CALIFORNIA Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

North Coast Regional Water Quality Control Board

Inspection Report
Stanshaw Creek Diversion
Marble Mountain Ranch
Douglas and Heidi Cole, Landowners
92520 Hwy 96, Somes Bar
Siskiyou County
WDID No. 1A15024NSI

Date:	March 9, 2015
To:	Diana Henrioulle – Senior Water Resource Control Engineer Shin-Roei Lee – Supervising Water Resource Control Engineer David Leland – Assistant Executive Officer Taro Murano – Division of Water Rights, Senior Environmental Scientist, Public Trust Unit
From:	Stormer Feiler, Environmental Scientist
Inspection Date:	February 12, 2015
Mailing and Physical Address:	92520 Hwy. 96, Somes Bar, CA 95568
Assessor's Parcel Number:	026-290-200,
Landowner:	Douglas and Heidi Cole
Watershed:	Stanshaw Creek and Irving Creek watersheds within the Ukonom Hydrologic Subarea of the Middle Klamath River watershed

Introduction

At the request of staff of the State Water Resources Control Board's Division of Water Rights Public Trust Unit (DIV), on February 12, 2015, I accompanied DIV staff Skyler Anderson and Michael Vella on an inspection of the Stanshaw Creek diversion. The diversion originates on Stanshaw Creek and discharges to Irving Creek, both tributaries to the Klamath River, near Somes Bar. Diverted water is used for electrical power generation with a pelton wheel and for domestic water supply on the Marble Mountain Ranch.

The diversion has reportedly been in place since the 1800s, supplying a variety of uses to landowners over the years with the most recent landowners being the current owners of the Marble Mountain Ranch, Douglas and Heidi Cole. The DIV is presently in the process of reviewing various aspects of the diversion, in response to complaints of public trust impacts and unauthorized diversion in excess of pre-1914 water rights. The objective of this inspection was to evaluate the existing and potential impacts to water quality and beneficial uses associated with operation of the diversion.

Diversion Description

As noted above, the diversion originates in Stanshaw Creek (tributary to Klamath River at river mile 76.1) and discharges into Irving Creek (tributary to Klamath River at river mile 75). The Point of Diversion (POD) is located on Stanshaw Creek, about 0.68 miles upstream of the Highway 96 crossing[1]. A gravel and cobble push-up dam diverts water from Stanshaw Creek. When flow in Stanshaw Creek is less than approximately 3-4 cfs (typical late spring, summer, and fall flow conditions), most of the creek flow is diverted into the ditch. Conveyance is gravity driven, via lined and unlined ditch, approximately 0.5 miles to a junction where flows are directed either to a water treatment plant or to a forebay and penstock that services the power generation facility and a pressurized irrigation system. Conveyance from the junction to the forebay is via lined and unlined ditch. Lined ditch reaches reportedly consist of half rounds of corrugated PVC, of approximately 30-inch diameter. Discharge from the power plant is conveyed via ditch to an onsite pond. Flows from the pond are conveyed in a ditch to the south across the Ranch to a steep slope that has headcut and is discharging to a tributary stream to Irving Creek.

Watershed and Beneficial Uses Information

Stanshaw Creek is within the Stanislaus Creek, Cal Water Watershed No. 1105.310701, and Irving Creek is in the Irving Creek Cal Water Watershed No. 1105.310702 (Cal Water version 2.2). Both of these streams are tributary to the Ukonom Hydrologic Subarea of the Middle Klamath River Hydrologic Area. The Middle Klamath River is federal Clean Water Act section 303(d)-listed for nutrient, temperature, and organic enrichment/dissolved oxygen impairments. On September 7, 2010, the State Water Resources Control Board adopted a Resolution approving amendments to the Water Quality Control Plan for the North Coast Region to establish: (1) Site Specific Dissolved Oxygen Objectives for the Klamath River; (2) an Action Plan for the Klamath River Total Maximum Daily Loads Addressing Temperature, Dissolved Oxygen, Nutrient, and Microcystin Impairments in the Klamath River; and (3) an Implementation Plan for the Klamath and Lost River Basins. On December 28, 2010, the US Environmental Protection Agency approved the TMDLs for the Klamath River in California pursuant to CWA Section 303(d)(2). The Action Plan indicates that temperature impairments in the Klamath are

[1] Diversion description drawn from information contained in “Marble Mountain Ranch Water Rights Investigation: Water Use Technical Memorandum,” prepared by Cascade Stream Solutions, LLC, November 18, 2014.

attributable in part to excess sediment loads from anthropogenic sources, and encourages parties responsible for existing sediment sources to take steps to inventory and address those sources.

The Water Quality Control Plan for the North Coast Region (Basin Plan) designates the following existing and potential beneficial uses for the Middle Klamath River and its tributaries within the Ukonom Hydrologic Subarea: Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Service Supply (IND), Industrial Process Supply (PRO), Ground Water Recharge (GWR), Freshwater Replenishment (FRSH), Navigation (NAV), Power Generation (POW), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Commercial and Sport Fishing (COMM), Warm Freshwater Habitat (WARM), Cold Freshwater Habitat (COLD), Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species Habitat (RARE), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Aquaculture (AQUA), and Native American Culture (CUL). Through direct site observation, it appears that the primary beneficial uses the diversion potentially impacts are COMM, MIGR, COLD, SPWN, RARE, and CUL.

The Basin Plan includes a series of water quality objectives designed and intended to protect the beneficial uses of water and guide determining violations of the Basin Plan and Porter Cologne Water Quality Control Act. The following objectives are likely to be associated with water quality violations that occur from the operation and maintenance of the Stanshaw Diversion as observed and discussed herein.

<u>Color</u>
Water shall be free of coloration that causes nuisance or adversely affects beneficial; uses.

<u>Floating Material</u>
Water shall not contain floating material, including solids, liquids, foams, and scum in concentrations that cause nuisance or adversely affect beneficial uses.

<u>Suspended Material</u>
Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

<u>Settleable Material</u>
Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affects beneficial uses.

<u>Sediment</u>
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.

