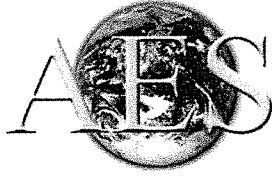


Phelan Residence
Stream Channel Assessment
Analytical Environmental Services
March 2013



**ANALYTICAL
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Technical Memorandum

To: Jeff Phelan
From: Ben Barker
Date: 9/14/2012
Re: Phelan Ranch Stream Channel Assessment

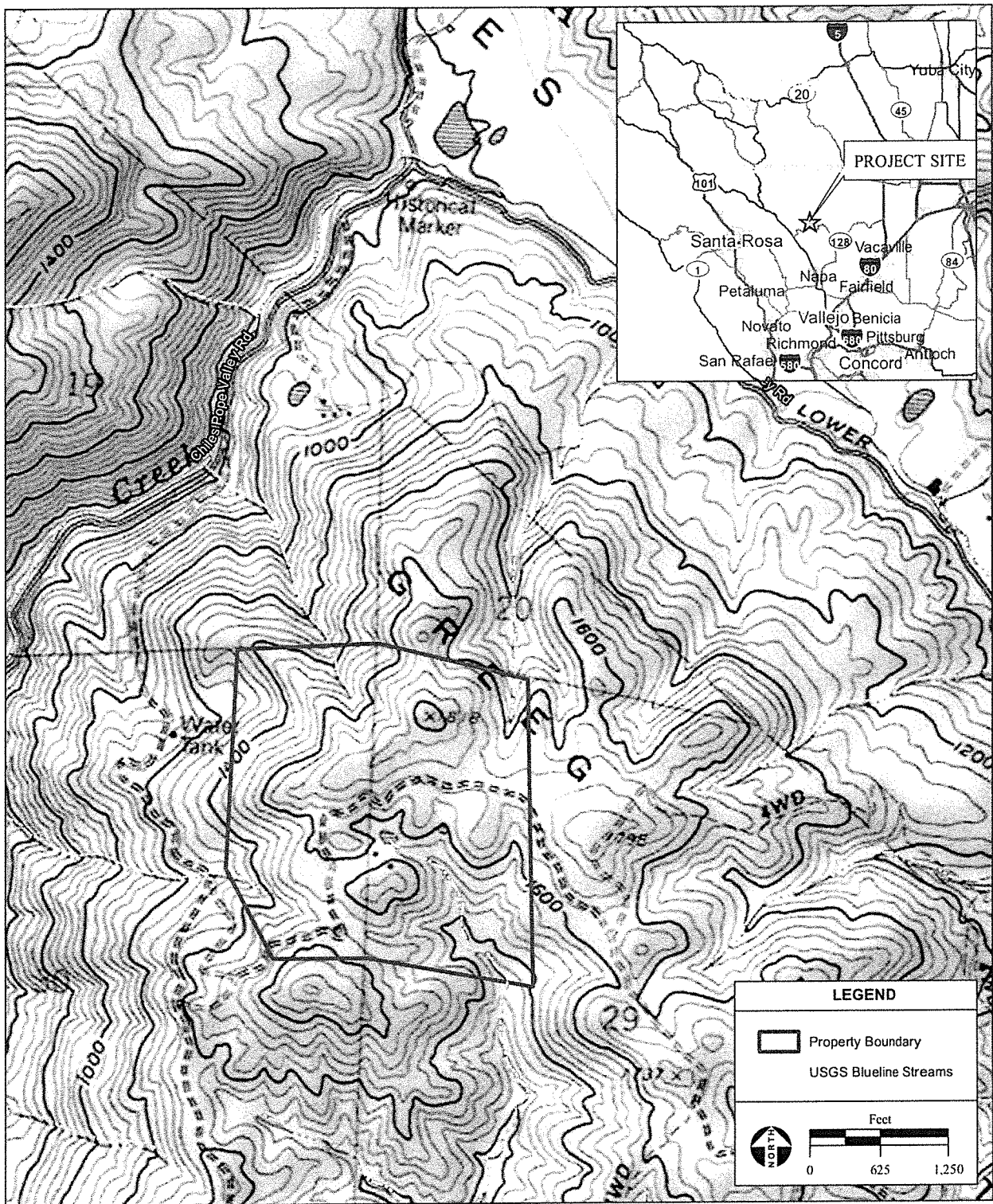
Background

The purpose of this memorandum (memo) is to characterize and classify an ephemeral channel, located on the Phelan Ranch Vineyard Property (property) located in Napa County (County), California. This channel is depicted as a blue-lined, intermittent stream channel on the Chiles Valley, California U.S. Geological Survey (USGS) 7.5 minute topographic quadrangle (quad). As shown on the USGS quad, the blue-lined stream extends from the western edge of a manmade storage pond which has existed on the property for over 100 years; the Napa County Assessor's office has records of taxes being paid for the cabin since 1902. In addition, the property has deeded rights conveyed by the federal government to construct the pond, dam and channels prior to 1902 establishing Pre 1914 State Water rights for the pond.

