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January 2014 Aquatic Habitat Assessment on San Jose and Potrero Creeks, Santa Lucia Preserve, Monterey County, California

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Preface

This report presents the results of the 2014 drought condition surveys for two streams flowing through Santa Lucia Preserve– Potrero and San Jose Creeks. This report has been prepared for the Santa Lucia Conservancy and is primarily intended to inform the conservancy of aquatic habitat availability during drought conditions.

Acknowledgments

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1 Introduction

The Santa Lucia Preserve (SLP) is a residential community established in 1994 on the 20,000 acre Rancho San Carlos property in Carmel Valley, California. The Santa Lucia Conservancy manages 18,000 acres of open space while the remaining 2,000 is occupied by the community.

The Santa Lucia Conservancy has surveyed stream flow conditions of the four major streams flowing through the Santa Lucia property during the end of each water year (WY) from WY2003 to WY2013 (Leiker et al. 2013). These surveys monitor the presence and distribution of aquatic habitat during the driest time of the year. Since these surveys occur long after the rainy season, the baseflows are strictly from groundwater discharge, such as springs and seeps, rather than from rainfall runoff. The baseflow surveys are intended to detect major changes in stream baseflow conditions through time, as well as monitor the persistence of baseflow during the driest part of the year. In January 2014, California had been in a 2.5-year period of drought, which began in 2012 (NOAA 2014). Santa Lucia Resource managers commissioned a special survey of aquatic habitat in January 2014 to determine if the streams were drier than the conditions recorded in the September 2013 baseflow study (Leiker et. al 2013). The January 2014 survey mapped the presence of remnant pools where aquatic organisms could survive the continuing drought. These pools provide an ecological “refugia” where species could survive extended dry periods.

Locations of pools were surveyed on January 24 and 25, 2014. This report provides the findings of the 2014 refugia survey and compares the January 2014 conditions to the September 2013 baseflow conditions for Potrero and San Jose creeks (Leiker et. al 2013).

2 Methods

2.1 Baseflow Drought Conditions Mapping

Surveys of Potrero and San Jose Creeks in the Santa Lucia Preserve were conducted by walking the length of each creek and recording spatially-relevant qualitative observations. Graduate students at California State University Monterey Bay conducted both the annual baseflow conditions survey and the baseflow drought conditions surveys. Baseflow conditions were described in detail and the locations of changing conditions were recorded with a Garmin 62sc handheld GPS unit. The annual baseflow conditions survey were conducted using a Trimble GeoXM. The results were then mapped in GIS. To evaluate the available aquatic habitat, the stream condition criteria were changed from annual baseflow surveys to appropriately assess low flow conditions. The new criteria are described in detail below. For comparison purposes,

definitions from previous baseflow surveys have also been included. The following definitions are used to describe sub-reach channel conditions during the drought period.

- ***Flowing***: Water present in channel with observable flow
- ***Large Pool***: There are single pools, > 4m in diameter, isolated by reaches of dry channel
- ***Medium Pool***: There are single pools, 1–4m in diameter, isolated by reaches of dry channel
- ***Wet No Flow***: Water present in channel with no observable flow
- ***Sporadic Wet/Dry***: Series of small pools intermittent with short dry reaches of channel
- ***Dry***: Stream reaches or sub-reaches having no surface water

2.2 Baseflow Conditions Mapping

The following definitions are used to describe sub-reach channel conditions for previously conducted baseflow surveys (Woysner et al. 2004; 2005, Croyle 2007).