<u>Turbidity</u>
Turbidity shall not be increased more than 20% above naturally occurring background levels. Allowable zones of dilution within which higher percentages can

be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof.

Inspection Observations

On February 12, 2015, I accessed the Marble Mountain Ranch and Stanshaw Diversion with Skyler Anderson and Michael Vella. During the course of my inspection, I walked the Diversion from the Point of Diversion in Stanshaw Creek to the penstock for the power plant (upper ditch), I observed a stretch of the lower ditch from the pond to the gully that discharges to Irving Creek (lower ditch), and I observed three established diversion monitoring locations used to measure cumulative daily flows and water losses.

The upper ditch is located upslope of and runs southwest, roughly parallel to Stanshaw Creek, gradually diverging away at an approximately 15-20 degree angle as it approaches the junction before turning southeast and heading toward the forebay and penstock. As noted above, this segment is comprised of lined and unlined reaches. Unlined and lined reaches are confined by an earthen berm on the outboard (downslope) side. Sediment from a number of sources, including Stanshaw Creek, hillslope erosion, and landsliding reportedly deposits in this segment of channel, affecting conveyance capacity. The outboard berm elevation reportedly varies at times due to overtopping, slumping, hillslope failure, and trampling by wildlife.

During the February 12 inspection, I identified 19 areas of concern (Points) on the upper ditch where the outboard berm or upslope cut banks have the potential to fail or have failed, diverting some or all in-channel flows onto native slopes causing erosion and formation of channels delivering sediment towards or into Stanshaw Creek. I observed evidence of three primary types of ditch failure: 1) cut bank slumps block the ditch and cause flows to overtop the berm; 2) water infiltrates into and seeps through the berm, and causes the berm to fail eroding underlying soils and hillslopes; and 3) as noted above, cumulative sediment inputs reduce the ditch capacity and increase the risk of overtopping as ditch capacity is diminished, particularly increasing the potential for failure in areas where the berm is low or has been damaged.

As discussed below, at inspection Points 4 and 5, and visible in image 1, the upper ditch crosses over an unnamed tributary to Stanshaw Creek. The tributary is conveyed under the ditch via culvert. At this location, there is also a culvert that drains a portion of the water in the ditch and discharges it through a shotgunned outlet onto the slope a short distance below the outfall for the stream crossing culvert. The combination of uncontrolled discharges and additional flows into the unnamed tributary has caused significant streambank erosion and channel widening in the tributary downstream of the culvert. The ditch may have historically failed at this location, which has likely also contributed to stream channel enlargement.

I followed the lower ditch from the pond to its discharge point into the gully leading to the unnamed tributary to Irving Creek. Along the lower ditch, the primary area of concern for water quality is Point 20, the headcut erosion where return flows from the Ranch are discharged to Irving Creek.

I do not have GPS coordinates for the points I observed and report on herein; however, the photos provided below include a description of the observed conditions.

Image 1 provides general locations for the Point of Diversion at Stanshaw Creek (Point 1), and the discharge point above Irving Creek (Point 20), which are the start and end points of inspection observations as ordered below.