Napa County is concerned that the current location of the residence and the associated septic/leach field adjacent to the channel does not comply with the County's minimum setback requirements derived from the USGS depicted blue-lined stream. This memo describes the existing physical condition of the channel, its capacity to support biological resources, and its formal stream classification based on a July 18, 2012 site visit, and compares it to the blue-lined stream identified on the USGS map to determine whether the County setback is applicable and whether a California Department of Fish and Game (DFG) Stream Bed Alteration Agreement (SAA) would apply for previous work completed to replace a 100 year old redwood flume which served as a spillway for the onsite manmade storage pond. For the purposes of this memo, the study area includes the ephemeral drainage, the manmade storage pond, the seep, the residential housing and associated infrastructure, and the intermittent drainage to the south of the residential housing.

Location

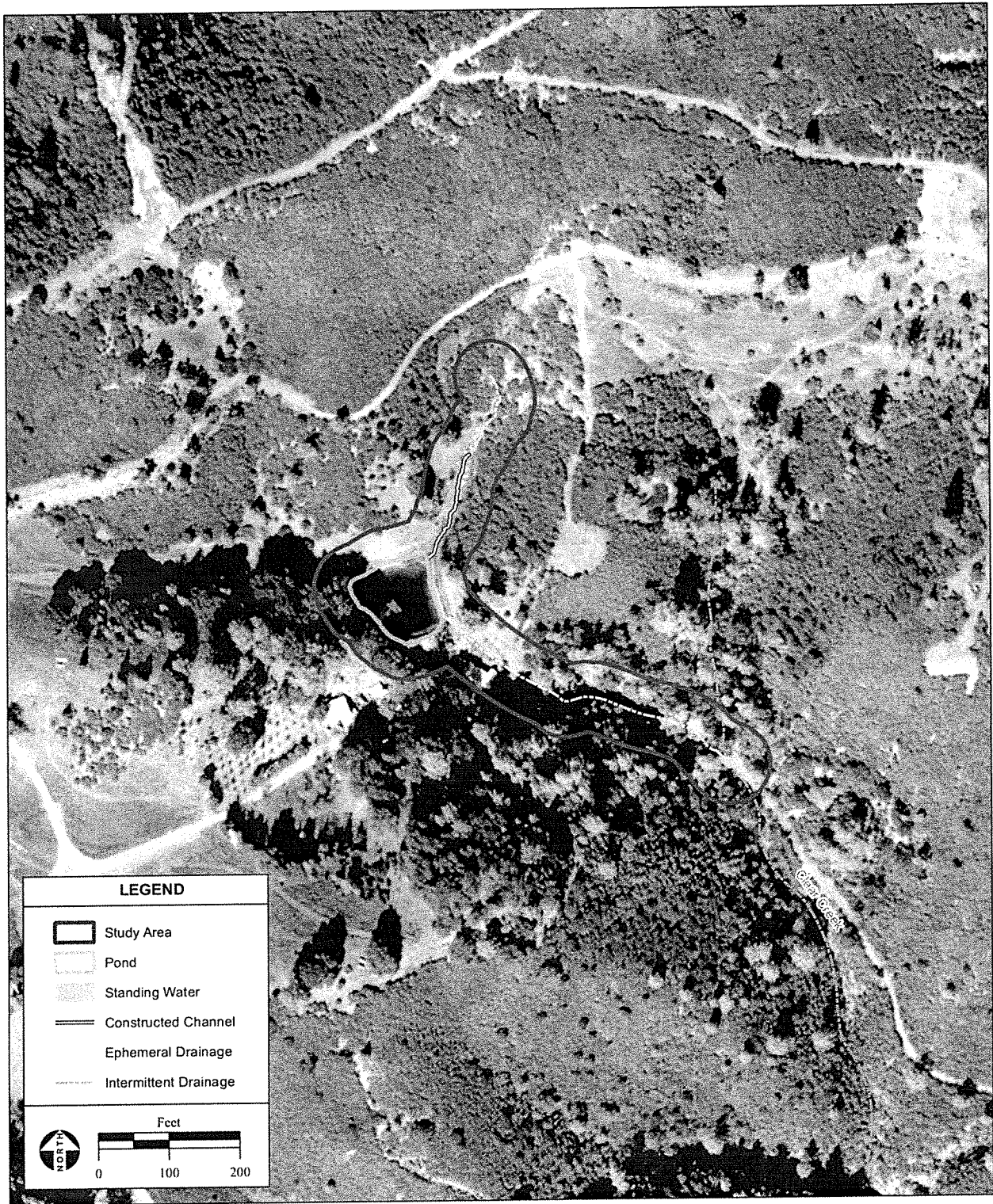
The property is located approximately seven miles east of St. Helena in Napa County, California. The property is located within Township 8 North, Range 4 West, Sections 29 and 30 of the Chiles Valley USGS quad map. The centroid of the property is 38° 31' 10.33" North, 122° 20' 12.20" West. A topographic map and an aerial photograph of the study area are provided in **Figures 1 and 2**, respectively.



