
Appendix B

Arroyo del Valle and Arroyo de la Laguna Amphibian and Riparian Habitat Assessment

Draft Report

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Prepared For Zone 7 Water Agency

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EXECUTIVE SUMMARY

As part of its water resource management activities, Zone 7 Water Agency (Zone 7) has a water right permit (Permit 11319) to put water diverted from Arroyo del Valle to beneficial use. Four protest letters were filed in response to Zone 7 Water Agency's most recent petition for extension of time to perfect Permit 11319; this assessment was conducted to address certain aspects of the environmental concerns raised in the protests.

At the request of Zone 7, the Alameda County Resource Conservation District (ACRCD) and the Natural Resources Conservation Service (NRCS) collaborated to complete the Arroyo del Valle and Arroyo de la Laguna Amphibian and Riparian Habitat Assessment (Assessment) in 2013. The assessment evaluated amphibian, aquatic reptile, avian and riparian habitat along 20% (4.5 miles) of the approximately 20 miles of stream within Arroyo del Valle and the Arroyo de la Laguna (Project Area). In addition, the Assessment included an evaluation of pond habitat within the Project Area.

The Assessment utilized the Natural Resources Conservation Service's Stream Visual Assessment Protocol (SVAP) to provide a qualitative evaluation of several stream elements to provide context to the stream riparian condition as compared to both historical conditions and to reference reaches. Surveys were conducted to document the presence of native and non-native species within the survey locations and assess habitat suitability. This included amphibian and western pond turtle field surveys, and a modified point-count of bird species encountered during surveys. In addition, a desktop evaluation was conducted to inventory and to evaluate the potential habitat values and limitations of ponds within a 2-mile radius of the Arroyo del Valle and Arroyo de la Laguna as potential habitat for amphibians, reptiles and riparian birds.

Sierran treefrogs (*Pseudacris sierra*) were the only native amphibians encountered during field surveys, though other native amphibian species are known to occur in the vicinity of the Project Area including the California red-legged frog (*Rana draytonii*) and the California tiger salamander (*Ambystoma californiense*) (CNDDDB, 2011). The suitability of habitat within the Project Area for native amphibian species is present although greatly limited by the presence of unseasonable water (i.e., water that is present in streams, due to management actions, at times of year that it naturally would not) and predators. Unseasonable, and often perennial, water within the Project Area contributes to the persistence of populations of non-native wildlife species including American bullfrogs (*Lithobates catesbeianus*), crayfish (*Cambarus sp.*), and non-native fishes including non-native bass species, and common carp (*Cyprinus carpio*) throughout the stream corridor. These non-native species prey on the native amphibian species and limit the value of habitat within the Project Area. In areas where increased urbanization exists, domestic cats and raccoons present additional threats to native amphibians.

No western pond turtles were detected; however, the species is known to occur within the Project Area (CNDDDB, 2011; LARPD, personal communication). There is suitable habitat present for the Western pond turtle within the Project Area. Primary threats to the western pond turtle populations include raccoons and potential competition with the non-native red-eared slider (*Trachemys scripta elegans*) observed during surveys.

The majority of the assessed reaches provide important habitat for riparian bird species. Throughout the reaches, native migratory songbirds were observed in varying types of canopy cover including birds which depend specifically on riparian areas for part of their life history. Native bird species were present even in areas where non-native vegetation dominated the creek banks. Primary threats to birds within the Project Area are the presence of domestic cats and increased populations of natural avian predators, especially within urban areas.

The desktop evaluation of ponds provides an inventory as well as an indication to the variety of habitat limitations for the ponds in the Project Area (within a 2-mile buffer), including the potential presence of non-native and native predator species and the potential lack of available and/or suitable upland habitat. The majority of the ponds identified were located within 1.0 miles of development (housing, golf courses, highways, etc.) and/or permanent crop agriculture (vineyards/olives). Exact habitat quality and availability of ponds cannot be determined based on the desktop evaluation and the information provided within this report serves as information only.

Overall, the Project Area is in a highly modified and managed system compared to the historical habitat. Decades of urban development, gravel quarrying, water management, and other activities continue to impact the value and quality of aquatic wildlife habitat in the Project Area. For the purposes of this Assessment, the Project Area was divided into three Reaches (Reaches 4, 7, and 10 – based on reach delineations in Zone 7's Stream Management Master Plan); following is a summary of key findings.

- **Reach 4, Arroyo del Valle - Upstream of Quarry Activities:** The majority of this Reach runs through publicly accessible lands, including East Bay Regional Park District's Del Valle Regional Park and Livermore Area Recreation and Park District's Sycamore Grove Park. Reach 4 provides riparian and instream habitats that have the potential to support relatively diverse communities of aquatic species. Reach 4 is the most likely, of the reaches studied, to provide valuable habitat conditions for California red-legged frogs out of all of the reaches surveyed.
- **Reach 7, Arroyo del Valle - Shadow Cliffs through Pleasanton:** Reach 7 includes areas adjacent to active quarries, East Bay Regional Park District's Shadow Cliffs Regional Recreation Area, and developed and channelized areas through the City of Pleasanton. Reach 7 is highly modified due to former quarry operations and urbanization. These modifications greatly reduce the value of riparian and instream habitat throughout the Reach.
- **Reach 10, Arroyo de la Laguna:** Reach 10 includes areas adjacent to larger homes sites, Castlewood golf course, and areas grazed by cattle. Reach 10 is characterized by the steep banks and bank erosion that is occurring throughout. Riparian and instream habitats are present and have the potential to support relatively diverse communities of aquatic species.

1 INTRODUCTION

The Alameda County Resource Conservation District (ACRCD) and the Natural Resources Conservation Service (NRCS) collaborated to complete the Arroyo del Valle and Arroyo de la Laguna Amphibian and Riparian Habitat Assessment (Assessment). Field work was conducted from May to June 2013. The Assessment evaluated amphibian, aquatic reptile, avian and riparian habitat along 20% (4.5 miles) of the approximately 20 miles of stream within the Project Area (see Section 1.2). The Assessment included a background data collection effort; this data was used to evaluate habitat values and species information, assess historical conditions, and establish ground survey locations. This Assessment did not focus on the presence and habitat of native or non-native fish species although encounters with any fish species during surveys were recorded.

In addition to the instream habitat assessment, a desktop evaluation of ponds within the vicinity of the Arroyo del Valle and Arroyo de la Laguna was also completed. Pond habitat potential within two miles on each side of the center line of Arroyo del Valle and Arroyo de la Laguna were assessed for the California red-legged frog (*Rana draytonii*) and the California tiger salamander (*Ambystoma californiense*).

1.1 Purpose

In 1957, local voters approved the creation of Zone 7 of the Alameda County Flood Control and Water Conservation District (Zone 7 or Zone 7 Water Agency), with a locally-elected board to oversee the vital matters of flood protection and water resource management in eastern Alameda County. As part of its water resource management activities, Zone 7 has a water right permit (Permit 11319) to put water diverted from Arroyo del Valle to beneficial use.

Four protest letters were filed in response to Zone 7 Water Agency's most recent petition for extension of time to perfect Permit 11319: three related to environmental concerns over effects to steelhead and amphibians (red-legged frog [*Rana draytonii*] and foothill yellow-legged frog [*Rana boylei*]) and one related to a senior water rights concern that was later dismissed. To resolve the remaining protests, Zone 7 Water Agency proposed environmental studies and hydrologic analyses to develop and identify measures to preserve sensitive habitats. This Appendix B summarizes amphibian and riparian habitat assessments conducted along Arroyo del Valle and Arroyo de la Laguna.

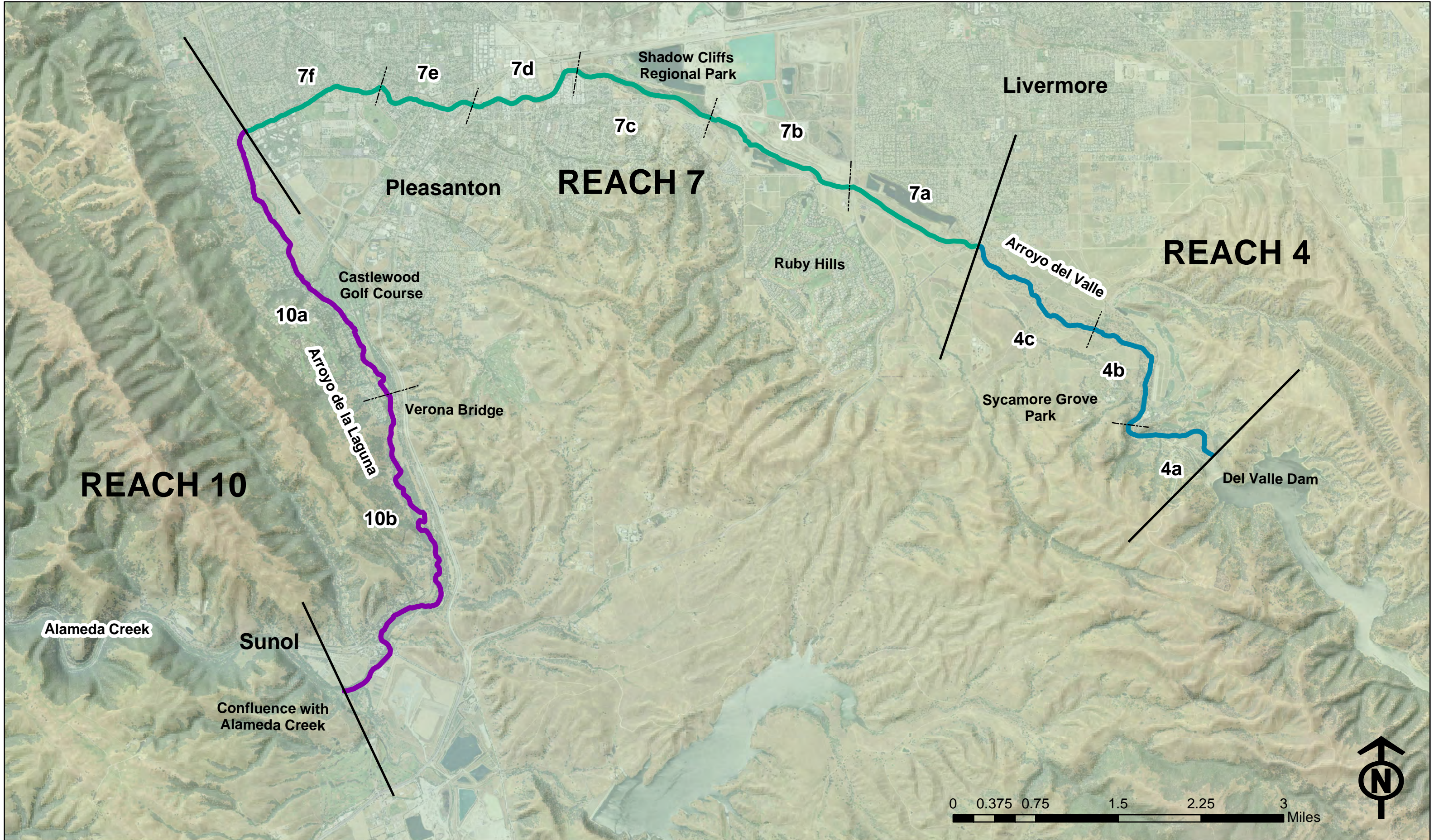
1.2 Project Area

The Project Area is defined as portions of the Arroyo del Valle from the Del Valle Dam downstream to the confluence with the Arroyo de la Laguna and the stretch of the Arroyo de la Laguna to the confluence with Alameda Creek (Figure 1). As part of the Stream Management Master Plan (SMMP), Zone 7 Water Agency identified 12 study reaches throughout the entire SMMP Study Area (Zone 7, 2006). Of these 12 study reaches, Reaches 4, 7 and 10 fall within the Project Area that is the subject of this Assessment. Within each Reach (ex. Reach 4), Sub-Reaches are defined based on geomorphic and other natural boundaries (ex. Sub-Reach 4a). Exhibit C provides more detailed reach maps.

Following is a brief description of the Reaches included in this Assessment:

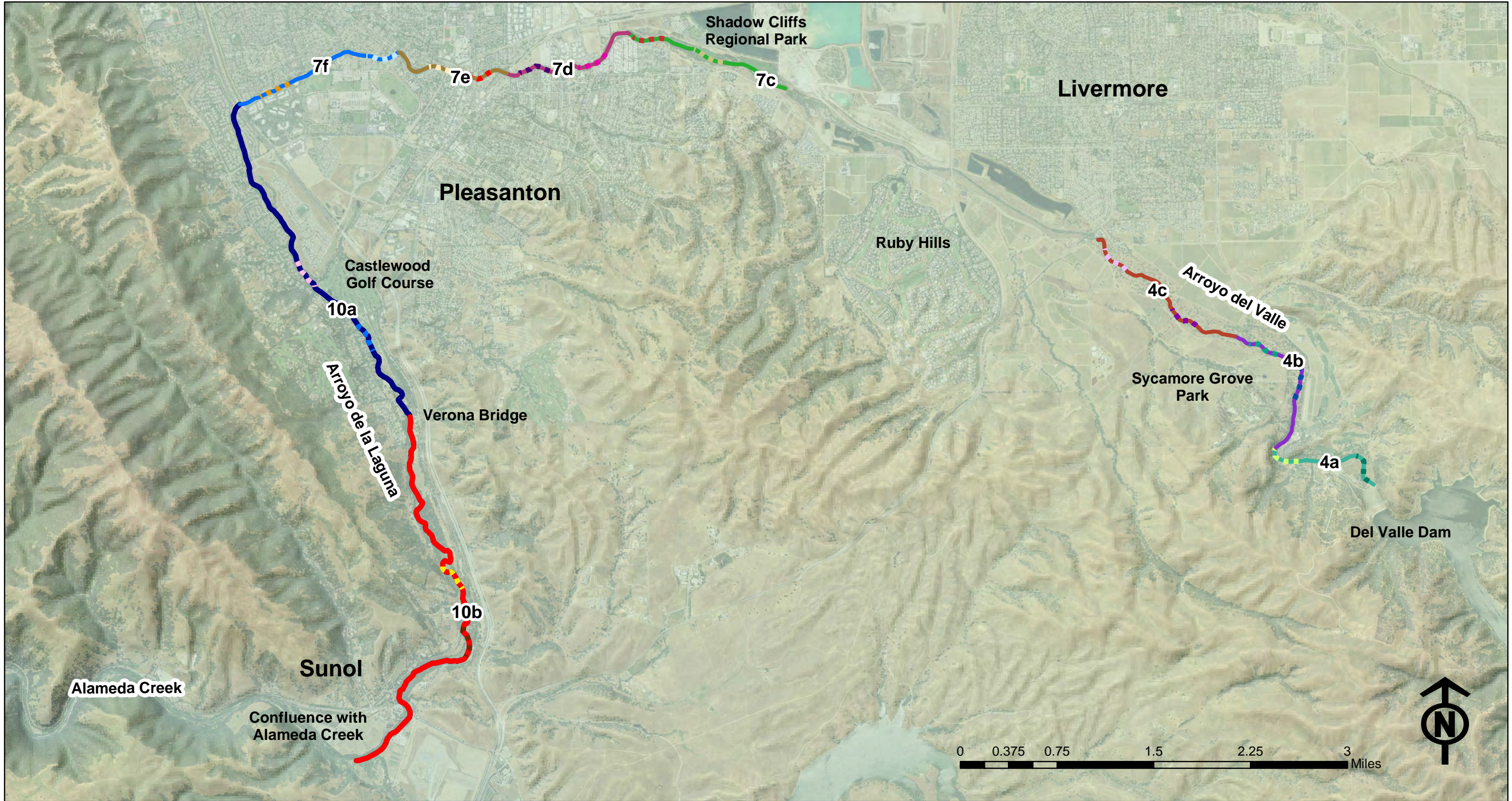
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- **Reach 4, Arroyo del Valle - Upstream of Quarry Activities:** Reach 4 includes the Sub-Reaches 4a, 4b and 4c. The majority of these Sub-Reaches run through publicly accessible lands – 4a is mostly part of East Bay Regional Park District’s Del Valle Regional Park, and 4b and 4c are in Livermore Area Recreation and Park District’s Sycamore Grove Park. The majority of these Sub-Reaches lack urban housing developments surrounding the stream and have limited inputs of stormwater from housing developments except for portions of 4c. Nearby Wente Golf Course and vineyards are adjacent land uses throughout most of the Reach.
 - **Reach 7, Arroyo del Valle - Shadow Cliffs through Pleasanton:** Reach 7 includes the Sub-Reaches 7a, 7b, 7c, 7d, 7e and 7f. Sub-Reaches 7a and 7b, adjacent to active quarries, were not accessible for this study. Sub-Reach 7c runs through East Bay Regional Park District’s Shadow Cliffs Regional Recreation Area where the stream now takes the course through former quarry pits, resulting in reservoir-like conditions. Downstream (westerly) of Shadow Cliffs Recreation Area the stream begins to become encroached upon on both sides by development. The Sub-Reaches 7d through 7f include developed and channelized areas through the City of Pleasanton.
 - **Reach 10, Arroyo de la Laguna:** Reach 10 includes Sub-Reaches 10a and 10b. Sub-Reach, 10a starts at the confluence of the Arroyo de la Laguna and Arroyo del Valle. Suburban development encroaches on portions of the creek, and the creek is limited throughout by Foothill Road to the west. The majority of Sub-Reach 10a is bordered by Castlewood golf course to the east. The downstream Sub-Reach, 10b is owned entirely by the San Francisco Public Utilities Commission and is bounded by Pleasanton-Sunol Road to the east and Foothill Road to the west. The property adjacent to the creek is grazed by cattle which have access to the creek in some locations but the large banks and associated riparian fencing limits access throughout most of the Sub-Reach. Much of Reach 10 is characterized by severe bank undercutting and erosional issues.