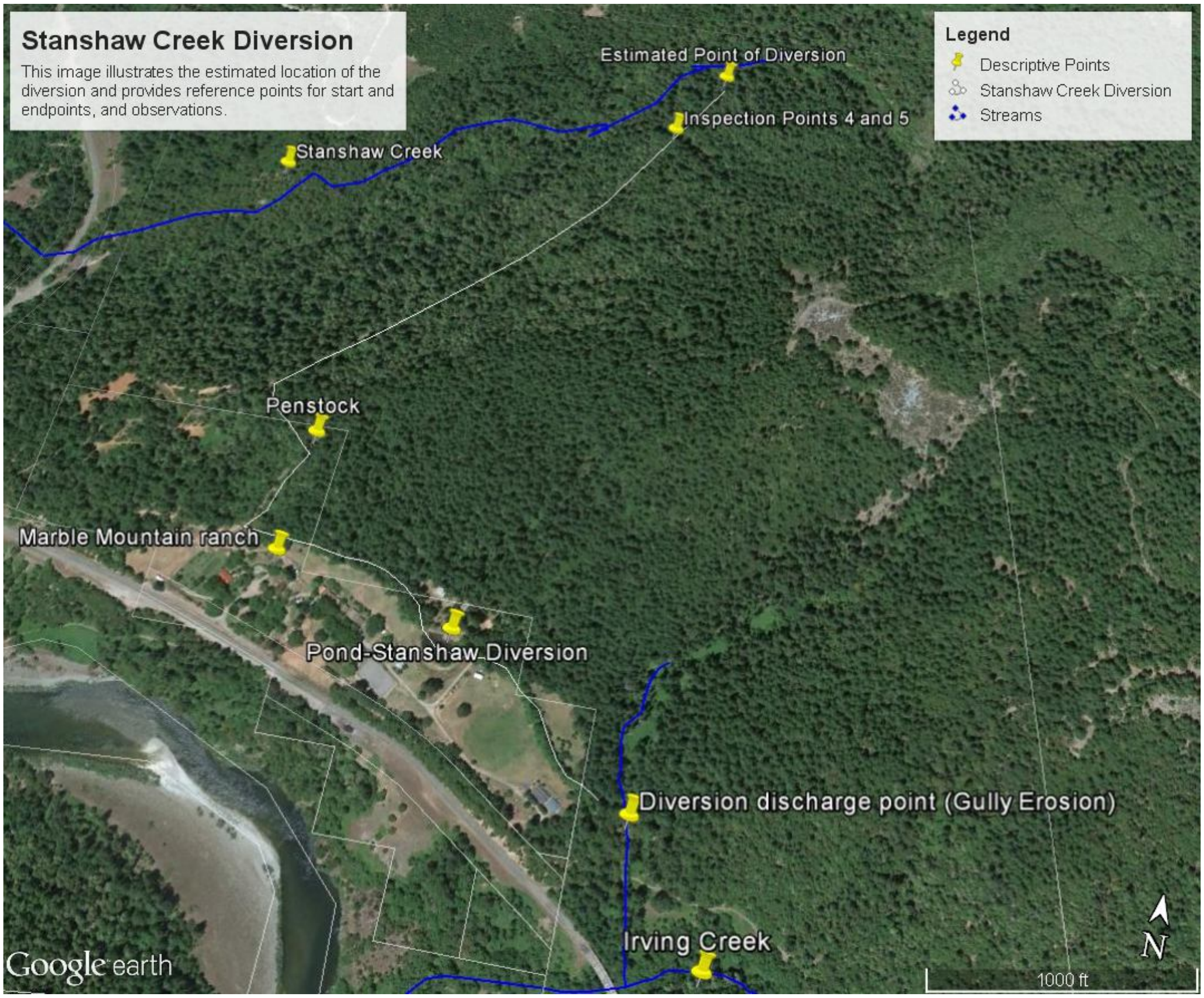

Image 1- shows an overview of the Stanshaw Diversion route and Marble Mountain Ranch. The locations identified are estimated based upon visual observation of the area during the inspection and through subsequent comparison with existing 6/6/2013 Google Earth Pro imagery, Arcview GIS topographic maps, and historic maps of the diversion.

<u>Inspection Photographs and Observations</u>

I have presented photographic images below in order proceeding down the diversion from the point of diversion to the diversions' discharge point into an unnamed tributary to Irving Creek. I took all photos on February 12, 2015. At many of the

Points, I observed multiple issues within a short reach of the ditch, likely posing an increased risk of ditch failure and downslope erosion.

Image 3- shows Point 1, the Point of Diversion. The Stanshaw Diversion flows toward the lower right corner of this image. It appears the rock and cobble diversion structure fails episodically and likely requires periodic modification as Stanshaw Creek's flows change, in order to maintain a diverted flow. (Photos 8459, 8460 and 8461 stitched)

Image 4- shows Point 2, a failure along the outboard berm, approximately 70 feet downstream of Point 1, allowing some of the water in the ditch to flow down to Stanshaw Creek, potentially resulting in erosion and sediment transport. This location appears to have failed repeatedly in the past. The instream flume in the Ditch just downstream of this failure is used to measure flows entering the diversion. (Photo 8454 and 8455)

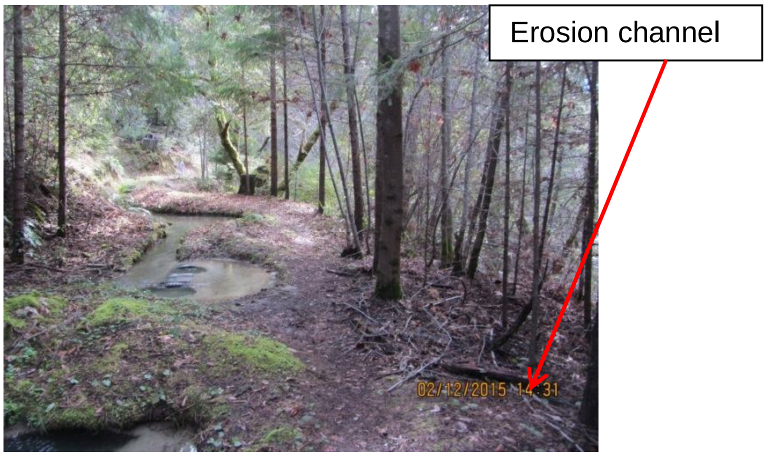

Image 5- shows Point 3, a tank or railroad tank car buried in the ditch channel, likely intended to trap sediment. The tank car is full of sediment. Water flowing in the ditch appears to have overtopped the outboard berm at this location and caused some erosion on the slopes below. (Photo 8467)

Image 6- shows the erosion channel downslope of Point 3.

Image 7- shows the erosion channel downslope of Point 3. The void is visible here in the foreground; the erosion extends downslope an unknown distance.

Image 8- at Point 3, shows a closer view of the buried tank car with stored sediments visible. (Photo 8450)

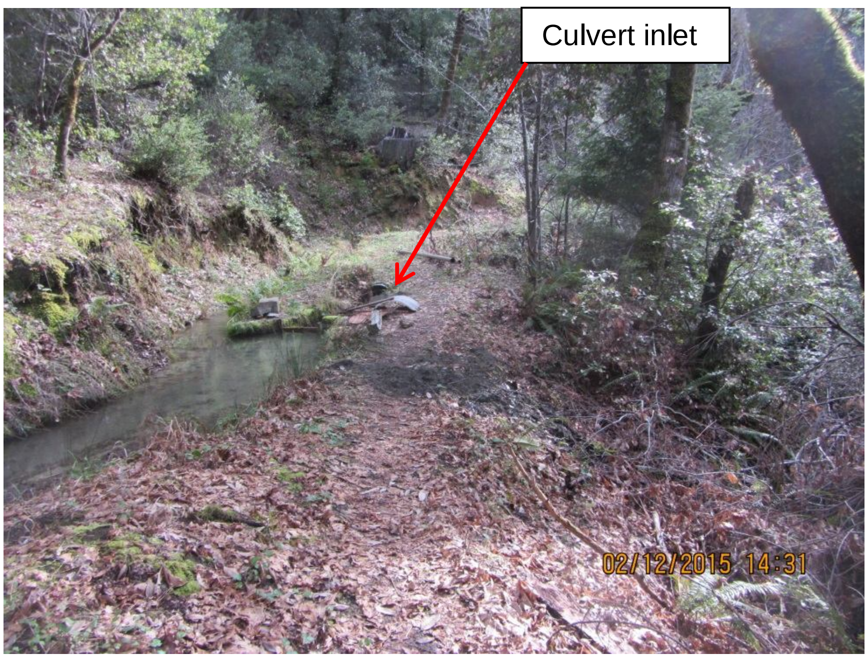

Image 9- at Point 4, shows the partial diversion of the ditch into an unnamed tributary to Stanshaw Creek through the inlet of a 12-inch culvert, before the diversion ditch is routed across the stream in a lined ditch. The culvert is shotgunned, which appears to have caused significant instream erosion in the downslope channel. The stream above the crossing is 3-4 feet wide at bankfull width; the eroded stream channel below the diversion crossing is 12-14 feet wide, and does not appear stable. At this location, I also observed muddy soils in the berm adjacent to the ditch, indicating that seepage from the ditch is saturating surrounding soils, which may lead to catastrophic failure of the ditch. (Photo 8441)

