Karuk Community Health Clinic
64236 Second Avenue
Post Office Box 316
Happy Camp, CA 96039
Phone: (530) 493-5257
Fax: (530) 493-5270

Karuk Tribe

Administrative Office
Phone: (530) 493-1600 • Fax: (530) 493-5322
64236 Second Avenue • Post Office Box 1016 • Happy Camp, CA 96039

Karuk Dental Clinic
64236 Second Avenue
Post Office Box 1016
Happy Camp, CA 96039
Phone: (530) 493-2201
Fax: (530) 493-5364

BEFORE THE STATE WATER RESOURCES CONTROL BOARD
In the matter of Douglas and Heidi Cole and Marble Mountain Ranch - Waste and Unreasonable Use Hearing

Declaration of Toz Soto in Support of Order Finding Waste and Unreasonable Use and Public Trust Violations

I. Statement of Qualifications

My name is Toz Soto and I am employed as a fisheries biologist by the Karuk Tribe. I reside in Somes Bar, California. This testimony is submitted in support of the Karuk Tribe. I have personal knowledge of the matters herein, and if called as a witness would be competent to testify thereto.

I serve as the Karuk Tribal Fisheries Program Manager and Senior Fisheries Biologist in the Karuk Department of Natural Resources. I have a Bachelor's degree (1996) in Freshwater Fisheries Biology from Humboldt State University. I have worked as a fisheries biologist in the Klamath River Basin since 1997. My work with the Karuk Tribe includes management of the Tribal Fisheries Program and includes collection of data on fisheries and stream conditions, its interpretation regarding the status of fisheries and impacts to them, and implementation of measures designed to improve their habitats and populations.

I also represent the Tribe as a fisheries biologist on many technical forums and issues regarding the Klamath River and its tributary streams including the Klamath River Flow Technical Team, the Klamath Inter-Tribal Technical Team, and serve as the tribal representative for the North Coast Resource Partnership technical review team. I have presented studies and information at numerous fisheries' workshops and symposiums including, but not limited to, the Klamath Basin

Fish and Water Symposium, the Klamath River Lower Basin Science Symposium, the Klamath Basin Science Conference, the Salmonid Restoration Federation, the Western Chapter of the American Fisheries Society, the Oregon Chapter of the American Fisheries Society, and the National Chapter of the American Fisheries Society.

I have co-authored several published papers regarding Klamath River Coho Salmon utilization of cold water refuges (2007 and 2012), fish disease in coldwater refuges (2014) and another manuscript regarding Klamath River freshwater mussels (2013), including Sutton, R. J., Deas, M. L., Tanaka, S. K., Soto, T. and Corum, R. A. (2007), Salmonid observations at a Klamath River thermal refuge under various hydrological and meteorological conditions. River Res. Applic., 23: 775–785. DOI: 10.1002/rra.1026; and Sutton, R. and Soto, T. (2012), Juvenile coho salmon behavioral characteristics in Klamath River summer thermal refugia. River Res. Applic., 28: 338–346. DOI: 10.1002/rra.1459.

The primary objective of the Karuk Fisheries Program is to protect and enhance the habitat of native fish. In particular, the Karuk Fisheries Program focuses on species that serve as subsistence food sources for tribal members including Coho salmon, Chinook salmon, Steelhead, Pacific Lamprey, Green Sturgeon, and mussels. Some of our efforts involve the development and implementation of habitat restoration projects on Tribal, private, and federal lands. Other efforts involve participation in regulatory and administrative processes that govern land and water use activities such as timber harvest plans, the construction of transportation infrastructure, dams, and irrigation diversions. These efforts often involve collaborations with state and federal agencies.

II. Testimony

My work as a fisheries biologist for the Karuk Tribe has required me to be familiar with the impact that water diversions and other water management actions have on fisheries habitat, and I have personally observed water diversions operations. This testimony is focused on the impacts from the Marble Mountain Ranch water diversion on Stanshaw Creek and the associated impacts on fish utilizing Stanshaw Creek and the cold water refuge habitat it provides where it enters the main-stem Klamath River.