Figure 1: Project Area and Reach Delineation



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Figure 2: Sub-Reach and Survey Locations



Legend

- | | | | | | | | | | | | | | | |
|--------------|--------------|--------------|---------------|---------------|-------------------------|------|------|------|------|------|------|------|-------|-------|
| Sub-Reach 4a | Sub-Reach 4c | Sub-Reach 7d | Sub-Reach 7f | Sub-Reach 10b | Survey Locations | 4a_2 | 4b_2 | 4c_2 | 7c_2 | 7d_2 | 7e_2 | 7f_2 | 10a_2 | 10b_2 |
| Sub-Reach 4b | Sub-Reach 7c | Sub-Reach 7e | Sub-Reach 10a | | | 4a_1 | 4b_1 | 4c_1 | 7c_1 | 7d_1 | 7e_1 | 7f_1 | 10a_1 | 10b_1 |

Note: See Exhibit C for more detailed sub-reach maps

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2 PROJECT AREA BACKGROUND

Although this assessment focused on current riparian and wildlife habitat in the Project Area, historical information was also evaluated to provide background and a better understanding of past conditions. The riparian habitat component includes an overview of historical and current flow regimes and plant communities of the Arroyo del Valle and Arroyo de la Laguna in order to understand how these conditions have changed over time. A snapshot of management activities that affect the present flow regime are also included. Background on the natural habitat needs of native amphibians, the Western pond turtle, and avian species, is discussed as well as implications of current conditions on the species.

2.1 Hydrology and Channel Morphology

Hydrology and channel morphology in the Project Area are discussed below.

2.1.1 Historical Setting¹

The Alameda Creek Watershed Historical Ecology Study (Stanford et al., 2013) synthesized hundreds of historical data sources to create a picture of the historical landscape and explore the implications for contemporary management. The following is a summary of the stream network and habitat patterns in the 1800s.

Arroyo del Valle near where the dam is today (Sub-Reach 4a) was gravelly and sinuous. Beginning approximately at the Veteran's Hospital (Sub-Reach 4b), the stream broadened to a braided pattern with islands between the multiple channels of the creek. It was in this area that Arroyo del Valle shifted from a perennial to an intermittent stream. Reports describe Arroyo del Valle through the area of Sycamore Grove Park (Sub-Reaches 4b, 4c) as having water only in pools, and no surface water at all at present-day Isabel Avenue (intersection of Sub-Reach 7a and 7b) in the summer months. Through the valley (approximately Sub-Reaches 4c, 7a, 7b, 7c), the braided channel riparian corridor may have been up to 1,500 feet wide.

Approaching Pleasanton (approximately in Sub-Reach 7d), Arroyo del Valle returned to a single-thread meandering channel, and the dominant substrate shifted from gravel to clay. Flow in this reach may have resurfaced in places, but was still largely intermittent and subsurface.

Present-day Pleasanton was once a 2,600- acre marsh complex, extending as wide as two miles in places. The streams and groundwater of the Tri-Valley area all drained towards the marsh, which provided an important freshwater resource in an otherwise largely summer-dry valley. By 1912, only small remnant patches remained, and much of the former marshland had been converted to agriculture and hop fields (Stanford et al., 2013). As Arroyo del Valle neared the historic Pleasanton marsh complex it spread into broad distributaries leading north and west towards the marsh (approximately Sub-Reaches 7e, 7f). After entering the marsh, the channel quickly lost definition, although the exact

¹ This historical information is largely from the Alameda Creek Historical Watershed Ecology Study (Stanford et al., 2013).

endpoint varied with the hydrologic conditions each year. In dry years, Arroyo del Valle did not maintain surface flow to the marsh at all. There is no indication that Arroyo del Valle connected directly with Arroyo de la Laguna as it does today; in fact many maps show how this connection was created over time as the marsh was ditched and drained, with a substantial connection only in place by 1910.

Arroyo de la Laguna (Sub-Reaches 10a, 10b) flowed south from the perennial pond in the center of the Pleasanton marsh complex to Sunol Valley. Arroyo de la Laguna occupied a narrow valley, and likely maintained perennial flow through the dry season. The name of the creek (“stream of the lake”) emphasizes its historical role as the outlet for the Pleasanton marsh. It functioned as the southern extension of the marsh over much of its length, with multiple channels and willows.

2.1.2 Current Conditions

Arroyo del Valle has a natural channel form throughout much of Sub-Reaches 4a, 4b, and 4c, although the sinuous nature has been lost throughout most of these areas. The channel condition of Sub-Reaches 7a, 7b, 7c, and 7d in the Livermore valley is that of a highly modified system (leveed, channelized, relocated, etc.), and one that is still in flux due to ongoing quarry operations. Sub-Reaches 7e and 7f are channelized throughout most of the City of Pleasanton, disconnecting the stream from the former floodplain. The Arroyo del Valle connects directly with Arroyo de la Laguna as a result of the draining the historic marsh complex in the late 1800’s to 1910. Sub-Reaches 10a and 10b in Arroyo de la Laguna consist of deep, incised channels . Additional reach-specific conditions are described in Section 3.1.

Today, flows on Arroyo del Valle below the dam are largely perennial (see Section 2.2), and the Arroyo de la Laguna continues to be a perennial system; the Arroyo de la Laguna drains the entire Livermore-Amador Valley (including Arroyo del Valle) as well as parts of the San Ramon Valley.

2.2 Water Management

The following is a summary of the major management activities and uses affecting flows in Arroyo del Valle. (Taken from Arroyo del Valle and Arroyo de la Laguna Steelhead Habitat Assessment, Attachment 1: Summary of water operations along Arroyo Valle [in Cardno-Entrix, 2013]).

There are no water management activities or infrastructure on Arroyo de la Laguna. However, because it drains the valley (including all major Arroyos like Arroyo del Valle), upstream activities do influence conditions on Arroyo de la Laguna.

2.2.1 Del Valle Dam & Lake Del Valle

Del Valle dam was built in 1968 as part of the State Water Project for flood control, recreation, and water supply purposes. Each year, after the summer recreational season is over, DWR typically releases water from Lake Del Valle between September and November to allow room for winter storms to fill the reservoir. In order to support recreational use of the lake (e.g., boating and fishing), DWR does not normally release water from the lake during the summer. As an earthen dam, some seepage occurs and likely contributes to the wetted stream just below the dam (Reach 4a).

2.2.2 Zone 7 and Alameda County Water District's Local Water Rights & Live Stream Requirement

Zone 7 and the Alameda County Water District (ACWD) have water right permits on Arroyo del Valle dating to the 1970s. In 1978, these permits were modified to include a new condition requiring a “live stream” in Arroyo del Valle between Lake Del Valle and the Arroyo Valle at Pleasanton gaging station as long as either water agency had local water stored in Lake Del Valle. Typically, Zone 7 and ACWD request that DWR release a combined flow of 8 to 10 cfs during the summer, when there would typically be no natural flow, and only 0 to 2 cfs during the winter to supplement natural runoff. This water is typically being released from the South Bay Aqueduct (State Water Project) and not from the reservoir itself.

2.2.3 Groundwater Management / Recharge

Zone 7 submits requests for DWR to release State Water Project water into the Arroyo del Valle for groundwater recharge. Recharge releases are typically done only in the dry months when there is capacity in the arroyos (e.g., no natural flow). In a typical year, Zone 7 and ACWD request that DWR release 8 to 10 cfs to Arroyo del Valle during the summer; this amount meets the agencies live stream requirement and supports groundwater recharge.

2.2.4 Mining Discharges

Arroyo del Valle has historical and existing gravel mining operations adjacent to its watercourse, and these gravel-mining operations may, from time to time, discharge water directly into the Arroyo del Valle. Exact timing of these releases are not documented.

2.2.5 East Bay Regional Park District Recreation Operations at Shadow Cliffs

Shadow Cliffs Regional Recreation Area, located about 7 miles downstream of Del Valle Dam within Reach 7c, is owned and operated by East Bay Regional Parks District (EBRPD). At the request of EBRPD and contingent upon availability, Zone 7 requests that DWR release State Water Project water for EBRPD to collect using a siphon located within the Arroyo del Valle, adjacent to Shadow Cliffs Regional Recreation area. The siphon is owned and operated by EBRPD, and EBRPD typically requests and siphons 1 to 2 cfs from May to October.

2.2.6 South Bay Aqueduct Operations

Zone 7 and ACWD receive water imports via the South Bay Aqueduct (SBA). Although Zone 7 and ACWD can request that DWR release SBA water to the Arroyo del Valle, DWR could release no water at all if the supply is unavailable (e.g., no water in storage [like 2014] or loss of facilities due to landslides or earthquakes or maintenance).

2.3 Amphibians and Aquatic Reptiles Potentially Occurring in the Project Area

Native amphibians in the region evolved with a Mediterranean climate characterized by warm to hot, dry summers and mild to cool, wet winters. As a result of this climate regime, many of the streams historically had water flows during the rainy season, with no or little flow in the summer months. The native amphibians are adapted to this water regime: breeding in pools and slow-moving areas in the

stream during the rainy season and finding moist refuge along the stream or in the uplands during the non-breeding season and/or when conditions are dry.

The extent of the historical value of the riparian corridors to native amphibians and Western pond turtles along the Arroyo del Valle and the Arroyo de la Laguna is unknown. Based on the known historic range and documented presence of the California red-legged frogs and the foothill yellow-legged frog, and also known historical flow regimes and stream descriptions, it is assumed both streams formerly functioned as valuable breeding, rearing and refugia habitat for the two sensitive species, as well as other native amphibians and the Western pond turtle.

The primary species of interest evaluated under this survey and that have the potential to occur in the Project Area are included below (Table 1). Species were selected for evaluation as part of this assessment were included for one or more of the following reasons:

1. The species is known to have occurred historically
2. The necessary habitat conditions for the species are present
3. The species is known to directly affect native amphibians and reptiles (e.g., predation, or competition).

Species occurrences within the Project Area based on California Natural Diversity Database (CNDDDB) records and are shown on Figure 3.

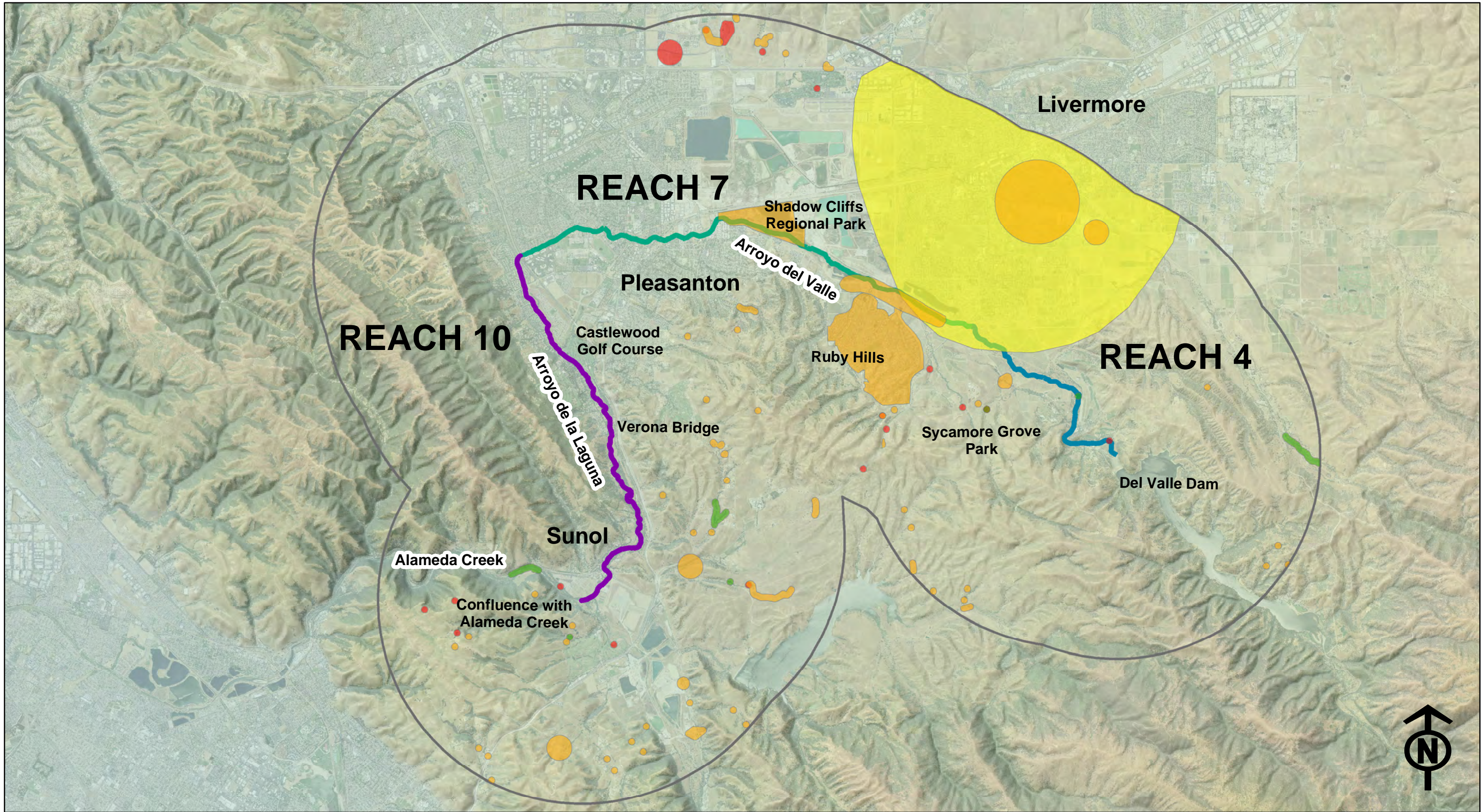
Table 1. Amphibian and Aquatic Reptile Species of Interest in the Project Area.

Species	Native	Status in Project Area	Federal Status	State Status
Amphibians*				
California red-legged frog <i>(Rana draytonii)</i>	Yes	Presumed present due to observations in the vicinity of Project Area, current and historical records and necessary habitat conditions are present	Threatened	Species of Special Concern
California tiger salamander <i>(Ambystoma californiense)</i>	Yes	Potentially present due to observations in the vicinity of Project Area, current and historical records	Threatened	Threatened
Foothill yellow-legged frog <i>(Rana boylei)</i>	Yes	Potential to occur due to historical records although necessary habitat conditions are no longer present	N/A	Species of Special Concern
American Bullfrog <i>(Lithobates catesbeianus)</i>	No	Presumed present due to observations in the vicinity of Project Area	N/A	N/A

Aquatic Reptiles				
Western pond turtle	Yes	Presumed present due to observations in the vicinity of Project Area, current and historical records and necessary habitat conditions are present	N/A	Species of Special Concern
<i>(Actinemys marmorata)</i>				
Red eared slider	No	Presumed present due to observations in the vicinity of Project Area	N/A	N/A
<i>(Trachemys scripta elegans)</i>				
*Only special-status amphibian and reptile species and their co-occurring predators were the focus of the habitat studies. Other common native amphibian species have similar habitat requirements to the California red-legged frog and are not evaluated specifically as part of this assessment.				

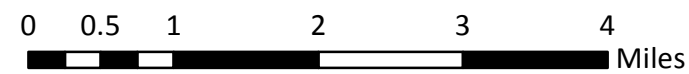
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Figure 3: Special Status Amphibian and Aquatic Reptile Species Occurrences



Legend

- 3 Mile Buffer
- CNDDDB (Species Occurrence) California red-legged frog
- California tiger salamander
- Foothill-yellow legged frog
- Western pond turtle



Date: 1/21/2015

Occurrence records from the California Natural Diversity Database, 2014. Occurrence data are limited by where field surveys have been conducted; occurrence points are limited by the accuracy of the information provided, and some may intentionally vague to protect the species

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2.3.1 Amphibians

California red-legged frog (Rana draytonii)

California red-legged frogs use a variety of aquatic habitats for breeding such as streams and livestock ponds. Breeding adults are often associated with deep (greater than 0.7 meter [2 feet]), still or slow-moving water, and dense, shrubby riparian or emergent vegetation (USFWS, 2002). The Project Area includes areas of similar potential habitat, such as streams and various off-stream ponds. Frogs spend considerable time resting and feeding in riparian vegetation when it is present. It is believed that the moisture and cover of the riparian plant community provide important foraging habitat and may facilitate dispersal, in addition to providing pools and backwater aquatic areas for breeding (USFWS, 2002).

The California red-legged frog is estimated to have disappeared from around 75% of former range throughout the state (Stebbins, 2003). Introduction of bullfrogs and non-native fishes, pesticides and other pollutants, and loss of habitat are all associated factors with the decline of the species around the state (Hayes and Jennings, 1986; Stebbins, 2003; USFWS, 2002). Raccoons can also have a negative impact on California red-legged frog populations through predation, especially within habitats in close proximity to urban development (Rathbun, personal communication).

The Project Area is located within the range of the California red-legged frog. The species is known to have occurred in the Project Area in the past, and currently occurs in other parts of the Arroyo del Valle and Arroyo de la Laguna watersheds and throughout the greater Alameda Creek Watershed.

California tiger salamander (Ambystoma californiense)

The California tiger salamander is most commonly found in annual grassland habitat, but also occurs in the grassy understory of valley-foothill hardwood habitats, and uncommonly along stream courses in valley-foothill riparian habitats (CDFG, 2005). The Project Area includes areas of similar potential habitat, including potential upland habitat and off-stream ponds however the streams within the area do not provide appropriate aquatic habitat. Adult California tiger salamanders spend most of their time in small mammal burrows in upland areas. They travel to aquatic resources, primarily vernal pools and livestock ponds for breeding. Larvae are aquatic and retreat to uplands after metamorphosis. Streams are rarely used for reproduction (CDFG, 2005). The California tiger salamander has had extensive habitat loss as a result of agriculture, housing and other developments. These land uses have impacted vernal pools and other seasonal wetland habitat (Stebbins, 2003, CDFG, 2005). Introduction of fish and bullfrogs to breeding sites and control of burrowing rodents are considered serious threats to the species.