Image 10- at Point 4, shows a closer look at the seepage in the berm; note the muddy soils in the foreground. (Photo 8441 cropped)

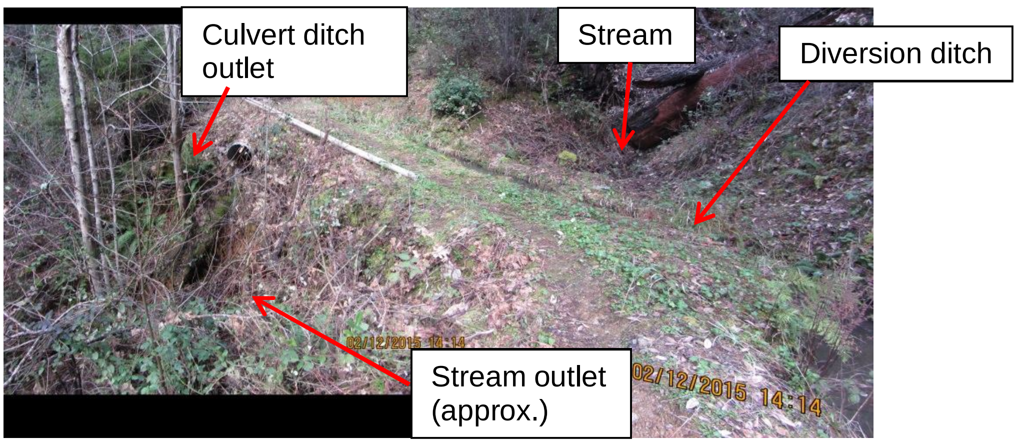

Image 9- at Point 5, shows the shotgunned 12-inch ditch culvert outlet, diversion ditch and native stream channel flowing under the diversion ditch. (Photos 8442, 8443, 8444, 8445 composite)

Image 10- shows the unnamed stream channel above Points 4 and 5; the upslope active bankfull stream channel width is approximately 3-4 feet.

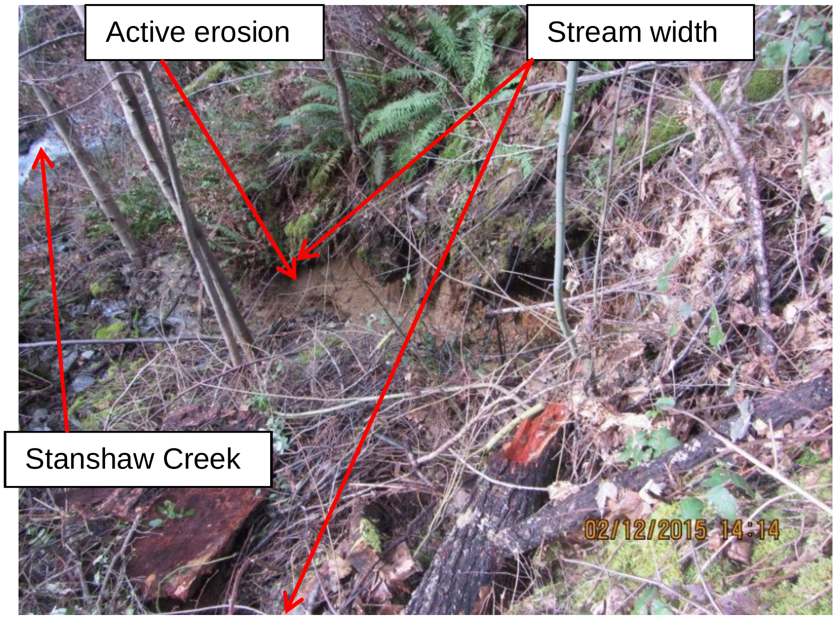

Image 11- shows the unnamed stream channel downstream of Point 5, and the erosion caused by water draining from the shotgunned culvert. Stanshaw Creek can be seen a short distance downslope. I conservatively estimate that this site has delivered 150-300yds³ of sediment and debris to Stanshaw Creek over the life of the Diversion. (Photo 8478)

Image 12- shows Point 6, where the diversion channel is full, leaving no freeboard should it rain or the ditch receive a bank slump upstream. It appears the outboard berm may have failed in this area in the past, and at present is seeping, indicating that a portion of the berm may be saturated. Stanshaw Creek is within 200 feet; any failure here likely results in direct delivery of sediment and erosional debris. The flume section visible in the photo appears to have been installed to remedy previous ditch failures and/or to prevent future failures.

Image 13- point 7, shows the end of the flume in the previous photo; note the black plastic sheeting on the outboard slope face, and the low outboard berm as the diversion ditch exits the flume. The lack of freeboard creates a high potential for overtopping and erosion. The presence of the pipe section and plastic sheeting in the area suggests that the berm or underlying slope in this area has likely failed in the past. (Photo 8483)

Image 14- shows point 8, an approximately 150-foot section of the channel downstream of Point 7, where the low berm and full ditch likely creates a high potential for berm or slope failure, erosion, and sediment transport downslope. I observed concrete blocks at various locations along the outboard edge of the berm throughout this segment, likely to rebuild or reinforce berm sections. (Photo 8486)

Image 15- shows Point 9, a significant failure point, likely caused by a cut bank slump filling the diversion channel and diverting the stream flow. Note the cut bank slump above and the erosion void downslope. This failure likely accelerated erosion on lower slopes and into the nearby streams. (Photo 8490 and 8491 composite)

