APPENDIX V

STREAMBED ASSESSMENT

STREAM ASSESSMENT

IONE BAND OF MIWOK INDIANS
CASINO PROJECT

NOVEMBER 2008

Prepared For:

Ione Band of Miwok Indians
14 West Main Street
Ione, CA 95640

Prepared By:

Analytical Environmental Services
1801 7th Street, Suite 100
Sacramento, Ca 95811

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TABLE OF CONTENTS

STREAM ASSESSMENT

TABLES

FIGURES

Appendices

STREAM ASSESSMENT

1.0 INTRODUCTION

1.1 BACKGROUND

The Ione Band of Miwok Indians has proposed the development of a casino on 228.04 acres of land that is proposed to be taken into trust by the BIA for the Tribe in Plymouth, CA. On site wastewater treatment and the discharge of the tertiary treated wastewater to an onsite drainage is the Tribe's preferred option. A state of the art wastewater treatment facility is proposed to maximize the use of reclaimed water on the property with the remainder of the tertiary treated wastewater discharged to an ephemeral drainage tributary to Dry Creek. There are four proposed alternatives, A-D, all of which all have differing wastewater treatment and effluent disposal volumes. The Tribe would need to obtain a National Pollutant Discharge Elimination System (NPDES) permit from the U.S. Environmental Protection Agency (USEPA) for discharge to surface waters on trust land.

1.2 PURPOSE OF STUDY

This Stream Assessment was prepared in response to comments on the Draft EIS and in support of the NPDES permit application to be submitted to the USEPA. The purpose of this study is to provide a description of biological resources and beneficial uses within the proposed receiving waters, as well as analyze the impacts of the proposed discharge. This assessment presents information on the existing hydrology, habitats, water quality and biota within and surrounding the Unnamed tributary to and of Dry Creek. Conclusions are drawn regarding the potential effects of the proposed wastewater effluent discharge on water resources, biological resources, and beneficial uses in and surrounding the receiving waters.

1.3 PREVIOUS STUDIES

Several studies have been performed within the vicinity of Unnamed tributary to Dry Creek and the area of proposed discharge, including:

- *DRAFT EIS, Ione Band of Miwok Indians Land Transfer and Casino Project (AES, 2007);*
- *Wastewater Feasibility Study for the Ione Casino and Hotel (HSE, 2005);*
- *Biological Resources Assessment (AES, 2005);and*
- *Drainage Study for Ione Band of Miwok Indians (Thorne and Associates, 2004)*

1.4 PROPOSED DISCHARGE

The estimated average daily flows from the Ione Casino Wastewater Treatment Plant (WWTP) vary depending on the alternative site plan. The greatest peak volume of wastewater that would be generated falls under the Alternative A weekend discharge scenario, at 192,500 gallons per day (gpd). The lowest peak volume of wastewater that would be generated falls under the Alternative D weekend scenario, at 38,500 gpd. All wastewater scenarios are detailed in **Table 1** below for Alternatives A-D.

Table 1
Estimated Wastewater Flows (gpd)

Site Alternative	A		B		C	D
	Phase I	Phase II	Phase I	Phase II		
Weekday Day	105,800	126,900	90,100	111,300	63,800	23,800
Weekend Day	192,500	233,700	153,800	195,100	104,500	38,500
Average Day	130,600	154,600	108,300	135,200	75,400	28,000

Source: HSE 2005

Wastewater would be treated in the WWTP to a level that meets California Title 22 disinfected tertiary recycled water quality standards. One hundred percent of wastewater flows would be treated to this level, making the water suitable for all recycled water uses and effluent disposal. Wastewater would be treated using a membrane bioreactor (MBR) system. The MBR system is a state-of-the-art, advanced wastewater treatment process that utilizes membrane technology, comparable to that used for production of potable water. It is the goal of the Tribe to minimize the volume of effluent that will be discharged to surface waters through the use of such water for landscaping and toilets at the casino and other similar recycled water uses. Similar wastewater treatment operations at casinos facilities in California, such as Cache Creek and Thunder Valley, have historically recycled approximately 40% of their treated wastewater for beneficial purposes (Hydro Science, 2005). Effluent produced by the WWTP would first be used for water reclamation such as landscape irrigation and toilet flushing. Once those demands are satisfied, effluent may be disposed of in leach fields and spray fields. Once both of those disposal methods have been utilized to the fullest extent possible, effluent would be disposed of by surface discharge into an Unnamed tributary to Dry Creek. Discharge into Unnamed tributary thence Dry Creek, a tributary of the Mokelumne River, is proposed to be done on a year round basis. **Table 2** shows the anticipated average daily wastewater disposal flows after recycled water is utilized. The balance indicated for each alternative and each phase is proposed to be split between spray field disposal, leach field disposal, and surface water discharge.

Table 2

Average Daily Wastewater Disposal Flows (gpd)

Site Alternative	A		B		C	D
	Phase I	Phase II	Phase I	Phase II		
Average Day[1]	80,000	90,000	70,000	80,000	40,000	30,000

Source: HSE 2005 ([1] Calculated after recycled water use)

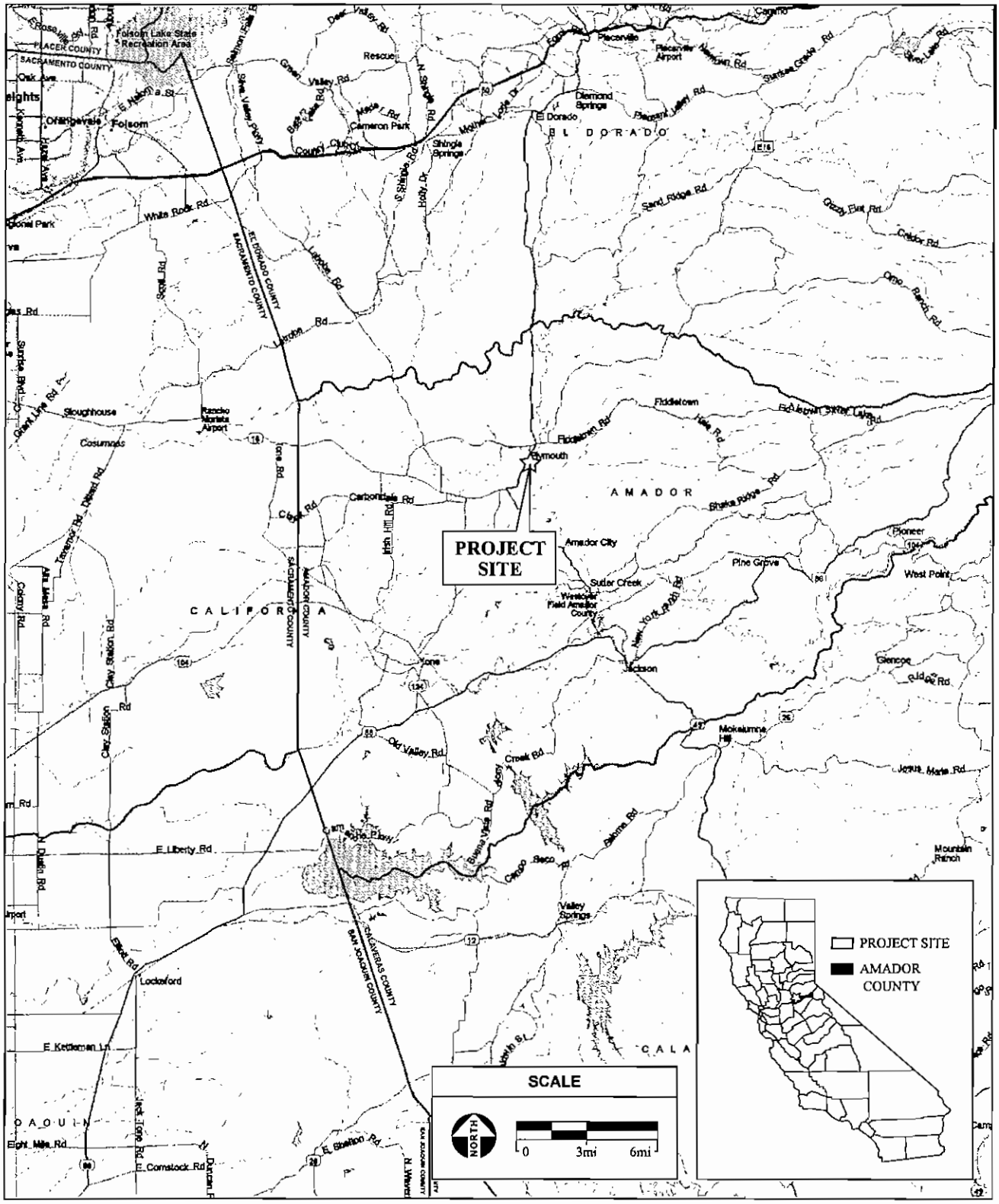
In order to discharge wastewater into the Unnamed tributary to Dry Creek, the tertiary treated effluent would be conveyed by means of a new pipeline extending east from the WWTP along the existing unmaintained roadway (**Figure 3**). Effluent would be discharged through an outfall structure into the creek on Tribal Trust lands, southeast of the WWTP. The outfall structure would be built to dissipate flows entering the creek to minimize the potential for streambank erosion. The proposed discharge outfall point is located at latitude 38° 27' 39.30" North and longitude 120° 50' 43.23" West. The Unnamed tributary to Dry Creek flows south from the onsite discharge location (**Figure 3**) off Tribal lands, approximately 250 feet from the discharge point. The confluence of the Unnamed tributary to Dry Creek is approximately 2,500 feet downstream from the proposed discharge location.