The Project Area is located within the range of the species. California tiger salamanders have known occurrences throughout the Alameda Creek Watershed where appropriate habitat exists.

California tiger salamanders are not likely to breed in streams, however, adults and/or juveniles may use the stream area for refuge. Due to the lack of breeding habitat within the Project Area, the potential for this species to occur is not discussed further.

Foothill yellow-legged frog (Rana boylei)

The foothill yellow-legged frog is found in or near rocky streams in a variety of habitats, including valley-

foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types (CDFG, 2000b). The Project Area includes areas of similar potential upland habitat, such as valley-foothill riparian however the streams within the Project Area no longer provide appropriate aquatic habitat. The species attaches its eggs to gravel or rocks in moving water near stream margins and breeding and egg laying usually await the end of spring flooding. Unlike most other ranid frogs in California, this species is rarely encountered (even on rainy nights) far from permanent water (CDFG, 2000b). They require shallow, flowing water in small to moderate-sized streams with at least some cobble-sized substrate (Hayes and Jennings 1986, Jennings 1988). The frog is also closely associated with riffles within small streams (Stebbins, 2003). Foothill yellow-legged frogs are usually absent from habitats where introduced aquatic predators, such as various fishes and bullfrogs, are present (Hayes and Jennings 1986; Jennings, 1988; Kupferberg 1994). The Project Area is located within historical range of the foothill yellow-legged frog. Records from the Museum of Vertebrate Zoology at Berkeley from 1960 document foothill yellow-legged frogs in the Arroyo del Valle.

Foothill yellow-legged frogs were documented in the Arroyo del Valle in 1960, prior to the construction of Del Valle reservoir. Historical accounts (also pre-reservoir) of the Arroyo del Valle within Reach 4 note rocky boulders and coarse gravel substrate throughout the channel with perennial sections of the stream and pools present. The historical description discusses wide areas of the stream reach, some shaded with vegetation and some sections that are un-vegetated (Stanford et al., 2013). These types of conditions provide favorable conditions for the frog. Recent studies document that the foothill yellow-legged frog has disappeared from 45% of its overall former range in California (Stebbins, 2003). Silts, poorly timed water releases from reservoirs, and introduction of bullfrogs and exotic fish species are cited as probable significant factors in decline (Stebbins, 2003), and these issues continue in the Project Area today.

Other native amphibian species

Many other native amphibian species including California newts (*Taricha torosa*), Sierran treefrogs (*Pseudacris sierra*), and western toads (*Bufo boreas*) may utilize the creeks within the Project Area for breeding and refuge. These species have the potential to be present within the creeks both currently and historically, as they have similar habitat requirements as the California red-legged frog and they evolved within the same Mediterranean climate conditions. California newts, Sierran treefrogs and western toads are subject to the same habitat declines and impacts as the other amphibian species listed above. The likelihood of the presence of other native amphibian species in the Project Area is not further discussed as it is assumed to be similar to the habitat needs of the California red-legged frog.

American Bullfrogs (Lithobates catesbeianus)

The American bullfrog is found throughout most of California. The species is native east of the Rocky Mountains throughout most of the midwestern, eastern and southern USA and bullfrogs were introduced throughout most of the western United States in the early 1900s. The bullfrog inhabits warm, sunny, open, permanent water including lakes, ponds, sloughs, reservoirs, marshes, slow river backwaters, irrigation canals, cattle tanks, and slow creeks (Stebbins, 2003). The Project Area includes areas of similar potential habitat, such as perennial creeks and a variety of off-stream ponds. This non-native predator eats anything it can swallow including insects, mice, fish, birds, snakes, and is considered a threat to the native amphibians within the Project Area.

2.3.2 Aquatic Reptiles

Western pond turtle (*Actinemys marmorata*)

Western pond turtles are associated with permanent or nearly permanent water in a wide variety of habitats such as permanent ponds, lakes, streams, irrigation ditches or permanent pools along intermittent streams. They require basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks (CDFG, 2000a). The Western pond turtle can utilize upland terrestrial habitat, primarily for egg laying and overwintering (Reese and Welsh, 1997). The Project Area includes areas of similar potential habitat, such as perennial creeks and a variety of off-stream ponds.

The species is estimated to be in decline throughout 75-80% of its range (Stebbins, 2003). Decline is proposed to be a result of loss of habitat due to development. Despite these estimated declines, species experts believe where there is valid habitat, the species is thriving (Rathbun, personal communication). Currently, the species is known to occur in the Project Area, both in the Arroyo del Valle (LARPD personal communication) and the Arroyo de la Laguna (ACRCD and NRCS observations, unpublished).

Red-eared Slider (*Trachemys scripta elegans*)

Red-eared sliders occur naturally in New Mexico and throughout much of the mid-west. This species was introduced in California mostly as a result of release of pets and release due to religious and cultural ceremonies in some Asian religions. They share very similar life history tactics of the native Western pond turtle including similar diet and habitat needs. Red-eared sliders prefer areas with calm water and abundant aquatic vegetation, and can inhabit streams, marshes, lakes and reservoirs. They nest in open, unshaded areas in soil that is not muddy and often travel long distances searching for suitable nesting habitat (Stebbins, 2003). Red-eared sliders are bolder and more aggressive than their native counterparts and can compete with native turtles for food, nesting and basking space, and cover.

2.4 Riparian Habitat

Historical riparian habitat within the Project Area is discussed below based on descriptions from the Alameda Creek Historical Ecology Study (Stanford et al., 2013). Current riparian habitat conditions are discussed in Section 4 Results.

The upper Arroyo del Valle (including Sub-Reach 4a) was sinuous and maintained a large riparian area. Riparian growth was fairly dense, with many sycamores (*Platanus racemosa*), alders (*Alnus* sp.), and willows (*Salix* sp.) growing in the wide gravelly bed of the creek (Stanford et al., 2013). Similarly, within the floodplain, intermittent pools of water, sycamores, alders, poplars (*Populus* sp.), and willows existed. The Arroyo del Valle began to split into multiple channels shortly after entering the valley (approximately where Sycamore Grove is located today – Sub-Reach 4a). The creek broadened to develop a braided pattern with the riparian corridor up to 1,500 feet wide and islands between the multiple channels of the creek (Stanford et al., 2013). Sycamore alluvial woodlands and possibly valley oaks (*Quercus lobata*) were supported within the braided portion of the channel, further away from the active channel on terraces in varying densities. Other riparian species such as sedges (*Carex* spp.) and annual grasses thrived (Stanford et al., 2013).

As the lower Arroyo del Valle flowed into the current Pleasanton area (Reach 7), the riparian cover shifted from sycamore alluvial woodland to more sparse cover though sycamores remained the dominating riparian tree species. The creek transitioned from a braided pattern to distributary channels. In areas of high groundwater and perennial flow, the channel was flanked with red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), and other aquatic plant species.

The Arroyo de la Laguna (Reach 10) was distinct from other creeks in the area, as a single-stem, meandering stream from perennial flow, with plentiful vegetation along its banks. The historical Pleasanton marsh complex riparian vegetation continued along upper Arroyo de la Laguna, consisting of dense willow thickets. A dense corridor of valley oak (*Quercus lobata*), sycamore (*Platanus racemosa*), cottonwoods (*Populus fremontii*), and willow (*Salix sp.*) continued further downstream, ranging from 300 to 700 feet wide (Stanford et al., 2013). At its southern most point, the creek transitioned with the canyon becoming narrower as it transitioned at the confluence with Alameda Creek.

2.5 Riparian Birds

Alameda County Breeding Bird Atlas (Richmond et al., 2011) describes historical and current distributions of breeding birds throughout the Project Area. Birds that were historically documented in the late 1800's to early 1900's are included within the Atlas. These species included swallow species, black phoebe (*Sayornis nigricans*), Bewick's wren (*Thyromanes bewickii*) and song sparrow (*Melospiza melodia*) among many other native species. These species were described as abundant, common residents. Belted kingfisher (*Megaceryle alcyon*) has confirmed nesting in Alameda County downstream on Alameda Creek and within the Arroyo Mocho (both outside of the Project Area), although it is reported an uncommon nesting species within Alameda County. Non-native European starlings (*Sturnus vulgaris*)—aggressive birds which compete with native species, were first reported in Alameda County in 1963 and by 1989 were documented as an abundant resident. Current bird species and distribution was assessed as part of this study and is further discussed in Section 4 Results.

2.6 Off-Stream Pond Habitat for Native Amphibians and Aquatic Reptiles

The USFWS (2002, 2005) determined that standing bodies of freshwater including ponds, both natural and artificial, provide critical habitat for the breeding of California red-legged frogs, California tiger salamander. Across the California red-legged frog and California tiger salamander's range, man-made ponds have become an important component to supporting vital breeding habitat for California red-legged frogs and California tiger salamanders in areas where natural habitats such as slow-moving creeks and vernal pools have been altered or lost over time. This is also true throughout the Project Area. Off-stream ponds also provide potential habitat for the native Western pond turtle.

Off-stream ponds provide varying degrees of habitat value for native species. Pond habitat suitability for native amphibians and aquatic reptiles can be limited by several factors including the condition of the surrounding uplands, barriers to species movement, chemical applications affecting water quality, and the presence of predators (e.g., feral cats, raccoons, bullfrogs) and need to be assessed on a case by case basis. A desktop evaluation was conducted of ponds within a two-mile buffer of the Project Area. Two miles was chosen as a reasonable distance for migration for amphibian species. See Section 4.4 Results.

3 METHODS

Several methods were used in the assessment to evaluate riparian habitat and health, amphibian, western pond turtle, and avian species identification and habitat conditions in the Project Area, as well as pond habitat in the surrounding upland areas.

3.1 Survey Selection Locations and Process

As part of the Stream Management Master Plan (SMMP), Zone 7 Water Agency identified 12 study reaches throughout the entire SMMP Study Area (Zone 7, 2006). Of these 12, three fall within the Project Area that is the subject of this assessment— Reaches 4, 7, and 10 (Figure 4).

Within Reaches 4, 7, and 10, Sub-Reaches were previously defined by Zone 7 based on geomorphic and other natural boundaries. A total of nine Sub-Reaches were identified along Arroyo del Valle (4a, 4b, 4c, 7a, 7b, 7c, 7d, 7e, 7f) and two Sub-Reaches along Arroyo de la Laguna (10a, 10b). Sub-Reaches 7a and 7b were not sampled due to property access limitations.

A subsample of total stream length in the survey area was surveyed as part of this assessment. Two survey locations were selected within each Sub-Reach. Each survey location was selected using a random number generator that corresponds to the number of feet along the Sub-Reach. Survey locations were ¼ mile long and were selected so they did not overlap within each Sub-Reach. Survey locations are detailed on Figure 2 (page 11). Survey results from the two survey locations were expected to represent conditions throughout that Sub-Reach.

A total of 4.5 miles (approximately 20%) of stream was assessed using this methodology. Exhibit E provides photos documenting the starting and ending point of each survey location.

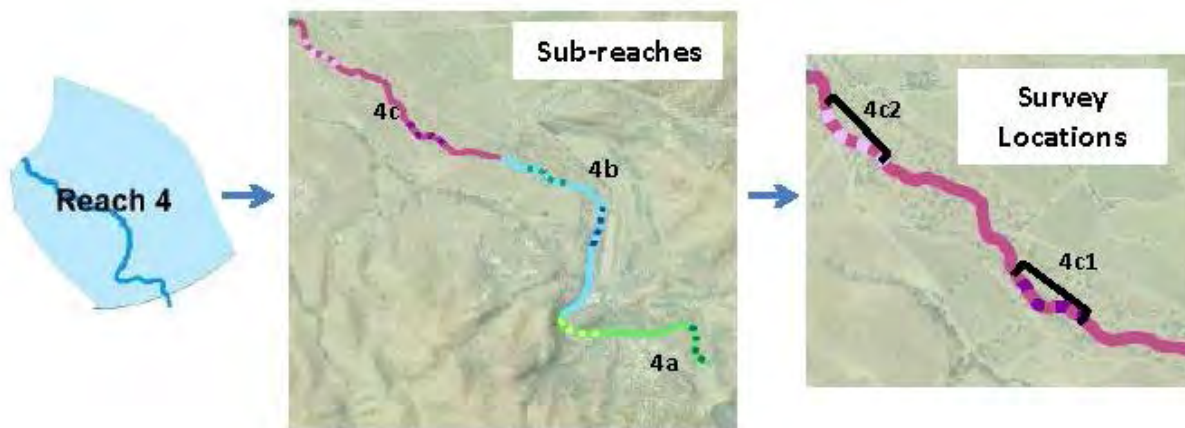


Figure 4. Methods for Establishing Reaches, Sub-Reaches and Survey Locations

3.2 Stream Visual Assessment Protocol

Each survey location within the Sub-Reaches was assessed using the Stream Visual Assessment Protocol (SVAP) Version 2, a basic stream health evaluation methodology developed by the Natural Resources Conservation Service for use in the field (USDA NRCS, 2009). The SVAP provides a relatively basic level of ecological assessment based on qualitative descriptions. The SVAP can be used to document current or baseline conditions and to document changes to these conditions over time. It can also be used to identify specific lower-scoring assessment elements that can be improved to benefit the conditions of the stream and the associated habitat.

3.2.1 SVAP Assessment Elements

Up to sixteen stream assessment elements can be used to represent the critical factors in a stream's condition. The stream assessment elements address hydrology, channel and bank properties, riparian vegetation and habitat quality, and water quality. These elements provide important context towards evaluating the habitat values that support riparian, avian and amphibian species.

Twelve of the sixteen assessment² elements were utilized for this study. Brief descriptions of each element and how they are assessed are included below and in more detail in Exhibit F.

Channel Condition

Channel condition is the geomorphic stage of the channel as it adjusts its shape relative to its floodplain. This element was scored by visually observing the severity and categorizing the channel condition into one of two adjustments groups: incision/degradation (dramatic drop in streambed elevation) or aggradation (excessive deposition of bedload that raises the bed elevation). A natural, stable channel with established bank vegetation will include the following elements: (1) no discernable signs of incision or aggradation; (2) the active channel and floodplain are connected throughout the reach and are flooded at natural intervals; (3) streambanks are low with few or no bank failures; and (4) no more than one bar is forming within the channel.

Hydrologic Alteration

Hydrologic alteration is the degree to which hydrology and streamflow conditions differ from natural, unregulated flow patterns. Hydrologic alteration indicators such as bankfull stage, presence of channel bars or water control structures, age/type of vegetation and evidence of flooding were used to determine a rating for each reach. A natural, stable stream condition will include the following elements: (1) bankfull or higher flows occur according to the flow regime that is characteristic of the site and; (2) no dams, dikes or development of the floodplain or water control structures are present and; (3) natural flow regime prevails.

² "Barriers" and "fish habitat" were assessed as part of Cardno-Entrix study (2013). "Evaluation of macroinvertebrate species" would have required a sampling study beyond the scope of this assessment and "Salinity" was not applicable for evaluating freshwater streams.

Bank Condition

Bank condition is an evaluation of the entire length of all banks along the assessment reach, considering the proportion of unstable to stable banks. Indicators used to rate this element include evaluation of unvegetated stretches, exposed tree roots, scalloped edges, evidence of construction and tension cracks. Each bank is scored individually and average of both banks is reported as the single, composite bank condition score. A healthy riparian corridor with a well-vegetated floodplain contributes to bank stability and will include the following elements: (1) banks are stable and protected by roots of natural vegetation wood and rock; (2) no fabricated structures are present on the bank; (3) no excessive erosion or bank failures are present and (3) there is no recreational or livestock access.

Riparian Area Quantity

Well-established riparian areas are critical for stream health and fish and wildlife habitat. This element rates the magnitude or size of natural plant community (species native to the site or introduced species that have become naturalized) within the floodplain. The corridor extent was defined as the edge of the active channel where the natural riparian vegetation begins outward to where other land use or land cover begins. Vegetation gaps (lengths of streamside with no natural vegetation ecologically suitable for the site and at a density and spacing uncharacteristic of the plant community being assessed) and bankfull width also contributed to overall riparian area quantity score. Natural, well-established riparian areas include the following elements: (1) plant communities that extend two bankfull widths or more than the entire active floodplain and (2) are generally contiguous throughout the survey area.

Riparian Area Quality

Riparian areas include the vegetated areas adjacent to stream channels that function as transitional areas between stream and uplands. This element evaluates the natural plant community's composition, density, and age structure appropriate for the site. Plant composition was evaluated based on the presence of each structural layer: the herbaceous grasses and native forbs layer, shrub layer and tree layers suitable for each reach natural plant community historical descriptions. Density was evaluated based on the stage of regeneration, growth and mortality occurring within each reach. The presence and extent of invasive species identified and evidence of concentrated flows running through the riparian area contribute to the overall score.

Canopy Cover

Canopy cover is defined as the percent of the ground (or stream) surface area that is shaded due to vegetation, as in aerial view. Shading of the stream is important because it maintains cool water temperatures and limits algal growth. This element was determined by visually assessing the stream from various view points and estimating the percent of the stream surface area that is shaded over the surveyed reach. Cold water (streams that hold trout) and warm water streams are separated and scored differently.³ The Project Area was evaluated as a cold water stream based on the natural stream class and native fish assemblage which would have historically supported trout (Stanford et. al, 2013).

³ The SVAP protocol allows the option to choose which matrix is used based on stream class and fish assemblage. It selects for the matrix that is appropriate for the stream and its native fauna. Cold water streams that have greater than 75% of the water surface shaded score the highest.

Water Appearance

Water appearance is the visual observation of the water within the reach, including the water surface and depths. This element compares turbidity (the depth to which an object can be clearly seen, with 3-6 feet as clear visibility), color, and other visual characteristics of the water within the reach. Observation of motor oil sheen on water surface or smell of motor oil also contributed to overall element score. Healthy streams have very clear water where submerged features are visible at depths of 3-6 feet and no motor oil sheen or evidence of metal precipitates is present.