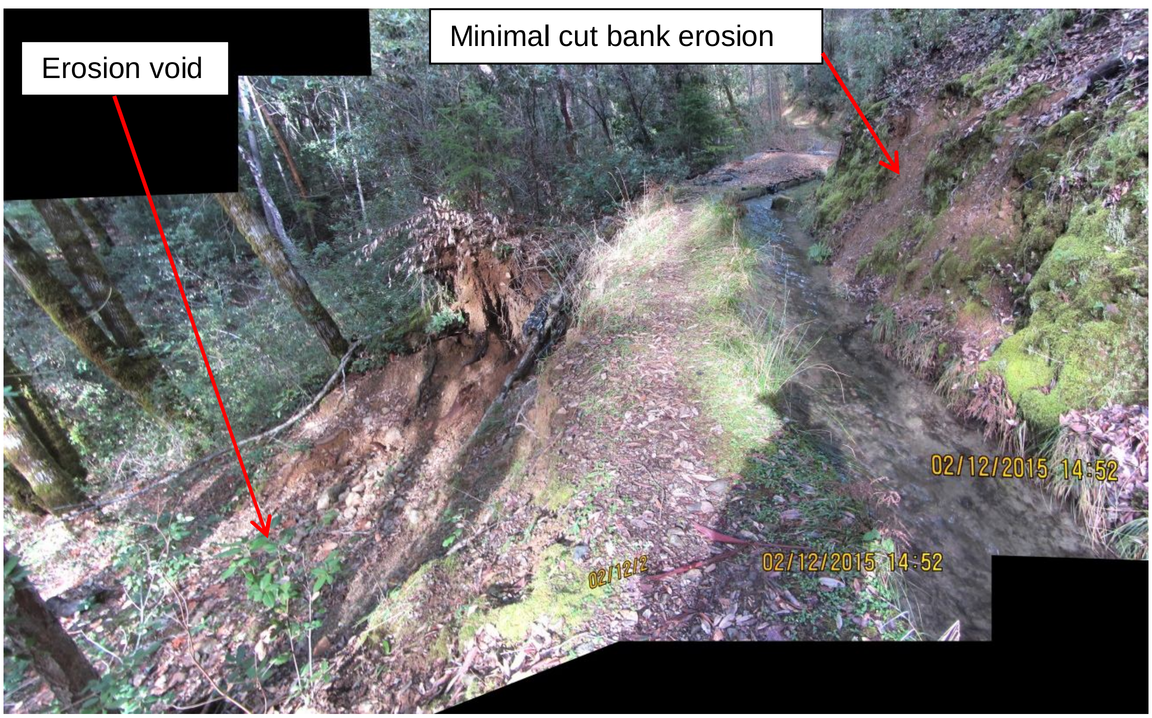

Image 16- Point 10 is an area of concern that includes an erosional channel likely formed by a berm failure and active erosion visible on the cut bank. I observed active cut bank erosion on many of the upper slopes above the diversion ditch and expect that bank slumps have and are contributing significantly to ditch failures. (Photos 8495, 8496, 8497, and 8498 composite image).

Image 17- Point 11 is another 150-200 feet of ditch with a low freeboard and evidence of past failures; this ditch segment leads to a section of ditch subject to a recent bank failure. I observed erosion scars on the lower slopes that are now overgrown with ferns and small shrubs. (Photo 8499)

Image 18- Point 12 shows evidence of a recent bank failure that caused water to overtop the outboard berm and erode slopes below the ditch. The outboard ditch shows signs of seepage throughout this length. Note the sand bags and fresh soils along the outboard berm, indicating recent repairs. Also, note the 50-75 foot section of the cut bank with exposed soils. (Photo 8503)

Image 19- Point 12, closer view of berm repair made with ready crete concrete sacks and soils. Note the saturated soils along the outboard berm where water is seeping. (Photo 8510)

Image 20- Point 13 shows a large continuous cut bank slump that extends for approximately 220 feet. Based on my observations, it appears the cut bank slumped along this stretch over this past winter, delivering approximately 10 yds³ of sediment into the ditch, blocking the channel, and causing water to overtop the berm and erode the lower slopes. Cut banks are often chronic sources of erosion, delivering additional sediment to streams and ditches each year.

Image 21- Point 14, a cut bank that appears to have slumped in the recent past, causing water to overtop the berm and erode the berm and lower slopes. (Photo 8520 and 8521 composite)

Image 22- Point 15 shows an active cut bank slump, and evidence of recent repairs to the ditch and berm. (Photo 8523)

Image 23- Point 16, another cut bank that has a high risk of failure. Note the steep, near vertical slope of this cut bank, which indicates that the bank is still likely to erode. The roots hanging out of the cut bank are indicators of the erosion that has occurred. Most cut banks are originally constructed in a planar form with no visible roots protruding. Over time the cut bank erodes, exposing the roots, and leaving an indicator as to the amount of soil that has eroded or slumped. (Photo 8525)

Image 24- Point 17 shows a segment of channel with an active cut bank slump and evidence of recent repairs to the outboard berm.

