

## Dark Gulch Creek Crossing Stabilization

### Project Overview

The San Mateo Resource Conservation District (RCD), in partnership with San Mateo County Parks Department, proposes to improve habitat conditions and water quality in the Pescadero Creek Watershed for the benefit of native fish and other species by reducing sediment sources from Old Haul Road into tributaries of Pescadero Creek. Pescadero Creek was listed in 1998 by the San Francisco Bay Regional Water Quality Control Water Board as impaired by excess sediment for fish habitat, including listed populations of coho salmon (*Oncorhynchus kitsutch*) and native steelhead trout (*Oncorhynchus mykiss*).

The project addresses a failing crossing on Old Haul Road at Dark Gulch Creek, a tributary to Pescadero Creek which is 0.06 miles downstream from the crossing. Erosion at the Dark Gulch crossing is shedding an estimated 600 cubic yards of soil annually. In addition, the site is at risk for complete failure, which would result in delivery of as much as 37,000 cubic yards of soil into the Pescadero Creek network. A catastrophic failure would result in significant damage to the downstream channel, streamside habitat, downstream assemblages of native fish and wildlife, and possible impacts to structures (e.g. bridges). Furthermore, catastrophic failure of the crossing would result in loss of a critical piece of infrastructure, Old Haul Road, used for emergency response, fire-fighting, and recreation. The proposed project removes the eroding crossing and collapsed box culvert, and reconstructs a stable crossing with drainage features that have been designed for proper, long-term function that prevents future erosion. Stabilizing the crossing will also ensure that crucial vehicle access is maintained on Old Haul Road for recreation, administrative and emergency purposes for San Mateo County Parks Department and CalFire.

### Background

Pescadero Creek is listed under the Clean Water Act Section 303(d) as impaired by sediment, harmful to salmonids including steelhead trout and coho salmon. The State Water Resources Control Board has developed a Total Maximum Daily Load (TMDL) to address the sediment impairment, which directly references this project to help achieve its goals for source control and protection of downstream public trust resources. In addition to the 303d listing and TMDL, NOAA Fisheries has designated Pescadero Creek as critical habitat for Central California coast steelhead (NMFS 2005) and is listed as a Phase 1 expansion area on the Central California Coast Coho Recovery Plan (NMFS 2012). U.S. Fish and Wildlife Service (USFWS) designated the project area as critical habitat for two federally-threatened species: California red-legged frog (*Rana draytonii*) and marbled murrelet (*Brachyramphus marmoratus*) and (USFWS 2010; USFWS 2011). Of these four federally listed species, the two salmonids and the red-legged frog will directly benefit from this project.

Old Haul Road was built along the south side of Pescadero Creek as a railroad grade in the early to mid-1900s for timber operation. (Figure 1) It was constructed using what would today be considered primitive construction technology, without concern for water quality impacts or long-term stability. The road crosses multiple tributaries to Pescadero Creek, and at these stream crossings, large crib logs were used to buttress and build up large fill embankments, and to form box culverts to convey stream flow through the bottom of the fill embankment. (See Figure 2)

Over the past 70 to 100 years the logs that make up the structural integrity of the crossings have decayed and the box culverts that convey stream flow through the fill embankment have collapsed to varying degrees. At Dark Gulch, the largest of these crossings, the original crib logs have decayed and collapsed and infilled the watercourse.

