San Jose Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 14: Downstream view of Upper San Jose Creek in September 2000

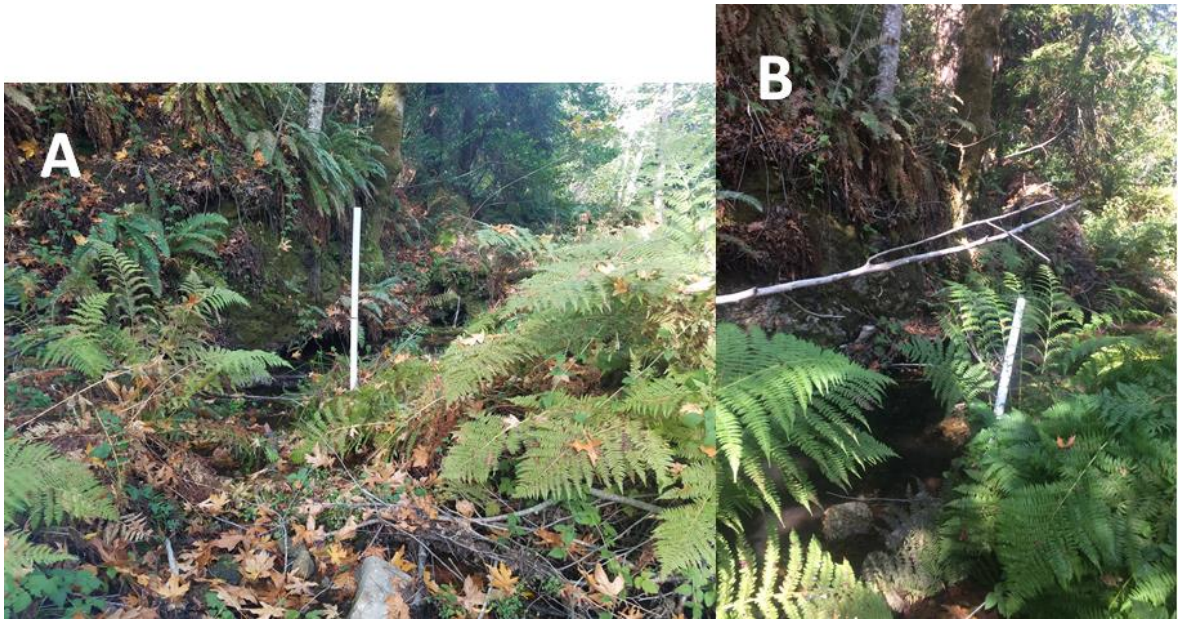

Figure 15: Downstream view of Upper San Jose Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 16: Upstream view of upper San Jose Creek in September 2000

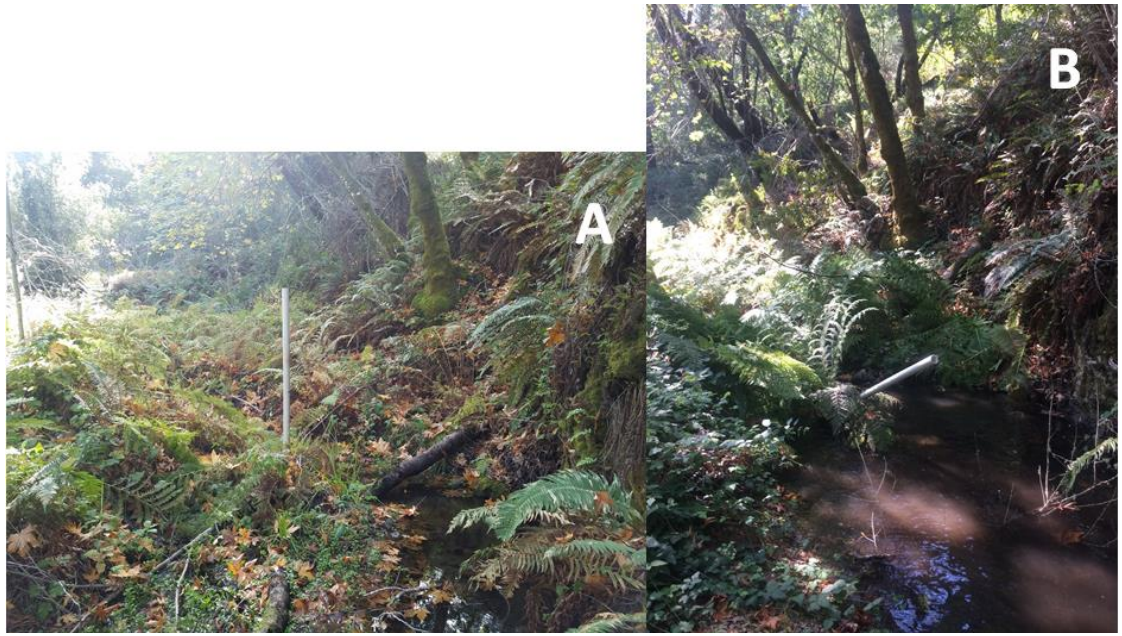

Figure 17: Upstream view of upper San Jose Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 18: Downstream view of Lower Las Garzas Creek in October 1999