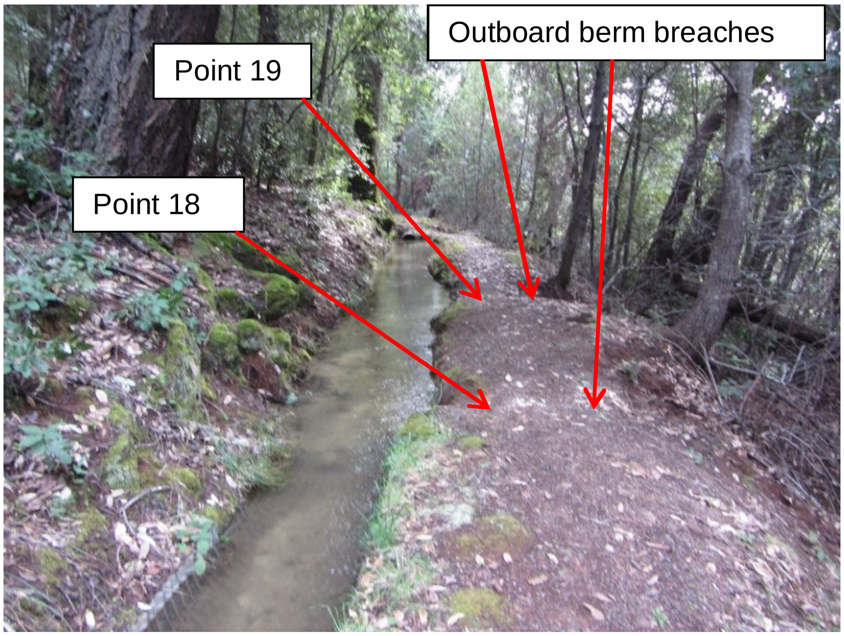

Image 25- shows two locations, points 18 and 19, where the outboard berm has apparently breached in the past, resulting in gully erosion on lower slopes. The failure at Point 19 resulted in the formation of a gully channel for a long distance down the slope, and may have contributed a significant sediment load to the Klamath River and possibly Stanshaw Creek. I did not follow the gully all the way down the slope, but did see an erosion channel from the lower road.

Image 26- Point 20 is the headcut upslope from Irving Creek. This is where tailwater from the Stanshaw Diversion is discharged to an unnamed stream, tributary to Irving Creek. This area is actively eroding. Several trees appear to have fallen recently through erosion of their root masses. I estimate that the headcut erosion has delivered between 1500-2200 yds^3 of sediment to the Irving Creek watershed. (Photo 8529)

Summary

In summary, I observed 19 Points in the upper ditch where the outboard berm has been or may be compromised by either erosion of the berm, saturation of the berm, or sediment loading to the ditch from cut bank failures; the ditch retains the potential to fail in the future from one or a combination of these mechanisms.

On the lower ditch, I observed evidence of significant active erosion occurring at the downstream discharge point to Irving Creek, representing a chronic source of sediment delivery into Irving Creek and, thence, to the Klamath River.

This list of observation points is not exhaustive, and my inspection was not a complete inspection of the entire diversion system. The points selected for discussion provide a basis for analyzing the long term and short term sediment-related impacts of the diversion ditch on water quality. Based upon the observations as provided in the body of this report, portions of the outboard berm and/or the upper ditch have likely been failing periodically since the original construction of the diversion ditch, delivering sediment and debris to Stanshaw Creek. Each time the berm or slope fail, there is the potential for mass erosion of earthen material from lower slopes. In some locations, these erosional gullies are visible and show the age of the failure through the relative recovery of vegetation and duff recruitment within the features.

As the ditch is maintained at a low gradient, approximately 3% grade, the ditch is both transporting fine sediments (colloidal materials) and storing sediment (coarse sediment and consolidated earthen deliveries). Storing sediment reduces the capacity of the ditch and increases the risk of mass failure of the berm through saturation and through berm overtopping and erosion. When sediment is transported out of this ditch system the result is a direct delivery into the pond on the Marble Mountain Ranch, or possibly to the downstream tributary to Irving Creek.

It is apparent that if the diversion system is maintained and operated in the present fashion, it will continue to represent a chronic source of sediment discharge to surface waters in the Middle Klamath River watershed. The Regional Water Board has received at least one complaint over the years regarding water quality impacts associated with the Diversion, specifically, in January 2011 staff received a complaint alleging that repeated failures of the diversion were impacting aquatic resources in the Klamath River and its tributaries through excessive sediment loading. My observations tend to support these allegations, and suggest that further such impacts will occur in the future. In my opinion, the diversion ditch likely represents a chronic source of sediment discharge to Stanshaw Creek and Irving Creek.

I did not inspect the reaches of Stanshaw Creek or Irving Creek downstream of the Stanshaw Diversion, so did not confirm evidence of recent sediment discharges to either Creek or to the Klamath River; however, I did inspect the site of a 2013 Fisheries Restoration Grant (FRGP), Grant # P1110319, which involved the removal of 560 cubic yards of stored sediments at the confluence of Stanshaw Creek and the Klamath River to restore a large backwater pool to provide refugial habitat for salmonid species. A report describing this project indicates, in part, that "[o]riginating from Stanshaw Creek, the bulk of the sediment plug was deposited during the 2005/2006 flood event when the upstream ditch diversion to Marble Mountain Ranch overtopped causing severe gully erosion." Here, I confirmed that at least at present, the backwater pool still appears to be functioning as intended.

The ditch has been in operation for a number of years and, as noted above, supplies water for domestic needs and power generation for the Marble Mountain Ranch. I briefly researched the alternator in use to generate electricity for the ranch. Upon initial evaluation, it appears that there may be opportunities to more efficiently operate the pelton wheel, which would result in significant reductions in the volume of water necessary for power generation.

Water quality is affected by a number of mechanisms, in this case observations indicate that 1) the operation of the Stanshaw Creek Diversion is likely influencing increased sediment loading on the Klamath River, and 2) the flows in Stanshaw Creek provide an important source of water to a refugial habitat for all life stages of salmonids occupying the Klamath River. Cold clean water is the basis of salmonid survival and properly functioning conditions supportive of all beneficial uses. The diversion is losing water through evaporation and seepage to surrounding soils, the loss of water is likely contributing to failures of the berm and erosion resulting in sediment contributions to Stanshaw Creek and Irving Creek. In addition, the loss of water is an impact on water quality when one considers that the diversion takes cold water from a native stream, and after use, places it in another location without the apparent habitat values of its original native location. Finally, as the water passes through the Stanshaw diversion system and crosses through the Marble Mountain Ranch, it may be subject to changes in characteristics based on potential pollutant inputs or increases in temperature. I did observe potential pollutant sources of concern while viewing the diversion system on the Marble Mountain Ranch, primarily domestic livestock grazing. I did not note any locations where the ditch was exposed to run off from livestock grazing or that the ditch was prone to intercepting pollutants generated on the ranch. However, I did not evaluate the entire system on the Ranch, nor collect any samples or take any measurements.