2.0 PROJECT SETTING

2.1 PROJECT LOCATION AND REGIONAL HYDROLOGIC SETTING

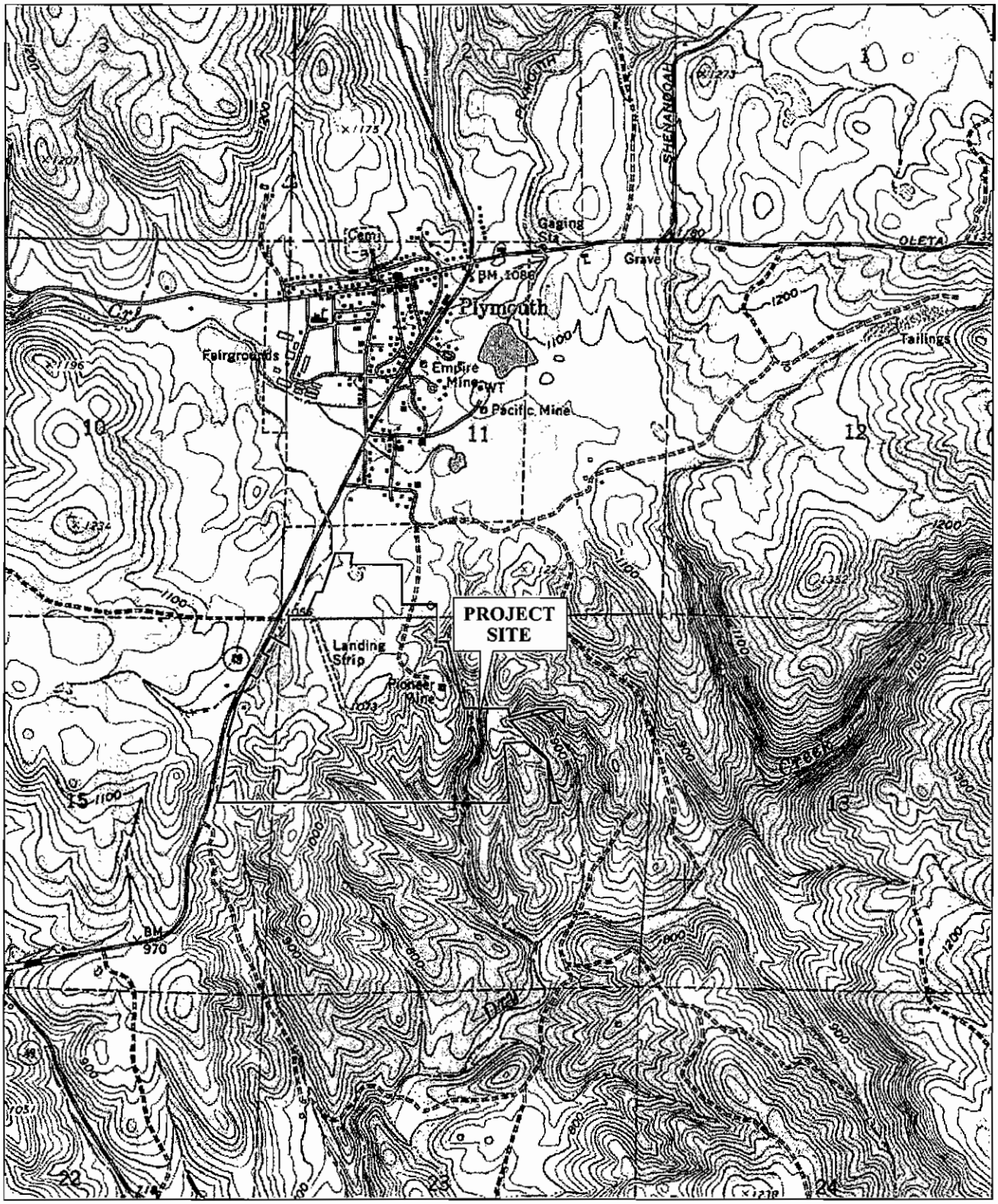
The project area consists of approximately 228 acres of land, 10±-acres of which are located within the City of Plymouth, while the remaining acres are located on unincorporated land within Amador County (**Figure 1**). This location is found within portions of Sections 11, 14 and 15 of Township 7 North, Range 10 East, Mount Diablo Baseline and Meridian, on the "Amador City, Calif." U.S. Geological Survey 7.5-minute quadrangle map (**Figure 2**). The proposed point of discharge would be located within Unnamed tributary to Dry Creek, approximately 0.5 mile upstream of the confluence of Unnamed tributary to Dry Creek. The Unnamed tributary to Dry Creek is located in California's San Joaquin Central Valley Region, Middle Sierra Hydrologic Unit, Sutter Creek Hydrologic Area (**Figure 4**). The Unnamed tributary to Dry Creek is part of the Mokelumne River watershed (watershed number 18040012, U.S. Geologic Survey, 1978) (**Figure 4**). The Dry Creek watershed collects waters from Sutter Creek and Jackson Creek then drains directly into the Mokelumne River and eventually into the Sacramento River, near Rio Vista, CA thence the Pacific Ocean.

Unnamed tributary to Dry Creek is a first order ephemeral drainage. It conveys water only during periods of heavy seasonal rainfall. The elevation of the tributary ranges from approximately 1,000 feet near the northeastern corner of the property to approximately 700 feet at the confluence to Dry Creek, with an approximate average stream gradient of seven percent. Rainfall within the Dry Creek Basin occurs primarily between December and April, with an average of 30 inches of rainfall occurring during this period (Applied Engineering, 2004). Both the Unnamed tributary and Dry Creek are influenced



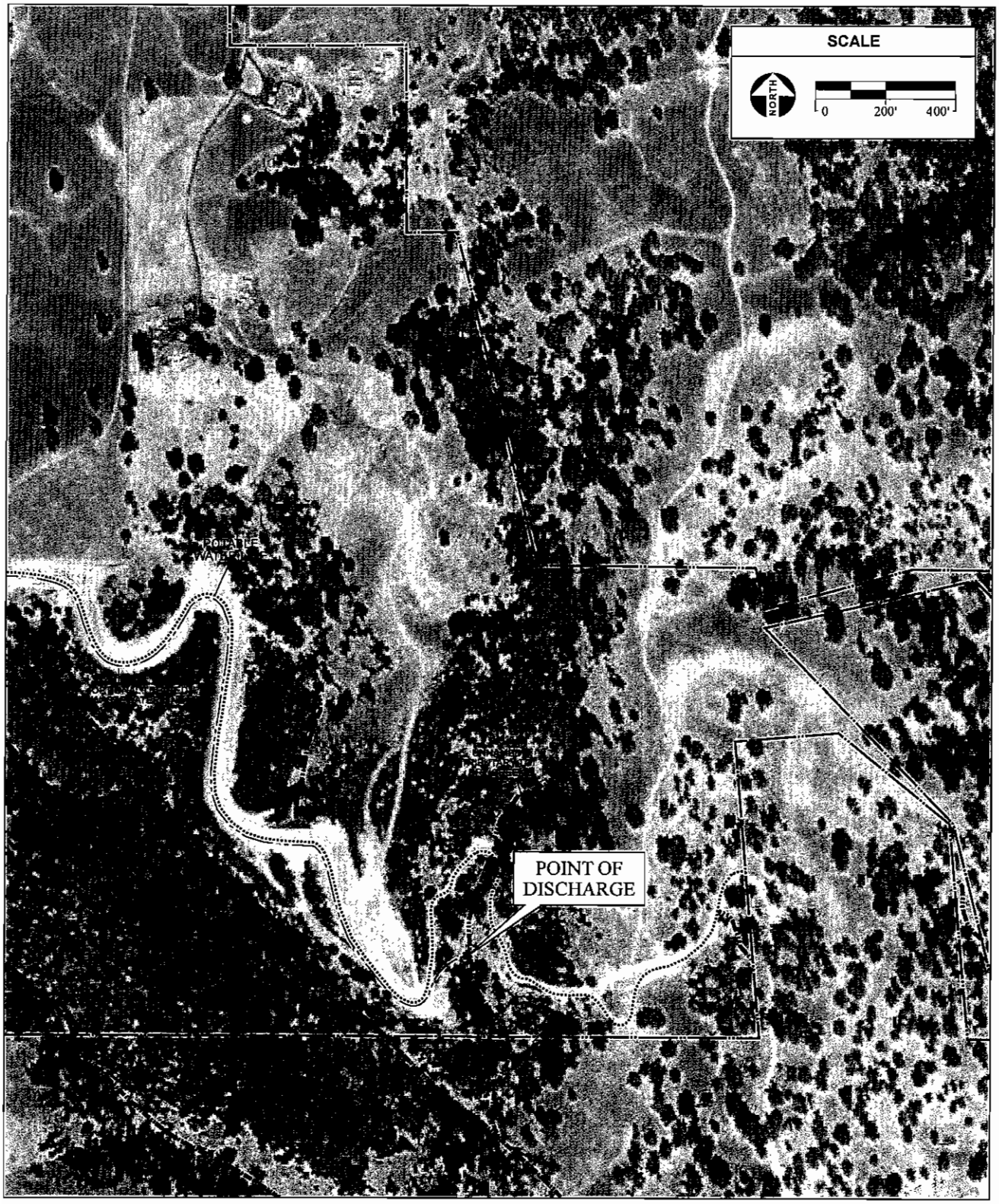
SOURCE: Microsoft Streets & Trips, 2003; AES, 2008

Figure 1
Regional Location Map



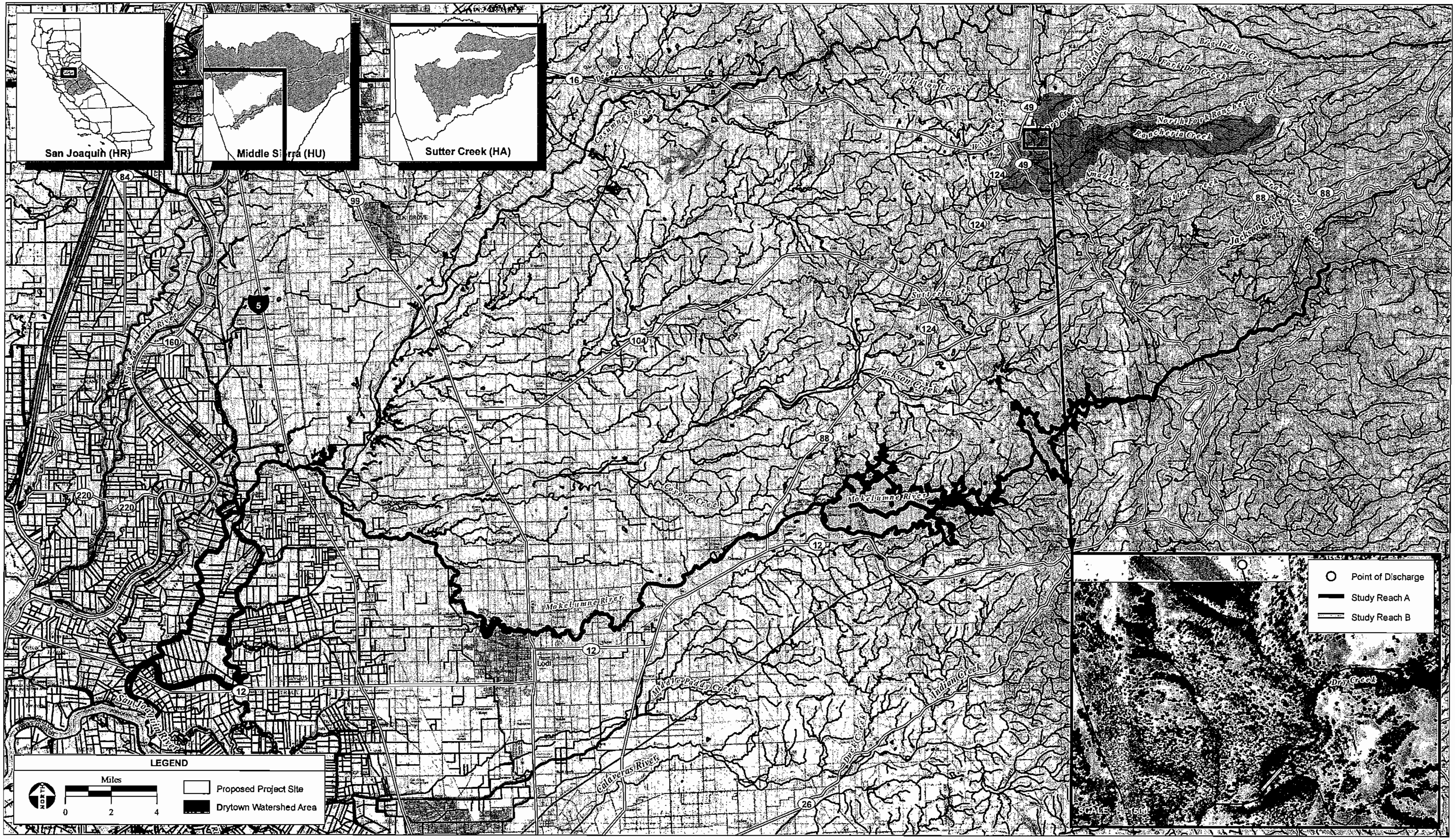
SOURCE: "Amador City, CA" USGS 7.5 Minute Topographic Quadrangle, Sections 11, 14, & 15, T7N, R10E, Mt. Diablo Baseline and Meridian; AES, 2008

Figure 2
Site and Vicinity



SOURCE: Airphoto USA Aerial Photograph, 11/1/2002; AES 2008

Figure 3
Proposed Point of Discharge



SOURCE: California Interagency Watershed Map of 1999; "San Andreas, CA"
USGS 100K Topographic Quadrangle, Mt. Diablo Baseline & Meridian; AES, 2008

Figure 4

Dry Creek – Watershed Map

solely by rainfall and direct runoff. This makes Dry Creek extremely flashy during and immediately following storm events, thus it is difficult to predict daily flows as there is no USGS flow gauge on this stream.