Nutrient Enrichment

Nutrients are necessary for stream food webs by promoting algal and aquatic plant growth, which provide habitat and food for aquatic organisms. However, an excessive amount of algal and plant growth is detrimental to stream ecosystems. Clarity of water through the reach, quantity of algal growth or other aquatic plants, and odor was assessed as part of this element. A natural, healthy stream has clear water along the entire reach with little algal growth present.

Manure or Human Waste

This element assesses livestock and human access and therefore, impacts to the reach. Manure and human waste increase nutrients and biochemical oxygen demand in streams, which alter food webs and nutrient cycles of stream/riparian ecosystems. Indications of livestock in/adjacent to the stream channel and observation of pipes or concentrated flows that may be discharging animal waste/sewage directly into the stream were used to rate this element. Natural stream systems have the least pressure from human and manure waste if livestock do not have access to the stream and no pipes or concentrated flows deliver waste or sewage directly into the stream.

Pools

Regardless of the stream channel type, pools are important resting, hiding, and feeding habitat for fish. Streams with a mix of shallow and deep pools offer diverse habitat for different species of fish and other aquatic species. Based on the stream gradient (<2% slope [low] or <2 slope [high]), the number of pools and pool morphology was used to score this element. Ponds were assessed by walking the reach or probing from the streambank with a stick or pole. The size and depth of each pool contributed to the overall rating of this element. The Project Area was assessed as a low-gradient stream, compared to natural, healthy stream conditions which include the following elements: (1) more than three deep pools separated by boulders or wood, where pools are deep enough to provide adequate rest and cover for resident fish; and (2) shallow pools are also present.

Aquatic Invertebrate Habitat

In a healthy stream, substrates are varied, free of sediment, abundant, and in place long enough to allow colonization by invertebrates. The number of different types of habitat (logs, large wood, cobble within riffles, boulders within riffles, leaf packs, etc.) within a representative subsection of the assessment reach that is equivalent in length to five times the active channel width determines the rating for this element. In a healthy stream, substrates are varied, free of fine sediment, abundant and in place long enough to allow colonization by invertebrates and include the following elements: (1) at least 9 types of habitat present and (2) a combination of wood with riffles should be present and suitable.

Riffle Embeddedness

Embeddedness measures the degree to which gravel and cobble substrates in riffles are surrounded by fine sediment. Riffles are critical for maintaining high species diversity and abundance of insects for most streams and for serving as spawning and feeding grounds for some fish species. Riffles are areas, often downstream of a pool, where the water is breaking over rocks, cobbles, gravel, or other substrate material on the bed of a stream, causing surface agitation. This element was scored by picking up particles of gravel or cobble with fingertips at the fine sediment layer of a riffle, then estimating the percent of the particle that was buried. This score was based on the depth to which objects are buried by sediment with the highest score for a healthy, fish bearing stream afforded to gravel or cobble substrates that are less than 10% embedded.

3.2.2 SVAP Scores

Scores are developed based on guidance within the national protocol. Stream assessment elements are scored by comparing observations in the field to descriptions provided within the protocol and the field staff's local knowledge of reference reaches. For the purposes of this assessment, riparian habitat conditions along Alameda Creek upstream of Calaveras Dam and portions of the Arroyo Mocho upstream of aqueduct releases provided the framework for similar natural streams appearance and function. Reference historical conditions from the Alameda Creek Historical Ecology Study (Stanford et al., 2013) also provide context for assessments.

The overall assessment score is determined by adding the values for each element and dividing by the number of elements assessed. This value is used as a general statement about the state of the environment of the stream or (over time) as an indicator of trends in condition. The score ratings range from Excellent to Severely Degraded. Table 2 below provides a description of the score ranges and what each condition means. For more information on how the SVAP scores are utilized, please see the SVAP2 Protocol included in Exhibit F – Stream Visual Assessment Protocol.

Table 2. SVAP Score Descriptions

Score Range	Condition	Description
1 to 2.9	Severely Degraded (SD)	Severely impaired and unstable stream system; little or no habitat available. Stream has largest deviation from reference sites - physical, chemical, and biological elements indicate an unnaturally functioning stream, without the ability to respond to natural disturbances. Artificial or human influence on stream is apparent and invasive species are dominant.
3 to 4.9	Poor	Riparian and instream habitats are present, but stream is relatively impaired and unstable. Resource concerns are numerous. Stream has a significant deviation from reference sites and does not function as a natural stream ecosystem. Artificial or human disturbances are evident, influencing the stream capacity to respond to change. The stream supports aquatic species, with invasive species evident.

Score Range	Condition	Description
5 to 6.9	Fair	Stream has identifiable deviation from SVAP reference sites, with resource concerns apparent. However, riparian and instream habitats exist and have the potential for improvement. Stream supports relatively diverse communities of aquatic species. The stream maintains some natural features and holds capacity for natural ecological and physical functions.
7 to 8.9	Good	Overall stream condition is close to SVAP reference sites. Stream retains high quality habitats, both instream and within riparian zones. The wadeable stream is relatively healthy, comprised of mostly natural features that maintain ecological and physical functions. Stream has few resource concerns, with potential causes evident. Conditions provide evidence that the stream has supported diverse communities of aquatic species.
9 to 10	Excellent (EX)	Wadeable stream ecosystem provides ideal or highest quality riparian and instream habitats. Represents a stable, healthy, natural stream that maintains key ecological and physical functions over time. Stream has little or no resource concerns; condition is close or mimics SVAP reference sites. Conditions relay a resilient ecosystem exist that supports diverse communities of aquatic species.

3.2.3 Riparian Vegetation Structure

Evaluation of riparian vegetation structure was based on two SVAP protocol elements – riparian area quantity and riparian area quality (discussed above under Section 3.2.1).

3.3 Amphibian Species and Western Pond Turtle Habitat Surveys

Each survey location within each Sub-Reach was walked, in-stream, to the maximum extent possible. The survey documented the presence of native amphibian species and Western pond turtle and their potential habitat. Surveys were conducted in May to June to provide the optimal time of year to encounter amphibian larvae. This window also corresponds with the time of greatest pond turtle activity, typically during the breeding season (May-July), and when pond turtles have not left the water to aestivate or overwinter in upland habitat. In some survey locations the creek was too deep to walk and/or choked out by vegetation, limiting access. Surveyors walked along the creek banks when in-stream access was limited due to thick vegetation. Dip nets were used where appropriate to survey aquatic fauna species. All plant and animal species observed throughout each Sub-Reach were noted.

3.4 Avian Species and Habitat Surveys

Surveys for riparian bird species were conducted within each survey location following a modified point count protocol.

Point counts are used to sample bird populations for estimating densities in local areas, determining trends in populations over regional areas, assessing habitat preferences and other scientific and population monitoring purposes. A point count is a tally of all birds detected visually or aurally by a single observer from a fixed station during a specified period (e.g., 5 minutes). Counts are made in the morning (e.g., before 10:00 a.m.) typically during the breeding season (usually May and June)

under acceptable weather conditions (e.g., winds less than 20 km/h and no rain). In the tally, the birds are identified by species. Often point counts will take into consideration the distance from the observer.

The goal of the avian species evaluations during this assessment was to document presence of identified bird species during the survey period. The point count method was modified under this assessment because the objective was not to determine numbers of individuals, the distance between them or any population trends. As such, the surveys evaluated the presence of all species detected (seen and heard) within the point count area within a 5 minute period, and did not include a tally of individuals. This survey provides only a snapshot into the potential species that could be present and utilizing the riparian areas on a year-round basis.

Point count surveys were conducted at the beginning, middle and end of each survey location to provide a minimum of 250m distance between locations, as suggested in point count protocols.⁴ Bird observations were conducted between 7 am and 10 am to provide the most optimal time of day to monitor during the months of May to June (Ralph et. al, 1993).⁵

The presence of riparian obligate or riparian dependent birds (particularly understory species) during the breeding season can be an indicator of riparian habitat quality. All avian point count data was assembled, and species were identified as either “riparian dependent” or “riparian obligate” according to previous analysis of riparian associations (Rich 2002; BLM [no date]).

3.5 Ponds Analysis

A desktop evaluation was conducted to assess habitat potential of existing ponds within two miles of the Arroyo del Valle and Arroyo de la Laguna stream reaches, based on existing data sources. The following data was used: East Alameda County Conservation Strategy (EACCS) pond point locations, EACCS land cover, California Atlas (CaSIL) streams, and California Natural Diversity Database (CNDDDB).

Using ArcGIS, a 2-mile buffer was created on each side from the center line of the two streams – Arroyo del Valle (Figure 5) and Arroyo de la Laguna (Figure 6)⁶. All EACCS pond point locations within the 2-mile buffer of each stream were evaluated and categorized. The pond number (FID), pond size (acres), and land cover were noted for each pond. Ponds were classified based on land use categories from the EACCS land cover data and observations of aerial imagery. Ponds located on a dry or intermittent drainage lacking typical riparian qualities were also classified by the predominant surrounding land use.

⁴ If the two randomly selected survey locations happened to be contiguous, then they were discarded and the next randomly selected location was included. Survey locations were selected so that they didn’t overlap and/or weren’t contiguous.

⁵ The land birds monitoring protocol states monitoring should occur between 5 and 10 am, preferred within 15 minutes of sunrise (Ralph et. al, 1993). Sunrise occurred between 6 and 6:30 during the survey period.

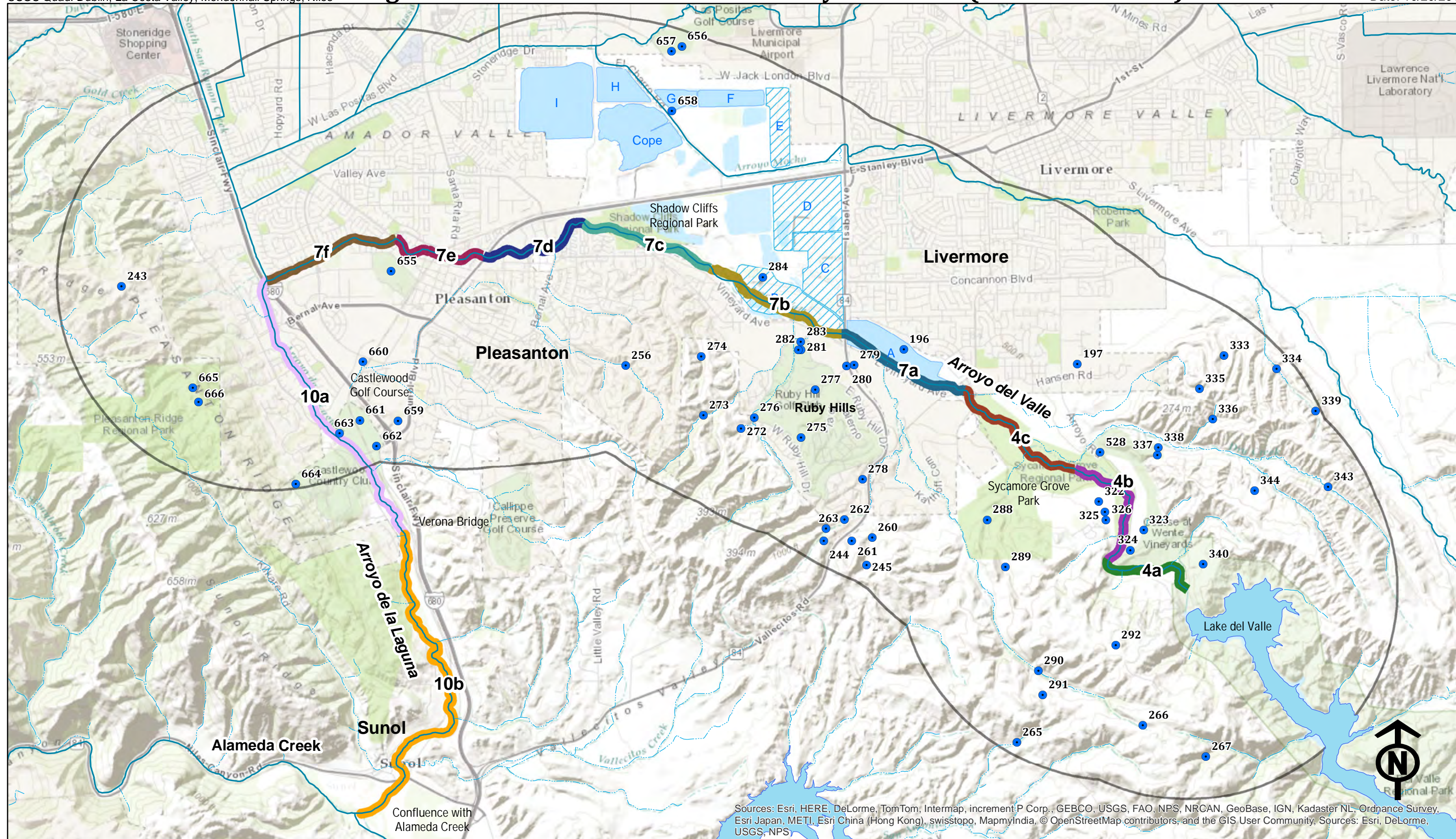
⁶ The ponds were not assessed by reach because overlap occurred within each reach buffer, resulting in duplicate data points.

Five different pond classifications were selected. Below are general descriptions of the habitat categories and a brief discussion on the general value of the ponds found within each category.

1. **Developed Ponds:** Ponds found within this category include ponds found within close proximity to housing developments mostly along the Arroyo del Valle through Livermore and Pleasanton. The lack of available and suitable upland habitat in and around housing developments presents a limiting factor for sustainable populations of the species in ponds that are located in and near urban and suburban developments.
2. **Golf Course Ponds:** Ponds included in this category include ponds that are found within or directly adjacent to a golf course. These types of ponds may be able to support populations of California red-legged frogs and California tiger salamanders. In general, while potential habitat is present, ponds found on or adjacent to golf courses provide reduced habitat quality to support sustainable populations of the species.
3. **Cropland Ponds:** Ponds included in this category include ponds found within or adjacent to vineyards and/or orchards. These ponds may provide aquatic habitat for the California red-legged frog and/or the California tiger salamanders. However, much like golf courses, ponds located in or near cropland can have reduced habitat potential for sustaining populations of the species.
4. **Rangeland Ponds:** Ponds included in this category include ponds located within grasslands on open rangeland. The plant communities in this category consist mostly of grassland and oak woodland. Ponds on rangelands are generally more likely to support sustainable populations of California red-legged frogs and California tiger salamanders than the areas closer to development.
5. **Not Ponds:** Several ponds were identified under the EACCS data set as ponds that upon further investigation into aerial imagery were eliminated as potential ponds.

General habitat potential for the California red-legged frog and the California tiger salamander were determined based on the category selected, NRCS/ACRCD staff knowledge, the surrounding areas, and the species habitat requirements. Factors influencing the general value of each pond are discussed further in Section 5.6. A specific rating system was not applied to each category because each pond's potential habitat value would need to be assessed on a case-by-case basis to fully determine which aquatic and upland habitat values are present.

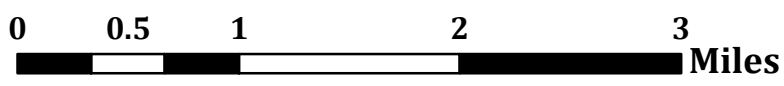
Figure 5: Ponds within 2 miles of Arroyo del Valle (Reaches 4 and 7)



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community, Sources: Esri, DeLorme, USGS, NPS

Arroyo del Valle	Arroyo de la Laguna	Chain of Lakes	Pond
Sub-Reach 4a	Sub-Reach 10b	Existing	Major Streams/Arroyos
Sub-Reach 4b	Sub-Reach 7b	Future	Intermittent Streams
Sub-Reach 4c	Sub-Reach 7c		2 Mile Buffer - Reach 4 and 7
Sub-Reach 7a			
Sub-Reach 7d			
Sub-Reach 7e			
Sub-Reach 7f			

NOTE: Ponds includes those on intermittent streams (ex. impoundments used for cattle ponds)

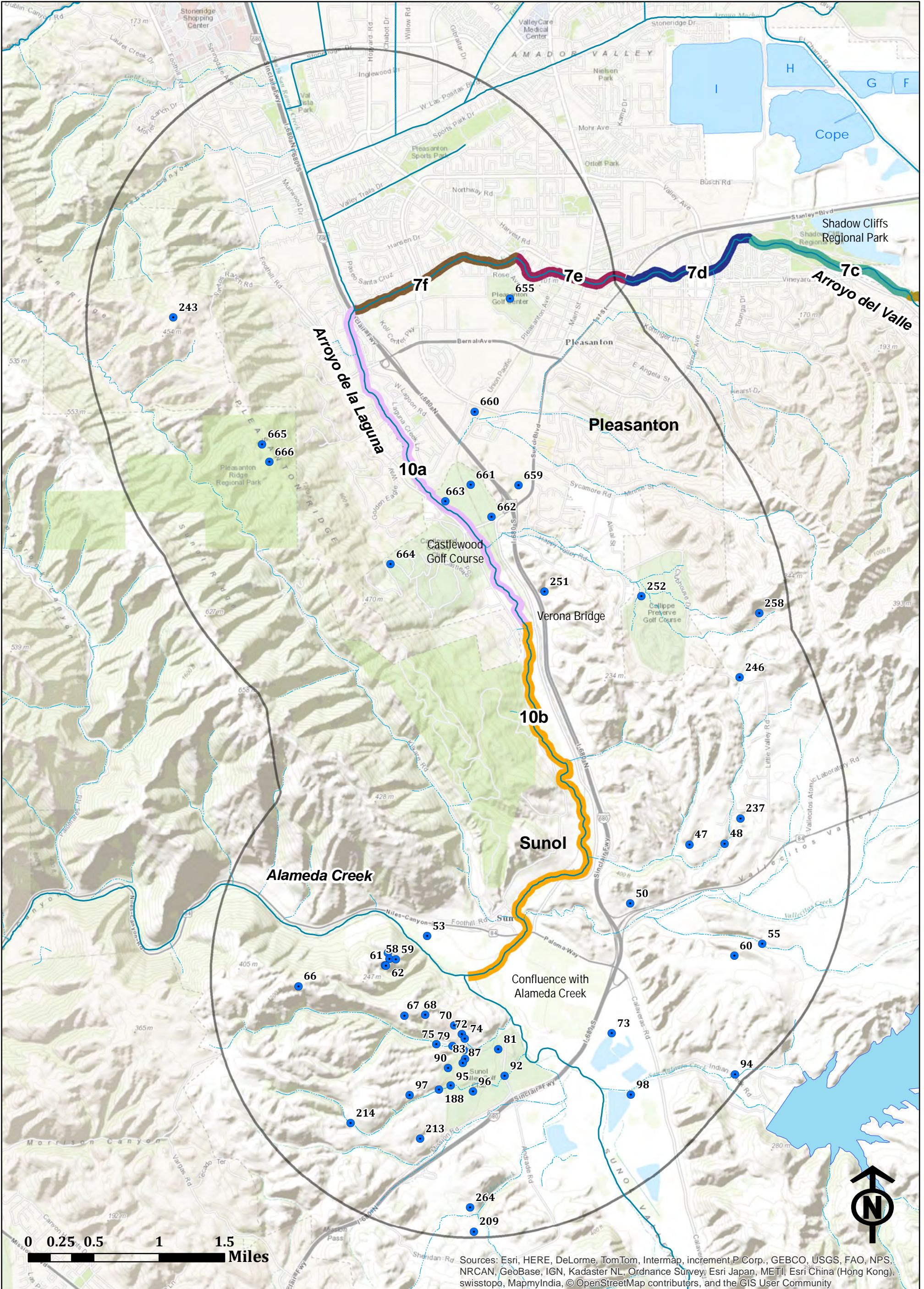


Source: EACCS, Ponds Centeroids, 2009.



