

Testimony of Jeffrey K. Meyer S016375

My name is Jeff Meyer. I am a Professional Engineer, registered in the State of California, license #C54387, and the Director of Water Resources Management at ECORP Consulting, Inc. I have over 27 years of water resources experience in California. My experience includes hydrology development, stream flow gaging, runoff forecasting, water rights analysis, operations model application development, long-term planning, short-term planning using position analysis, alternatives evaluation, operations rules development, hydroelectric system evaluation, computer-aided dispute resolutions, and California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) review. I have extensive experience working on Sierra Nevada hydrology and have developed and/or used operations simulation applications for many of the Mountain Counties Water Resources Association members.

My testimony reflects my knowledge of the Marble Mountain Ranch (MMR or Ranch) operations through communications with Mr. Douglas Cole, review of water right S016375, review of the Inspection report Stanshaw Creek Diversion Marble Mountain Ranch by the North Coast Regional Water Quality Control Board, and review of the MMR water usage estimates work performed by Mr. Joey Howard of Cascade Stream Solutions.

The purpose of my testimony is to provide an objective estimate of the water supply needs of MMR. The following is a description of the MMR activities and operations followed by estimates of the water supply needs under various operational scenarios.

Background

Douglas and Heidi Cole own and operate Marble Mountain Ranch, located near Stanshaw Creek, a tributary to the Klamath River, in the County of Siskiyou. The Ranch property is a portion of the former Stanshaw mining claim, currently operated as a dude ranch. The Ranch offers a number of recreational activities including horseback trail riding, arena games, rafting, shooting, archery, gold panning, and fly fishing. The Ranch provides three housing options for its guests. Those options include rental cabins, RV camping, and tent camping. During the summer months, the Ranch often becomes a base camp for firefighting activities, providing food, shelter, power and water supply both to serve the firefighters and to fight wildfires. The Ranch operates off grid and creates its own power supply either by diesel or hydropower generation.

The water supply serving the Ranch comes from a handmade rock diversion dam constructed in the late 1800s that redirects water from Stanshaw Creek into a ditch which conveys water to the Ranch. These mining ditches originated in the 1800's and are common throughout the mountainous mining areas of California. The MMR water supply is gravity fed to the Ranch by sections of lined and unlined ditch. From the point of diversion, water travels approximately 0.5 mile to a bifurcation where flow can be sent to either the water treatment plant or to a forebay and penstock. The penstock provides pressurized flow to run the hydropower plant and irrigation system. Discharge from the hydropower plant can be sent across the Ranch by way of a ditch that provides water supply to a pond or is carried to a tributary to Irving Creek.

Because of its remote location, MMR remains off grid and generates all of its own electricity. Electricity is either produced by a diesel generator or a hydropower generator that runs on diversions from Stanshaw Creek. Until the summer of 2016, MMR maximized diversions from Stanshaw Creek to support the hydropower generation. In response to the action by the State Water Resources Control Board, MMR has reduced diversions such that there is little or no discharge to Irving Creek.

Water Right

On 5/28/2010, MMR filed an Initial Statement of Water Diversion and Use claiming a pre-1914 water right with diversions of up to 3 cfs with year of first use listed as approximately 1860. The State Water Resources Control Board issued statement S016375 in response to the claim. Purposes of use under this claim include hydropower generation, domestic use, irrigation and stock watering. The Coles are one of the senior most water right holders in the watershed. Their water right stems from the Stanshaw mining company operations in the late 1860s. In 1867, Samuel Stanshaw claimed water and mining rights to establish the Stanshaw mining company north of Somes Bar on the Klamath River. The initial claim was for 600 miner's inches from Stanshaw Creek to support hydraulic mining, domestic use, and hydropower generation. In California, 600 miner's inches equates to 15 cubic feet per second (cfs). In the 1920's, hydraulic mining was prohibited, reducing the need for water. To support domestic uses, irrigation, stockwatering, firefighting and power generation, the Ranch relies on the 3 cfs water right.