- ***“Predominantly wetted channel:*** Flowing segments and/or strings of isolated pools, without reference to exact location of segments. Most pools contain at least some water, however riffles may be dry. In the 1990 and 1991 memos and field notes, these segments were referred to as “continuously wetted channel,” but we have changed the phrase to avoid confusion with “continuously flowing” and to provide a more general definition that can be applied to all creeks. Some short sections of dry channel may be included, but the reach/sub-reach was defined as having predominantly wetted conditions.”
- ***“Predominantly dry channel:*** Stream reaches or sub-reaches with isolated pools and completely dry channel (short, predominantly-wetted channel segments separated by long dry channel segments). Some very short sections with flowing water may be included, but reach-wide conditions are predominantly dry or contain only low-volume pools. Many to most pools in these reaches are dry. The current mapping of the 1990/1991 accounts and field notes is based on reach descriptions without reference to exact locations of surface water and dry segments.”
- ***“Isolated Pool:*** Stream reaches or sub-reaches that are intermediate in character between Predominantly Dry and Dry. There are single pools isolate by very long reaches of dry channel.”
- ***“Dry:*** Stream reaches or sub-reaches having no surface water”

3 Results

Results for the 2014 baseflow drought survey are briefly summarized and compared with baseflow conditions from September 2013. Both Potrero and San Jose creeks were similar to, or slightly drier, than in September 2013. There was less precipitation in water year 2014 (14.88 inches) than the average year (25.68 inches) (Figure 1). Furthermore, water year 2014 was preceded by two years of below average rainfall, 18.53 and 18.71 inches in 2012 and 2013 respectively. At the time of the survey, in January, there had been 1.94 inches of total precipitation for the water year, but no runoff had been noted.

3.1 Potrero Creek

The Potrero Creek baseflow survey was conducted on September 13, 2013 and the drought conditions survey was conducted on January 25, 2014. The survey extended from the SLP gatehouse to Potrero Trail Bridge crossing (Figure 2 and 3). In both September and January the creek was dry downstream of the “Protected Baseflow Reach”. In both surveys there was water present in the mid to lower section of the “Protected Baseflow Reach” while the upper portion was dry. Areas that had a predominantly wetted channel upstream of the “Protected Baseflow Reach” in September were characterized by pools and areas of sporadic wet and dry in January. In January many of the pools in the upper reach were murky and had poor visual water quality. In general there was less surface flow and water present in January 2014 than in September 2013.

3.2 San Jose Creek

The San Jose Creek baseflow survey was conducted on September 27, 2013 and the drought conditions survey was conducted on January 24, 2014. The survey began at the SLP property line and extended upstream to Stickleback Pond (Figure 4 and 5). In both September and January there was continuous surface flow in the “Protected Baseflow Reach”. Areas that had a predominantly wetted channel upstream of the “Protected Baseflow Reach” in September were characterized by pools and areas of sporadic wet and dry in January. In general there was less surface flow and water present in January 2014 than in September 2013.

4 Discussion

Baseflow conditions were surveyed on two of the four major streams that flow through the Santa Lucia Preserve – Potrero and San Jose Creeks. The drought baseflow characteristics of these streams were collected and compared with the 2013 annual baseflow characteristics (Leiker et al. 2013). The drought baseflow conditions were similar to, or slightly drier, than in the fall of 2013. The 2014 water year rainfall (14.88 inches) was lower than the average rainfall (25.68 inches) and was the third year of below average water conditions. Therefore, we would expect the baseflow conditions in January to be lower than that in the fall of 2013, which is

consistent with the 2014 surveys. However, the difference in channel condition criteria, as well as the different types of GPS units used, does not necessarily allow for a direct comparison between the two surveys. The 2014 survey suggests that the 2014 drought conditions, as well as two preceding years of below average rain conditions, generally decreased the amount of water present within Potrero and San Jose Creeks.