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Figure 6: Ponds within 2 miles of Arroyo de la Laguna (Reach 10)



- Arroyo del Valle**
- Sub-Reach 4a
- Sub-Reach 4b
- Sub-Reach 4c

- Arroyo de la Laguna**
- Sub-Reach 10a
- Sub-Reach 10b

- Chain of Lakes**
- Existing
- Future

- Pond**
- Major Streams/Arroyos
- Intermittent Streams
- 2 Mile Buffer - Arroyo de la Laguna

NOTE: Ponds includes those on intermittent streams (ex. impoundments used for cattle ponds)

Source: EACCS, Ponds Centeroids, 2009.



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4 RESULTS

This section summarizes the findings of this study; see Section 5 for a discussion. Exhibits A, B, C and D provide the data collected on each stream reach.

4.1 Reach 4, Arroyo del Valle Upstream of Quarry Activities

Table 3 below provides a summary of key survey findings within Reach 4.

Table 3. Reach 4 Key Findings Summary

SVAP Overall	Score	Fair
SVAP Elements	Channel Condition	Fair
	Hydrologic Alteration	Poor
	Bank Condition	Good
	Riparian Area Quantity	Good
	Riparian Area Quality	Good
	Canopy Cover	Poor
	Water Appearance	Fair
	Nutrient Enrichment	Fair
	Manure or Human Waste	Good
	Pools	Fair
	Aquatic Invertebrate Habitat	Good
	Riffle Embeddedness	Fair
Native Amphibians	Observations	Sierran treefrogs
	Habitat Availability	Potential habitat present; best potential for CRLF in the Project Area
Native Aquatic Reptiles	Observations	None observed
	Habitat Availability	Potential habitat present
Predators	Observations	Bullfrogs, bass, crayfish
Avian	Riparian Dependency	21% of species (averaged across all point count locations in Reach 4)
	Habitat Availability	Present
Riparian Habitat Value	Quantity	Appropriate for the site
	Quality	Native and diverse; with invasive species present in small numbers

4.1.1 SVAP Score, Reach 4

Within Reach 4, SVAP overall ratings ranged from Poor to Good (Table 4) with an overall SVAP rating of “Fair.” Channel conditions in Reach 4 were incising, except for survey location 4c-1 that goes through the central portion of Sycamore Grove Park was highly braided and aggrading. The hydrology within the reach is altered as a result of flow augmentation and Del Valle Dam that alters the natural flow regime. Banks within this reach were moderately stable and support a relatively contiguous natural and diverse plant community although invasive plant species are present in small numbers. The canopy cover provided 20-40% shade cover throughout the reach. Water quality throughout the reach was turbid at most locations with greenish water present in slow sections. Moderate to abundant algal growth was observed, especially in slack water areas.

Table 4. Reach 4 SVAP Score by survey location and summarized by Reach

Element	Survey Location						Reach Average	Rating
	4a-1	4a-2	4b-1	4b-2	4c-1	4c-2		
Channel Condition	6	7	8	9	3	3	6.0	Fair
Hydrologic Alteration	3	3	3	3	3	3	3.0	Poor
Bank Condition ¹	7	7.5	8	8	8	6	7.4	Good
Riparian Area Quantity ¹	8.5	9	9	9.5	9	6	8.5	Good
Riparian Area Quality ¹	7	7	7	8	7	6	7.0	Good
Canopy Cover	3	4	4	4.5	3	3	3.6	Poor
Water Appearance	4	4	6	6	6	8	5.7	Fair
Nutrient Enrichment	5	5	5	5	5	5	5.0	Fair
Manure or Human Waste	9	8	9	9	9	9	8.8	Good
Pools	2	6	3	6	6	7	5.0	Fair
Aquatic Invertebrate Habitat	5	10	7	9	9	9	8.2	Good
Riffle Embeddedness	0	7	7	7	7	9	6.2	Fair
Total	58.5	77.5	76	84	75	74		
Number of Elements	12	12	12	12	12	12		
Average Score	4.9	6.5	6.3	7.0	6.3	6.2		
Rating	Poor	Fair	Fair	Good	Fair	Fair		

¹ Bank condition, riparian area quantity and riparian area quality scores are developed as an average for right bank and left bank scores.

Key to Score Ranges:

1 to 2.9 = Severely Degraded (SD); 3 to 4.9 = Poor; 5 to 6.9 = Fair; 7 to 8.9 = Good; 9 to 10 = Excellent

With the exception of 4c-2, there were not many deep pool-riffle complexes observed. The majority of pools present were shallow or often present as elongated slack-water areas rather than pools associated with riffles. Throughout most of these reaches the floodplain remains connected to the stream channel and is not restricted by development or other barriers to the floodplain.

4.1.2 Riparian Habitat, Reach 4

Within Reach 4, the average Riparian Quantity score was 8.5 (good) suggesting that overall, the riparian plant community extends at least two bankfull widths of the active floodplain and is generally continuous throughout the Reach. This average score for the Reach does not take into consideration

areas within 4a-1 where the floodplain is restricted due to the adjacent road and the riparian plant community is restricted. Overall, the extent of the riparian area has very few vegetation gaps provides an appropriate riparian area compared to reference conditions. Vegetation gaps were present throughout survey location 4c-2, reducing the extent of the riparian corridor within this portion of the Reach.

The average Riparian Quality score was 7.0 (good) suggesting that the composition, density and age structure of riparian vegetation was appropriate for the stream corridor based on natural plant community and historic species composition for the area. The majority of the survey locations had a consistent amount of native vegetation with small amounts of non-native vegetation mixed in. Some areas throughout the Sub-Reaches, particularly in 4b and 4c were very heavily vegetated with willows that limited access to the stream for surveying.

The dominant riparian plant species found throughout the survey locations included Fremont cottonwood (*Populus fremontii*), Western sycamore (*Platanus racemosa*), California buckeye (*Aesculus californica*), oak (*Quercus* sp.), willow (*Salix* sp.), California blackberry (*Rubus ursinus*) and aquatic species such as cattails, rushes (*Juncus* sp.) and sedges (*Scirpus* sp.). Some highly invasive non-native weeds were observed including pampas grass (*Cortaderia jubata* or *C. selloana*) in Sub-Reaches 4a, 4b and 4c and giant reed (*Arundo donax*) in Sub-Reaches 4a and 4c. Palm tree species were observed throughout the survey locations. A full listing of plant species observed during stream surveys is included in Exhibit B.

4.1.3 Amphibian and Western Pond Turtle Presence and Habitat, Reach 4

The only native amphibian larvae that were observed throughout the reach were Sierran treefrog (*Pseudacris sierra*) tadpoles and only one tadpole was observed. Bullfrog tadpoles (20+) and adults (15+) were observed within each Sub-Reach during the survey period. Observations included capture, visually sighted and calling bullfrogs. Non-native bass and crayfish were also observed throughout the survey locations.

California red-legged frog observations and habitat

No California red-legged frogs were observed within this Reach during field surveys though potential habitat is present for them and the species has been recorded within the Reach. The California Natural Diversity Database (CNDDDB) has a known sighting of three juvenile California red-legged frogs along the Arroyo del Valle in 1995 (CNDDDB, 2011). The sighting was recorded by an East Bay Regional Park District biologist and was located directly downstream from Del Valle dam in survey location 4a-1 of the Project Area. There are no historical accounts from CNDDDB or the Museum of Vertebrate Biology of California red-legged frogs in this Reach.

California red-legged frogs have been observed recently by Sycamore Grove Park ranger staff (LARPD, personal communication) in the park's "Nature Area" which is within Sub-Reach 4b. This area consists of secondary channels that are densely vegetated with hardstem bulrush (*Scirpus acutus*), and willows (*Salix* sp.). The secondary channels typically run parallel to the Arroyo del Valle throughout the park, with varied vegetation and water levels. This Reach was part of the braided system that comprised the Arroyo del Valle before the upstream dam was constructed (Stanford et. al., 2013). At the time of the

survey, shallow standing water was observed in isolated pools in the secondary channels. The water source for these channels was not defined during the assessment.

Table 5. Reach 4 Species Observations

Species	Native	Sub-Reach 4a	Sub-Reach 4b	Sub-Reach 4c
Amphibians				
Foothill-yellow legged frog	Yes			
California red-legged frog	Yes			
Sierran tree frog	Yes			x
American bullfrog	No	x	x	x
Aquatic Reptiles				
Western pond turtle	Yes			
Red-eared slider	No			
Fish				
Sculpin	Yes		x	
Bass Species ¹	No			x
Carp	No			
Unidentified fish species	unknown	x	x	
Other				
Crayfish	No	x	x	x
Snail species	unknown			

¹ Bass observed were not in hand to fully identify which species. However, [Zone 7's steelhead study](#) indicates a prevalence of largemouth bass within the Project Area.

Foothill yellow-legged frog observations and habitat

Foothill yellow-legged frogs were not observed within this Reach during field surveys. There are no records from CNDDDB. There is one historical account from the Museum of Vertebrate Biology within Arroyo del Valle, slightly downstream of the current dam. The specimen was an adult/juvenile collected in 1960 which pre-dates the installation of Del Valle Dam. Under current conditions, suitable habitat is not present throughout the Reach.

American bullfrog observations and habitat

Bullfrog tadpoles and adults were widespread throughout Reach 4. The presence of permanent water throughout this Reach contributes to the beneficial habitat conditions that continue to support a population of this non-native predator species.

Western pond turtle observations and habitat

No western pond turtles were observed within this Reach, though habitat is present for them and the species has been recorded in this area. The Western pond turtle is known to occur within Sub-Reaches

4b and 4c. A 1993 sighting of a Western pond turtle adult is the only CNNDDB documentation of the species on the Arroyo del Valle and is located within survey location 4b-1 (CNDDDB, 2011). Park Rangers at Sycamore Grove observe Western pond turtles on a regular basis in the Arroyo del Valle within the park boundaries in Reaches 4b and 4c (LARPD, personal communication). LARPD rangers primarily see the turtles inhabiting ponded areas within the creek. Chief Ranger Pat Sotelo has observed their presence in the creek since he first started working at the park in 1989. Habitat needs for the turtle along the Arroyo del Valle including deep slack water pools, downed logs for basking and adequate upland habitat for nesting are found throughout the Reach.

4.1.4 Avian Presence and Habitat, Reach 4

Fifteen point count surveys were conducted in Reach 4. Within Reach 4 a total of 57 species were observed from 166 observations. Table 6 below includes the list of the 10 most common observed bird species during the point count surveys within this Reach. A full listing of species observed during counts is included in Exhibit A. The species are listed below in alphabetical order based on common name. Exhibit A provides the number of observations per species.

Table 6. Ten Most Commonly Observed Bird Species in Reach 4

Common name	Scientific Name	Native
American crow	<i>Corvus brachyrhynchos</i>	Yes
Bewicks wren	<i>Thryomanes bewickii</i>	Yes
Bushtit	<i>Psaltriparus minimus</i>	Yes
European starling	<i>Sturnus vulgaris</i>	No
Oak titmouse	<i>Baeolophus inornatus</i>	Yes
Song sparrow	<i>Melospiza melodia</i>	Yes
Spotted towhee	<i>Pipilo maculatus</i>	Yes
Swallow species	--	Yes
Turkey vulture	<i>Cathartes aura</i>	Yes
Western scrub jay	<i>Aphelocoma californica</i>	Yes

Three riparian dependent or obligate bird species were observed during Reach 4 surveys: American goldfinch, Bewicks wren, and song sparrow. At least two riparian dependents or obligates were observed at 60% (n=9) of point counts in Reach 4. European starlings were present at 80% (n=12) of point count locations in Reach 4

4.2 Reach 7, Arroyo del Valle Shadow Cliffs through Pleasanton

Sub-Reaches 7a and 7b were not accessible and therefore not evaluated. A full SVAP was not completed at Sub-Reach 7c (Shadow Cliffs Regional Recreation Area) due to the significant hydrologic and physical alterations to the stream. The SVAP is intended to provide an evaluation of wadeable streams (USDA NRCS, 2009). The stream is currently very wide and too deep to access without a boat, which limited our ability to conduct a full SVAP assessment. Riparian habitat quality and quantity and avian bird studies were still conducted. Non-native amphibian, Western pond turtle, and fish species were also surveyed in this Sub-Reach. Table 7 below provides a summary of key survey findings within Reach 7.

Table 7. Reach 7 Key Findings Summary

SVAP Overall	Score	Poor
SVAP Elements	Channel Condition	Poor
	Hydrologic Alteration	Severely Degraded
	Bank Condition	Fair
	Riparian Area Quantity	Good
	Riparian Area Quality	Poor
	Canopy Cover	Poor
	Water Appearance	Fair
	Nutrient Enrichment	Poor
	Manure or Human Waste	Good
	Pools	Poor
	Aquatic Invertebrate Habitat	Fair
	Riffle Embeddedness	Severely Degraded
Native Amphibians	Observations	Sierran treefrogs
	Habitat Availability	Potential habitat present although limited due to urbanization and former quarry activities; CRLF habitat value limited.
Aquatic Reptiles	Observations	None observed, non-native red-eared sliders observed in Sub-Reach 7c and 7d
	Habitat Availability	Potential habitat present
Predators	Observations	Bullfrogs, bass, carp, crayfish
Avian	Riparian Dependency	18% of species (averaged across all point count locations in Reach 7)
	Habitat Availability	Present
Riparian Habitat Value	Quantity	Appropriate for the site
	Quality	Natural vegetation compromised, invasive species common

4.2.1 SVAP Score, Reach 7

The average SVAP scores were poor within each Sub-Reach, except 7f-1 which was fair (Table 8). This is an indication of the highly modified stream system including the upstream hydrologic alterations, inputs of stormwater, and development encroachment on each side of the stream throughout most of the reaches. There are very few riffle-pool complexes throughout the Reach. There is often no direct connection to a floodplain due to the encroachment of development on both sides of the stream. In Sub-Reaches 7d through 7f the stream has been constrained to function as a flood control channel with little ability to meander and move within the former floodplain area. Throughout the survey locations there is evidence of bank failures that have been repaired with rip-rap and concrete. Sub-Reach 7e has portions of the creek where retaining walls exist to protect structures. The presence of these fabricated structures within the creek limits the quality of the riparian habitat and affects bank condition.

Table 8. Reach 7 SVAP Score by Survey Location and Summarized by Reach

Element	Survey Location						Reach Average	Rating
	7d-1	7d-2	7e-1	7e-2	7f-1	7f-2		
Channel Condition	4	5	3	4	4	4	4.0	Poor
Hydrologic Alteration	2	2	2	2	2	2	2.0	SD
Bank Condition ¹	6	6	4	5	4	5	5.0	Fair
Riparian Area Quantity ¹	8	8	5.5	7	8	5.5	7.0	Good
Riparian Area Quality ¹	4	4	2	2	4	5	3.5	Poor
Canopy Cover	3	4	5	4	6	4	4.3	Poor
Water Appearance	5	5	5	6	8	3	5.3	Fair
Nutrient Enrichment	3	6	3	4	5	5	4.3	Poor
Manure or Human Waste	9	9	9	9	8	8	8.7	Good
Pools	2	2	2	2	6	6	3.3	Poor
Aquatic Invertebrate Habitat	7	7	5	6	8	8	6.8	Fair
Riffle Embeddedness	0	0	0	2	0	0	0.3	SD
Total	53	58	45.5	58	63	55		
Number of Elements	12	12	12	12	12	12		
Average Score	4.4	4.8	3.8	4.8	5.3	4.6		
Rating	Poor	Poor	Poor	Poor	Fair	Poor		

¹ Bank condition, riparian area quantity and riparian area quality scores are developed as an average for right bank and left bank scores.