Figure 19: Downstream view of Lower Las Garzas Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 20: Upstream view of Lower Las Garzas Creek in October 1999

Figure 21: Upstream view of Lower Las Garzas Creek in (A) November 4, 2016 and (B) September 17, 2017

Figure 22: Downstream view of Middle Las Garzas Creek in November 2000

Figure 23: Downstream view of Middle Las Garzas Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 24: Upstream view of Middle Las Garzas Creek in August 2000 (estimate of date)

Figure 25: Upstream view of Middle Las Garzas Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 26: Downstream view of Upper Las Garzas Creek in August 2009

Figure 27: Downstream view of Upper Las Garzas Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 28: Upstream view of Upper Las Garzas Creek in August 2009

Figure 29: Upstream view of Upper Las Garzas Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 30: Downstream view of Potrero Creek in July 2003

Figure 31: Downstream view of Potrero Creek on (A) November 4, 2016 and (B) September 17, 2017

Figure 32: Upstream view of Potrero Creek in July 2003

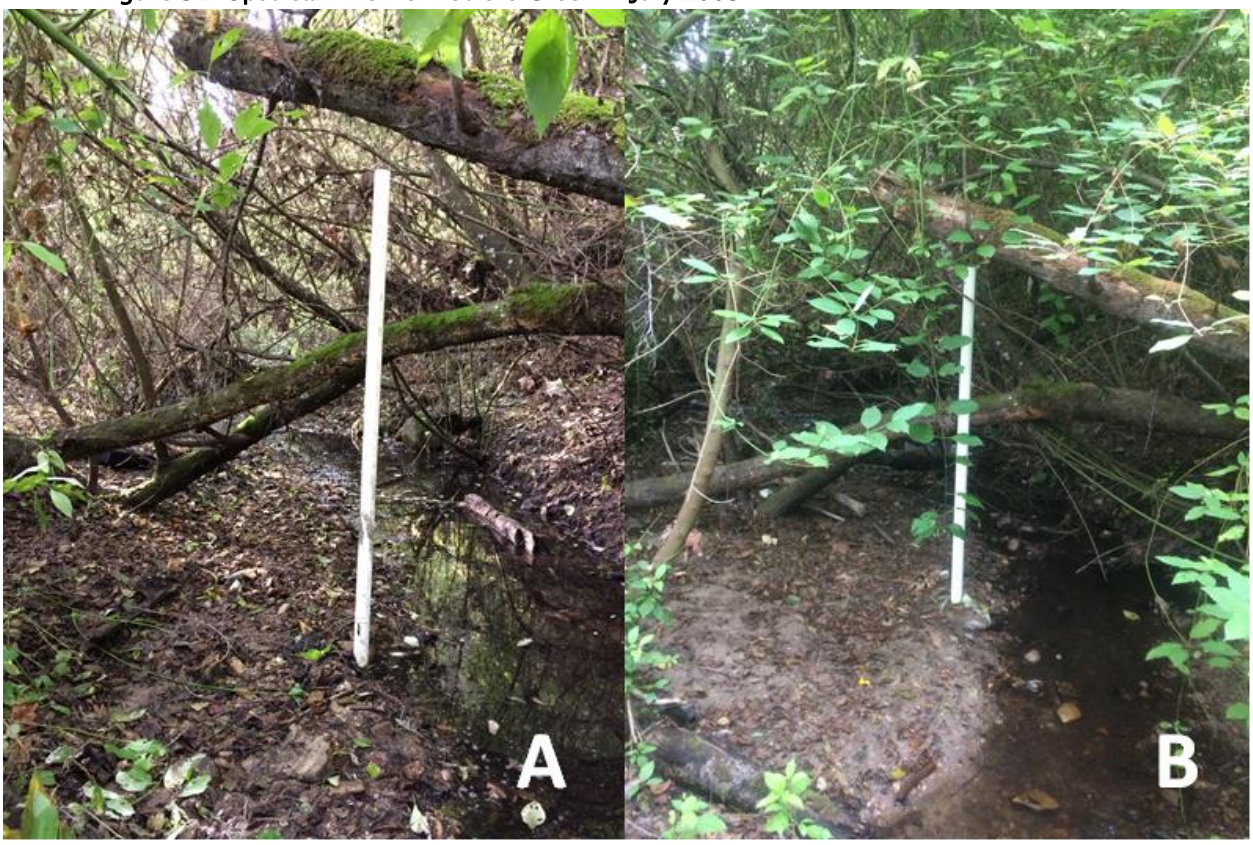

Figure 33: Upstream view of Potrero Creek on (A) November 4, 2016 and (B) September 17, 2017

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7 Appendix A

Monitoring Site Locations

Site #1: Potrero Creek
Location: 36.51898°N, -121.86406°W
Directions: This site is located 50 meters downstream of the Potrero streamflow datalogger, approximately a quarter mile upstream of the preserve main gate. Immediately following the main gate, turn left onto Potrero Canyon Road. There will be a small gravel parking pad on the right side. Park here and walk 100 meters south to the site.