2.2 BENEFICIAL USES AND SURFACE WATER QUALITY

The Porter-Cologne Water Quality Control Act protects the water quality of the State California from degradation by assigning beneficial uses to major surface water bodies. Beneficial uses are protected by water quality objectives that define limits and levels for water quality constituents and characteristics for the reasonable protection of beneficial uses and prevention of nuisances. Water quality objectives are achieved through the adoption of waste discharge requirements and cleanup and abatement orders. The Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) was prepared by the Central Valley Regional Water Quality Control Board (CVRQWCB) and identifies the potential beneficial uses of surface waters (RWQCB, 2007). According to the Basin Plan, Chapter 2, page 2, "The beneficial uses of any specifically identified water body generally apply to its tributary streams." Therefore, the beneficial uses associated with the Mokelumne River generally apply to Dry Creek and the Unnamed tributary. The CVRWQCB has determined the "Beneficial Uses" for the receiving waters of Dry Creek tributary to Mokelumne River and Sacramento/San Joaquin River Delta, to be:

1. Municipal and Domestic Supply
2. Agricultural Irrigation and Stock Watering
3. Industrial Processes and Service Supply
4. Contact and Noncontact Recreational Uses
5. Warm and Cold Freshwater Habitat
6. Warm and Cold Water Migration
7. Warm and Cold Water Spawning
8. Wildlife Habitat
9. Navigation

While the USEPA is not required to follow the State Basin Plan, the plan nevertheless provides useful guidance. Therefore, the basin plan is used as the standard for assessing impacts of the discharge.

2.3 HABITATS AND BIOLOGICAL COMMUNITIES

The study area (**Figure 4**) is located within the northern Sierra Nevada floristic district, which is contained within the Sierra Nevada biogeographic region of the larger California floristic province (Hickman 1993). Five dominant vegetative community types are noted to occur in the study area; annual grassland; chaparral, oak savanna; oak woodland; and riparian woodland.

The northeastern portion of the study area is an 81.78-acre annual grassland. This community corresponds to the "non-native grassland – 42200 / valley and foothill grasslands - 42000" in the Holland (1986) system, and "California annual grassland" in the CNPS (2001) Vegetation Classification system. Within the southern half of the project area 37.46 acres of chaparral occur. Chaparral communities are dominated by dense, often nearly impenetrable vegetation found on dry, rocky, steep slopes with very little soil. The chaparral within the project area is a chamise chaparral. According to Holland, "Chamise Chaparral" (37200) is defined as a 1-3m-tall brush community overwhelmingly dominated by chamise (*Adenostoma fasciculatum*), where associated species contribute little to cover. Oak savanna is typically defined by having oak trees comprising 2-10% of the canopy cover. Oak savanna comprises 37.86 acres of the project area. The oak savanna of the site is dominated by blue oak (*Quercus douglasii*). This plant community is equivalent to the Holland type "Blue Oak Woodland" (71140), which includes stands varying from open savannas with grassy under stories to fairly dense woodlands with shrubby under stories (Holland 1986). Oak woodland comprises 33.00 acres of the project area and is dominated by blue oaks and interior live oaks. This habitat corresponds to the Holland type "Blue Oak Woodland" (71140) (Holland 1986). Riparian woodlands comprise 21.50 acres of the study area and occur in association with the ephemeral drainages onsite. These ephemeral drainages make up 0.79 acres of the site, in addition to the 21.50 acres of riparian woodland already discussed. This riparian woodland is an intermediate of the Holland types "Interior Live Oak Woodland (71150)" and "Interior Live Oak Chaparral (37A00)". Riparian or moisture-loving habitat often occurs in canyons and arroyos along rivers and streams and often forms scrub or woodland as observed onsite.

3.0 SAMPLING METHODOLOGIES AND RESULTS

To fully assess the potential for impacts to aquatic resources from the proposed discharge of effluent to Unnamed tributary, the following methodologies were used.

1) Physical habitat assessment of the Unnamed tributary and Dry Creek,
2) Surface water quality sampling of the Unnamed tributary,
3) Ground water quality sampling for the wells to be utilized by the proposed project, and
4) A special status species analysis for fully aquatic species (fishes), semi aquatic species (amphibians and reptiles) and associated riparian species (plants, mammals, and birds) that could potentially use Dry Creek and its associated riparian corridor.

The following section details the methods used and the results generated from direct field observations and current literature review.

3.1 PHYSICAL HABITAT ASSESSMENT

As part of this study a full physical habitat assessment was conducted to assess the physical habitat characteristics of the Unnamed tributary and Dry Creek using the methods outlined in the CA Waterboards Surface Waters Ambient Monitoring Program (SWAMP) Bioassessment Procedures

(CASWRCB, 2007). This assessment was conducted to characterize the instream and riparian habitats for the Unnamed tributary and Dry Creek in the evaluation of aquatic and associated habitats that could potentially be influenced by the effluent discharge from the proposed wastewater treatment plant. It should be noted that this assessment was conducted during the dry season, therefore all physical habitat and biological data that could be collected under these ambient conditions was done within the limits of the SWAMP bioassessment framework.

3.1.1 METHODS

The SWAMP bioassessment protocol involves the characterization of ambient stream conditions for a randomly chosen section within the stream of study. The data collected with this methodology yields a generalized characterization of the entire stream. The length of stream segment to be evaluated is determined by the average width of the stream. If the average width of the stream is 10 meters or greater a 250 meter reach is used, if the average width is less than 10 meters then a standard 150 meter stream reach is used. Both streams studied used the standard 150 meter representative reaches. The reach locations were chosen randomly by dividing each stream into ten 150 meter segments on an aerial map, from which the random reach of study was then chosen. Unnamed tributary was divided into ten sections from the proposed wastewater discharge point downstream; Dry Creek was similarly divided into ten 150 meter segments downstream of the point of confluence of the two streams. The upper extent of the reach on Unnamed tributary was approximately 250 feet downstream from the proposed discharge point (**Figure 4, Study Reach A**) while the reach on Dry Creek was approximately 1500 feet downstream the confluence of the two streams (**Figure 4, Study Reach B**). Once the reaches were chosen, they were dissected into eleven transects (A-K) equally spaced fifteen meters apart. The upstream transect was labeled (A) whereas the downstream transect is labeled (K). The evaluation of multiple physical habitat factors was done at each transect. These physical habitat parameters included the measurement of bankfull width and depths across each transect, substrate composition at each depth measure (5 measures of equal distance from bank to bank), percent embeddedness of cobble substrate (if present), evaluation of riparian vegetation class and relative cover, bank stability, tree canopy density, evaluation of human influence, and instream habitat complexity. For each inter-transect location the bankfull width, depths and substrates were also documented. Additionally, the stream gradient for both reaches was determined with a handheld clinometer. Detailed notes were taken on the riparian flora for each stream reach.

3.1.2 RESULTS

These following results characterize the dominant physical habitat and geomorphic characters and the associated biotic habitats that are a result of stream processes in Unnamed tributary to and Dry Creek. All instream measures were taken with bankfull indicators as a result of ambient field conditions. Averages were calculated for all measurable attributes such as width, depth, substrate composition, cobble embeddedness, and canopy density below in **Table 3**. This data describes the baseline condition of the streams of interest. This allows for an evaluation of the potential for impacts to downstream

beneficial resources as a result of the effluent discharges into the Unnamed tributary to and within Dry Creek.

Table 3
Physical Habitat Results for Unnamed Tributary (UT) and Dry Creek (DC)

	Width (m)	Depth (cm)	Max Depth (cm)	Embeddedness	Canopy Density
Average Reach Value (UT)	1.4	19	27	37%	71%
Average Reach Value (DC)	7.2	21	37	17%	47%

The cumulative averages were calculated for stream width from 21 measurements taken throughout the reach at each transect and inter-transect location. Stream depths were averaged for each transect and inter-transect, the average of these measurements is seen as the average stream depth for the entire reach. The average maximum stream depth was calculated by averaging all maximum stream depths recorded for each transect and inter-transect location, totaling 21 measurements. The average cobble embeddedness was calculated as the average of all measures taken for cobble substrates at transects and inter-transects. Canopy density was calculated as the average of all measures taken for the entire reach; totaling 44 measures.

3.1.3 UNNAMED TRIBUTARY

The total percentage of each substrate class for the entire reach of Unnamed tributary was calculated by dividing the number of times that substrate was recorded by the total number of random observations; a total 105 random observations were made throughout Unnamed tributary in the stream assessment. Cobbles (64-250mm) were the most dominant substrate observed, composing 48% of the random observations; coarse gravels (16-64 mm) constituted 21% of the substrate observations; smooth bedrock (> 4m) comprised 14% of the observations; fines (<.06mm) comprised 9% of the observations; rough bedrock (> 4m) composed 5% of the observations; and fine gravels comprised 4% of the observations. The substrates within the channel are predominantly composed of fragmented shale. These substrates are moderately weathered and minimally transported due to the suppressed nature of stream processes in such a small ephemeral drainage.

Riparian cover classes were assessed for each habitat tier within a 10 square meter plot centered on each transect. Relative scores (1-5) were generated on both banks at each transect for ground cover (<0.5m), lower canopy (0.5-5.0m), and upper canopy density (>5.0m). The results of riparian cover class assessment showed that Unnamed tributary was dominated by herbs and grasses at the ground cover tier while minimal amounts of woody shrubs and saplings were present. Additionally, there was on average

of about ten percent barren soils on the banks and noticeable upslope bank sloughing in the large patches of herbs and grasses in Unnamed tributary. The upper canopy density was observed to be between 10-40 percent cover of the available area for the entire reach. The dominant tree species within this tier was the Interior Live Oak (*Quercus wislizeni*). These observations are typical for open riparian woodlands at this elevation as the limited seasonal influence of water within Unnamed tributary does not allow the establishment of thick riparian species such as blackberry (*Rubus sp.*) or willows (*Salix sp.*) to establish on the banks that are typical of riparian corridors associated with semi-permanent streams.

Instream habitat complexity was evaluated to establish niche availability within the stream channel. This helps determine the potential habitat suitability for aquatic species to utilize the stream on a seasonal or permanent basis and further determine the potential impacts to species with beneficial use designations. Attributes such as aquatic vegetation, emergent vegetation, woody debris, undercut banks, overhanging vegetation and live tree roots were assessed on a relative scale (0-4). The results for instream habitat complexity showed that a majority of habitat attributes were completely absent from Unnamed tributary such as boulders, large woody debris (>0.3m) and undercut banks, while overhanging vegetation, small woody debris (<0.3m), and live tree roots were sparsely (<10%) observed in the channel. The average measured stream gradient for this channel was seven percent. Since the Unnamed tributary is an ephemeral drainage with limited stream processes, it can be expected that these habitat attributes would score low. Hence, the assessment of instream (epifaunal) habitat complexity and suitability shows that a minimal amount of suitable habitat exists in Unnamed tributary for utilization by beneficial use or sensitive species. Site photos from this field visit are shown in **Figure 5a**.