SOURCE: "Chiles Valley, CA" USGS 7.5 Minute Topographic Quadrangle, T8N R4W, Sections 29 & 30; Mt. Diablo Baseline & Meridian; AES, 2012

Phelan Vineyard Stream Characterization Memorandum / 212526 ■

Figure 1
Site and Vicinity



SOURCE: USDA NAIP Aerial Photograph, 2010; AES, 2012

Phelan Vineyard Stream Characterization Memorandum / 212526 ■

Figure 2
Aerial Photograph

Methodology

Analytical Environmental Services (AES) Senior Biologist Benjamin Barker conducted a site visit of the study area on July 18, 2012. Mr. Barker walked the study area in a north-to-south direction to document habitat types, characterize and classify the stream channel, evaluate whether it significantly contributes water to the existing storage pond, and to preliminarily determine the location and periodicity of seasonal flow of the channels within the study area. Photographs of the stream channels and habitat types within the study area are provided in **Figure 3**.

Stream classifications were made pursuant to the State Water Resources Control Board (State Water Board), Division of Water Rights (Division) Policy for Maintaining Instream Flows in Northern California Coastal Streams (Policy)¹ which includes the following justifications:

- Class I Stream: Fish are always or seasonally present, either currently or historically; and habitat to sustain fish exists.
- Class II Stream: Seasonal or year-round habitat exists for aquatic non-fish vertebrates and/or aquatic benthic macroinvertebrates.
- Class III Stream: An intermittent or ephemeral stream exists that has a defined channel with a defined bank (slope break) that shows evidence of periodic scour and sediment transport.

Results

There are six habitat types that occur within the study area. These include chaparral, ephemeral drainage, intermittent drainage, manmade storage pond, seep, and ruderal/developed. Ruderal/developed areas include a residential dwelling and associated out buildings, garden, graded roads, and driveway. Descriptions of each habitat type are discussed below as they were encountered during the survey.

Chaparral occurs within the northern portion of the study area surrounding the ephemeral drainage and storage pond to the north and east. Dominant vegetation observed within this habitat type includes manzanita (*Manzanita* sp.), chamise (*Adenostoma fasciculatum*), gray pine (*Pinus sabiniana*), toyon (*Heteromeles arbutifolia*), wild oat (*Avena fatua*), and soap plant (*Chlorogalum* sp.).