Water Usage Estimate

Water usage estimates at the Ranch were developed by applying reasonable usage rates provided by the State of California. The basis for the estimate is California Code of Regulations, Title 23, Section 697. This section provides examples of amounts considered reasonably necessary. Applying the following rates to identified needs on the Ranch provides a theoretical estimate of the total demand.

Homes, Resorts, Motels, Organization Camps, etc

Fully plumbed	55 to 75 gallons per day per person
Sink and flush toilet only	40 gallons per day per person
Sink and shower only.....	35 gallons per day per person
Sink only	25 gallons per day per person
Outside supply only	15 gallons per day per person
Cafe, fountain, etc	2.5 gallons per day per person

Camp Grounds

Depending upon facilities provided, allowances range from 5 gallons per day per person, where faucets only are provided, to 30 gallons per day per person where washbowls, showers, flush toilets and laundry trays are provided.

Lawn, Garden, Orchard and Grounds

Irrigation.....	8.5 gallons per day per 100 square feet
Sprinkling to allay dust. ...	7.5 to 10 gallons per day per 100 square feet

Livestock

Milch cows	30 gallons per day per head
Horses.....	15 gallons per day per head
Goats and hogs	2.5 gallons per day per head
Poultry, rabbits, etc	0.25 gallon per day per head

These usage rates were used to develop the Ranch needs using various assumptions. This first estimate of demand was completed by Mr. Joey Howard of Cascade Stream Solutions in June of 2016. The assumptions used by Mr. Howard represented MMR needs at the time Mr. Howard performed the analysis. I reviewed Mr. Howard's estimate and interviewed Mr. Cole regarding both past, present and future levels of demand on the Ranch. With the additional information, I built upon Mr. Howard's analysis using the same methodology, adding demands described by Mr. Cole. The following summarizes the two approaches.

Approach 1: Cascade Stream Solutions

Mr. Joey Howard prepared an analysis based on area and land usage types with existing infrastructure. Mr. Howard prepared a detailed map of the ranch identifying areas of pasture, grass & trees, garden, arenas and pond. He also summarized the number of animals on the ranch and estimated water needs by species and the number of people to use the full time plumbed facilities. Mr. Howard also computed the demands when a fire camp is using the ranch.

Usage Type	Units	Beneficial Use, cfs
Irrigation	14.28 acres	0.17
Livestock and Pets	101 animals	0.001
Guests and Residents	75 people	0.0087
Fire Camp	450 people	0.04

In summary, the total demand calculated by Mr. Howard is 0.18 cfs without the fire camp and 0.22 cfs with the fire camp. I reviewed Mr. Howard's theoretical estimates of usage and found it to be complete per MMR's consumption at the time Mr. Howard performed the estimate.

Approach 2: Communication with Mr. Douglas Cole

Following my review, I had several discussions with Mr. Cole about the past, present and future MMR operations. The following is a summary of various email exchanges with Mr. Cole regarding MMR operations as they pertain to water usage.

- Daily Maid Services / Housekeeping **From Doug Cole email dated 7/19/2017, Subject: RE: Ditch loss**
 - Guest Population serving 50
 - Commercial Kitchen serving 50
- Fire Fighting **From Doug Cole email dated 7/25/2017, Subject: Marble Mountain Ranch**
 - During active fires, MMR increases diversion to maximum 3 cfs flow to:
 - Irrigate entire property as a preventative measure
 - Direct spray of advancing flames
 - Fill fire engines
 - Water access to the pond allows for quick and multiple refills