Stanshaw Creek is a small tributary of the Klamath River with a drainage area of approximately four square miles. The creek's confluence with the Klamath River is located at river mile 75 near the community of Somes Bar, CA in Siskiyou County. Stanshaw Creek originates from the high elevation Marble Mountain Wilderness Area and its waters remain cold into the summer months thus providing a cold water refuge for juvenile salmon in its lower reaches before mixing with the much warmer Klamath River. In late summer months the Klamath River becomes too warm for salmon to the point where fish must actively migrate and seek out cold water patches known as thermal refugia in order to survive. Thermal refugia are typically located in lower reaches of cold tributaries including the alluvial deltas and confluences such as Stanshaw Creek. Tributaries like Stanshaw Creek are absolutely critical for the survival of juvenile salmon during the dry hot summer months. This is particularly true for salmon species such as Steelhead, Spring Chinook and Coho, which spend an entire year rearing in fresh water.

My experience working on Stanshaw Creek began in 2001. The Tribe was concerned about the impacts of Marble Mountain Ranch's diversion so I was directed to perform a snorkel survey to determine what species were present and their condition. My initial survey found both Steelhead and Coho salmon present in the lower ¼ mile of Stanshaw Creek. At the time, I was surprised to find juvenile Coho salmon in the creek because of an apparent lack of suitable spawning habitat. At the time, I assumed all juveniles in the creek were natural to the stream. Later I learned from my research on thermal refugia that juvenile Coho salmon have a tendency to migrate long distances to seek out preferable habitats and the utilization of cold non-natal streams for rearing purposes is very common.

I've studied both the physical processes which form refuges and how salmon utilize them. I've surveyed thermal refuges extensively along the Klamath River corridor in an attempt to better understand where they exist and the ecological role served within the spatial continuum of salmon habitat. Thermal refugia are dynamic physically because they are situated along active stream channels, including deltas and confluences, where annual changes in stream morphology are common. The physical process of cold water mixing with warm water is highly influenced by topographic terrain and the balance of cold and warm water inputs. Depending on the topography of the site, the spatial extent or size of the refuge can be large even with a small

amount of cold water inputs. For example, large scour pools can form along the floodplain of the Klamath River during floods, but as river flows seasonally decline the pools become wetted with cold tributary water. This type of thermal refuge is located near the mouth of Stanshaw Creek where a large off channel pond or pool has formed within the active Klamath River floodplain. The pool fills with cold creek water and spills out into the main-stem Klamath River during the summer months. Juvenile salmon migrate from the main-stem Klamath into the pool and lower creek in their attempt to seek refuge. This migration typically occurs in late spring or early summer as flows are dropping and water temperatures are rising.

My research on cold water refugia along the Klamath River shows that, when river water temperatures during the early part of summer approach 19 degrees Celsius, juvenile Coho actively seek out cold water refugia. Once a fish locates a cold water refuge they will typically reside there until the fall when river temperature become suitable again and it's safe to migrate down-stream. This means that at some point during the summer, juvenile fish are essentially trapped in their cold water refuge, unable to migrate out due to lethal high temperatures in the main-stem Klamath. It is during these periods when fish are vulnerable to flow manipulations and other impacts to their habitat. This is the case in Stanshaw Creek.

Middle Klamath River Tributaries flows are high during the early summer, but continually drop until fall rains recharge the system. Our long term summer flow monitoring shows the largest drop off occurring between August and September with flows being the lowest in late September. Water temperatures typically peak in late July or early August and coincide with low flows and hot weather. Human demands for water typically follow the same pattern with the highest demand during the peak of the summer when fish need cold water the most. Again, this is the case in Stanshaw Creek.

The problems in lower Stanshaw Creek are twofold. First, fish are excluded from Stanshaw Creek's thermal refuge when low flows fail to connect the creek to the river. As a result these salmon are forced to seek refuge in other locations further upstream or downstream which extends their exposure to lethally warm conditions. Second, the fish residing in the refuge pool are trapped and unable to migrate away from harmful conditions or predators. Fish are known to

move into the mainstem Klamath during the night time when temperatures are cooler for feeding purposes therefore connectivity between the refugia and the river is especially important for their growth and survival.

In an effort to better understand the flow requirements for maintaining the thermal refuge at the bottom of Stanshaw Creek and connectivity with the main-stem Klamath River, the Karuk Tribe contracted with Ross Taylor and Associates to provide an independent habitat and streamflow assessment. Taylor provided a preliminary flow recommendation of 1.3-1.5 cubic feet per second (CFS) to maintain the refuge at the bottom of Stanshaw Creek.

In order to maintain connectivity between Stanshaw Creek and the Klamath River, Taylor noted that "based on the 11/17/14 streamflow measurement just upstream of the pond, 1.3 cfs was insufficient in providing connectivity between the pond and the Klamath River. When inspected by RTA on 11/17/14, the lowest of the two outlet channels was approximately 0.1 ft higher than the pond's water surface. Preliminary recommendation is for 2.0-2.5 cfs in Stanshaw Creek, measured at pond entrance."