A single ephemeral drainage extends north-to-south along the eastern portion of the study area (**Figure 3**). The drainage initiates approximately 250 feet north of the storage pond at the very top of the watershed forming an approximately two-foot wide and less than six inch deep scour channel within a relatively steep hillside surrounded by the chaparral habitat described above. This minor scour channel flows naturally for approximately 100 feet. At this point the channel is significantly altered from its natural state and contains constructed step pools formed with large boulders that are lined with a thick plastic to prevent infiltration and loss from seepage. This work was completed by the previous land owner with the intention of creating a year round water feature supplied by water from the existing spring fed pond. This water feature was unsustainable, and eventually abandoned, as the evaporative loss of the ponds cycled spring fed water through the feature functionally drew down the pond at a rate

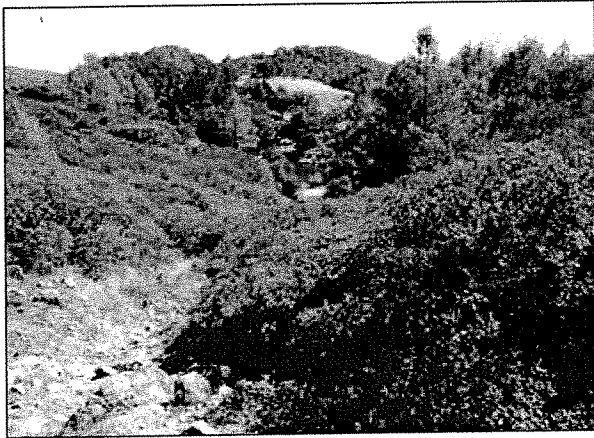


PHOTO 1: View south of ephemeral drainage, surrounding scrub habitat, and manmade storage pond.

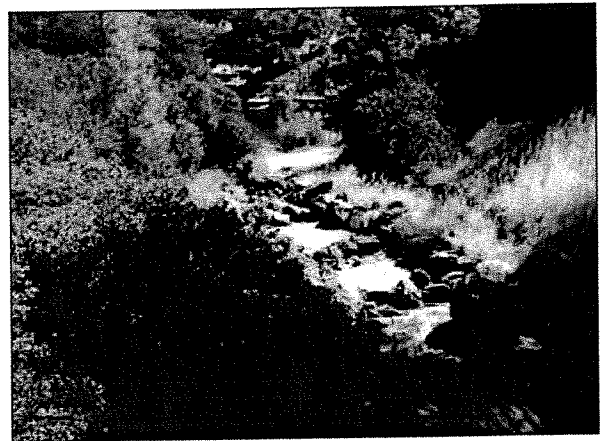


PHOTO 2: View south of ephemeral drainage comprised of rip-rap and manmade storage pond.

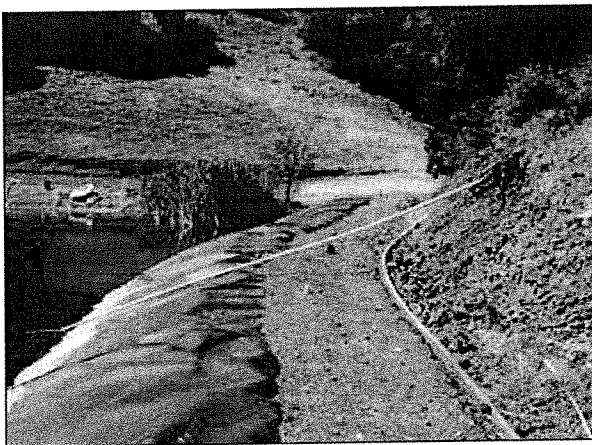


PHOTO 3: View north of pipe transferring water from the seep within the hillside to the manmade storage pond.

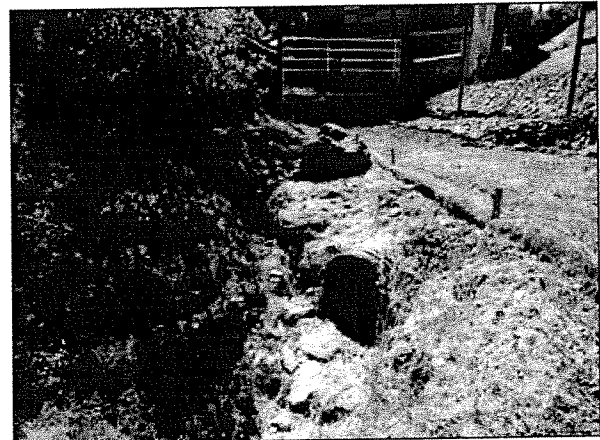


PHOTO 4: View north at discharge point of underground pipeline to the east of the residential housing.