- Dust control/abatement From Doug Cole email dated 8/3/2017, Subject: MMR water / From Doug Cole email dated 8/18/2017, Subject: regarding Joey Howard estimates for beneficial water use.
- Climate control From Doug Cole email dated 8/3/2017, Subject: MMR water
 - Swamp coolers
 - Outdoor ambient air coolers
- Pond Maintenance as healthy water body. Joey Howard stated that missing from his estimate is the demand for the pond. He follows by stating that a few gallons a minute would be sufficient to account for infiltration and evaporation. From Joey Howard email to Will Harling dated June 27, 2016, Subject: Consumptive Use Estimate.
- Estimated ditch losses are 0.4 to about 1 cfs due to infiltration, evaporation, spillage, or any other process that results in a reduction in the flow rate in the canal between the point of diversion and the junction where water is split between treated water and the water used for hydropower and irrigation. From Doug Cole email dated 8/16/2017, Subject: Fwd: MMR ditch losses.
- Each area of use should be calculated using the use rate that is highest for a likely use of that area. (Is “grass and trees” the same as “irrigated pasture” for “hay / Alfalfa production”? From Doug Cole email dated 8/18/2017, Subject: regarding Joey Howard estimates for beneficial water use.
- What were Joey Howard’s assumptions about the number of residents? New demands on Ranch resources will affect the business plan and the need to expand operations. (Currently have 6 full time residents with plans to expand to 6 – 8 more, Plans to increase capacity from 36 to 50 guests) From Doug Cole email dated 8/18/2017, Subject: regarding Joey Howard estimates for beneficial water use.
- Expansion would also include adding 20 more horses (from 30 to 50) and the opening up the existing 55 RV spaces. From Doug Cole email dated 8/18/2017, Subject: additional MMR water uses.
- Maintenance of public (10’ x 27’ x 4’ deep) pool and spa. From Doug Cole email dated 8/19/2017, Subject: MMR water use analysis.
- There are two covered pavilions with level tent pads and bbq facilities. There is room for 20 - 30 tents in the camping area. From Doug Cole email dated 9/08/2017, RE: Water Use Estimates.

Using the information provided to me by Mr. Cole, I updated the analysis performed by Mr. Howard. The following table summarizes my estimate.

Usage Type	Units	Beneficial Use, cfs
Irrigation	14.28 acres	0.17
Livestock and Pets	121 animals	0.001
Guests and Residents	344 people	0.029
Fire Camp	450 people	0.04

My results indicate that MMR would consume between 0.20 cfs and 0.24 cfs depending upon whether MMR was hosting a fire camp. This analysis, however, does not include the use of water to fight fires or to generate hydropower for MMR.

A review of the California Code of Regulations, Title 23 current as of April 1, 2017 lists the following beneficial uses of water.

The beneficial uses of water, pertaining to water rights, are defined in the California Code of Regulations (CCR) §659-672 to include:

- domestic
- irrigation
- power
- frost protection
- municipal
- mining
- industrial
- fish and wildlife preservation and enhancement
- aquaculture
- fish and wildlife protection and enhancement
- recreational
- water quality
- stockwatering
- heat control.

Missing from this list of beneficial uses is fire protection. The April 2017 CCR §798 Changes to Cover Incidental Uses of a Reservoir addresses the use of the MMR water supply for fire protection. §798 states that:

*When an applicant, permittee or licensee proposes incidental use of a reservoir for stockwatering, **fire protection**, recreation fish culture, or other similar purposes which consume a minimal quantity of water and*

- (a) such purposes are not listed in the application, permit or license, or*
- (b) the reservoir is not described as a place of use, or*
- (c) the reservoir covers land not included in the described place of use, then no petition need be filed to correct such an omission, provided that the board finds that no person would be adversely affected by such corrections. The board may make such corrections at any time such omissions are discovered.*

My assumption is that this statement would also be extended to Pre-1914 claimants. The following describes MMR operations during firefighting activities.

Fire Protection

Fire Protection is a frequent occurrence at MMR. Refilling fire truck tanks, fire suppression and supporting fire fighters is a frequent event in the summer months. During wildfire operations, Mr. Cole opens the diversion to provide a maximum of 3 cfs. During this time, all irrigation lines are running and the pond is filled to support firefighting activities. According to Mr. Cole, there are times when there is a constant flow of trucks lined up to refill tanks at the pond. During these times, Mr. Cole has indicated that diversions of up to 3 cfs can be consumed by firefighting activities.