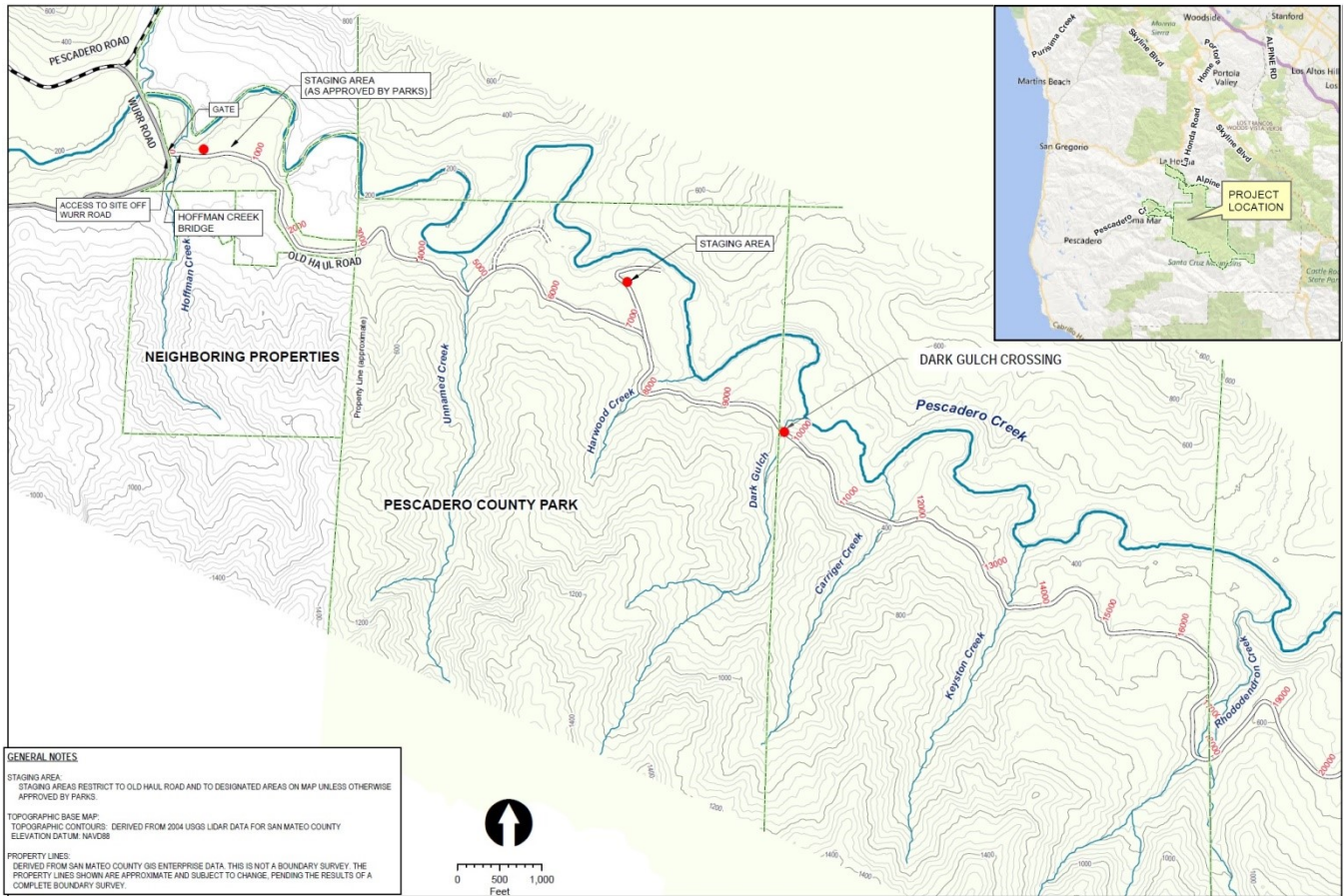


Figure 1. Project location map.