5 References

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6 Figures

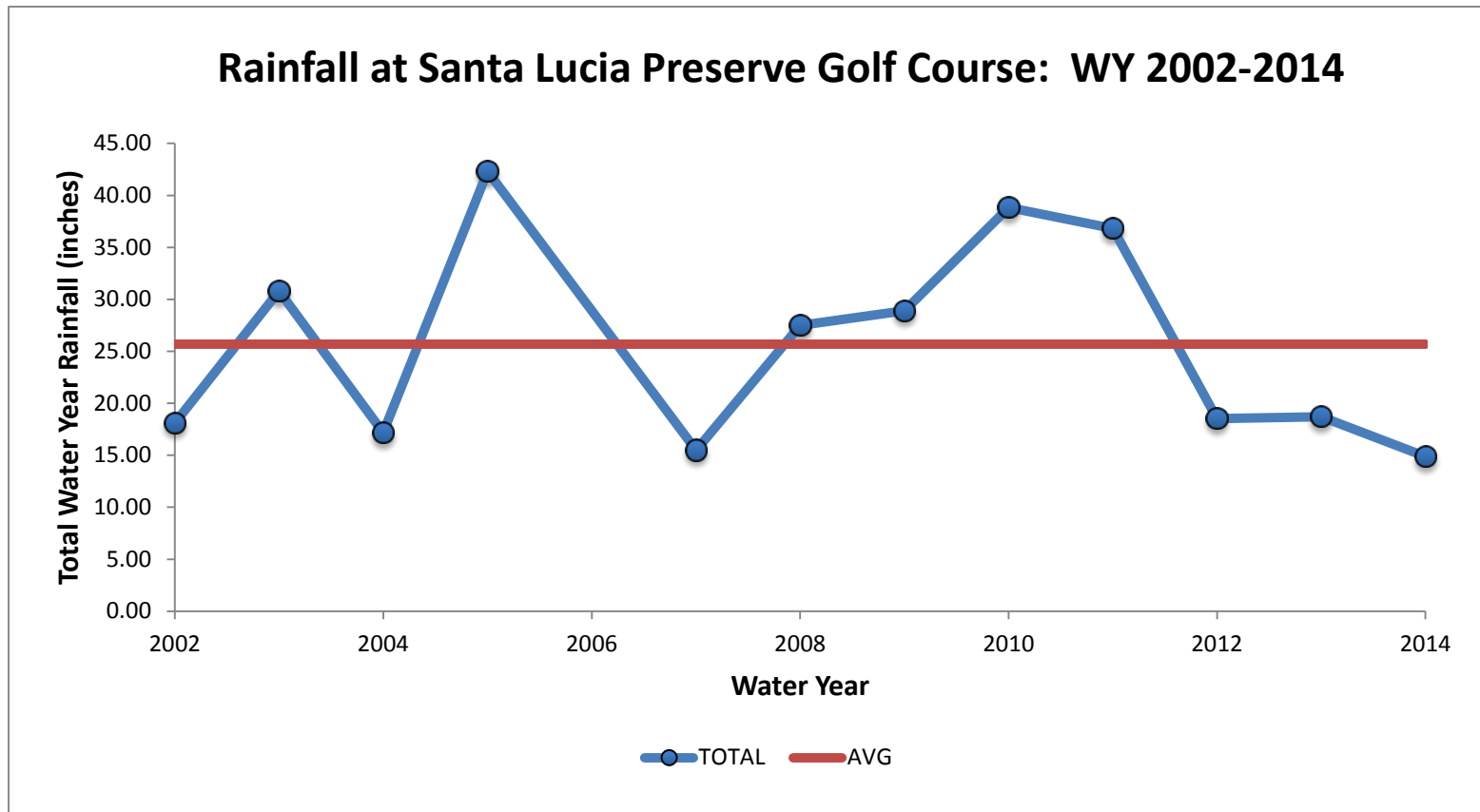


Figure 1: Total rainfall at the Santa Lucia Preserve Golf Course for water years 2002–2014 resulted in an average rainfall of 25.68 inches. Water year 2014 received 14.88 inches of rainfall, which was preceded by 18.53 inches in 2012 and 18.71 inches in 2013. The 2014 water year was the lowest year on record at the Santa Lucia Preserve Golf Course.