Hydropower Operations

Based upon the information on the generator nameplate, the existing generator can produce up to 40 kw. Using LiDAR maps provided by Rocco Fiori, Engineering Geologist, PG8066, *Stanshaw Creek Diversion Ditch Sediment Source Assessment*, dated April 4, 2017, the difference in elevation from the top of the penstock to the hydropower generator is approximately 210 feet. A 14" pipeline estimated to be approximately 510' long could have head losses of about 1 foot. The resulting head at the generating plant is about 209 feet. Turbine efficiencies in a unit like the one at MMR is commonly in the 80% – 85% range. To calculate generation in kw at a hydropower generating unit, the following equation can be used.

$$P = \eta QH / (1.181 * 10^4) * 1000$$

Where P = power in kilowatts (kw)

Q = flow in cubic feet per second (cfs)

H = hydraulic head

η = turbine efficiency

Assuming a turbine efficiency of 80%, a hydraulic head of approximately 208 feet, and a generator that should produce about 40 kw as stated on the nameplate, I rearranged the equation to calculate the required flow.

Rearranging the equation and substituting known values, I solved for flow (Q) in cfs:

$$Q = \frac{P * 1.181 * 10^4}{\eta H * 1000}$$

$$Q = \frac{40 * 1.181 * 10^4}{0.80 * 208 * 1000}$$

$$Q \cong 2.83 \text{ cfs}$$

My calculations indicate that the existing hydropower generator will produce 40 kw at approximately 2.83 cfs.

Summary

Based on my research and analysis, I've determined that water demand of the residents, guests, livestock and irrigation is approximately 0.20 – 0.24 cfs. Because the Ranch is located in a remote area of the Klamath National Forest, it must produce its own power. The Ranch has a long history of producing power using a hydropower generating unit. Based on my calculations, the existing unit can put almost all of the 3 cfs water right to beneficial use by maximizing power production. The power production and consumptive use can put the entire 3 cfs right to beneficial use.

According to Mr. Cole, when wildfires develop in the area, the Ranch becomes a firefighting base camp and may support up to 450 firefighters and associated equipment. During these times, the entire 3 cfs can be put to beneficial use to support firefighting activities. These activities can last between a few weeks to a few months depending upon the severity of the fire.

Based upon my calculations and assumptions, maximizing the water supply and power needs could result in usage that exceeds 3 cfs if the water were available. Based on the configuration of the water delivery system and the needs, the sum of the potential beneficial uses at the Ranch exceeds the conveyance system capacity and water right.

References

- Initial Statement of Water Diversion and Use S016375
- Supplemental Statement of Water Diversion and Use for 2010
- Supplemental Statement of Water Diversion and Use for 2011
- Supplemental Statement of Water Diversion and Use for 2012
- Supplemental Statement of Water Diversion and Use for 2013
- North Coast regional Water Quality Control Board, Inspection report Stanshaw Creek Diversion Marble Mountain Ranch dated March 9, 2015
- California Code of Regulations Title 23, §659-672
- Rocco Fiori, Engineering Geologist, PG8066, *Stanshaw Creek Diversion Ditch Sediment Source Assessment*, dated April 4, 2017

ATTACHMENT A

Marble Mountain Ranch
Environmental Documents to permit the
piping of return flow From the hydropower plant to Stanshaw Creek along Highway 96

Documents/Permits Likely to be Required:

- Joint Environmental Assessment/Finding of No Significant Impact (NEPA) - Initial Study/Mitigated Negative Declaration: **Cost - \$110,000 to \$130,000**
- NPDES Permit (SWRCB): **Cost - \$12,000 - \$15,000**
 - This is required to discharge to the Stanshaw Creek.
 - This will likely require state and federal permits.
 - The permitting process will include coordination with agencies.
- Special Use Permit from USFS for cultural surveys: **Cost ~\$5,000**
 - This is required to complete survey on USFS lands, and is issued by the USFS
 - This is the first thing we need to acquire from the USFS before we can begin the inventory
 - It includes completion of a USFS permit application, field survey plan, development of an APE map, and extensive back and forth with the USFS Heritage Program Manager
 - This cost does not guarantee USFS will issue Special Use Permit.
- Cultural Resources Inventory Report: **Cost ~\$15,000**
 - This report is needed to identify whether cultural resources exist in the project area
 - The cultural resources inventory report is written for both Section 106 and CEQA compliance
 - It includes a records search at the Northeast Information Center AND the USFS records, archaeological pedestrian field survey, and full report following OHP standards (cost is higher due to challenging location)
 - Does not include evaluations of identified resources, which may be needed if any are found during the inventory
- AB-52 Tribal Consultation and Section 106 Tribal Consultation: **Cost ~\$5,000**
 - Tribal consultation is required for both Section 106 (between USFS and interested tribes) and CEQA (between lead CEQA agency and interested tribes).
 - This includes coordinating with the federal/state agencies and NA tribes, drafting letters, organizing consultation meetings and site visits
 - Cost is not inclusive of all consultation that may be required. If consultation is extensive, it may require more funding; and vice versa.
- Special Use Permit for construction (USFS): **Cost ~ \$8,000 to \$10,000**

Documents/Permits **Potentially** Required:

- Biological Assessment in support of a Section 7 consultation process between the U.S. Forest Service and National Marine Fisheries Service: **Cost ~\$12,000 - 16,000**
 - Biological Assessment (BA) is required for formal consultation under Section 7 of the Endangered Species Act (ESA)
 - Evaluates the potential effects of the project on ESA-listed anadromous fishes, designated critical habitat, and essential fish habitat (EFH) under NMFS' jurisdiction
 - Assessment will evaluate pipeline construction, discharge to Stanshaw Creek, and flow reductions in Irving Creek on Klamath River coho salmon, steelhead, Chinook salmon, and green sturgeon populations
 - Initial review indicates that the project would not affect wildlife or plant species under the jurisdiction of the U.S. Fish and Wildlife; cost assumes no USFWS Section 7 consultation
 - A Biological Evaluation (BE) may also be incorporated into the document to fulfill consultation with the USFS to assess potential project effects on special-status plant species; higher range of the cost estimate includes the USFS BA

- U.S. Army Corps of Engineers Clean Water Act Section 404 Permit: **Cost ~\$5,000 - 12,000**
 - USACE is responsible for implementing and enforcing Section 10 and Section 404 of the Clean Water Act (CWA)
 - USACE regulations require that any activity that discharges fill material or requires excavation in "waters of the United States" requires a permit from the Corps
 - Because the Project consists of a pipeline to return diverted water to Stanshaw Creek via a buried pipeline and outfall structure, the pipeline project likely qualifies for a Nationwide Permit 7 (NWP 7)
 - The pipeline may qualify for an exemption under Section 404(f) of the CWA; low end of the cost estimate assumes submittal and approval of a notification of exemption from Section 404

- State Water Resources Control Board 401 Water Quality Certification: **Cost ~\$7,000**
 - The SWRCB and local Regional Water Quality Control Board (RWQCB) oversee enforcement of water quality standards that protect water quality and regulate discharges to surface waters
 - Because the diversion may alter water quality and/or temperature, and because issuance of a Section 404 permit may be required, the pipeline project will be subject to water quality certification under Section 401
 - An additional fill and excavation fee, which will be determined by the RWQCB, will be provided by the client

- California Department of Fish and Wildlife 1602 Streambed Alteration Agreement: **Cost ~\$8,000**
 - CDFW requires notification for any project or activity that will take place in, or in the vicinity of, a river, stream, lake, or its tributaries
 - Section 1600 of the Fish and Game Code requires CDFW notification and procurement of a Streambed Alteration Agreement before construction of a project that will divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake

- The application considers and evaluated impacts to species protected under the California Endangered Species Act (CESA), in accordance with Sections 2081 (b) and (c) of the CESA
 - CDFW application fee will be provided by the client and must be included with the application submittal
- State Water Pollution Prevention Plan and site inspections: **Cost ~ \$9,500 - \$11,000**