Site #2: San Jose Creek
Location: 36.48709°N, -121.86329°W
Directions: From the main gate, follow Rancho San Carlos Road SE. Just past the Canterra Trail intersection, the road descends steeply into San Jose Creek Canyon. Near the bottom of the hill, there is a dirt road to the right. Park on the pavement at the beginning of the dirt road. Walk 300 meters down the road to the creek. The monitoring sit is 50 meters downstream, just upstream of the cement weir.

Site#3: Upper San Jose Creek
Location: 36.47178°N, -121.84326°W
Directions: From site #2, continue heading southeast on Rancho San Carlos Road. The site is located about 2 miles up the canyon near Lot 46, just before the road splits around a group of trees. Park on the side of the road before the bridge of the Lot 46 driveway. Follow the hiking trail to the north side of the driveway, on the east side of the creek, for 50 m to the monitoring site.

Site #6: San Clemente
Location: 30 m upstream from the datalogger that is located at 36.42527°N, 121.74842°WDriving Directions: From Robinson Canyon Road, drive east on San Clemente Road. At the Dormody Road intersection, take the left turn to continue heading down San Clemente Creek Canyon. The site is located a couple of miles down the road from the Dormody Road, and about a half a mile upstream from the San Clemente Ranch gate. Here you will find a small area off to the side of the road that is suitable for parking. (PVC marker)

Site #11: Lower Garzas Creek
Location: 36.45938°N, -121.79708°W, 100 m downstream from Moore's Lake Outflow datalogger.
Driving Directions: On Robinson Canyon Road, park alongside the road 50m south of the bridge where Moore's lake feeds into Garzas Creek. Climb over the fence and follow the abandoned gravel road to the left for about 150m to the site. (staff plate on tree upstream of crossing)

Site #9: Moore's Lake Inflow (Middle Garzas Creek)
Location: 36.45665°N, -121.80166°W
Driving Directions: From Rancho San Carlos Road heading SE, turn left onto Pronghorn Run at the equestrian center. Then turn left onto Lake Walk Trail. The stables will be on your left and the corrals on your right. The trail curves left into a willow filled wetland where it crosses Garzas Creek. There is parking 25 meters past the culvert. (PVC marker)

Site #4: Upper Garzas Creek
Location: 36.44793°N, -121.81918°W
Driving Directions: Heading SE on Rancho San Carlos Road, turn right onto Garzas Trail just past Chamisal Pass Road. Drive up Garzas Trail to the cul-de-sac loop at the end of the road. Turn left onto a driveway that heads to 9 and 10 Las Garzas Trail immediately before the loop. In ¼ mile there is a bridge that crosses Garzas Creek. The site is about 50 m upstream from the bridge. (PVC marker)

Site #10: Upper San Clemente Creek, 36.428938°N, -121.788800°W
Directions: From the southern terminus of Rancho San Carlos Road, exit the gate and head south on Robinson Canyon Road. After about 1 mile, the road makes a sharp right, crosses a small intermittent creek and then heads back sharply to the left. After this zig zag in Robinson Canyon Road, there will be a gated driveway on the east side of the road to access lots 99 and 100. Park here, go through the gate, head down the driveway about 50 yards, then head to the left to the small stream. The sampling site is directly upstream from the footbridge. Gate combo is 9910.

Site #12: Old Lower Potrero Creek
No longer being monitored according to Bruce Cyr's report

Site #7: Upper Hitchcock Creek, 36.450195°N, -121.758980°W (Has not been recently monitored)

Directions: On Black Mountain Trail, about a half-mile up the hill from the intersection with Touche Trail, the road makes a very broad curve to the left. In the middle of this curve, the road passes a saddle between the Las Garzas Creek watershed and the Hitchcock Creek watershed. From this saddle, walk (or drive if you have 4WD) down the Portugese Spring Trail down the hill to the east. About a mile down the hill, the trail cuts back sharply to the left and ends at the Portugese spring cement trough. About 200 feet south of the spring, from the trail, head down the hill toward the east, hiking down through open grassland. As you head down the hill to the east, you will enter a strip of dense patch dark green rush that cuts west through

the oaks. Follow this patch of rush down the hill until the rushes end at the edge of the oaks, and turn to the left (north) into the woods to find the monitoring site.

Site #8: tributary of Robinson Creek, 36.497824°N, -121.813132°W (has not been recently monitored)

Directions: This site is located in the small creek at the bottom of (east of) the homeland of lot 224. From the end of the paved driveway at the entrance to the homeland of lot 224, walk down the hill to the east through the open grassland area. Where the grassland grades into oak woodland, continue heading down the hill to the east into the scattered coast live oaks. The monitoring site is in the small creek in the bottom of the ravine just inside the oak woodland. This creek is NOT on the main branch of Robinson Creek, but rather a small tributary.