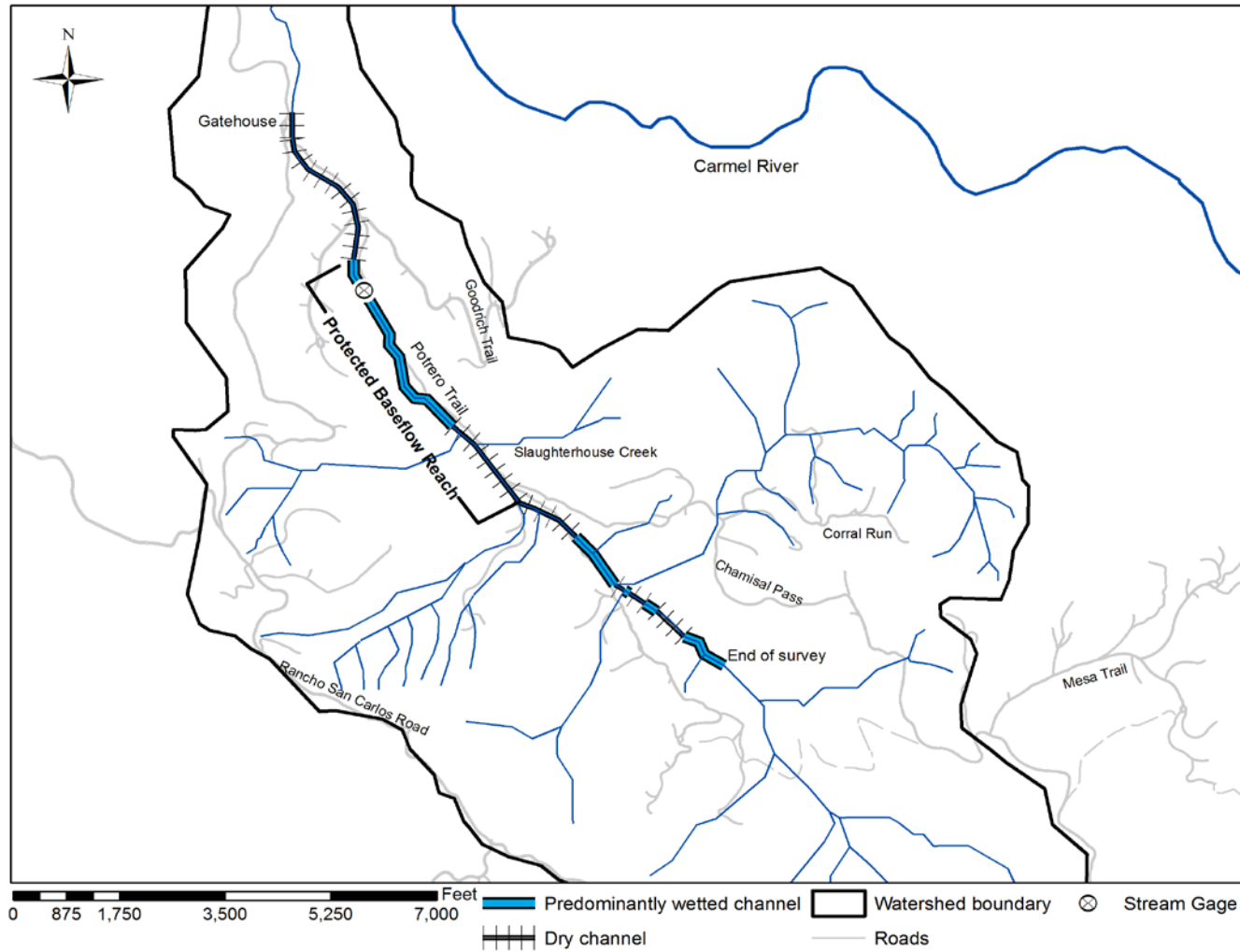


Figure 2: Map of generalized flow conditions on Potrero Creek on September 13, 2013. There was continuous surface flow throughout the mid to lower portion of the “Protected Baseflow Reach.” Downstream of the “Protected Baseflow Reach” the channel was dry. The upper reach was mainly dry with intermittent surface flow.