Juvenile fish kills are difficult to document because juveniles are small and hard to observe while submerged in water and scavengers such as birds and small mammals consume them before mortalities can be observed. I have assessed juvenile fish kills along the Klamath River and found that the abundant scavengers make it especially difficult to document. Despite these difficulties in documenting juvenile fish kills, I have witnessed dead juvenile Coho salmon and steelhead in Stanshaw Creek. In my professional judgment, I believe it was a result of flow impairment stemming from the MMR diversion. The most memorable event occurred in late July of 2009 after I was notified by one of the residents along the creek that the creek had dropped significantly in a matter of hours. He believed that MMR had increased the amount of water diverted into the ditch to their guest ranch. Upon inspection of the site, I observed the lower reach of the creek reduced to just a fraction of its normal volume with the entire creek bed nearly dry. I found that the cold water refuge pool near the creek mouth was reduced to a fraction of its normal size with input flows from Stanshaw Creek reduced to a trickle. It appeared that surface flows into the pool had dropped rapidly during those past 24 hours causing

the water surface elevation and pool volume to drop dramatically or become temporarily dry. The inlet channel to the pool was actively head cutting and typically occurs when a pool or pond is drawn down rapidly. I took photos of a dead juvenile Coho salmon that was located floating on the water surface. I observed what I thought were two dead steelhead juveniles laying on the bottom of the pool. These events coincided with a summer heat wave and rising water temperatures. I hypothesized that the cause of death was either lethal temperature shock or simply dewatering and drying of the creek and pool. Low water volume associated with shallow pools can create a situation where water can heat up rapidly, much like how a tea pot heats more quickly with less water. I am confident the dead fish I observed in July of 2009 were a direct result of a rapid reduction of flows in Stanshaw Creek. I believe they were trapped and unable to escape from lethal water temperatures and a dry creek. The resident landowner (Konrad Fisher) told me he commonly witnesses dead fish in the creek.

These observations lead me to conclude that the MMR diversion is managed in a haphazard manner that leads to sudden drops in flow when improvements are made to the gravel push-up dam at the diversion intake. The push-up dam and ditch are capable of diverting the entire creek during periods of low summer base flow. These actions are done without regard to the health and safety of downstream fish and other aquatic species.

I have observed the diversion inlet which has no mechanisms for control such as a head gate where diverted flows can be measured and controlled. The diversion has no screen to protect fish from entrapment in the ditch. The flow capacity of the ditch appears to be greater than the summer base flow of Stanshaw creek and therefore has the potential to capture and dewater the entire creek channel below the diversion. There are no tributaries feeding into Stanshaw creek below the diversion point which furthermore makes fish habitat dependent on the bypassed water. The primitive nature of the diversion inlet and lack of infrastructure needed to regulate flows creates a scenario where fish are constantly at risk of harm during the summer low flow period. Furthermore, as the gravel pushup dam ages, during the summer it collects debris washing down the creek that can seal off any leakage through the gravels making them even more efficient at capturing water.

The Tribe and local watershed group Mid Klamath Watershed Council (MKWC) have worked to improve habitat conditions in Stanshaw Creek. Our primary goal has been to make the habitat more resilient during the summer low flow period. Crews manually manipulate the creek channel in Stanshaw Creek to assist with fish passage and maximize water reaching the pool. MKWC received a grant from the California Department of Fish and Wildlife in 2013 to mechanically excavate the refuge pool at the mouth of Stanshaw creek. The project goal was aimed at increasing the pool volume and be more resilient to sudden decreases in flow. Without our efforts to enhance habitat in lower Stanshaw Creek, I believe fish kills would be even more common than they currently are, but long term protection must include water conservation and regulation. Both MKWC and the Tribe have engaged in proactive meetings with MMR about water usage and presented grant opportunities to improve flows though water conservation techniques and reduce risk to fish in Stanshaw Creek. Despite these actions, little action has been taken on the part by MMR to reduce their flow impacts through water efficiency projects or self-regulation. Recently, it appears that more aggressive action by NOAA Fisheries over concerns of harm to ESA listed Coho Salmon have led to MMR voluntarily reduce water diverted . This occurred during the droughts of 2015 and 2016. During that time I did not observe fish kills or harmful habitat conditions at the site.

III. Affirmation

I declare under penalty of perjury to the laws of the State of California that the foregoing is true and correct.

/*s*/Toz Soto

October 6, 2017