3.1.4 DRY CREEK

The total percentage of each substrate class for the entire reach of Dry Creek was calculated by dividing the number of times that substrate was recorded by the total number of random observations; a total 105 random observations were made throughout Dry Creek in the stream assessment. Cobbles (64-250mm) were the most dominant substrate observed, composing 35% of the random observations; rough bedrock (> 4m) constituted 23% of the substrate observations; coarse gravels (16-64 mm) constituted 15% of the substrate observations; smooth bedrock (> 4m) comprised 14% of the observations; fine gravels (2-16mm) comprised 5% of the observations; fines (<.06mm) comprised 5% of the observations; sand (.06-2mm) comprised 2% of the observations; and a large boulder consisted 1% of the observations made within Dry Creek. The average gradient for the Dry Creek reach was two and a half percent. The substrates observed within the Dry Creek channel were dominated by large substrates as 73 percent of all observations were either bedrock or cobble. Alternatively, only 27 percent of the observed substrates were coarse gravels smaller than 64 mm. Minimal depositions of sand bars was observed throughout the entire creek, both in and out of the reach studied. These observations would be typical of large, flashy, moderately graded, bedrock dominated, intermittent streams like Dry Creek as heavy unregulated winter pulse flows would tend to blow out finer sediment loads in moderate to high runoff events. This stream

PHOTO 1: Unnamed tributary approximately 250 feet downstream from discharge point (looking downstream).

PHOTO 3: Unnamed tributary approximately 750 feet downstream from discharge point (looking downstream).

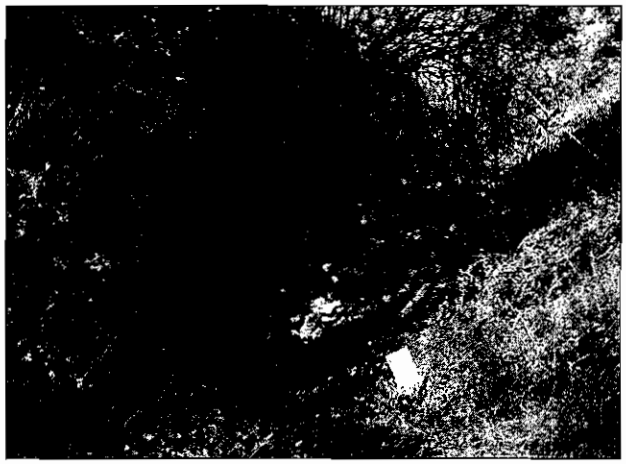


PHOTO 2: Unnamed tributary approximately 500 feet downstream from discharge point (looking downstream).

PHOTO 4: Unnamed tributary approximately 1000 feet downstream from discharge point (looking downstream).

SOURCE: AES, 2008

Figure 5a
Site Photographs of Unnamed Tributary

process ultimately develops a channel with more degradation than aggregation, thus leaving behind only larger, more armored substrates as observed in the survey.

As stated above for the Unnamed tributary, cover classes were assessed within Dry Creek for each habitat tier within a 10 square meter plot centered on each transect. Relative scores (1-5) were generated on both banks at each transect for ground cover (<0.5m), lower canopy (0.5-5.0m) and upper canopy (>5.0m) density. The results of riparian cover class assessment showed that Dry Creek was dominated by woody shrubs and saplings at the ground cover tier while minimal amounts of barren soils, grasses, and herbs were observed. An average of 40-75 percent cover was observed for the woody shrubs and saplings layer throughout the reach in Dry Creek. This observation is more consistent with riparian cover in a large intermittent channel such as Dry Creek. The riparian vegetation is well established and complex, creating a greater habitat value for associated aquatic species. The lower canopy was also well established in Dry Creek, ranging from 10-75 percent relative cover. The upper canopy density was observed to be between 10-75 percent cover of the available area for the entire reach. It should be noted that the right bank facing downstream was much more densely vegetated than the left bank as it was more confined. The left bank is more susceptible to floodplain flows, thus the establishment of the riparian flora is less apparent. The dominant tree species within this tier were; willow (*Salix exidua*), Cottonwood (Populus sp.) red alder (*Alnus oregana*), Oregon ash (*Fraxinus latifolia*), big leaf maple (*Acer macrophyllum*), and Black walnut (*Juglans californica*). These observations are typical for intermittent streams at this elevation as a dense, more established riparian flora is observed along the channel.

Instream habitat complexity was evaluated within Dry Creek to establish the habitat availability within the stream channel. Evaluation of instream habitat complexity helps determine the potential suitability for associated aquatic species to utilize the stream on a seasonal or permanent basis and further assess the potential for impacts to species with beneficial use designations. Attributes such as aquatic vegetation, emergent vegetation, woody debris, undercut banks, overhanging vegetation and live tree roots were assessed on a relative scale (0-4). The results for instream habitat complexity showed that some habitat attributes were completely absent from Dry Creek such as large woody debris (>0.3m) and undercut banks; while overhanging vegetation, and live tree roots were sparsely (<10%) observed in the channel; small woody debris (<0.3m) were moderately observed in the channel; and boulders (25cm-4m) were moderately observed within the reach. Overall there is a good variety of habitats within the stream channel of Dry Creek to support a suite of aquatic associated species. Site photos from this field visit are shown in **Figure 5b**.

3.2 AMBIENT SURFACE WATER QUALITY

3.2.1 METHODS

In addition to the stream habitat assessment, water quality samples were taken at one point along the Unnamed tributary to Dry Creek as well as in the other two ephemeral drainages to the west as shown in

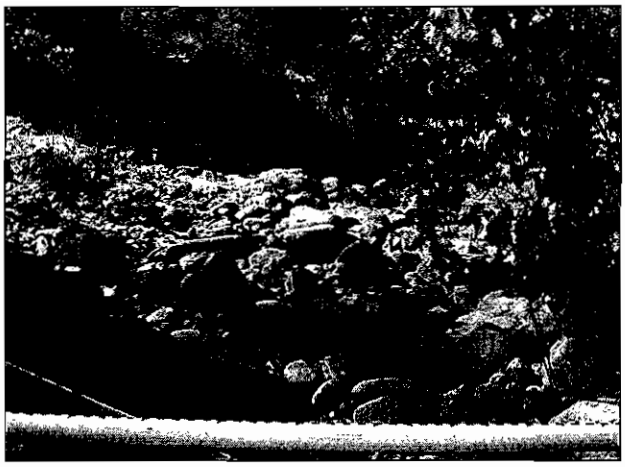


PHOTO 5: Dry Creek approximately 1000 feet from confluence with Unnamed stream (looking downstream).

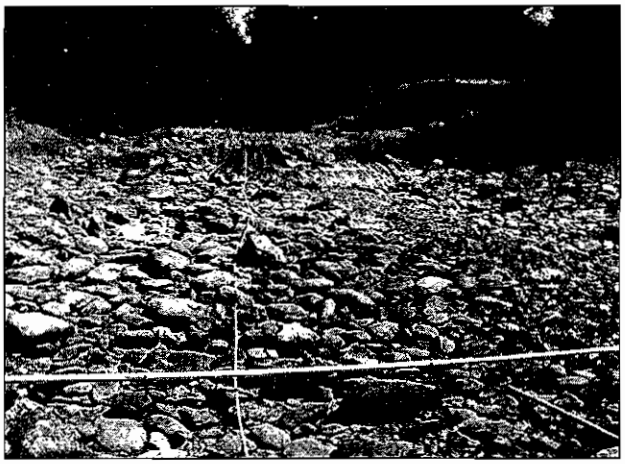


PHOTO 7: Dry Creek approximately 1250 feet from confluence with Unnamed stream (looking upstream).

PHOTO 6: Dry Creek approximately 1100 feet from confluence with Unnamed stream (looking upstream).

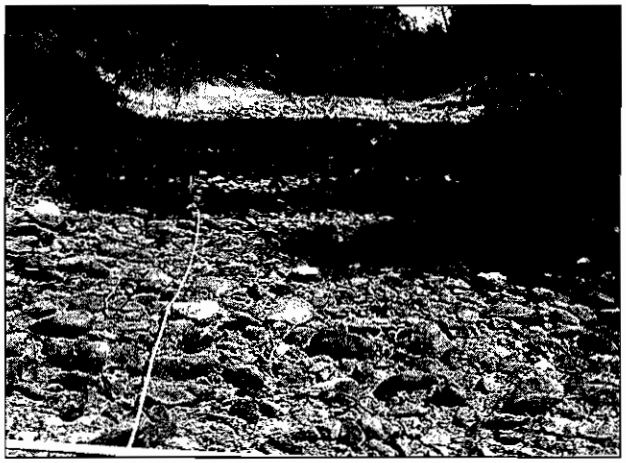


PHOTO 8: Dry Creek approximately 1500 feet from confluence with Unnamed stream (looking upstream).

SOURCE: AES, 2008

Figure 5b
Site Photographs for Dry Creek

Figure 6. These samples were taken at the point where these drainages cross the southern property boundary. Samples were taken at these locations during the winter of 2007 in order to capture normal flows within the tributaries and establish ambient water quality conditions as water leaves the site. These results helps establish the baseline quality of surface waters discharging naturally from the project site. Additionally, this data evaluates the potential for these surface waters to pick up any constituents during normal runoff conditions. Alpha Analytical Laboratories, Inc. analyzed water samples according to EPA methods for coliform bacteria, fluoride, nitrate, total dissolved solids (TDS), nitrate/nitrite, turbidity, pH, color, zinc, and arsenic. Water quality is a primary factor in determining whether or not a beneficial use will be affected as the result of any new discharge to surface waters. The Basin Plan describes water quality objectives for inland surface waters of the upper Middle Sierra Hydrologic unit as listed in **Table 4** below. As stated previously, "The beneficial uses of any specifically identified water body generally apply to its tributary streams." Therefore, the beneficial uses associated with the Mokelumne River and Dry Creek generally apply also to the Unnamed tributary.