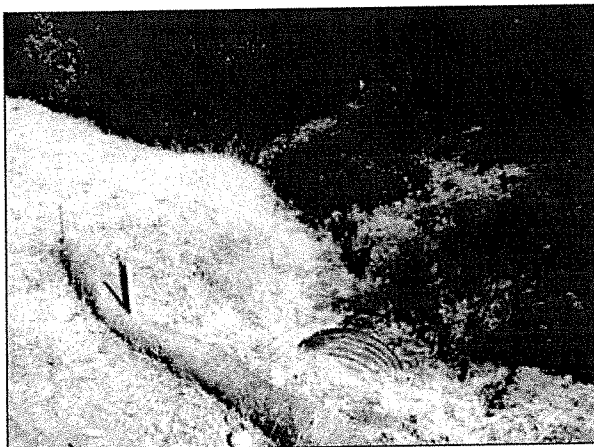


PHOTO 5: View north of dry streambed and culvert just south of the residential housing and north of the tributary.



PHOTO 6: View northeast of tributary to the south of the property. A trickle of water was observed within the tributary during the July 18, 2012 site visit.

exceeding the evaporative losses from the reservoirs surface area. The ephemeral drainage completely lacks any indicators of supporting hydric vegetation above the manmade storage pond.

The ephemeral channel would likely have historically extended through the existing manmade storage pond presumably maintaining a relatively steep graded scour channel through a transition of chaparral and mixed oak woodland to its transition with an intermittent drainage channel located approximately 400 feet downstream of the manmade storage pond. Based on the known age of the cabin on site (ca. 1903) and the fact that the building pad was excavated it would appear that the material from this excavation was the primary source of the construction of the pond (dam). This indicates that the date of construction of the pond was approximately 1903. The pond initially served as a stock pond until recently when it has been also used for limited recreational uses by the current and previous land owner.

The pond currently contains a corrugated plastic culvert (approximately 130 feet in length), which acts as a passive spillway during significant rain events. At the toe of the hillslope, the pipe directs water into a small constructed rip-rap pool to dissipate energy where it is then shunted under an access road through a second section of culvert where it exits into the continuation of natural ephemeral stream channel. From this point, the ephemeral channel flows for an additional 250 feet through a deeply confined ravine to its confluence with a small intermittent drainage (described in further detail below). No water was observed flowing or ponded within the ephemeral drainage during the July 18, 2012 site visit. The ephemeral channel in this reach becomes deeply incised (up to one meter) approximately 75 feet below the re-initiation point of the natural channel to the confluence with the intermittent drainage. The remaining 175 feet of ephemeral drainage shows signs of small pool formation (50-60 centimeters) and sporadically supports rush (*Juncus* sp.) and sedge (*Cyperus* sp.) which are hydric wetland associated plant species. Once it merges with the intermittent channel it becomes a full Class II stream course based on intermittent hydrology, physical habitat indicators, and the subsequent capacity to support aquatic species on a seasonal basis.

The manmade storage pond that the ephemeral drainage flows into is lined with an impermeable layer of plastic and generally lacks hydric and/or riparian vegetation around the perimeter with exception to a small patch of cattails (*Typha latifolia*) and willow (*Salix* sp.) which occurs at the transition of the ephemeral drainage and the pond. The pond is non-consumptive, used only for recreation, and is maintained at maximum capacity on a year round basis via a one inch PVC pipeline that transfers water from a perennial spring located within the hillside to the east. A second, smaller seep flows from the hillside approximately 15 feet south of the point where the ephemeral drainage meets the pond. This seep flows at a relatively low rate throughout the year contributing a minor amount of water the reservoir primarily in the winter and spring months; it was trickling down the cut bank during the survey and was not flowing into the reservoir.