Recommendations

This diversion and its operation can likely be improved significantly, to both reduce sediment discharges, and increase native instream cold water resources in Stanshaw Creek, and the Klamath River basin. To facilitate such an improvement to the benefit of water quality, I recommend the following information be considered in evaluating the current and future operation of the Stanshaw Creek Diversion. Some of this information may already be available or may be under development. Information should be developed by a California licensed professional or professionals with relevant experience.

- Water balance, i.e., how much water enters the Stanshaw diversion, how much discharges, how much is demonstrably applied to consumptive uses within the Marble Mountain Ranch

- Water quality review, i.e., sampling/testing of water entering the Stanshaw diversion and discharging from the Marble Mountain Ranch, identification of factors or features that may be contributing to changes, if any, to water quality– in vs. out
- Review onsite water needs for domestic uses
- Review opportunities to optimize water needs for power generation (this may include reviewing operational requirements for the existing pelton wheel to identify ways to optimize efficiency and/or consideration of alternative hydropower generation systems)
- Review opportunities to reduce water loss or head loss
- Design a delivery system that optimizes water conservation while fulfilling onsite water needs

Outfall/Irving Creek tributary
Regional Water Board staff recommend that an appropriately qualified California licensed professional experienced in Geology and stream restoration evaluate the diversion outfall tributary to Irving Creek and develop a stream restoration plan to restore stream side vegetative and hydrological functions of the tributary, if applicable, and to ensure the long term recovery of the affected streams; and 2) replant slopes and streamside areas with native vegetation to prevent erosion and sediment delivery. The plan shall include provisions to ensure that continued use of this tributary, either for diversion outfall flow or for transport of seasonal flows through the ranch property, does not create new or exacerbate existing erosion.

Upper Ditch
Water quality recommendations regarding the upper ditch will vary depending on whether the ditch or ditch alignment is to be maintained to any degree as part of the delivery system, or whether it is to be taken out of service altogether. Specifically, if/when the ditch is to be taken out of service, Regional Water Board staff recommend that a licensed California professional (or professionals) with experience including hydraulic engineering, geology, and instream and hillslope restoration, develop a plan to decommission the ditch by removing the outboard berm, outsloping the channel as appropriate/necessary to disperse drainage, and stabilizing and replanting all bare soils as necessary on the upslope, channel, berm material, and slopes below the ditch to minimize the potential for continued or future erosion, slope failure, and/or sediment delivery to downslope receiving waters.

Alternatively, for any delivery system that will require that the ditch, ditch alignment, or segments thereof be retained in service, Regional Water Board staff recommend that an appropriately qualified California Licensed professional (or professionals) with experience including hydraulic systems analysis; design, construction and maintenance of water transport and delivery systems; stream and hill slope restoration; and geologic analysis of slope stability:

a) Evaluate the entire ditch system, identify all features and locations susceptible to failure by any of the physical processes and mechanisms described herein, (including but not limited to ditch seepage, berm fill saturation, upslope cutbank stability), identify locations where there is potential for sediment delivery to receiving waters in the event of a failure, develop mitigations including design and construction standards and an implementation schedule as necessary to complete the defined scope of work,

b. Develop and submit for approval a ditch operation and maintenance plan that includes an inspection and maintenance schedule, specifying those measures to be incorporated/ constructed and steps to be taken to ensure that the slopes above the ditch do not fail into and block the ditch, that water seepage from the ditch does not saturate underlying materials and result in failure, that the ditch does not overtop the berm, that the berm does not fail, and that sediment does not deliver from the ditch to waters of the state.

For either alternative, the ditch repair or decommissioning plan shall include specifications to restore the affected stream/unnamed tributary that crosses at inspection points 4/5, replant with native vegetation, and to protect streams from any further impacts or discharges associated with the ditch.

Additional Measures to Protect Water Quality

Regional Water Board staff recommends that an appropriately qualified licensed California professional or professionals conduct the following reviews and develop plans to ensure or implement the following:

a) Assess slopes between the upper ditch and Stanshaw creek and identify any erosional issues associated with the ditch that should be corrected to prevent or minimize sediment delivery to Stanshaw Creek and/or to the Klamath River, and propose and provide a schedule for implementing corrective measures.

b) Assess segments of Stanshaw and Irving Creeks downstream of the diversion inlet & outlet points to identify and map any evidence of damage or sediment storage with potential for restoration. In the event the survey identifies areas where stored sediments can be remediated, or past discharges from the ditch have created erosional features that have the potential to actively erode with rainfall and transport sediment into downstream receiving waters, then develop a plan to remediate and describe any potential concerns with implementing the scope of restoration work identified.

c) Assess the potential for pollutant inputs and/or changes to water quality over the segment of lower ditch passing through the property and discharging at the outfall to Irving Creek. A visual assessment to identify potential locations where pollutants may be added or temperatures may increase coupled with samples collected at the upstream and downstream end of this segment may be adequate for an initial assessment and help to focus additional assessment if necessary. Constituents of concern for sampling/testing may include but are not necessarily limited to nutrients, fecal coliform, total coliform, BOD, temperature, blue green algae and any other potential contaminant of concern identified through the visual assessment.

General Recommendations for Restoration Plans

Restoration plans prepared per recommendations above should include or specify, as applicable/appropriate:

a) Design and construction standards specifications and designs for stream restoration, surface drainage controls, erosion control methods and standards for unanticipated precipitation during restoration, compaction standards, an implementation schedule, a monitoring and reporting plan, and success criteria.

b) Map(s) and/or project designs at 1:12000 or larger scale (e.g., 1:6000) that delineate existing site conditions including existing channels, the projected restored slopes and stream channels, illustrating all restoration plan work points, spoil disposal sites, re-vegetation planting areas, and any other factor that requires mapping or site construction details to complete the scope of work

c) Best management practices to be applied for all work associated with construction activities affecting, or having the potential to impact, surface waters.

d) Proposed time schedules for completing work, taking into account time needed to receive any necessary permits from State, County and/or federal agencies. In the event that the Water Boards impose deadlines for work completion, proposed work schedules must adhere to those deadlines.

e) Proposed program to monitor, assess, maintain, and report on the success of restoration efforts. Restoration monitoring plans should include regularly scheduled inspections, and established monitoring photo points of sufficient number to document the site recovery for five years or until the Site is restored, mitigation is complete, vegetation is reestablished, erosion is no longer ongoing and monitoring is no longer necessary.