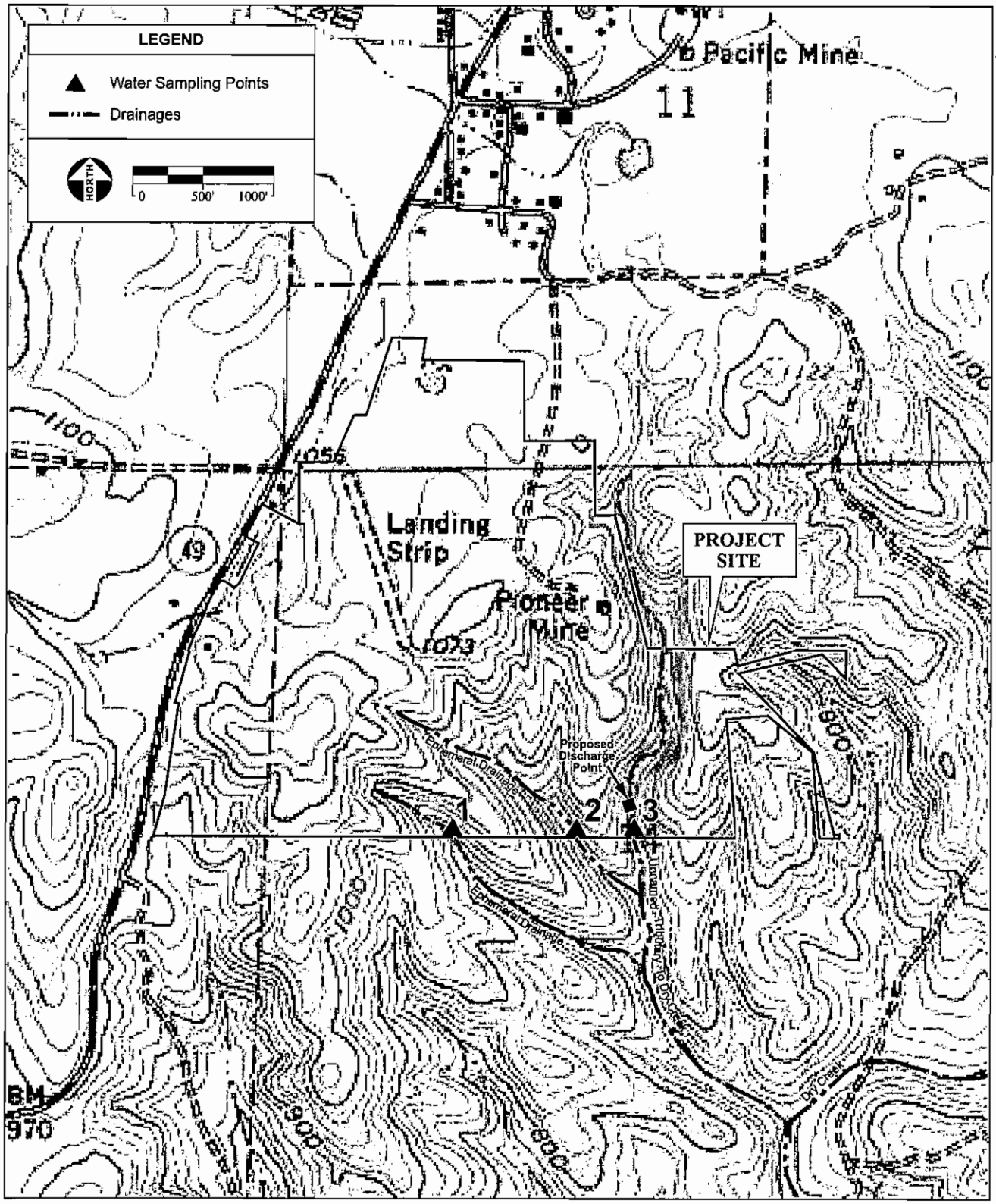
Table 4
Water Quality Objectives for Inland Surface Waters

Characteristic	Objective
Color	Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses
Tastes and Odors	Waters shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or that cause nuisance or adversely affect beneficial uses
Floating Material	Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.
Suspended Material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses
Settleable Material	Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses
pH	The pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in waters designated as cold or warm habitat.
Oil and Grease	Waters shall not contain oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses
Biostimulatory Substances	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Turbidity shall not be increased more than 1 NTUs where the natural turbidity is between 0-5 NTUs; shall not increase over 20 percent where natural turbidity is between 5-50 NTUs; shall not increase more than 10 NTUs where natural turbidity is between 50-100 NTUs and shall not increase greater than 10 percent when natural turbidity exceeds 100 NTUs.

Characteristic	Objective
Dissolved Oxygen	The monthly median of the mean daily dissolved oxygen concentrations shall not fall below 85 percent saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent saturation. In COLD designated streams the value may not fall lower than 7.0mg/l while WARM designated streams shall not fall below 5.0 mg/l at any point in time.
Bacteria	In waters designated for contact recreation, the median fecal coliform concentration based on a minimum of not less than five samples for any 30 day period shall not exceed 200/100mL, nor shall more than ten percent of total samples during any 30 day period exceed 400/100mL.
Temperature	The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect any beneficial uses. At no time or place shall the temperature of any water with the designated beneficial use of COLD freshwater habitat be increased by more than 5 degrees F above natural receiving water temperature. At no time or place shall the temperature of any water with the designated beneficial use of WARM freshwater habitat be increased by more than 5 degrees F above natural receiving water temperature
Toxicity	All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays or appropriate duration, or other appropriate methods as specified by the Regional Board
Pesticides	No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses. There shall be no bioaccumulation of pesticide concentrations found in bottom sediments or aquatic life. Waters designated for use as domestic or municipal supply shall not contain concentrations of pesticides in excess of the limiting concentrations set forth in the California Code of Regulations, Title 22, Division 4.
Chemical Constituents	Waters designated for use as domestic or municipal supply shall not contain concentrations of chemical constituents in excess of the limits specified in the California Code of Regulations, Title 22, Chapter 15, Division 4, Article 4, Section 64435 (Tables 2 and 3), and Section 64444.5 (Table 5), and listed in Table 3-2 of this Plan. Waters designated for use as agricultural supply shall not contain concentrations of chemical constituents in amounts which adversely affect such beneficial use.
Radioactivity	Radionuclides shall not be present in concentrations which are deleterious to human, plant, animal, or aquatic life or which result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or indigenous aquatic life. Additional limitations for radionuclides are contained within the Basin Plan.

Source: CVRWQCB, 2007

Water quality within the upper watershed of the Mokelumne River is generally good, and is typically of sufficient quality to support listed beneficial uses. However, copper and zinc have been identified at high levels within the Lower Mokelumne River Watershed. These constituents are found at high enough levels to list the Lower Mokelumne River as an impaired water body segment on the Section 303(d) list



SOURCE: "Amador City, CA" USGS 7.5 Minute Topographic Quadrangle, Sections 11, 14, & 15, T7N, R10E, Mt. Diablo Baseline and Meridian; AES, 2008

Figure 6
Surface Water Sample Locations

of the federal Clean Water Act for Central Valley water bodies (CVRWQCB, 2003). Major sources of copper and zinc contamination are limited to resource extraction, mining and processing. No gauging stations are located on Dry Creek or on the Mokelumne River. The nearest active U.S. Geological Survey (USGS) gauging station (#11335000) is located on the Cosumnes River at Michigan Bar.

3.2.2 RESULTS

Results of the surface water quality analysis from the 2007 winter sampling event are presented below in **Table 5**. The data is compared side by side to California Title 22 standards which outlines the allowable maximum contaminant levels within drinking water. The Central Valley Basin Plan utilizes the drinking water standards as inland surface water quality standards. Primary standards (1°) are based on human health protection while secondary standards (2°) are based on consumer acceptance of taste, odor, and color and are not based on risk to human health.

Table 5
Constituents in Three Unnamed Tributaries to Dry Creek

Chemical or Constituent	Sample Location			Title 22 MCLs	
	1	2	3	1°	2°
Fluoride (mg/L)	0.12	0.12	0.14	2.0	-
Nitrate (mg/L)	2.3	3.0	2.2	45	-
Total Dissolved Solids (mg/L)	94	110	170	-	500
Nitrate/Nitrite (mg/L)	0.52	0.67	0.50	10	-
Turbidity (NTU)	7.5	9.6	12	-	5
pH	7.25	7.41	7.62	-	-
Color	30	30	15	-	15
Zinc (µg/L)	<20	<20	58	-	5,000
Arsenic (µg/L)	<5.0	<5.0	11	50	-
Fecal Coliforms (MPN/100mL)	8.0	170	240	-	-

Source: Alpha Analytical Laboratories, Inc. 2007

Results of water sampling indicated contaminants were not present at levels above their respective primary maximum contaminant levels (MCLs), where applicable. Primary MCLs are standards outlined in Title 22 of the California Code of Regulations (Title 22). Primary MCLs are based on potential human health effects, are enforceable regulatory levels for drinking water, and have been incorporated as inland surface water quality objectives within the Basin Plan. Color sample results were reported at sample sites 1 and 2 greater than the respective Title 22 secondary MCL. Secondary MCLs are also listed in Title 22; however these levels are not based on human health effects, but are based on consumer taste and acceptance. This result is anticipated for intermittent streams that traverse grazing areas. The other samples constituents were below their applicable secondary MCLs.

Fecal coliform levels were reported at sample site 3 (UT) are greater than the Basin Plan water quality objective for inland surface waters. Although the fecal coliform results were slightly higher at sample site 3 than the Basin Plan water quality objective, the objective is specific for surface waters designated with the beneficial use of contact recreation. As discussed above, the surface waters in the area are designated as non-contact recreation. Slightly higher coliform levels are expected within surface waters that traverse through livestock grazing areas like the project site. The coliform results from site 3 do not indicate a water quality concern in regards to the protection of the beneficial uses of the sampled tributary to Dry Creek. For pH, the basin plan states that surface waters shall read between 6.5 and 8.5 standard pH units. Samples indicated all three sites were within the Basin Plan requirement for pH.

3.3 GROUND WATER QUALITY

3.3.1 METHODS

Groundwater samples were collected by Applied Engineering and Geology, Inc. in October 2004 from groundwater wells M1, M3, H1, H2, and the cistern, located along the west edge of the project site (Applied Engineering, 2004).

3.3.2 RESULTS

The results indicated high quality groundwater, with only one MCL parameter exceeded. In wells H1 and H2, total dissolved solids (TDS) levels exceeded secondary (taste, odor, and color) MCL levels. In order to provide consumers with water that would not be rejected due to taste, water treatment would be required to remove excess (TDS) from the groundwater. The sample results are summarized below in **Table 6**. It should be noted that both copper and zinc are over the reporting limit for wells M1 and H2 yet well below the MCL levels established by the EPA.

Table 6

Groundwater Quality Results [a]

Analyte	MCL	Reporting Limit	M1	M3	Cistern	H1	H2
Arsenic (ug/L)	10	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Lead (ug/L)	15	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (ug/L)	100	20	< 20	< 20	< 20	< 20	< 20
Copper (ug/L)	1,300	20	440	< 20	< 20	< 20	27
Zinc (ug/L)	5000 [d]	20	60	< 20	< 20	< 20	< 20
Mercury (ug/L)	2	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Fluoride (mg/L)	2.0	0.10	0.34	0.21	0.36	0.24	0.17
Nitrate as NO (mg/L)	10	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
pH (std. units)	6.5-8.5	--	8.00	6.90	7.40	7.20	7.12
Total Dissolve Solids (mg/L)	500[d]	10	200	360	240	910	760

NOTES: [a] Results reported as micrograms per liter, unless otherwise noted.
[b] Sample collected during pumping test.
[c] Sample collected after pumping test was complete, but before water level in well had recovered.
[d] Secondary MCL.
[e] MCL is for foaming agents.
SOURCE: HSE, 2005

The lower Mokelumne River is listed as an impaired water body on the 303(d) list for Central Valley waters for both copper and zinc. The Total Maximum Daily Load (TMDL) for this impaired stream has not yet been established and is anticipated to be implemented in 2020. It should be noted that natural background levels of these metals are apparent in the geology and groundwater of the area. Wells M1, M3 and H1 would be utilized to supply groundwater for the project.