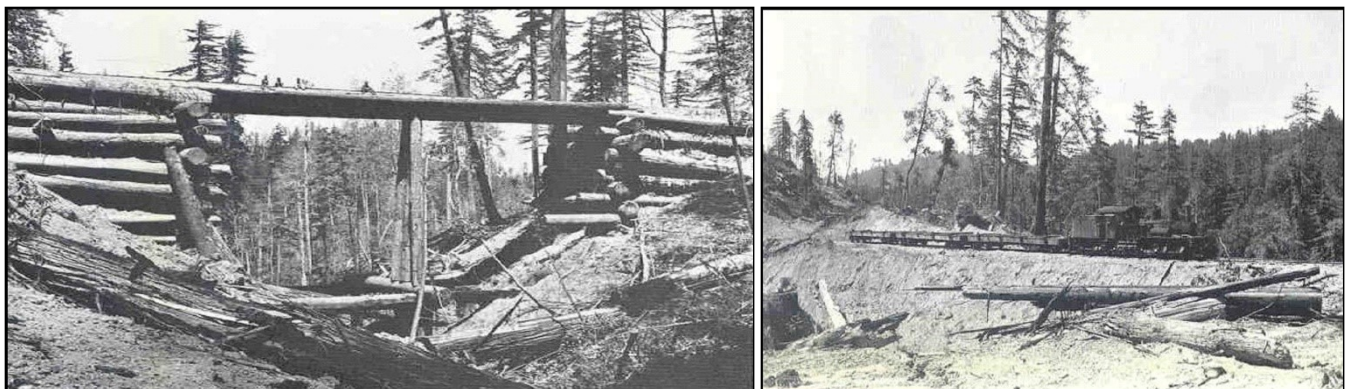


Figure 2. Rail crossings on Old Haul Road circa 1940s. Left, crib log box culvert. Note the men sitting on top of the crossing. (Santa Cruz Lumber Company photo (1943)). Right, example of large fill embankment. (Jack Gison photo (1947)). Both photos referenced in Dwight Ennis, <http://www.santacruzlumberco.com/index1.htm>

Survey mapping and subsurface investigations indicate that the Dark Gulch crossing has approximately 37,000 cy up to 69 feet deep. Presently, runoff flows and percolates through soil pipes and small cavities in the crossing fill, and erosion around the crib logs and the collapse of cavities has resulted in sediment delivery to the stream and the formation of cone shaped “sinkholes” on the ground surface, as well as several gullies and debris flow failures on both the up and downstream embankments.



Most recently, failures occurred in 2015 and 2017. Sinkhole formation has also led to tension cracks, fissures, and overturned trees rooted in the fill, adding to chronic erosion because of the barren soils that are being continuously produced and impacted by seasonal rainfall. The crossing has a high potential for continued slow progressive failure and if no action is taken, excess sediment delivery 0.06 miles downstream to Pescadero Creek (currently estimated at 600 cy/yr) will increase, degrading water quality and aquatic habitat, and potentially impacting fisheries. There is also a risk of catastrophic failure of the crossing which would result in significant damage to the downstream channel, streamside habitat and other structures (e.g. bridges).

### Project activities

To establish a stable road prism across the drainage, allow for the safe conveyance of stream flow through the crossing, and substantially reduce the risk of the crossing failure and sediment delivery to the stream network the project will:

1. remove the entire crossing, including all unstable fill material;
2. install a large diameter culvert; and
3. reconstruct a smaller crossing embankment with engineered fill.

Approximately 37,360 cy of fill material will need to be excavated from the Dark Gulch crossing, and approximately 22,725 cy of approved clean fill (i.e., non-deleterious material) from the excavation will be used for engineered fill to reconstruct the crossing. This new crossing will be relocated approximately 50 feet upstream with the road lowered by about 15 feet to reduce the size of the crossing. Crossing reconstruction includes installation of a new plastic (HDPE) or heavy gauge steel culvert (60" to 72" inch diameter by 260 foot long) at native channel grade (16%). A rock energy dissipater will be installed at the culvert outlet; a headwall that is rock-armored to the top of the pipe inlet; and a trash rack/pole upstream of the culvert inlet. Installation of final erosion control measures will include drainage dips to hydrologically disconnect the road from Dark Gulch stream.



*Figure 3. Example of crossing failure: a sinkhole collapsed on the downslope side of Dark Gulch crossing (2015).*

### REFERENCES:

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