Approximately 400 feet downstream of the manmade storage pond (within the southern portion of the study area), an intermittent drainage converges with the ephemeral channel described above. A steady seep of water and channel saturation was observed within the bed of the intermittent drainage. The drainage is comprised of an approximately four-foot wide defined bed and bank. The drainage appears

to be intermittent and receive ground water seepage throughout the year given the observed hydrologic conditions (e.g. the previous low water year and timing of the summer survey). The intermittent drainage is comprised of characteristics more similar to those that would be considered a blue-lined intermittent stream (e.g. channel morphology and presence of habitat for aquatic organisms during summer months). Water was noted in this channel downstream from the point of confluence with the ephemeral drainage and a small pool was observed at this junction that supported aquatic macroinvertebrates.

Discussion

The USGS map identifies this ephemeral drainage as a blue-line intermittent stream (**Figure 1**) which initiates near the center of the manmade storage pond. USGS blue-line streams are derived from USGS 7.5-minute topographic contours at a scale of 1:24,000. As shown in **Figure 1**, the USGS derived blue-line stream course is contradictory to what is actually present on the ground as described above and as depicted in **Figure 2**.

Based on the physical dimensions of the ephemeral drainage channel, deficiency of pool formation, lack of substrate sorting, and small drainage area, the channel contributes very little to the water level within the manmade storage pond when considering the year-round influence from the hillside spring that feeds the impoundment and the lack of consumptive use of this water. As such, contribution to the pond from this ephemeral drainage channel is limited to the first substantial rain event of the season (likely greater than or equal to 0.5 inches) which would fill the difference between summer/fall evaporative losses and the inflow from the spring; it is apparent this ephemeral drainage flows only during and immediately following significant precipitation events.

Based on historical accounts of previous land owners, the manmade storage pond has been present since the early 1900s (ca. 1903). These historical accounts indicate that the pond has always been fed primarily from the hillside seep and that historically an open flume comprised of redwood conveyed passive flows from the pond during storm events. This redwood flume followed the alignment of the existing buried corrugated culvert which currently serves as the passive spillway pipe for the manmade storage pond.

Over time this redwood flume naturally deteriorated and created a condition where runoff and seepage under and around the structure was causing significant erosion, which compromised the integrity of the hillside, created routine maintenance issues, and conveyed an aberrant sediment load downstream to Clear Creek, which is ultimately a tributary to the Napa River. For these reasons, and due to the dilapidated condition of the 100-year old redwood flume, the current property owner installed the current culvert outfall.

The existing buried culvert outfall is sized to accommodate a 100-year plus storm event modeled for the watershed. This was done to ensure that flows generated from such an event would be passively conveyed downstream and subsequently guarantees that stream forming processes (e.g. gravel and large woody debris recruitment and channel maintenance flows) are maintained in the receiving water

bodies where they are needed downstream given the fact that in the winter months the pond is at capacity and all storm flows are passively bypassed through the pond.

In addition, the Napa River is listed on the Clean Water Act (CWA) 303d list of impaired water bodies for sediment and currently has a Total Maximum Daily Load (TMDL) established to help reduce sediment sources in the watershed. As such, the replacement of this deteriorating redwood flume, functionally decreasing the rate of erosion and the contribution of sediment to downstream receiving water body's tributary to the Napa River, is in conformance with the goals and objectives of this Napa River Basin TMDL and should be taken into consideration if after the fact permits are required for the work.

Conclusions

Based on the observation made during the July 18, 2012 site visit, the ephemeral drainage is best described as a Class III stream course as it does not contain the physical habitat or flow duration to support aquatic dependent species and has a defined channel with a defined bank (slope break) that shows evidence of periodic scour and sediment transport. Based on this classification, the blue-lined intermittent stream identified on the USGS map is not accurately located when considering the existing biological and physical habitat conditions and indicators observed during the survey.

The intermittent drainage to the east of the pond is best described as a Class II stream based on the hydrologic conditions observed during the site visit (e.g. wetted channel) and the presence of seasonal habitat for aquatic macroinvertebrates at and below the confluence with the ephemeral drainage.

The replacement of the redwood flume with the current culvert outfall contributed a net benefit to the stream system when considering the Napa River Basin TMDL for sediment reduction in the watershed.

References

- ¹Policy for Maintaining Instream Flows in Northern California Coastal Streams. State Water Resources Control Board, Division of Water Rights. Adopted May 4, 2010, Effective September 28, 2010.