3.3 AQUATIC COMMUNITIES

3.3.1 METHODS

Information was obtained on all aquatic and terrestrial special-status species with the potential to occur in the vicinity of the project site and the Dry Creek corridor from the following sources; a 2007 U.S. Fish and Wildlife Service (USFWS) Sacramento District list of federally listed special status species that could potentially occur in the "Amador City" and eight surrounding 7.5 minute USGS topographic quadrangles; a California Native Plant Society (CNPS) list of special status species records known to occur within the "Amador City" and eight surrounding 7.5 minute USGS topographic quadrangles; and a 2007 California Natural Diversity Data Base (CNDDB)/Rare Find list. This information was compiled to create tables of regionally occurring special status species as seen in **Appendix A**. All special-status species documented to occur within 10 miles of the project site were mapped using the CNDDB data. Species records occurring within 10 miles of the project site are illustrated in **Figure** 7. Additionally, a thorough examination of current literature was conducted to determine the aquatic communities that are supported within the upper reaches of Dry Creek. Furthermore, a database search was conducted to determine if any anadromous fish species are documented to occur in the upper reaches of Dry Creek

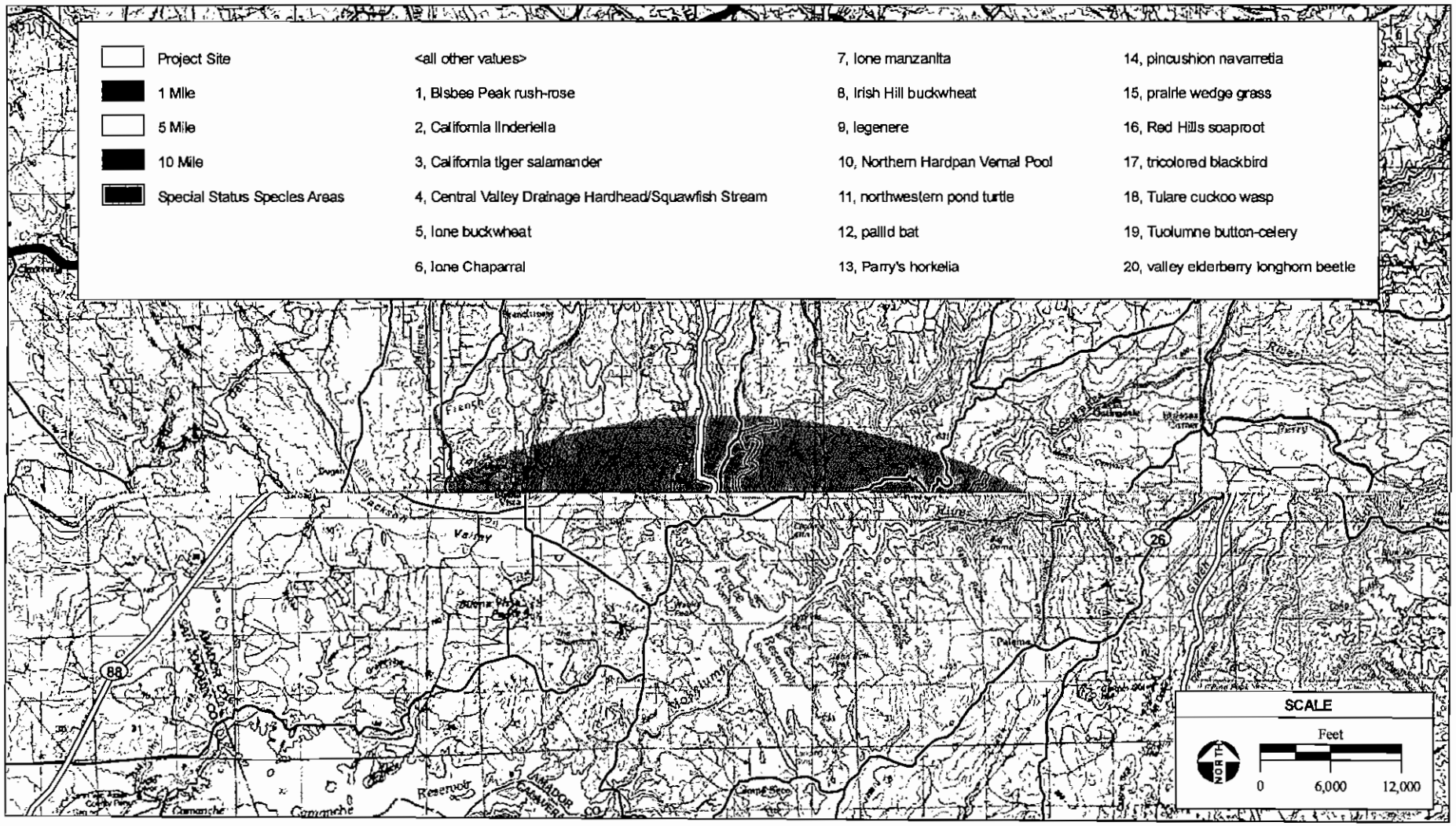
using the California Department of Fish and Games Anadromous Fish and Habitat Data Program. The National Marine Fisheries Service database was also queried to determine special status species distributions and designations for Central Valley Evolutionary Significant Units (ESUs).

3.3.2 FISHERIES RESULTS

Three fish species were determined to potentially occur in Dry Creek as a result of the special status species searches. These species are; Central Valley steelhead (*Oncorhynchus mykiss*), fall run Central Valley Chinook salmon (*Oncorhynchus tshawytscha)*, and spring run Central Valley Chinook salmon (*Oncorhynchus tshawytscha)*. These species are further evaluated for their potential to occur in Dry Creek below.

The Unnamed tributary to Dry Creek is an ephemeral drainage that only flows during and immediately after storm events. Because this tributary is so dependent upon direct precipitation, and flows for such a limited duration, it does not support a fish community. Additionally, the confluence between the Unnamed tributary and Dry Creek is unapparent as it fans out into un-channelized overland flow prior to entering the Dry Creek channel. Based on field observations and a literature search it can be concluded that no fish species would be capable of utilizing the Unnamed tributary to Dry Creek.

Dry Creek is a direct tributary to the Mokelumne River. It flows over 40 river miles from the confluence of the Unnamed tributary to its connection with the Mokelumne just east of Mokelumne City, CA. Dry Creek is an intermittent stream. Seasonally, it begins flowing in the late fall and early winter months and dries down in the late spring and early summer depending on seasonal variations in rainfall patterns. As such this stream has the ability to support a mix of California fish species adapted to this highly fluctuating environment common to the streams of the open foothill woodlands. This narrow band of fish habitat at the foothill transition zone of the Sierra Nevada Mountains supports a unique suite of warm water species. These communities are described as a mix of the California roach assemblage and the pike minnow-hardhead-sucker assemblage (Moyle 2002) which include; California roach (*Hesperoleucus symmetricus*), Sacramento pikeminnow (*Ptychocheilus grandis*), hitch (*Lavinia exilicauda*), hardhead (*Mylopharodon conocephalus*), and Sacramento sucker (*Catostomus occidentalis*). These assemblages are commonly found in intermittent drainages that seasonally dry out leaving water only in large pools that are significantly shaded. Because these interrupted pools are the only perennial waters in the stream channel, the fishes that are able to survive must be adapted to extremely high water temperatures, typically over 30° C, and low dissolved oxygen conditions. California roach are tolerant of relatively high temperatures (30°C-35°C) and low oxygen levels (1-2 ppm), which allows them to survive in conditions that are too extreme for other fishes (Moyle, 2002). While, the pike minnow-hardhead-sucker assemblage is not typically seen in completely intermittent streams as they generally require a base stream flow greater than 300 liters per second (Moyle 2002). Therefore, as Dry Creek regularly dries out in the summer leaving very few stagnant pools, the dominant fish assemblage would predominantly consist of California roach for most of the upper reaches of Dry Creek and its tributaries. Although, above average seasonal rainfall and high spring flows would allow the movement of a pike



SOURCE: California Natural Diversity Database, 9/2008; "San Andreas, CA", "Placerville, CA", "Lodi, CA" and "Sacramento, CA"
USGS 100K Topographic Quadrangles; AES, 2008

Figure 7
CNDDB 10-Mile Radius Map

minnow-hardhead-sucker assemblage from the more perennial downstream reaches of Dry Creek within the eastern portions of valley floor.

In the Mokelumne and Cosumnes Rivers, runs of Chinook salmon and steelhead historically dominated the naturally accessible reaches during the fall, winter and spring months. In recent times, the impoundment and diversion of waters that historically supported these fish have altered flows and reduced accessible critical spawning habitats. The Mokelumne and Cosumnes still support a much reduced Salmon and steelhead fishery supplemented predominantly by hatchery fish (Moyle 2002). Dry Creek on the other hand has always been a seasonally intermittent stream with higher average temperatures and reduced habitat suitability due to the short duration of seasonal flows it experiences. Dry Creek topographically splits the Mokelumne and Cosumnes River drainages. Because the fall run Chinook salmon peak migration and spawning period is from October through December they have not traditionally utilized Dry Creek because substantial flows are not seen until the end of the fall run Chinook migration and spawning windows. The basic temporal and spatial requirements to be met by these salmon are more readily available in the cooler perennial waters of the Mokelumne and Cosumnes. Therefore, the life history strategies of the central valley fall run Chinook salmon have detached it from utilizing Dry Creek. This determination is supported by the California Department of Fish and Games Anadromous Fish and Habitat Data Program which shows the Chinook salmon range does not include Dry Creek. Therefore, it can be concluded that Chinook salmon do not utilize Dry Creek to spawn.

Alternatively, the intermittent nature of Dry Creek, in rare instance, may allow the winter run Central Valley steelhead to utilize the high winter flows in the creek. California Department of Fish and Games Anadromous Fish and Habitat Data Program illustrates that winter run steelhead were historically documented to range up to Ione just beyond the confluence of Sutter Creek and Dry Creek. Although federally designated critical habitat is not present on lower Dry Creek, the historical range of winter run steelhead does include these lower reaches of Dry Creek. Critical habitat is designated for the federally threatened Central Valley steelhead in the Mokelumne River, Federal Register: September 2, 2005 (Volume 70, Number 170). Yet, it should be noted that with the possible exception of a small population in the lower Stanislaus River, steelhead appear to have been extirpated from the San Joaquin basin (Moyle 2002). Additionally, there are no occurrences of steelhead within Dry Creek on the 10-mile CNDDB map (Figure 7), which further supports the conclusion that winter run steelhead do not currently utilize Dry Creek for spawning, rearing or refugia.

3.3 TERRESTRIAL COMMUNITIES

3.3.1 METHODS

Detailed species information was gathered as outlined in **Section 3.2.1**, and reported in **Appendix A**. This table includes the name, regulatory status, distribution, habitat requirements, and period of

identification for all terrestrial and semi-aquatic species identified on the USFWS, CNDDB, and CNPS lists. These sources of information were used to determine the potential for these species to occur within the upper reaches of Dry Creek and to assess if the proposed effluent discharge could potentially affect these species or the related beneficial uses within the Unnamed tributary or its receiving body, Dry Creek.