Key to Score Ranges:

1 to 2.9 = Severely Degraded (SD); 3 to 4.9 = Poor; 5 to 6.9 = Fair; 7 to 8.9 = Good; 9 to 10 = Excellent

Canopy cover was variable throughout the Reach. Within the survey locations of Sub-Reach 7c there was little canopy cover over the water due to the wide nature of the stream corridor. Downstream in 7d, 7e and 7f canopy cover was fair to good although it varied depending upon the width of the stream and where vegetation gaps due to fabricated structures were present.

Channel condition within survey locations throughout the reach were altered and deepened (lacking access to floodplain and experiencing bank failure). Local areas of sediment and gravel deposition, leading to braided reaches were consistently observed downstream of bridges.

4.2.2 Riparian Habitat, Reach 7

Within Reach 7, the average Riparian Quantity score was 7.0 (good) and is indicated by the extent of the riparian plant community which extends at least one bankfull width and is generally contiguous throughout the Reach. Despite the overall average score of 7.0, throughout much of the Reach the corridor extent is limited due to development and channelization. Due to the lack of an active, natural floodplain throughout much of the Reach, the extent of the riparian plant community is limited, reducing the value of the riparian area compared to reference conditions. The riparian plant community throughout 7c and 7d was diverse and generally continuous with very little vegetation gaps. Downstream of the Stanley Boulevard bridge in Sub-Reaches 7e and 7f vegetation gaps are present that impact the extent of a consistent plant community, limiting the value of the riparian area within this Reach.

The average Riparian Quality score was 3.5 (poor), indicating the riparian vegetation community is much different than the natural plant community and historic species composition for the area. The majority of the survey locations had a consistent amount of non-native vegetation with small amounts of native vegetation mixed in. The native riparian plant species found throughout the survey locations included Fremont cottonwood (*Populus fremontii*), Western sycamore (*Platanus racemosa*), California buckeye (*Aesculus californica*), oak (*Quercus* sp.), willow (*Salix* sp.), and aquatic species such as cattails (*Typha latifolia*), rushes (*Juncus* sp.) and sedges (*Scirpus* sp.). Non-native Himalayan blackberry (*Rubus armeniacus*) was a dominant species throughout a majority of the survey locations and created thickets that were dense and impassable through many portions of the creek. Invasive non-native plants were observed including tamarisk (*Tamarix* sp.) in Sub-Reach 7e and 7f and giant reed (*Arundo donax*) in Sub-Reaches 7c, 7d and 7e. Eucalyptus trees (*Eucalyptus globulus*) were observed throughout the Reach. Due to the close proximity to development there is an increase in the amount and density of other non-native ornamental plants including *Vinca* species, English ivy (*Hedera helix*), cherry and wild plum trees, privets (*Ligustrum* sp.), and palm species.

Locations were observed where residents were using areas outside of their fence line for ornamental and other gardening, and these plants were encroaching on the riparian corridor. It was not specifically evaluated if these occurrences were on public or private property, which could influence the ability to alter the behavior. Additionally, there was evidence of yard waste being dumped over the fence which can contribute to the spread of non-native vegetation. A full listing of plant species observed during stream surveys is included in Exhibit B.

4.2.3 Amphibian and Western Pond Turtle Presence and Habitat, Reach 7

The only native amphibian larvae that were observed throughout the Reach were Sierran treefrog (*Pseudacris sierra*) tadpoles (Table 9). Two tadpoles were observed in an off-stream puddle in Sub-Reach 7d. Bullfrog tadpoles (12+) and adults (9+) were observed throughout the survey locations (Sub-Reaches 7c, 7d, 7e, and 7f). Observations included capture, visually sighted and calling bullfrogs. Additionally, non-native turtles (red-eared sliders [*Trachemys scripta elegans*]) were observed in Sub-Reaches 7c, 7d and 7e. Non-native bass and crayfish were also observed at several survey locations within the Reach (Table 9).

California red-legged frog observations and habitat

No California red-legged frogs were observed within this Reach, there are no recorded occurrences of the species in the vicinity, though suitable habitat exists. CNDDDB does not have documented occurrences of any special-status amphibians within the Reach. There are no historical accounts from CNDDDB and the Museum of Vertebrate Biology of California red-legged frogs in this Reach. Adequate upland habitat and dispersal options are limited in areas along the creek where houses line the top of the creek banks (Sub-Reaches 7d, 7e and 7f).

Table 9. Reach 7 Species Observations

Species	Native	Sub-Reach 7c	Sub-Reach 7d	Sub-Reach 7e	Sub-Reach 7f
Amphibians					
Foothill-yellow legged frog	Yes				
California red-legged frog	Yes				
Sierran tree frog	Yes		x		
American bullfrog	No		x	x	x
Aquatic Reptiles					
Western pond turtle	Yes				
Red-eared slider	No		x	x	
Fish					
Sculpin	Yes			x	x
Bass Species ¹	No		x	x	x
Carp	No				x
Unidentified fish species	unknown		x		
Other					
Crayfish	No		x	x	x
Snail species	unknown		x		

¹ Bass observed were not in hand to fully identify which species. However, Zone 7's steelhead study indicates a prevalence of largemouth bass within the Project Area.

Western pond turtle observations and habitat

Western pond turtles were not observed within the 2013 survey locations in this reach, there are no recorded occurrences of the species in the vicinity, though suitable habitat exists. CNDDDB does not have documented occurrences of Western pond turtles within this Reach and historical accounts are unknown. Non-native red-eared sliders were observed in Sub-Reach 7c and 7d. Habitat for the turtle along the Arroyo del Valle including deep slack water pools, downed logs for basking and are found throughout the Reach. Adequate upland breeding options are limited in areas along the creek where houses line the top of the creek banks (Sub-Reaches 7d, 7e and 7f).

Foothill yellow-legged frog observations and habitat

Foothill yellow-legged frogs were not observed within this Reach and no CNDDDB records were observed. It is unknown if foothill yellow-legged frogs were historically present throughout Reach 7. Historically, the species has been documented both upstream in the Arroyo del Valle and downstream in Alameda Creek.⁷ The Arroyo del Valle through Reach 7 lacks the riffle pool complexes and shallow flowing water

⁷ Historically there may have been portions of Arroyo del Valle between 7a to 7d or so that provided potential habitat but became more perennial as it approached the Pleasanton marsh which would not have served as appropriate habitat for FYLF.

that foothill yellow-legged frogs require for breeding and refugia. The deep slack water pools that are found throughout the Reach currently do not support the breeding needs of the species. The presence of non-native predators especially bullfrogs greatly limits the habitat values within Reach 7 for this species.

American bullfrog observations and habitat

Bullfrogs were widespread throughout Reach 7. The presence of permanent water throughout this Reach contributes to the beneficial habitat conditions that continue to support a population of this non-native predator species including bullfrogs.

4.2.4 Avian Presence and Habitat, Reach 7

Twenty-four point count surveys were conducted in Reach 7. Within Reach 7 a total of 49 species were observed from 265 observations. Table 10 below includes the list of the most commonly observed bird species during the point count surveys within this Reach. A full listing of species observed during counts is included in Exhibit A. The species are listed below in alphabetical order based on common name. Exhibit A provides the number of observations per species.

Table 10. Ten Most Commonly Observed Bird Species in Reach 7

Common name	Scientific Name	Native
American crow	<i>Corvus brachyrhynchos</i>	Yes
Bewicks wren*	<i>Thryomanes bewickii</i>	Yes
Black phoebe	<i>Sayornis nigricans</i>	Yes
Bushtit	<i>Psaltriparus minimus</i>	Yes
California towhee	<i>Melospiza crissalis</i>	Yes
House finch	<i>Carpodacus mexicanus</i>	Yes
Hummingbird species	--	Yes
Mourning dove	<i>Zenaidura macroura</i>	Yes
Western scrub jay	<i>Aphelocoma californica</i>	Yes
Woodpecker species	--	Yes

*Riparian dependent or obligate species.

Four riparian dependent or obligate bird species were observed during Reach 4 surveys: Bewicks wren, Bullock's oriole, song sparrow, and tree swallow. At least two riparian dependents or obligates were observed at 54% (n=13) of point counts in Reach 7. European starlings were present at 17% (n=4) of point count locations in Reach 7.

4.3 Reach 10, Arroyo de la Laguna

Table 11 below provides a summary of key survey findings within Reach 10.⁸

Table 11. Reach 10 Key Findings Summary

SVAP Overall	Score	Poor
SVAP Elements	Channel Condition	Poor
	Hydrologic Alteration	Severely Degraded
	Bank Condition	Poor
	Riparian Area Quantity	Fair
	Riparian Area Quality	Fair
	Canopy Cover	Severely Degraded
	Water Appearance	Poor
	Nutrient Enrichment	Fair
	Manure or Human Waste	Good
	Pools	Poor
	Aquatic Invertebrate Habitat	Fair
	Riffle Embeddedness	Excellent
Native Amphibians	Observations	Non observed
	Habitat Availability	Potential habitat present although limited due to incision and flashy flows
Aquatic Reptiles	Observations	None observed
	Habitat Availability	Potential habitat present
Predators	Observations	Bullfrogs, bass, carp, crayfish
Avian	Riparian Dependency	18% of species (averaged across all point count locations in Reach 10)
	Habitat Availability	Present
Riparian Habitat Value	Quantity	Reduced due to steep banks
	Quality	Natural vegetation compromised, invasive species common

4.3.1 SVAP Score, Reach 10

The average SVAP scores were poor and fair within each Sub-Reach (Table 11). This is an indication of the highly modified stream system including the upstream hydrologic alterations, inputs of stormwater, development encroachment and the significant incision and bank erosion throughout Sub-Reaches 10a and 10b. There are very few riffle-pool complexes observed throughout the survey locations. There is often a lack of floodplain throughout the survey locations due to incision and erosion of the streambanks.

⁸ The SVAP Assessment is intended to provide an evaluation of wadeable streams (as long as they are accessible during either wet periods or low flow). Therefore, despite the size of the watershed and incised stream condition, this stream still meets the protocol requirements of a wadeable stream.

Throughout Sub-Reaches 10a and 10b there is evidence of bank failures that have been repaired with rip-rap and concrete, typically along roads and within the golf course. The presence of these fabricated structures within the creek limits the value of the riparian habitat extent and affects bank condition.

Canopy cover was poor throughout the survey location. Sub-Reach 10a has no woody vegetation in the channel or on the banks, and no shade on the stream surface, but there are consistent sparse trees along the corridor. Sub-Reach 10b has good riparian canopy at the abandoned floodplain elevation.

Channel condition through the survey locations was incising, although areas of aggradation (sediment and gravel deposition leading to point bars and bank erosion) were observed.

Table 12. Reach 10 SVAP Score by 2013 Survey Location and Summarized by Reach

Element	Survey Location				Reach Average	Rating
	10a-1	10a-2	10b-1	10b-2		
Channel Condition	1	4	1	2	2.0	SD
Hydrologic Alteration	1	1	1	1	1.0	SD
Bank Condition ¹	4	5	3.5	6.5	4.8	Poor
Riparian Area Quantity ¹	6.5	6.5	5	6	6.0	Fair
Riparian Area Quality ¹	6	6	5.5	6	5.9	Fair
Canopy Cover	2	2	2	2	2.0	SD
Water Appearance	2	2	5	5	3.5	Poor
Nutrient Enrichment	6	6	6	6	6.0	Fair
Manure or Human Waste	9	9	9	5	8.0	Good
Pools	6	2	4	4	4.0	Poor
Aquatic Invertebrate Habitat	7	8	6	6	6.8	Fair
Riffle Embeddedness	9	9	9	9	9.0	Excellent
Total	59.5	60.5	57	58.5		
Number of Elements	12	12	12	12		
Average Score	5.0	5.0	4.8	4.9		
Rating	Fair	Fair	Poor	Poor		

¹ Bank condition, riparian area quantity and riparian area quality scores are developed as an average for right bank and left bank scores.

Key to Score Ranges:

1 to 2.9 = Severely Degraded (SD); 3 to 4.9 = Poor; 5 to 6.9 = Fair; 7 to 8.9 = Good; 9 to 10 = Excellent

4.3.2 Riparian Habitat, Reach 10

Within Reach 10, the average Riparian Quantity score was 6.0 (fair) indicating the riparian plant community extends at least ½ of the bankfull width although the corridor extent is limited throughout much of the Reach as a result of incision and the steep banks found throughout. Vegetation gaps exist especially along Castlewood Golf Course and along portions of Foothill Road through 10a and 10b. Outside of the golf course areas, the riparian habitat structure was diverse and generally continuous.

The average Riparian Quality score was 5.9 (fair) suggesting the riparian vegetation community is natural and diverse with composition, density and age structure appropriate for the site. The native vegetation present is appropriate for the stream corridor based on natural plan community and historic species composition for the Reach. The presence of native vegetation throughout the Reach provides valuable riparian habitat, although the location of the vegetation is primarily on the upper terraces as a result of the incised and steep banks. The dominant native riparian plant species found throughout the survey locations include Fremont cottonwood (*Populus fremontii*), Western sycamore (*Platanus racemosa*), California buckeye (*Aesculus californica*), oak (*Quercus* sp.), willow (*Salix* sp.), and aquatic species such as cattails (*Typha latifolia*), rushes (*Juncus* sp.) and sedges (*Scirpus* sp.). Non-native species observed include English walnut (*Juglans regia*) and giant reed (*Arundo donax*) which were observed in both Sub-Reaches. A full listing of plant species observed during stream surveys are included in Exhibit B.

4.3.3 Amphibian and Western Pond Turtle Presence and Habitat, Reach 10

There were no native amphibian larvae that were observed throughout the survey locations (Table 13). Adult bullfrogs (2+) were observed calling although no bullfrog tadpoles were observed.

Table 13. Reach 10 Species Observations

Species	Native	Sub-Reach 10a	Sub-Reach 10b
Amphibians			
Foothill-yellow legged frog	Yes		
California red-legged frog	Yes		
Sierran tree frog	Yes		
American bullfrog	No		x
Aquatic Reptiles			
Western pond turtle	Yes		
Red-eared slider	No		
Fish			
Sculpin	Yes		
Bass Species ¹	No		
Carp	No	x	x
Unidentified fish species	unknown	x	x
Other			
Crayfish	No		
Snail species	unknown		

¹ Bass observed were not in hand to fully identify which species. However, [Zone 7's steelhead study indicates a prevalence of largemouth bass within the Project Area.](#)

California red-legged frog observations and habitat

No California red-legged frogs were observed within this Reach. There are no CNDDDB records within this Reach and the nearest CNDDDB sighting occurs downstream on Alameda Creek. Historical accounts of California red-legged frogs within this Reach are unknown, however, considering this stream drained the

former Pleasanton marsh, it's highly possible the Arroyo de la Laguna provided important habitat for the frog. RCD and NRCS staff have conducted four bioengineered stream restoration projects along the Arroyo de la Laguna since 2006. Biological surveys, along with partial channel dewatering were done in association with the restoration projects. California red-legged frogs have not been observed in the Arroyo de la Laguna during any of these activities. Habitat features do exist for the California red-legged frog in Sub-Reaches 10a and 10b, such as overhanging banks and riparian vegetation and some pools and slack-water within each Sub-Reach.

Foothill yellow-legged frog observations and habitat

No foothill yellow-legged frogs were observed within this Reach during surveys. There are no CNDDDB records within this Reach and it is unknown whether or not foothill yellow-legged frogs historically occurred in the Arroyo de la Laguna. Historically the species has been documented both upstream in the Arroyo del Valle and downstream in Alameda Creek.

American bullfrog observations and habitat

Adult bullfrogs were observed in Sub-Reach 10b during surveys. The presence of permanent water throughout this Reach contributes to the beneficial habitat conditions that continue to support a population of this non-native predator species including bullfrogs.

Western pond turtle observations and habitat

No Western pond turtles were observed within this Reach during surveys. The CNDDDB does not include any records of the turtle within Reach 10, however, Western pond turtles are known to be present in the Arroyo de la Laguna. Sightings by NRCS and RCD staff have occurred within Sub-Reaches 10a and 10b as recently as 2011 during past restoration and creek walk activities. All of the sightings have been of adults. Historical accounts within the Arroyo de la Laguna are unknown. Habitat needs for the turtle along the Arroyo de la Laguna including deep slack water pools and downed logs for basking are found throughout the Reach. Adequate upland breeding options are limited in areas along the creek where houses line the top of the creek banks (Sub-Reaches 10a). The downstream Sub-Reach 10b however has accessible breeding.

4.3.4 Avian Presence and Habitat, Reach 10

Twelve point count surveys were conducted in Reach 10. Within Reach 10 a total of 46 species were observed from 146 observations. Table 14 below includes the list of the most common observed bird species during the point count surveys within this Reach. A full listing of bird species observed during counts is included in Exhibit A.

Five riparian dependent or obligate bird species were observed during Reach 10 surveys: American goldfinch, belted kingfisher, Bewicks wren, song sparrow, and tree swallow. At least two riparian dependents or obligates were observed at 67% (n=8) of point counts in Reach 10. European starlings were present at 42% (n=5) of point count locations in Reach 10. The species are listed below in alphabetical order based on common name. Exhibit A provides the number of observations per species.

Table 14. Ten Most Commonly Observed Bird Species in Reach 10.

Common name	Scientific Name	Native
Bewicks wren*	<i>Thryomanes bewickii</i>	Yes
Black phoebe	<i>Sayornis nigricans</i>	Yes
Chestnut backed chickadee	<i>Poecile rufescens</i>	Yes
European starling	<i>Sturnus vulgaris</i>	No
House finch	<i>Carpodacus mexicanus</i>	Yes
Northern rough winged swallow	<i>Stelgidopteryx serripennis</i>	Yes
Oak titmouse	<i>Baeolophus inornatus</i>	Yes
Song sparrow*	<i>Melospiza melodia</i>	Yes
Turkey vulture	<i>Cathartes aura</i>	Yes
Western scrub jay	<i>Aphelocoma californica</i>	Yes

*Riparian dependent or obligate species

4.4 Ponds Evaluation for Reaches 4, 7, and 10

The ponds evaluation included an inventory of ponds within the 2-mile buffer (Figure 7). Detailed evaluations of each pond appear and their potential for habitat occurs within the Discussion section. The majority of ponds within each stream reach were on rangelands which present the highest potential habitat value, followed by golf courses which present some of the lowest potential habitat value for California red-legged frogs and California tiger salamanders.