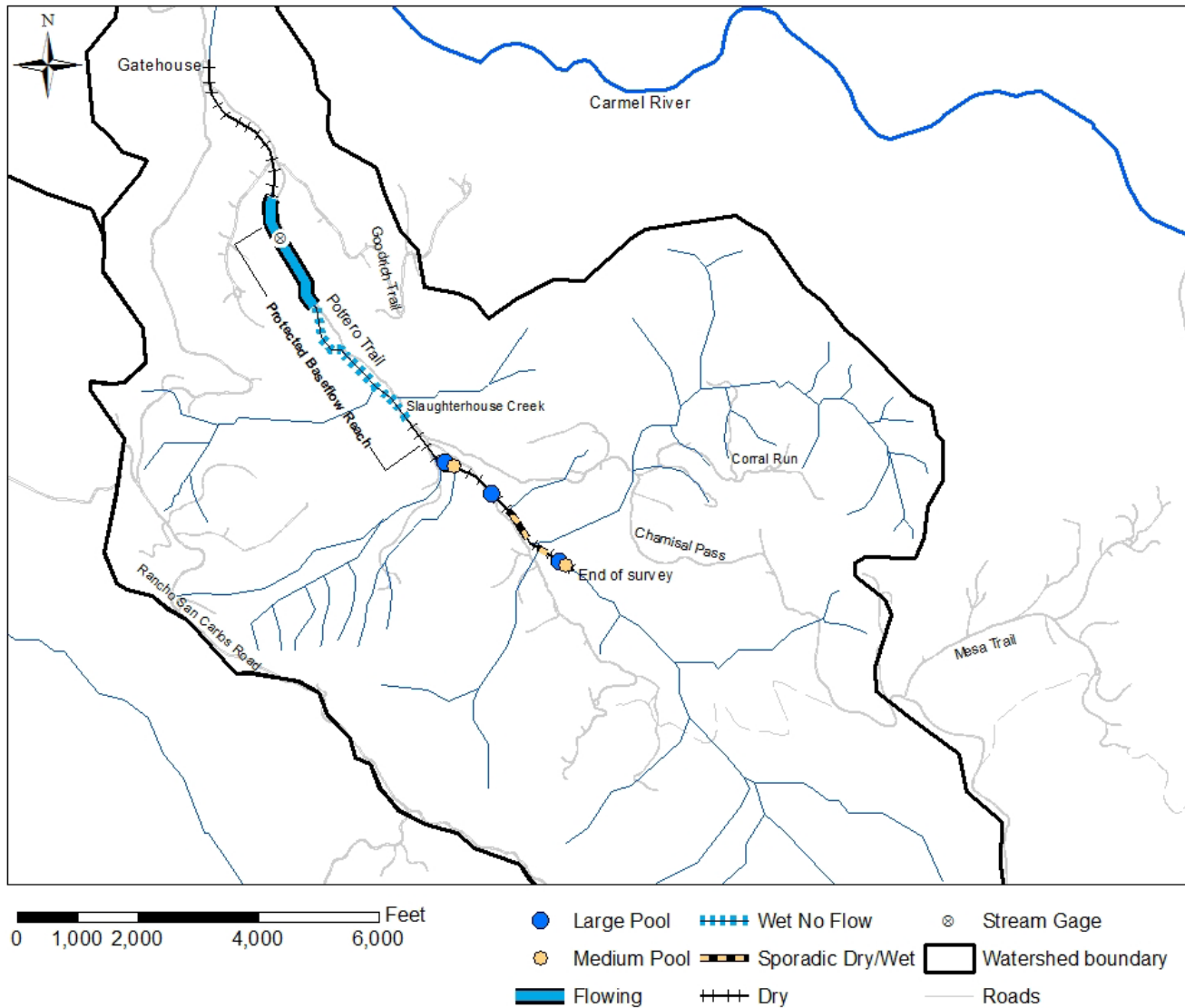


Figure 3: Map of generalized flow conditions on Potrero Creek on January 25, 2014. There was continuous surface flow throughout the lower portion of the “Protected Baseflow Reach” and the channel was wet with no visible flow in the mid to upper portion of the “Protected Baseflow Reach”. Downstream of the “Protected Baseflow Reach” the channel was dry. The upper reach was mainly dry with sporadic wet areas and pools.