3.3.2 RESULTS

Appendix A lists all of the special status species with the potential to occur on the site and within the eight surrounding quadrangles. These species were all evaluated for their potential to utilize the Unnamed tributary or Dry Creek and the associated riparian habitats for foraging, refuge or habitation. Of all these species, the following six were further evaluated for their potential to use the streams or their associated aquatic habitats; Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*); two amphibian species: California red-legged frog (*Rana aurora drytonii*) and foothill yellow-legged frog (*Rana boylii*); one reptile species: northwestern pond turtle (*Actinemys marmorata marmorata*); and two bird species: tri-colored blackbird (*Agelaius tricolor*) and loggerhead shrike (*Lanius ludovicianus*). Of these species, only three have been documented to occur within five miles of the site, while the rest are not documented to occur within ten miles of the site, therefore they are not further discussed. The valley elderberry longhorn beetle, northwestern pone turtle and tri-colored blackbird have been observed within a five mile radius of the site, (**Figure 7**) while only one of these species, (northwestern pond turtle) is fully associated with the stream environment. It can be concluded that the northwestern pond turtle is documented to occur in Dry Creek approximately eight miles downstream of the confluence of Unnamed tributary and Dry Creek. It can also be concluded that the tri-colored blackbird has been documented to occur in Drytown, approximately three miles downstream of the confluence of Unnamed tributary and Dry Creek. Additionally, valley elderberry longhorn beetle is documented to occur nearly ten miles downstream of the confluence of Unnamed tributary and Dry Creek. It should be noted that no Elderberry shrubs were observed during the stream assessments. None of the other species analyzed from **Appendix A** have been documented within the Dry Creek stream corridor within ten miles of the project site. Protocol level red-legged frog surveys were conducted on the proposed project site and the results were negative. One unidentified pond turtle was observed in Dry Creek ¼ mile below the project site during the red-legged frog surveys.

4.0 DISCUSSION

It is anticipated that the project will utilize ground water from wells M1, M3 and H1. The groundwater sample results for these well sites shown in **Table 6** reported no constituents that could potentially conflict with effluent discharge water quality standards of the wastewater treatment plant. Because of the observed high (TDS) content of the groundwater, it will be purified through a reverse osmosis (RO) or similar process and further treated for high iron and manganese concentrations prior to use by the project. This water supply will meet all EPA standards for potable drinking water after treatment.

Therefore, the existing groundwater supply for the project will not contribute any unwanted constituents to the water before initial use and treatment at the WWTP. The proposed wastewater treatment plant will produce disinfected tertiary recycled water in accordance with Title 22 requirements. The Title 22 approved uses for disinfected tertiary recycled water include the following: flushing of toilets and urinals, structural fire fighting, decorative fountains, parks, and landscape irrigation. This water will shall also meet the numerical receiving water quality objectives for inland surface waters as outlined in the Central Valley Basin Plan for the Mokelumne River and its tributaries (**Table 4**). Projected effluent water quality from the proposed WWTP for fecal coliform and turbidity is summarized in **Table 7**.

TABLE 7
PROJECTED EFFLUENT QUALITY

Parameter	Units	Anticipated Effluent
Turbidity	NTU	<2.0
Coliform	MPN/100mL	<2.2

NTU = Nephelometrie Turbidity Units
MPN = Most Probable Number
Source: Hydro Science, 2004

Disinfected tertiary treated water includes secondary effluent that has undergone tertiary treatment and has been disinfected to a level such that the median coliform bacterium in the water does not exceed 2.2 per 100 mL. Title 22 defines the tertiary treatment process as wastewater that has been oxidized, coagulated, clarified and filtered. The recycled water turbidity should not exceed 2 NTU on average, should not exceed 5 NTU more than five percent of the time during any 24-hour period, and should never exceed 10 NTU (Hydro Science, 2005).

While the potential for many common and a limited number of sensitive species to utilize Dry Creek and its associated riparian corridors exists, it should again be noted that all wastewater will be treated to California Code of Regulations Title 22 standards. Additionally, the volume of effluent discharged into Dry Creek will be minimized as recycled water, spray field discharge, and leach filed discharge will occur prior to surface water discharge. As stated previously, the proposed discharge will meet or exceed water quality standards of the CVRWQCB Basin Plan for surface waters; therefore it will not adversely impact aquatic life beneficial uses in Unnamed tributary, Dry Creek or the Mokelumne River.

While Dry Creek is an intermittent stream with extreme seasonal fluctuations in flow, the utilization of the available instream habitat by aquatic species is highly variable. The potential for aquatic species to use Dry Creek is progressively based on water availability, then ambient temperature, then niche availability. In order for a species to utilize this highly variable aquatic system, all three of these constraints must fit their life history strategy. Therefore, only the most adapted species within this narrow range of foothill habitat can be regularly predicted and observed to occur within the upper reaches of Dry Creek; as explained in the fisheries section. With this in mind it could be beneficial for the species that occur throughout Dry Creek corridor to have a minor supplemental flow from the WWTP

during the drier seasons. During abnormally dry conditions this supplemental flow could help sustain the function of riparian habitats and minimize daily movements of resident species to watering holes as upstream water allocations, diversion, and drought can accelerate the dry down of the Dry Creek channel. Species such as the northwestern pond turtle, a state species of concern, could potentially benefit from this additional flow.

None of the special status species evaluated in **Section 3.0** would be adversely impacted by the proposed wastewater discharge. If anything, the supplemental flows would benefit the resident flora and fauna associated with Dry Creek. From the analysis **in Section 3.0** it can be assumed that the aquatic life beneficial uses for the communities of Dry Creek could potentially be designated as both WARM and COLD freshwater habitat. Although, based on the potentially limited utilization of the stream by steelhead, and its seasonal connection to the Mokelumne River, a COLD spawn and COLD migration beneficial use designation would be unlikely. Due to the seasonal nature of this stream and the low potential for utilization by threatened winter run steelhead, Dry Creek would be designated solely as a WARM freshwater habitat beneficial use stream for fishes. Although this designation has not yet been determined by the CVRWQCB, it can be concluded based on the existing data. It can also be concluded that Dry Creek would have a designated beneficial use under the Basin Plan for wildlife, as the stream and associated riparian habitats support a suite of common birds, reptiles, amphibians, and mammals. The ambient water quality such as temperature, dissolved oxygen, and pH requirements of the wastewater treatment plant effluent would meet the basic criteria for these designated beneficial uses as outlined in inland surface water quality requirements in the Basin Plan as outlined in **Table 4**.

5.0 CONCLUSION

No adverse impacts to the designated aquatic life beneficial uses as outlined in **Section 4.0** would occur as a result of direct wastewater discharge from the proposed project. The high level of treatment at the proposed WWTP will reduce impacts to the creek while minimizing the volume of effluent that will be discharged by utilizing other disposal methods such as spray fields, leach fields, irrigation and toilet flushing. These practices will reduce discharges by up to 40 percent. A stream setback and enhancement corridor will be established for the Unnamed tributary to Dry Creek on the project site to promote native vegetation establishment and ensure stream bank stabilization. This will increase aquatic habitat value and allow the establishment of vegetation which will reduce the potential for bank erosion in the discharge channel.

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7.0 REPORT PREPARATION

Analytical Environmental Services

Project Manager: David Zweig
Technical Staff: Ben Barker
Kristie Haydu

APPENDIX A

FEDERAL, STATE, CNPS AND CNDDB SPECIAL STATUS SPECIES LISTS

SUMMARY OF REGIONALLY OCCURRING FEDERAL SPECIAL-STATUS SPECIES
IONE CASINO PROJECT

Scientific Name Common name	FEDERAL/ CDFG/ CNPS STATUS	Distribution	Habitat Requirements	Ideal Period of Identification	Potentially Occurring on Project Site?
PLANTS					
Arctostaphylos myrtifolia Ione manzanita	FT/--/1B	Amador and Calaveras counties.	Acidic sandy or clay Ione soil in chaparral, and cismontane woodland.	November-February	**No.** This soil type does not occur on the project site.
Eriogonum apricum var. *prostratum* Irish Hill Buckwheat	FE/--/1B	Far western portion of Amador County.	Chaparral openings on Ione soil. Found on open, cobbly areas within marine sediments with Ione manzanita. Only two occurrences documented. One within *Adenostoma-Arctostaphylos viscida* chaparral and one within Ione chaparral.	June-July	**No.** This soil type does not occur on the project site.
ANIMALS					
Invertebrates					
Branchinecta lynchi Vernal pool fairy shrimp	FT/--/--	Vernal Pools in the Central Valley, Coast Ranges, and limited number of sites in Transverse ranges and Riverside County, California.	The vernal pool fairy shrimp is restricted to seasonal vernal pools and prefers cool-water pools that have low to moderate dissolved solids, are less predictable, and often short lived.	December-May	**Yes.** There is suitable habitat for this species in the vernal pools on the project site.
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	FT/--/--	Central Valley in riparian habitats.	Breeds and forages exclusively on elderberry shrubs (*Sambucus mexicana*) below 2,500 ft. in elev.; specifically on shrubs with stem diameter of one-inch or greater.	All year	**Yes.** There are elderberry shrubs on site.
Lepidurus packardi Vernal pool tadpole shrimp	FE/--/--	The vernal pool tadpole shrimp is known from 18 populations in the Central Valley, ranging from east of Redding in Shasta County south to the San Luis National Wildlife Refuge in Merced County, and from a single vernal pool complex located on the San Francisco Bay National Wildlife Refuge in the City of Fremont, Alameda County.	Found in a variety of seasonal wetlands from 6.5 square feet to 88 acres in size. Found on a variety of geologic formations and soil types but over 50 percent of the time on High Terrace landforms and Redding and Corning soils. May be able to resist temporary drying conditions.	December-May	**Yes.** There is suitable habitat in the vernal pools on the project site.
Amphibians					
Rana aurora draytonli California red-legged frog	FT/CSC/--	Locally abundant within portions of the San Francisco Bay area (including Marin County) and the central coast. Only isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse ranges and Baja California, Mexico.	Lowlands and foothills in or near permanent or late-season sources of deep water with shrubby overhanging or dense emergent vegetation.	May - November	**Yes.** There is suitable breeding habitat in the cattle ponds on the project site.
Ambystoma californiense California tiger salamander, central population.	FT/CSC/--	Sacramento and San Joaquin River Valleys, surrounding foothills and westward in the lower elevations of California's central Coast.	Occurs in annual grasslands. Breeds and lays eggs November to February in vernal pools and other temporary rainwater ponds and sometimes permanent man-made ponds where predators are absent. May co-exist with bullfrogs (*Rana catesbeiana*) in vegetated ponds that provide refugia.	November-February	**Yes.** There is suitable breeding habitat in the vernal pools and seasonal ponds and upland burrows in the annual grassland and oak savannah.
Fish					

Scientific Name Common name	FEDERAL/ CDFG/ CNPS STATUS	Distribution	Habitat Requirements	Ideal Period of Identification	Potentially Occurring on Project Site?
Hypomesus transpacificus Delta smelt	FT/ST/--	Sacramento and San Joaquin Rivers and their tributaries; Sacramento-San Joaquin Delta and San Pablo Bay.	Spawns in dead-end sloughs and shallow edge waters. Spends most of life cycle in brackish water with salinity up to 10-12 ppt.	All Year	**No.** There is no suitable habitat on the project site.
Oncorhynchus mykiss Central Valley steelhead	FT/--/--	Spawn in the Sacramento and San Joaquin rivers and tributaries before migrating to the Delta and Bay Area.	In the Bay, requires shelter in dense marine vegetation (i.e., eelgrass) as juveniles, and a constant supply of larger fish such as herring as adults.	December-July	**No.** There is no suitable habitat on the project site.
Oncorhynchus tshawytscha Central Valley fall/late fall-run Chinook salmon	FC/CSC/--	Sacramento and San Joaquin Rivers and their tributaries.	Majority of spawning occurs in the mainstream of the Sacramento River where eggs are laid in large depressions hollowed out in gravel beds.	October-March	**No.** There is no suitable habitat on the project site.
Oncorhynchus tshawytscha Central Valley spring-run chinook salmon	FT/CT/--	Spawn in the Sacramento river and some of its tributaries. Juveniles migrate from spawning grounds to the Pacific Ocean.	Spawning occurs in large deep pools in tributaries with moderate velocities and a large bubble curtain at the head.	March-May	**No.** There is no suitable habitat on the project site.
Birds					
Haliaeetus leucocephalus Bald eagle	FT/CFP/--	Throughout North America.	Found near ocean shorelines, lakes, reservoirs, river systems, and coastal wetlands.	All Year	**No.** There is no suitable habitat on the project site.
Mammals					
Martes pennanti pacifica Pacific fisher	FC/CSC/--	Northwestern California, Cascade Range, and Sierra Nevada above 1000 m.	Favors stands of pine, Douglas fir, and true fir.	Consult Agency	**No.** The project elevation is out of the range of the Pacific fisher and the habitat is not suitable.