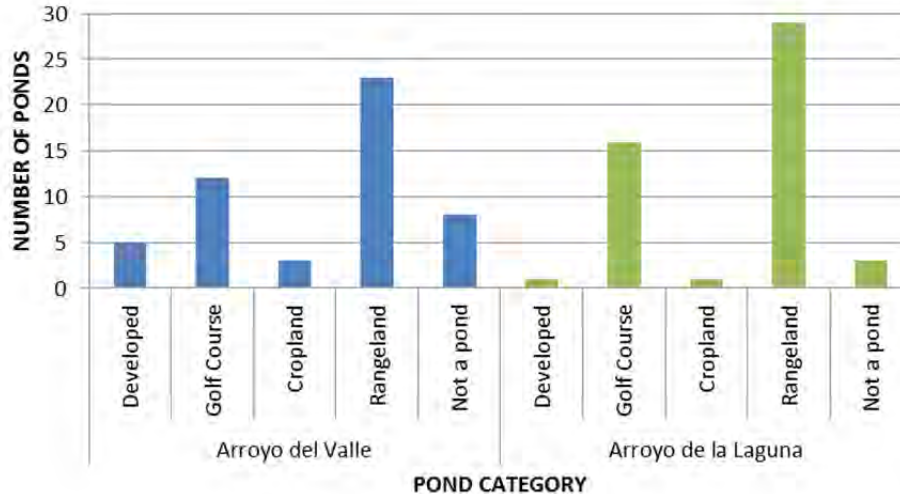


Figure 7. Ponds within Arroyo del Valle (Reaches 4, 7) and Arroyo de la Laguna (Reach 10)

Additional focused pond and field evaluations would have to be conducted to evaluate the overall availability and quality of pond habitat for native amphibians, aquatic reptiles and other species.

5 DISCUSSION

5.1 SVAP

The average score for the Arroyo del Valle Reaches 4 and 7 was 6.2 (fair) and 4.7 (poor) respectively for an overall average for Arroyo del Valle at 5.4 (fair) (Table 15). The score is a result of the alterations to the stream morphology and hydroperiod as a result of multiple human influenced changes including multiple water management activities and development (both historical and ongoing). Within Reach 4, riparian and instream habitats are present and have the potential to support relatively diverse communities of aquatic species with the hydrologic alterations of the watershed providing the largest deviation from historical and current reference sites. Reach 7 has riparian and instream habitat present although the habitat has had significant deviation from historical and reference sites and is no longer functioning as a natural stream ecosystem.

Table 15. Average SVAP Element Scores and Ratings by Reach

Element	Average Score			Average Rating		
	Reach 4	Reach 7	Reach 10	Reach 4	Reach 7	Reach 10
Channel Condition	6	4	2	Fair	Poor	SD
Hydrologic Alteration	3	2	1	Poor	SD	SD
Bank Condition ¹	7.4	5	4.8	Good	Fair	Poor
Riparian Area Quantity ¹	8.5	7	6	Good	Good	Fair
Riparian Area Quality ¹	7	3.5	5.9	Good	Poor	Fair
Canopy Cover	3.6	4.3	2	Poor	Poor	SD
Water Appearance	5.7	5.3	3.5	Fair	Fair	Poor
Nutrient Enrichment	5	4.3	6	Fair	Poor	Fair
Manure or Human Waste	8.8	8.7	8	Good	Good	Good
Pools	5	3.3	4	Fair	Poor	Poor
Aquatic Invertebrate Habitat	8.2	6.8	6.8	Good	Fair	Fair
Riffle Embeddedness	6.2	0.3	9	Fair	SD	EX
Total	74.2	55.4	57.7			
Number of Elements	12	12	12			
Average Score	6.2	4.7	4.9			
Rating	Fair	Poor	Poor			

¹ Bank condition, riparian area quantity and riparian area quality scores are developed as an average for right bank and left bank scores.

Key to Score Ranges:

1 to 2.9 = Severely Degraded (SD); 3 to 4.9 = Poor; 5 to 6.9 = Fair; 7 to 8.9 = Good; 9 to 10 = Excellent

The average score for the Arroyo de la Laguna through Reach 10 was Poor (4.9). Within Reach 10, the poor scores are mostly an indication of the upstream hydrologic alterations of the watershed including historical draining of Pleasanton marsh and the increased storm flow from developments in the Livermore-Amador and San Ramon Valleys. These alterations impact storm flows that have caused

significant bank erosion along the stream channel in this reach. Bank erosion was most strongly reflected in the channel condition, hydrologic alteration and canopy cover SVAP scores which all received grades of "severely degraded" .

5.2 Amphibian Habitat

Sierran treefrogs were the only native amphibian species documented in the Project Area during field surveys. Current records of California red-legged frogs exist within Reach 4 suggesting the presence of suitable habitat; and potential, although not ideal habitat is present through Reach 7 and 10. Foothill-yellow legged frogs have been documented historically but the only record pre-dates significant modifications to the stream within the Project Area. Valid foothill yellow-legged frog habitat is currently lacking throughout the Project Area. Non-native bullfrogs and non-native fish were documented within survey locations and are presumed to be widespread throughout the Project Area. Table 16 below provides a summary of the species observed during surveys.

Table 16. Project Area Species Observations by Reach

Native Species	Native	Reach 4	Reach 7	Reach 10
Amphibians				
Foothill-yellow legged frog	Yes			
California red-legged frog	Yes			
Sierran tree frog	Yes	x	x	
American bullfrog	No	x	x	x
Aquatic Reptiles				
Western pond turtle	Yes			
Red-eared slider	No		x	
Fish				
Sculpin	Yes	x	x	
Bass Species ¹	No	x	x	
Carp	No		x	x
Unidentified fish species	unknown	x	x	x
Other				
Crayfish	No	x	x	
Snail species	unknown		x	

¹ Bass observed were not in hand to fully identify which species. However, Zone 7's steelhead study indicates a prevalence of largemouth bass within the Project Area.

Many of the reaches surveyed within the Project Area had some habitat characteristics that have the potential to support native amphibian populations. In particular, the presence of suitable vegetation (both in composition and structure) and slack water pools are indicative of potential stream habitat for native species, especially the California red-legged frog. However, development and water management activities throughout the Project Area create an altered hydrologic regime that provides unnatural breeding conditions for native amphibians in the Arroyo del Valle and the Arroyo de la Laguna. Elevated flows from dam releases could disturb amphibian lifecycles by scouring embryos and generating

velocities lethal to tadpoles (Kupferberg et. al., 2012). Unseasonable flows, especially during the summer and fall, can result in the creation or prolonging of favorable conditions for non-native predators. The effects of this altered hydrologic regime and the additional presence of non-native predators including American bullfrogs and fish, appear to be limiting factors for native amphibians within the Project Area.

Foothill Yellow Legged Frog:

The altered hydrologic regime and the presence of predators present the largest potential impacts the foothill yellow-legged frog. This species relies on stream conditions that provide shallow pools with a dense gravel substrate and riffles to lay their eggs. The presence of the perennial water without the natural conditions of scour and low flows to allow riffles limit the ability of this species to occur within the Project Area. See Section 5.2.2 below for further discussion on the limitations for foothill yellow-legged frog habitat in the Project Area.

Other Native Amphibians:

Perennial water is not the only direct factor affecting habitat for California red-legged frogs, California tiger salamanders and other common amphibians including the Sierran treefrog. The presence of perennial water coupled with the presence of non-native predators makes the conditions less desirable for successfully completing their life history. These amphibians can adapt to perennial and unseasonable water sources and thrive if non-native predators are not present. Throughout the Project Area non-native predators including bullfrogs, crayfish and non-native fish have become established and coupled with the unseasonable water source, present the largest potential threat to these amphibians. See Section 5.2.1 below for further discussion on the limitations for California red-legged frog habitat in the Project Area.

Predator Threats:

American bullfrogs in particular are a highly aquatic species and perennial or permanent water is often required for them to complete their life history cycles (CDFG, 1990). Changes to the natural water regime throughout the Project Area have improved the ability of non-native predators to thrive within the Project Area. The bullfrog is found throughout the Project Area and is an aggressive predator of native amphibians. The bullfrog can prey on all stages of amphibian lifecycles from eggs to adults. Other non-native predators found in the Project Area, including crayfish, mosquito fish, and gamefish (including bass), can also have detrimental effects to the native amphibian populations through predation, and also require perennial water sources for survival.

In the U.S. Fish and Wildlife Service Recovery Plan for the California red-legged frog, non-native predators are listed as a significant threat (2002). Specifically, bullfrogs, crayfish, and non-native fish including bass, all documented within the Project Area, are listed as causes of population declines and extirpation of the native species (USFWS 2002, Hayes and Jennings, 1986). In the notes of the 1995 CNDDDB sighting within the Arroyo del Valle, predation by bullfrogs is listed as a threat to the species at the location it was observed (CNDDDB, 2011). Also included in the Recovery Plan (USFWS, 2002) as threats to the species are large reservoirs, water management, channelization and flood control, all of which can be found within the Project Area. The Recovery Plan includes studies of these threats that document the extirpation of the frog from downstream portions of a drainage one to five years after filling of a reservoir, depending on the size of the drainage (USFWS, 2002). Changes to channel morphology and poorly timed flow releases are all listed as potential influencing factors. Arroyo del

Valle is subject to several water management requirements that may result in unseasonal flow releases, as described in Section 2.2.

In addition to aquatic predators, raccoons can have a negative impact on California red-legged frog and other native amphibian populations through predation (Rathbun, personal communication). Raccoons are a concern in Sub-Reach 4c because of the increased proximity to the suburban setting. The opportunistic nature of raccoons can make them pests in urban and suburban settings with the species feeding on pet food, garbage, bird seed, etc. When creeks are in suburban settings raccoons can easily travel from neighborhoods to the creek, increasing the potential threat. Also within urban settings you have increased potential for domestic cats which are known to predate on frogs as well as other native species (Loss et al., 2013).

5.2.1 California red-legged frog habitat

Throughout Reach 4 and 10, California red-legged frog habitat is present but in variable conditions. Reach 4 is most likely to provide valuable habitat for California red-legged frogs out of all of the reaches surveyed. The Sub-Reaches within Reach 4 have many of the habitat features that the frog requires including suitable pools for breeding, summer habitat, adequate and available upland habitat, and riparian vegetation that provides important foraging habitat. Despite the fact that many habitat conditions are favorable for the species; the presence of bullfrogs limits the value of the habitat within this Reach.

Reach 7 does not provide the necessary habitat features needed to support the California red-legged frog. The reservoir-like conditions through the ponds at Shadow Cliffs provide optimal habitat for non-native predator species including bullfrogs and bass. The majority of the stream through this Reach is channelized and within close proximity to housing developments. This factor may have an effect on general aquatic wildlife health in the creek. Urbanization is listed as one of the main threats to California red-legged frogs in the recovery plan for the species (USFWS, 2002). Within urbanization, water quality degradation and channelization are highlighted along with the potential negative effects on native amphibians and other aquatic invertebrates by the U.S. Fish and Wildlife Service.

Within Reach 10, the altered channel condition and lack of a connection to the floodplain prevents consistent persistence of isolated, deep pools throughout the creek corridor which provide important habitat for breeding and refugia. Lack of consistent pools, however, is not the only limiting factor effecting habitat in this Reach. As with the upstream reaches on the Arroyo del Valle, the multiple water management activities impact the value of California red-legged frog habitat within the Arroyo de la Laguna. Non-native predators including crayfish, bullfrogs, and game fish were observed within the survey locations, all of which propose threats to the species and reduce the value of the habitat within Reach 10. Since the Arroyo de la Laguna is a larger watershed than the Arroyo del Valle and the stream is highly incised, flows are higher and faster, making conditions less suitable for the red-legged frogs.

5.2.2 Foothill yellow-legged frog habitat

Suitable foothill yellow-legged frog habitat is lacking throughout the Project Area. The dam at Del Valle reservoir and the changes to stream flow within the Arroyo del Valle seem to have a considerable impact on habitat for the species in the watershed based upon the habitat conditions observed during this assessment and the habitat requirements of the species. Foothill yellow-legged frogs require

shallow, flowing water in small to moderate-sized streams with at least some cobble-sized substrate (Hayes and Jennings 1986, Jennings 1988). In addition to the nearly perennial low flow releases when permit conditions necessitate it, Arroyo del Valle has, at times, irregular, increased, ceased, and/or otherwise unseasonable water releases to which the species is not adapted. Foothill yellow-legged frogs are not adapted to habitats with unseasonable flows (Kupferberg et. al., 2012). In rivers with seasonally predictable flooding, reproduction within many aquatic species, including the foothill yellow-legged frog, is timed to avoid flow fluctuations, whereas in rivers with unpredictable flooding, species often exhibit morphological and behavioral adaptations to withstand flooding (Kupferberg et. al., 2012). Foothill yellow-legged frog tadpoles lack the morphological features for burrowing or adhering to rocky substrates, traits seen among frogs which occur in streams where floods can happen any time of year (Kupferberg et. al., 2012).

Habitat needs including shallow pools and slow-moving water with riffles and gravel substrate were not observed during this assessment. The presence of deep slack water pools that are found throughout the Reaches do not support the breeding needs of the species. Riffles, a key habitat component for the frog, are mostly absent and silts covering the substrate are present in many of the survey locations.

In addition to the lack of valuable habitat conditions, the presence of non-native predators especially bullfrogs greatly limits the habitat values throughout the Project Area.

5.3 Western Pond Turtle Habitat

The entire Project Area provides appropriate habitat for the Western pond turtle although they were not observed during surveys. They are known to occur within the Project Area based on previous assessments and local biologist knowledge.

Western pond turtles evolved to persist within the Mediterranean climate and are typically associated with slow-moving streams and is adapted to retreat to the uplands during seasonal flows in late fall and winter. However, Western pond turtles can easily adapt to perennial water sources although the potential ecological tradeoffs for that are not well understood (Bondi and Marks, 2013, Reese and Welsh, 1998). While the traditional habitat values that pond turtles have evolved to are not present, the current habitat conditions within the Project Area are favorable for supporting a population.

Habitat features that support the species are present throughout the Reaches, including deep slack water pools, downed logs for basking, and adequate upland habitat for nesting. These habitat types provide the key resources needed for the species to successfully forage and breed. Reach 4 and Sub Reach 10b presents the best access to suitable upland habitat making oviposition (nesting) sites possible. Portions of Reach 7 and Sub-Reach 10a have limited access to upland habitat due to urbanization and steep banks.

Potential impacts for Western pond turtle populations within the Project Area are unseasonable releases from the reservoir, the presence of predators, and thick non-native vegetation that can limit movement. Unseasonable flows could impact both hatchlings and adults who rely on aquatic insect larvae and other aquatic food resources that could be flushed out during unseasonable flows.

Hatchlings and juveniles are preyed upon by a variety of vertebrate predators including certain fishes, bullfrogs, garter snakes, and wading birds (CDFG, 2000a). Species experts estimate that bullfrogs and fish are not anticipated to have a major impact on the species, but raccoons are known to have an impact on populations (Rathbun, personal communication). While bullfrogs are not anticipated to provide significant predation pressure on adult and juvenile turtles, they do compete for invertebrate food resources (Adamus, 2003).

Non-native red-eared sliders were observed within the Project Area. Red-eared sliders and Western pond turtles are known to co-exist together, but not a lot is known about the interactions between the two species. It is thought that the red-eared slider could be detrimental to native turtles because they may compete for food and basking sites. The risk of introduction of disease to the wild from red-eared sliders may also be a concern for Western pond turtles within the Project Area.

Thick stands of non-native vegetation including Himalayan blackberry, arundo and other invasive, densely-spaced plants may limit the ability of turtles to move between habitats, and to excavate and emerge successfully from nest sites (Adamus, 2003).

5.4 Riparian Habitat

Throughout the Project Area, the quality and quantity of the riparian habitat varies between reaches, depending upon the extent of non-native plant species present as well as the extent of deviation of the natural plant community and stream corridor connectivity from both reference and historical conditions. In Reaches 4 and 10, the stream retained high quality habitats within the riparian zone and has maintained similar riparian habitat diversity that supports ecological and physical functions when compared to reference sites. However, within these Reaches there are considerable changes from historical riparian conditions. Despite the changes that have occurred as a result of the multiple water management activities and development within the Project Area, the habitat values provided by these two Reaches support diverse and consistent plant communities.

Within most of Reach 4, the riparian habitat is comparable to historical conditions. Stanford et al. (2013) mapped the historical land cover in the 1800's as Sycamore Alluvial Woodland which is still present throughout much of the Reach. The current species composition is comparable to the historical conditions along Arroyo del Valle (see Section 2.4) with the exception of the non-natives species present.

In Reach 7, the strong presence of non-native plant species along the stream corridors and significant deviation from historical conditions limits the value of riparian habitat. Within most of Reach 7 the riparian habitat is very different from historical conditions. Stanford et al. (2013) mapped the historical land cover in the 1800's within Sub-Reaches 7c and 7d as "sparsely vegetated braided channel" dominated by mulefat thickets, sycamore woodlands and sandbar willow thickets. Mulefat, sycamores and willow species were observed throughout the Sub-Reaches but were not the dominant species. The changes due to the multiple water management activities and development encroachment has created a shift in the riparian habitat which is dominated by non-native species including Eucalyptus with sparse native cottonwoods and willows present.