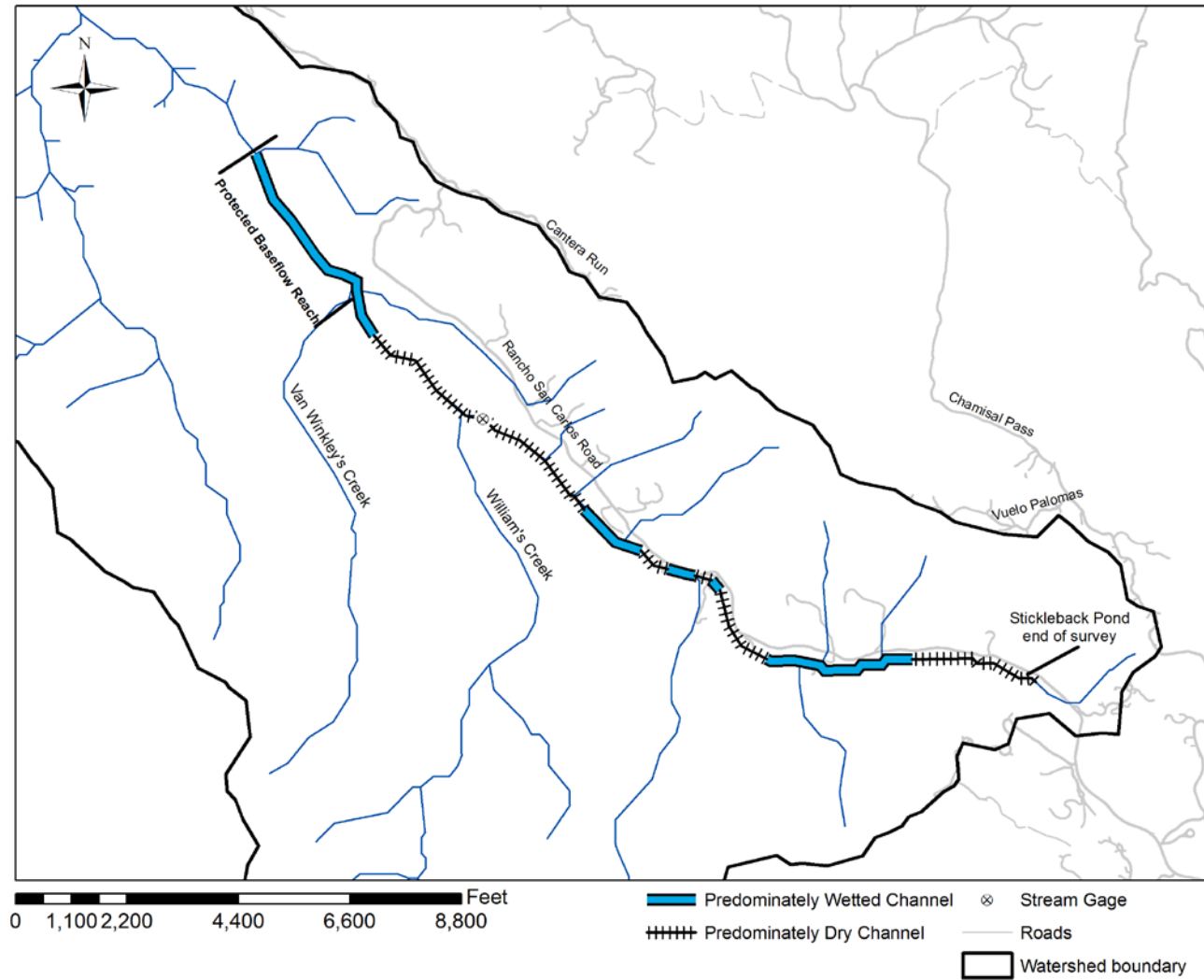


Figure 4: Map of generalized conditions on San Jose Creek on September 27, 2013. There was continuous surface flow in the “Protected Baseflow Reach” and dry conditions for the remainder of the surveyed reach with intermittent surface flow.