STATUS CODES:

FEDERAL: U.S. Fish and Wildlife Service or National Marine Fisheries Service
- FE = Listed as Endangered by the Federal Government
- FT = Listed as Threatened by the Federal Government
- FPE = Proposed for Listing as Endangered
- FPT = Proposed for Listing as Threatened
- FC = Candidate for Federal Listing

STATE: California Department of Fish and Game
- CE = Listed as Endangered by the State of California
- CT = Listed as Threatened by the State of California
- CSC = California Species of Special Concern
- CFP = California Fully Protected Species

CNPS: California Native Plant Society
- List 1A = Plants presumed to be extinct
- List 1B = Plants rare, threatened, or endangered in California and elsewhere
- List 2 = Plants rare, threatened, or endangered in California, more common elsewhere

SOURCE: U.S. Fish and Wildlife Service, 2007; California Natural Diversity Data Base, 2007; CNPS 2007.

SUMMARY OF REGIONALLY OCCURRING STATE SPECIAL-STATUS SPECIES
IONE CASINO PROJECT

Scientific Name Common name	CDFG/ CNPS STATUS	Distribution	Habitat Requirements	Ideal Period of Identification	Potentially Occurring on Project Site?
PLANTS					
Chlorogalum grandiflorum Red Hills soaproot	--/1B	Known occurrences from Tuolumne, El Dorado, Placer, and Calavaras Counties.	Serpentine outcrops, open shrubby or wooded hills between 1,000 and 4,000 ft. in elevation.	May-June	**No.** Site does not provide suitable habitat for this species. Site does not have any documented serpentine soils.
Clarkia biloba ssp. *brandegeeae* Brandegee's clarkia	–/1B	Butte, El Dorado, Nevada, Placer, Seirra, and Yuba counties.	Chaparral and cistmontane woodland, often in roadcuts.	May-July	**Yes.** Site does provide suitable habitat for this species.
Eryngium pinnatisectum Tuolumne button-celery	–/1B	Amador, Calaveras, Sacramento, and Tuolumne counties.	Cismontane woodland, lower montane coniferous forest, and vernal pools. Elevation ranges from 230-3,000 ft.	June-August	Yes. Site does provide suitable habitat for this species.
Horkelia parryi Parry's horkelia	–/1B	Amador, Calaveras, El Dorado, and Mariposa counties.	Open chaparral and cismontane woodland between 300 and 3,000 ft. in elevation, found most often on Ione Soils.	April-June	**Yes.** Site does provide suitable habitat for this species, although it's preferred soil type does not occur on site.
Navarretia myersii ssp. *myersii* Pincushion navarretia	–/1B	Known from Amador, Lake, Merced, and Sacramento counties.	Valley and foothill vernal pools 60 to 270 ft. in elevation.	April-May	**No.** Site does provide suitable habitat, however is out of this species' known range of elevation.
Sphenopholis obtusata Prairie wedge grass	–/2	The current distribution is Amador, Fresno, Inyo, Mono, Riverside, and San Bernardino Counties.	Meadows and seeps 1,000-6,500 ft. in elevation.	April-July	**Yes.** Seasonal wetlands and intermittent drainages represent suitable habitat.
ANIMALS					
Amphibians					
Rana boylii Foothill yellow-legged frog	CSC/--	From Santiam River, Marion County, Oregon, south through the Coast Ranges and western slope of the Cascade and Sierra Nevada Mountains, to San Gabriel River, Los Angeles County, California.	Found in shallow, flowing water, preferentially in small to moderate-sized streams with at least some cobble-sized substrate.	All year	**No.** Site does not provide suitable habitat for this species, i.e. perennial streams.
Spea hammondii Western spadefoot toad	CSC/--	Alameda, Butte, Calaveras, Fresno, Kern, Kings, Los Angeles, Madera, Merced, Monterey, Orange, Placer, Riverside, Sacramento, San Benito, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Stanislaus, Tulare, Ventura and Yolo counties.	Occurs primarily in grassland habitats, but can be found in valley and foothill woodlands. Vernal pools are essential for breeding and egg laying.	November-March	**No.** Site does not provide suitable habitat for this species, i.e. perennial streams.

Scientific Name Common name	CDFG/ CNPS STATUS	Distribution	Habitat Requirements	Ideal Period of Identification	Potentially Occurring on Project Site?
Reptiles					
Actinemys marmorata marmorata Northwestern pond turtle	CSC/--	West coast of North America from southern Washington, USA to northern Baja California, Mexico. Many populations have been extirpated and others continue to decline throughout the range, especially in southern California.	Requires aquatic habitats with suitable basking sites. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	All year	**Yes.** Site does provide marginal habitat for this species. There are documented records in the CNDDB within 5 miles of the site.
Birds					
Agelaius tricolor Tricolored blackbird	CSC/--	California and Baja California, Mexico.	Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, and other tall herbs near fresh water in Central Valley.	April-July	**Yes.** Site does provide some suitable habitat for this species, i.e. detention basin.
Amphispiza belli belli Bell's sage sparrow	CSC/--	San Diego, Contra Costa, Marin, and Sonoma County.	Seeks cover in fairly dense stands in chaparral and scrub habitats in breeding season.	April-September	**No.** Site does not provide suitable habitat for this species.
Lanius ludovicianus (nesting) Loggerhead shrike	CSC/--	United States and western Canada.	Occurs in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats. Found in a variety of habitats with open areas, available perches, and dense shrubs for nesting	March-August	**No.** Site does not provide suitable habitat for this species.
Mammals					
Antrozus pallidus pallid bat	CSC/--	Much of western North America, from central Mexico to British Columbia. In California, throughout most of state.	Especially common in open, lowland areas, generally below 2,000 meters. Roosts in cliffs, abandoned buildings, bird boxes, and under bridges.	All Year	**No.** Site does not provide suitable habitat for this species.
Corynorhinus townsendii townsendii Pacific western big-eared bat	CSC/--	Washington, Oregon, California, Nevada, and Idaho. In California, the species is distributed west of the Central Valley.	Found throughout CA, highly associated with mines and caves. Throughout much of known range, commonly occurs in mesic habitats characterized by coniferous and deciduous forests.	All year	**No.** Site does not provide suitable habitat for this species.
Euderma maculatum Spotted bat	CSC/--	Western North America and Canada south to central Mexico.	Habitats occupied range from arid deserts and grasslands through mixed conifer forests. Apparently prefers to roost in rock crevices. Occasionally found in caves and buildings. Cliffs provide optimal roosting habitat.	All year	**No.** Site does not provide suitable habitat for this species.
Eumops perotis californicus Greater western mastiff-bat	CSC/--	Specific California distribution unknown. Thought to inhabit an area east of San Francisco to the Sierra Nevada mountains and south.	Occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban. Crevices in cliff faces, high buildings, trees, and tunnels are required for roosting.	All year	**No.** Site does not provide suitable habitat for this species.
Sensitive Natural Communities					

Scientific Name Common name	CDFG/ CNPS STATUS	Distribution	Habitat Requirements	Ideal Period of Identification	Potentially Occurring on Project Site?
Central Valley Hardhead/Squawfish Stream	Special Concern	Limited distribution in Sierra Nevada foothills.	Low-to-mid elevation streams characterized by deep, bedrock pools, clear water, and cool temperatures (<25 C); characteristic fishes are hardhead, Sacramento squawfish, and Sacramento sucker, although typically 5-6 species are present.	All Year	**No.** This habitat does not occur on the project site.
Ione Chaparral	Special Concern	The vicinity of the town of Ione in Amador County, California, and a few local areas of adjacent northern Calaveras County, California.	Ione chaparral is found in soils that exhibit properties typical of those produced under tropical climates. Characterized by very acidic, nutrient-poor, coarse soils.	All Year	**No.** Ione soils have a very limited range and are not found in the project site.

STATUS CODES:

STATE: California Department of Fish and Game

CE = Listed as Endangered by the State of California
CT = Listed as Threatened by the State of California
CR = Listed as Rare by the State of California (plants only)
CSC = California Species of Special Concern
CFP = California Fully Protected Species

CNPS: California Native Plant Society

List 1A = Plants presumed to be extinct
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SOURCE: U.S. Fish and Wildlife Service, 2007; California Natural Diversity Data Base, 2007; CNPS 2007.

California Department of Fish and Game
Natural Diversity Database
Selected Elements by Scientific Name
Special-status species occuring in the "Amador City, California" 7.5' quadrangle and surrounding four quadrangles: Pine Grove, Irish Hill, Latrobe, and Fiddletown.

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1	***Actinemys marmorata marmorata*** northwestern pond turtle	ARAAD02031			G3G4T3	S3	SC
2	***Agelaius tricolor*** tricolored blackbird	ABPBXB0020			G2G3	S2	SC
3	***Antrozous pallidus*** pallid bat	AMACC10010			G5	S3	SC
4	***Arctostaphylos myrtifolia*** Ione manzanita	PDERI04240	Threatened		G2	S2.1	1B.2
5	***Central Valley Drainage Hardhead/Squawfish Stream***	CARA2443CA			G?	SNR	
6	***Chlorogalum grandiflorum*** Red Hills soaproot	PMLIL0G020			G2	S2.2	1B.2
7	***Chrysis tularensis*** A cuckoo wasp	IIHYM72010			G1G2	S1S2	
8	***Eriogonum apricum var. prostratum*** Irish Hill buckwheat	PDPGN080F2	Endangered	Endangered	G2T1	S1.1	1B.1
9	***Eryngium pinnatisectum*** Tuolumne button-celery	PDAPI0Z0P0			G3	S3.2	1B.2
10	***Helianthemum suffrutescens*** Bisbee Peak rush-rose	PDCIS020F0			G2Q	S2.2	3.2
11	***Ione Chaparral***	CTT37D00CA			G1	S1.1	
12	***Navarretia myersii ssp. myersii*** pincushion navarretia	PDPLM0C0X1			G1T1	S1.1	1B.1
13	***Rana boylii*** foothill yellow-legged frog	AAABH01050			G3	S2S3	SC
14	***Sphenopholis obtusata*** prairie wedge grass	PMPOA5T030			G5	S2.2	2.2
15	***Stygobromus gradyi*** Grady's Cave amphipod	ICMAL05460			G1	S1	