Sub-Reaches 7e and 7f are currently located where Arroyo del Valle was draining to the historical Pleasanton marsh complex and was surrounded primarily by grassland (Stanford et al., 2013). The channelization and multiple water management activities has created an unnatural riparian habitat (i.e., impacted by channelization, urbanization, non-natives, etc.) that did not exist historically, and is dominated by non-native species including Eucalyptus, Himalayan blackberry and English ivy with sparse native cottonwoods and willows present.

While the current riparian habitat is unnatural within the Reach, it still provides important refugia and foraging value to native species, especially migratory and resident bird species.

Within most of Reach 10 the riparian habitat structure is diverse and generally continuous, and the species composition present is appropriate for the site when compared to reference streams and historical conditions. Stanford et al. (2013) mapped the historical land cover in the 1800's within Sub-Reaches 10a as "willow thickets" consisting of arroyo and red willow trees. This portion of the stream that currently flows through most of what is present-day Castlewood Country Club historically drained the upstream Pleasanton marsh. Historical accounts indicate that this willow thicket was likely composed of a mix of valley oak, sycamore and willow and the remaining portions of the Arroyo de la Laguna was heavily vegetated with plentiful vegetation along its banks. The current incised and constricted stream corridor has arroyo willow present throughout portions of the survey locations and valley oaks, sycamores and cottonwoods are present, although the location of the vegetation is different. Due to the ongoing incision and presence of steep banks, very little vegetation is able to establish along the edges or banks of the stream and most vegetation is limited to the upper slopes of the steep banks, limiting the presence of historic willow thickets throughout the Reach.

Throughout the survey locations there were small patches of arundo, eucalyptus and other non-native vegetation, such as *Vinca*, present. The constricted stream and steep banks limits the value of the riparian habitat within a natural floodplain due to a lack of important refugia habitat adjacent to the stream corridor.

5.5 Avian Habitat

Throughout the Project Area, valuable riparian bird habitat is present, as indicated by the presence of riparian obligate and riparian dependent species during the surveys. The riparian trees and shrub habitat provide the necessary foraging, nesting and refugia habitat for migratory and resident bird species. Reach 4 and 10 had a higher diversity of native riparian tree and shrub species which can support a larger diversity of bird species although through Reach 7, even despite the non-native plant species, the riparian areas provide a valuable oasis for migratory and resident bird species.

Riparian obligate and riparian dependent species were evaluated within the survey areas. These two categories are defined as follows: (based on Rich 2002, and BLM (no date):

- **Riparian Obligate Species:** These are species that place >90% of their nests in riparian vegetation or for which >90% of their abundance occurs in riparian vegetation during the breeding season. They may forage outside riparian vegetation. Without riparian vegetation in good ecological condition, these species will not occur in a given area. Some species may be classified as obligates in one geographic area but not another.

- Riparian Dependent Species:** These are species that place 60%-90% of their nests in riparian vegetation or for which 60%-90% of their abundance occurs in riparian vegetation during the breeding season. Riparian dependents might still occur in an area if riparian vegetation were seriously degraded but their populations would be greatly reduced and they might not persist in the long-term. Some species may be classified as dependents in one geographic area but not another. (<http://www.npwrc.usgs.gov/resource/birds/ripveg/dependnt.htm#tab2>)

The presence of riparian obligate and riparian dependent species within the survey locations provides a basic indication of the value of the riparian habitat for birds because of their dependency upon the riparian habitat for nesting and foraging. The more riparian obligate and/or dependent species present, the higher the potential value of habitat.

Within the Project Area seven species detected during surveys were identified as being either riparian dependent or riparian obligate species. At least two riparian obligate or dependent bird species were detected within each Sub-Reach (Table 17). Bewick’s wrens and song sparrows were detected within all Sub-Reaches. Three species were detected at only one Sub-reach (belted kingfisher, Bullock’s oriole, and Cooper’s hawk). Sub-Reaches 10a and 10b had the highest number of riparian obligate or dependent bird species detections across all Sub-Reaches. Belted kingfishers were sighted along the creek corridor within Reach 10. This species’ breeding success relies upon vertical banks near watercourses where it excavates a cavity. The steep banks along the Arroyo de la Laguna provide potential breeding habitat for this species.

Table 17. Distribution of riparian obligate or dependent bird species detected during field surveys by Sub-Reach.

Species	Obligate or Dependent	REACH 4			REACH 7			REACH 10		
		4a	4b	4c	7c	7d	7e	7f	10a	10b
American goldfinch	DEP	X	X						X	X
Belted kingfisher	OBL									X
Bewick’s wren	DEP	X	X	X	X	X	X	X	X	X
Bullock’s Oriole	DEP						X			
Coopers hawk	DEP								X	
Song sparrow	OBL	X	X	X	X	X	X	X	X	X
Tree swallow	DEP				X	X			X	X

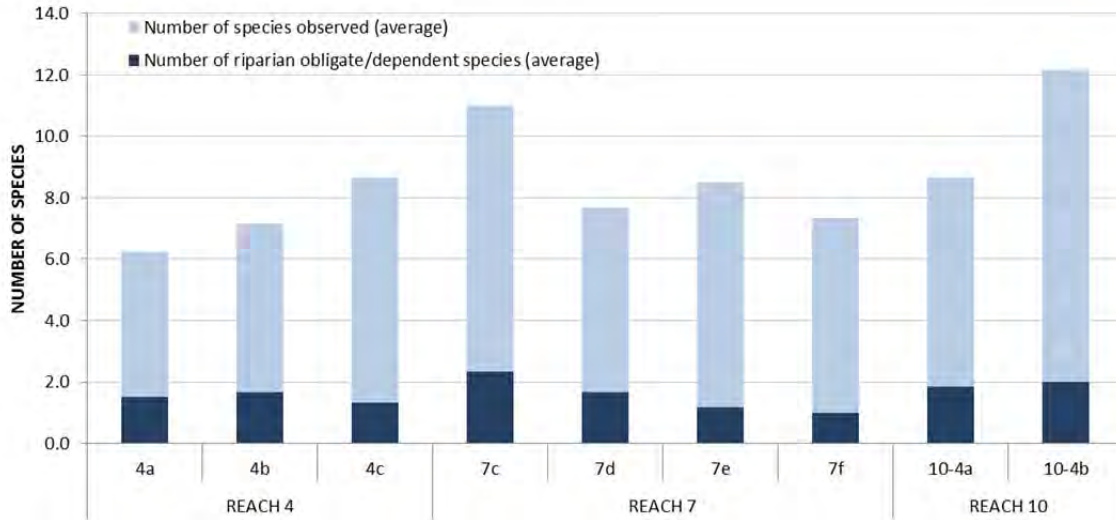


Figure 8. Average number of species (riparian obligate/dependent and total number of species) detected during field surveys, presented by Reach.

The average of species detected at the three point count locations (start, middle and end) for each survey location was used to summarize data by Sub-Reach.

Table 18. Most Commonly Observed Bird Species Summarized by Reach

Common Name	Species Name	Native	Reach 4	Reach 7	Reach 10
American crow	<i>Corvus brachyrhynchos</i>	Yes	x	x	
Bewick's wren	<i>Thryomanes bewickii</i>	Yes	x	x	x
Black phoebe	<i>Sayornis nigricans</i>	Yes		x	x
Bushtit	<i>Psaltriparus minimus</i>	Yes	x	x	
California towhee	<i>Melospiza crissalis</i>	Yes		x	
Chestnut backed chickadee	<i>Poecile rufescens</i>	Yes			x
European starling	<i>Sturnus vulgaris</i>	No	x		x
House finch	<i>Carpodacus mexicanus</i>	Yes		x	x
Hummingbird species	--	Yes		x	
Mourning dove	<i>Zenaida macroura</i>	Yes		x	
Northern rough winged swallow	<i>Stelgidopteryx serripennis</i>	Yes			x
Oak titmouse	<i>Baeolophus inornatus</i>	Yes	x		x
Song sparrow	<i>Melospiza melodia</i>	Yes	x		x
Spotted towhee	<i>Pipilo maculatus</i>	Yes	x		
Swallow species	--	Yes	x		
Turkey vulture	<i>Cathartes aura</i>	Yes	x		x
Western scrub jay	<i>Aphelocoma californica</i>	Yes	x	x	x
Woodpecker species	--	Yes		x	

The presence of riparian obligate and dependent bird species within the Project Area suggests that patches of high quality riparian habitat are present. The point count surveys however provide a very short snapshot of time and cannot provide an indication of the long-term habitat value or species abundance for riparian dependent or obligate species.

Threats to riparian bird species throughout the Project Area include non-native bird species that outcompete for nesting and foraging resources and urban influences, predation from cats, and increased concentrations of native predators. European starlings which were found throughout the entire Project Area are non-native, aggressive competitors and commonly usurp cavities of other native hole-nesting species. They were most prevalent within Reach 4 at Sycamore Grove Park near the picnic tables (Sub-Reach 4c) where many sycamore trees provide an abundance of nest cavities that the starlings were actively using. Additionally cats provide a considerable threat to birds in urban areas. In the United States, domestic cats kill 1.4–3.7 billion birds (Loss et. al., 2013). Native predators including western scrub jays (*Aphelocoma californica*) and American crow (*Corvus brachyrhynchos*) often concentrate in riparian areas adjacent to urban development as they are highly adaptive to living in urban environments. These species are known to prey on eggs, nestlings and fledglings of other songbirds (Ehrlich et. al., 1998) and large concentrations of them could have an impact on songbird breeding success along riparian areas adjacent to urban development.

Reach 7 includes highly urbanized portions with considerable threats by domestic cats and native avian predators. Domestic cats were observed throughout Sub-Reaches 7d through 7f and in Sub-Reach 7d, three cat feeding stations were seen behind the Valley Humane Society, further contributing to the problem. Western scrub jays (*Aphelocoma californica*) and American crow (*Corvus brachyrhynchos*) were observed throughout the survey locations in Reach 7 and could have an impact on songbird breeding success along riparian areas adjacent to urban development.

5.6 Ponds Evaluation

The majority of the ponds evaluated in the Project Area that were within 1.0 miles of the Arroyo del Valle and Arroyo de la Laguna were located adjacent to or within golf courses, permanent cropland, and/or housing developments (Figure 5, Figure 6). The remaining ponds, mostly within 1.0 to 2.0 miles from the Arroyo del Valle and the Arroyo de la Laguna, were located in rangeland (grassland or oak woodland) habitat in the hills of Livermore, Pleasanton, and Sunol.

Generally, ponds that are located closer to the Arroyo del Valle and the Arroyo de la Laguna, in most cases have more limiting habitat factors than ponds that are further away from these stream reaches. Multiple influences contribute to this situation, including proximity to developments such as golf courses and housing. Ponds on rangelands provide the best potential habitat value because they often meet important habitat requirements—adequate upland habitat surrounding the ponds, availability of aquatic habitat for breeding, and reduced barriers to species movement including roads and development. However, California red-legged frogs and California tiger salamanders are known to occur in situations that do not meet their ideal habitat descriptions.

A desktop analysis can evaluate known threats and potential limitations, but on-the-ground reconnaissance is the best approach to determine whether or not a pond and the surrounding uplands

are potential habitat for a species. This analysis cannot rule out any ponds in the Project Area as potential habitat.

The ponds that are on rangelands are most likely located on privately owned properties, and on-the-ground reconnaissance would be required to determine actual habitat conditions. As this information is potentially sensitive, a thorough needs and feasibility assessment should be conducted before embarking on any further analysis or contacting landowners.

5.6.1 Developed Ponds

Multiple housing developments exist in close proximity to the Arroyo del Valle through Livermore and Pleasanton with potential ponds present (5 ponds within Arroyo del Valle buffer and 1 pond within Arroyo de la Laguna buffer). Housing developments and associated infrastructure such as roads and buildings can have a negative effect on amphibian species and present barriers to species movements. Non-native predator species such as domestic cats, and native predators such as raccoons, are associated with housing developments. These predators when concentrated, particularly raccoons, can heavily impact California red-legged frog and California tiger salamander populations. The lack of available and suitable upland habitat in and around housing developments is also a limiting factor for sustainable populations of the species in ponds that are located in and near urban and suburban developments.

5.6.2 Golf Course Ponds

Golf course ponds were the second most prevalent pond category within the Project Area (12 ponds within Arroyo del Valle buffer and 16 ponds within Arroyo de la Laguna buffer). These types of ponds may be able to support populations of California red-legged frogs and California tiger salamanders. However, there are many factors that reduce the potential of these ponds to provide quality habitat for sustainable populations of the species. Golf course ponds are usually perennial and commonly support populations of non-native species such as American bullfrogs (*Lithobates catesbeianus*) and western mosquitofish (*Gambusia affinis*). These species are known to predate on varying life stages of the California red-legged frog and California tiger salamander (USFWS, 2002). Mosquito fish predate mostly on eggs and bullfrogs are voracious predators eating all life stages of both amphibian species.

Golf courses often have high inputs of fertilizers, herbicides and pesticides. Amphibians can be sensitive to these chemicals, with effects to the California red-legged frog and California tiger salamander mostly unknown. Studies on other species of amphibians do show that effects of pesticides, herbicides and fertilizers can be detrimental and in some cases lethal (USFWS, 2002).

One of the most limiting habitat factors of golf course ponds for California red-legged frogs and California tiger salamanders is the surrounding land use. The landscaped nature of golf courses and the lack of rodent burrows that are necessary for California tiger salamander upland habitat greatly reduces the potential for sustainable populations of either species.

5.6.3 Cropland Ponds

Multiple vineyards, and to a lesser extent olive orchards, are present in South Livermore and in close proximity to the Arroyo del Valle (3 ponds within Arroyo del Valle buffer and 1 pond within Arroyo de la Laguna buffer). Much of this cropland replaced historical grassland, leaving remnant ponds that were

likely formerly associated with cattle grazing. These ponds are now either surrounded on one or more sides by vineyards or olive orchards, or are located directly adjacent to the crops. These ponds may provide the aquatic habitat for the California red-legged frog and/or the California tiger salamanders. However, much like golf courses, ponds located in or near cropland can have reduced habitat potential because of chemical use and lack of available and suitable upland habitat.

5.6.4 Rangeland Ponds

Most of the ponds within 2.0-miles from the Arroyo del Valle and the Arroyo de la Laguna are located on rangeland (23 ponds within Arroyo del Valle buffer and 29 ponds within Arroyo de la Laguna buffer). The plant communities in this part of the Project Area consists mostly of grassland and oak woodland. Upland habitat is generally available, although on-the-ground reconnaissance would be necessary to fully assess the suitability of the upland habitat. Ponds on rangelands are generally more likely to support sustainable populations of California red-legged frogs and California tiger salamanders than the areas closer to development. However, these ponds are still in dispersal distance from known bullfrog sources (golf courses, the Arroyo del Valle, and the Arroyo de la Laguna). Predators still may be an issue for these ponds, especially perennial ponds.

5.6.5 Not a Pond

Records within this category were eliminated upon further investigation. Most include things like water tanks or trees that were mistaken for ponds during GIS evaluations. This includes former quarry lakes that are often so large and so deep they do not present pond habitat values for the species.

6 CONCLUSIONS

6.1 Reach Summary

Reach 4 provides riparian and instream habitats that have the potential to support relatively diverse communities of aquatic species. Despite the modifications due to surrounding land uses as well as historic and current water management activities within the Reach, the stream maintains some natural features and holds capacity for natural ecological and physical functions. California red-legged frogs and Western pond turtles have recorded occurrences within this Reach and potential habitat is present. Reach 4 is most likely to provide valuable habitat conditions for California red-legged frogs out of all of the reaches surveyed.

Reach 7 is highly modified due to former quarry operations and urbanization. These modifications greatly reduce the value of riparian and instream habitat throughout the Reach. California red-legged frog habitat is not supported through this Reach although Western pond turtle habitat is present.

Reach 10 is characterized by the steep banks and bank erosion that is occurring throughout. The hydrologic alterations of the northern Alameda Creek watershed as a result both regional water management activities as well as large-scale urban development that has occurred over time, have increased storm flows that, in turn, have caused significant bank erosion along the stream channel. Riparian and instream habitats are present and have the potential to support relatively diverse communities of aquatic species. California red-legged frogs are not recorded within this Reach but potential habitat is present. Western pond turtles are known to occur.

6.2 Project Area Summary

Within the Project Area, a combination of human influenced threats impact the value of the amphibian, Western pond turtle, avian and riparian habitat. This includes the highly modified and managed system but also the presence of non-native predators introduced by humans. Potential amphibian habitat is most strongly impacted by the introduction of non-native species especially bullfrogs and bass that thrive in the perennial flow that is a result of historical mining, current water management activities on Arroyo del Valle, and increased urban runoff as a result of urban development throughout the watershed. Despite these modifications, California red-legged frogs are known to occur within the Project Area and potential habitat for them exists. Suitable foothill yellow-legged frog habitat is no longer present in the Project Area due to modifications within the watershed. Western pond turtles have the ability to survive within the current habitat conditions. Avian species including migratory and resident bird species rely upon the presence of riparian areas which continue to provide valuable nesting, foraging and refugia habitat.

The altered physical and hydrologic conditions within the Project Area as a result of the gravel mining, multiple water management activities and associated development, greatly limit the ability for the stream system to support a continuous, natural, functionally intact ecosystem. The magnitude, frequency, duration, and timing of flows have all been changed by human alteration.

The ponds analyzed as part of this assessment that are located closer to Arroyo del Valle and Arroyo de la Laguna, in most cases have more limiting habitat factors than ponds that are farther away from these stream reaches. Multiple influences contribute to this situation, including proximity to developments such as golf courses and housing and non-native predator sources. However, California red-legged frogs and California tiger salamanders are generally known to occur in situations that do not meet their ideal habitat descriptions. While the desktop analysis in this assessment evaluated known threats, on-the-ground reconnaissance is the best approach to determine whether or not a pond and the surrounding uplands are potential habitat for a species. Therefore, this analysis cannot rule out any ponds in the Project Area as potential habitat.

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