Areas that have been revegetated with native plants must be monitored for five years following planting, including a minimum of two years of monitoring following irrigation, if any. Revegetation success criteria for tree and shrub plantings is a minimum of 85%, and may require one or more replanting efforts, weeding, exotic species removal, watering, etc.

Photo-documentation points should include restoration work areas, revegetation areas, and affected tributaries, up and downstream of restoration sites, and individual work sites where construction occurs within the ditch (upper or lower). Monitoring plans should include a site map with the photo-documentation points clearly marked. Restoration sites, affected watercourse segments, and other photo-documentation points should be photographed immediately prior to and immediately after implementing restoration and/or mitigation work, and pre- and post-project photos should be included with the map as part of the as-built report, to be submitted with the next regular monitoring report following the completion of restoration work.

Restoration sites should be monitored periodically including, at a minimum, inspections prior to, during, and towards the end of each rainy season (for example: October 15, January 5, and March 1 of each year), and monitoring reports should be submitted within 30 days of each inspection. Monitoring Reports should include a summary of any monitoring observations or results (in the event that monitoring includes sampling); describe any corrective actions made or proposed to address any failures of the Site and restoration measures (features to be assessed for performance and potential failure should include, but are not limited to, erosion controls, stream bed and bank erosion, sediment discharges, work, and re-vegetation); and include narrative and photo documentation of any necessary mitigation and evidence of successful restoration and Site recovery for five years, or until Site recovery is considered complete.

Staff recommend that when applicable restoration sites are stable and monitoring programs have been fulfilled, a Summary report be submitted for staff review, and that a site representative arrange for an inspection with Regional Water Board staff to determine whether restoration has been adequately completed and conditions representing water quality violations have been successfully corrected.

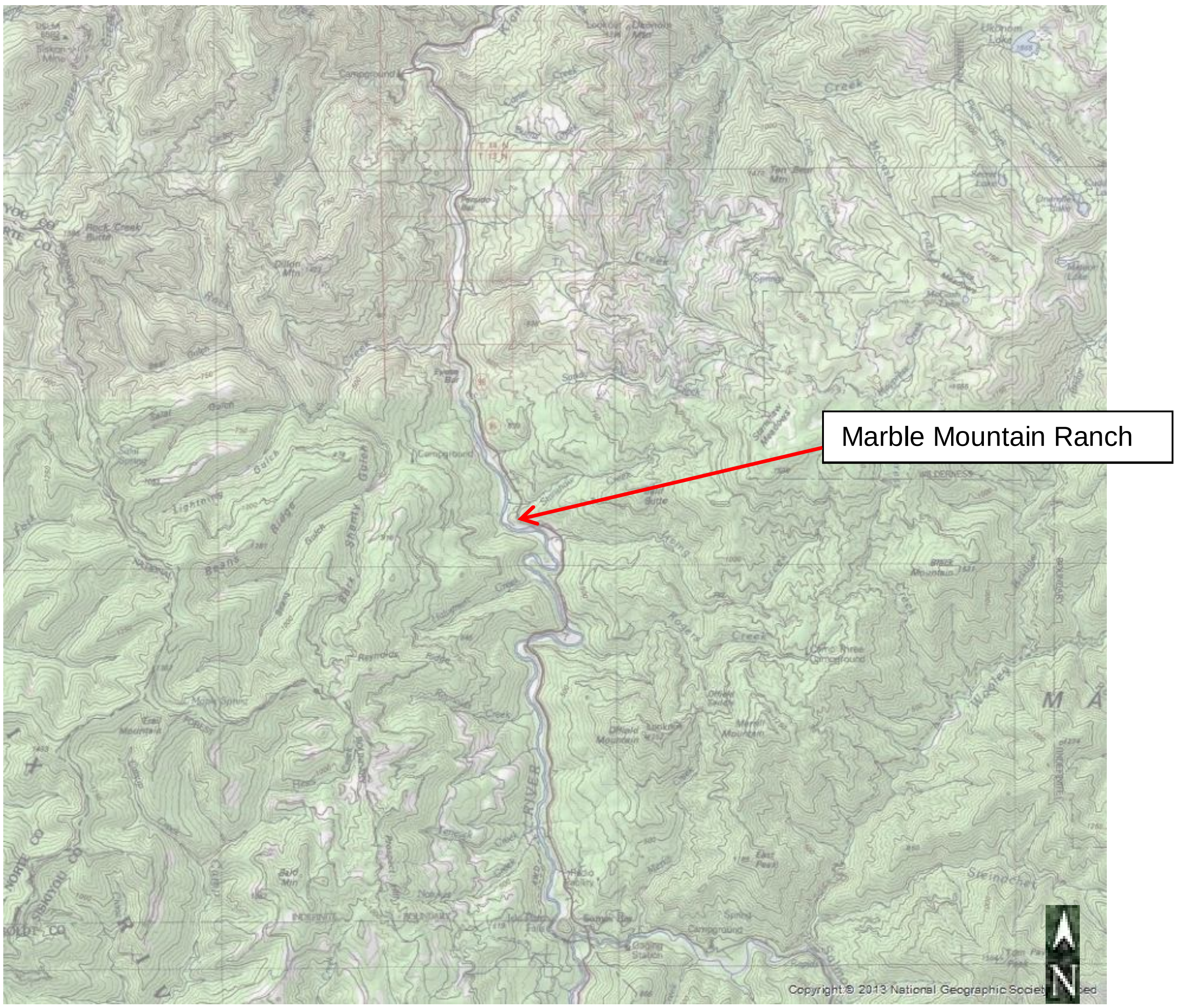

Image 27 shows the general location of the Marble Mountain Ranch.