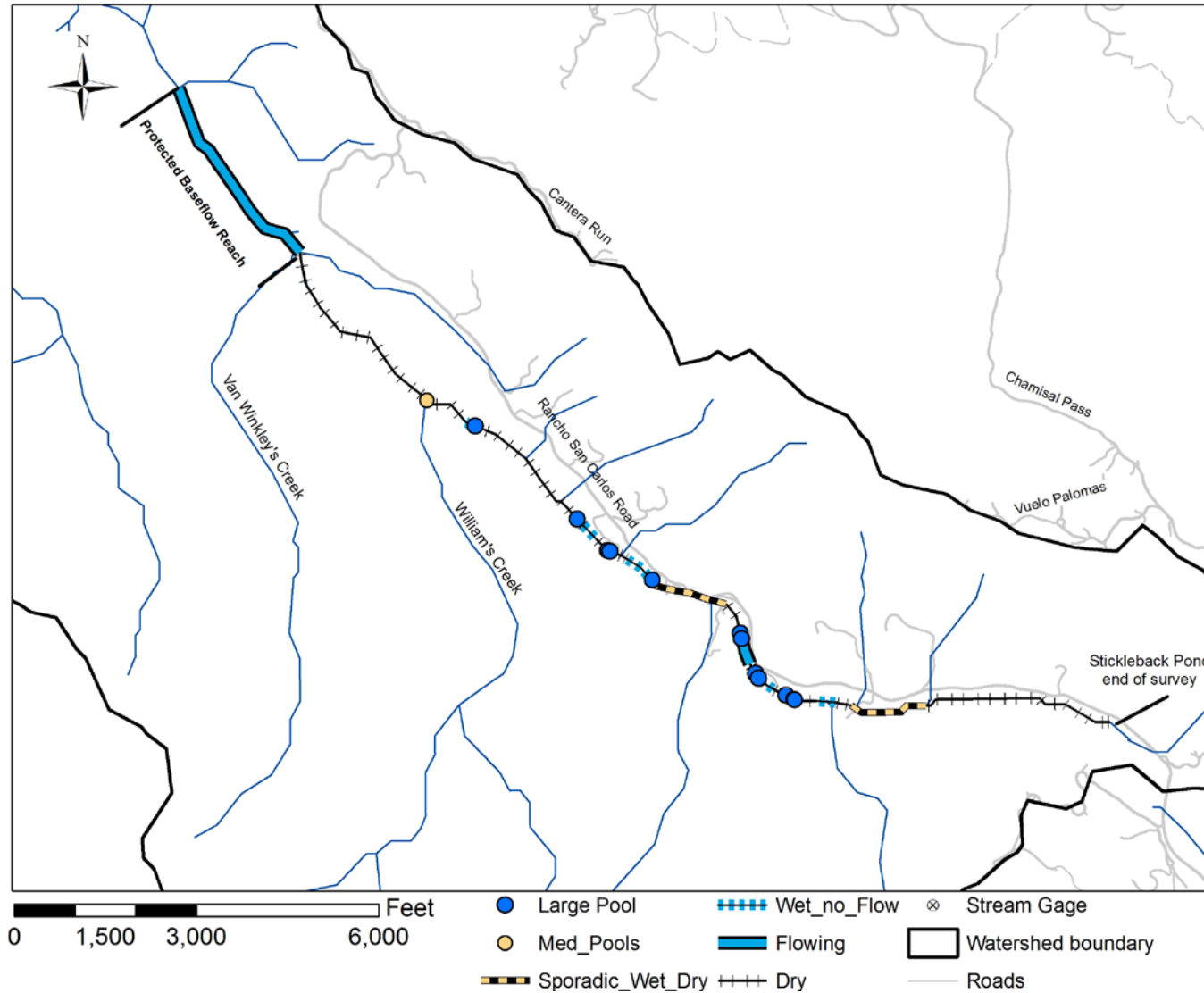


Figure 5: Map of generalized flow conditions on San Jose Creek on January 24, 2014. There was continuous surface flow throughout the lower portion of the “Protected Baseflow Reach”. The channel was dry through the middle of the reach, and sporadically wet and dry with some pools in the upper portion of the reach.