AQUALLIANCE
DEFENDING NORTHERN CALIFORNIA WATERS

Hearing in the Matter of California Department of Water Resources and United States Bureau of Reclamation Request for a Change in Point of Diversion for California WaterFix

Testimony of James R. Brobeck On Behalf of AquAlliance

I, James R. Brobeck, do hereby declare:

I own an acre of land in the Chico Urban Area that is served by a 70 year old well, 100' deep that provides domestic water for two families and a family orchard and vegetable garden. Maintaining a usable elevation of groundwater under my land is of the utmost importance to maintaining our domestic water supply, irrigating our modest agricultural pursuits and sustaining 23 valley oak and live oak trees that provide a cool canopy of shade during the hot summer and fall months.

I have lived in this northern portion of the great Central Valley since the early 1970's and have been an advocate for the public trust the whole time. Clean air, reliable water and healthy forests have been the focus of my activism. In the 80's and 90's I was a member of the Cohasset Fire Department Company 21 where I learned the art of wildland fire management as well as other valuable first responder skills.

My professional engagement as a resource policy analyst began early this century when I learned to navigate CEQA and NEPA process that pertained to projects in the Lassen National Forest region. I worked with the Lassen Forest Preservation Group and the Sierra Forest Legacy to help devise vegetation management programs that improved public safety and forest health by steering taxpayer funds and individual efforts into areas that would most efficiently use scant money most effectively. I served on the board of Butte County Fire Safe Council for about 10 years, advised many wildland/urban/interface residents on creating defensible space, planned and implemented a mountain roadside fuel reduction project and coordinated the Cohasset Community brush chipping program to assist residents in creating defensible space.

More recently I have served AquAlliance as a water policy analyst and have worked closely with our Executive Director for over 12 years. AquAlliance represents independent groundwater users in the Northern Sacramento Valley by tracking regional water projects, participating in NEPA and CEQA processes, engaging with the Butte County Water Commission and the Northern Sacramento Valley Integrated Regional Water Management Plan. I was appointed by Butte County Supervisor Yamaguchi to serve on the county Water Advisory Committee. Over the years AquAlliance has communicated with and occasionally challenged NorthState Irrigation Districts that have a history of being willing sellers of Sacramento Valley water they hold legal entitlement to.

My work has raised my awareness of the importance of maintaining a balanced aquifer system in preserving a quality of life for groundwater dependent family farms that are unaffiliated with senior irrigation districts, maintaining a balanced aquifer system in preserving a quality of life for urban dwellers that need their groundwater dependent urban forest shade to endure the blistering summer heat, and maintaining a balanced aquifer system in maintaining tributary flow that provides critical rearing habitat for anadromous fish in the Northern Sacramento Valley, fish that have been extirpated from the southern Central Valley due to faulty water management. I represent the interests of these family farmers and these urban dwellers. My efforts to maintain and restore flow in so-called ephemeral stream tributaries contribute to the viability of salmon in the Sacramento Valley ecosystem.

The Water Fix fails to clearly identify the risks to a balanced Northern Sacramento Valley aquifer system that is presented by the emerging water market that intends to employ groundwater substitution water transfers to fill the giant tunnels that require this water right change petition. There is an unfortunate history of injury associated with groundwater substitution water transfers that occurred in the 1990's. When regional water districts sold their allotment and installed wells to substitute the forgone river diversions family farms, domestic wells and a municipal water district had to scramble to keep their water flowing. Besides creating economic damage to existing groundwater pumpers, declining aquifer levels inevitably reduce streamflow and destabilize shallow aquifers that are important to a wide variety of groundwater dependent ecosystems.

On September 30, 2014 the U.S. Bureau of Reclamation released for public comment a draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) on a proposed Long Term Water Transfer Program (LTWTP). This program includes plans to conduct up to 600,000 acre feet of groundwater substitution water transfer sales out of my region. The EIS/EIR failed to adequately take into consideration that current groundwater conditions are being impacted beyond routine seasonal fluctuations and the document fails to account for projected impacts from climate change. Many water wells in my region are below historic low elevation and have failed to comply with Basin Management Objective (BMO) levels. These monitoring objectives have no enforcement mechanisms. There are a number of areas that have a steady decline in groundwater elevation even during so-called normal water-year conditions. In other words, existing demands on the aquifer system are creating an unsustainable aquifer imbalance that will impact groundwater dependent family farms, urban forests and streamflow that sustains fisheries. The Water Fix will require sources of "reliable supply water" to fill the tunnels and the buzzword for where this water will come from is "conjunctive use". Conjunctive use of groundwater, an already depleted resource, has been used as a tool of flexibility by surface water users and is the primary management technique employed in groundwater substitution transfer/sales.

My shallow well is indicative of a resource condition that has been the foundation of the quality of life for the residents of my region. Groundwater dependent ecosystems include springs, stream base-flow and deep rooted native vegetation such as valley oak trees that occur outside the hyporheic zone. The water elevation in my well fluctuates between 25-40 feet below ground level, well within the taproot-zone of both native trees and many common urban forest trees. The underlying confined aquifer is artesian pressurized and presumably leaks upward through fissures in the aquitard. Unfortunately a widespread groundwater extraction infrastructure has

been developed before the aquifer system has been accurately characterized by science and before a network of shallow monitor monitoring wells was developed to detect changes in water levels over the shallowest portion of the aquifer. The long-term health of riparian vegetation, wetland species, and number of other native habitat are commonly associated with maintaining a minimum range of groundwater levels and an appropriate level of interaction between surface water and groundwater resources.[1]

Valley Oak trees were once a dominant feature of Central Valley landscapes. Declining groundwater levels and land use conversion have eliminated the majority of Valley Oak woodlands[2], but the botanical characteristics of the species provides us with a model of urban forestry that does not require using scarce water supplies for irrigation. Urban tree canopy cover results in air quality improvements and can help local governments in meeting federal clean air standards. Air quality is a concern for all local governments but it is a particular challenge in urban areas where cities and regions struggle to meet air quality standards. Trees are capable of removing a variety of pollutants from the air. In addition to these physical benefits, trees also offer significant social, cultural, and spiritual services in urban areas. The social importance of trees is clearly evidenced by their power and pervasiveness as spiritual and cultural icons. In March of 2010 the Chico City Council approved several revisions in the Municipal Code relating to trees. This revision included setting up a Voluntary Heritage Tree Program to recognize significant trees growing in Chico. [3] Urban trees, which provide an aesthetic value beyond objective quantification, can turn city blocks into special places—places for residents to recreate, to gather with family and friends, and to care about. Health-related benefits illustrate the profound importance of trees and tree services in urban areas. Shade from trees reduces sun exposure. Air pollutant filtering mechanisms in trees can reduce the stressors that trigger asthma. Trees also provide services in the form of energy conservation and climate control. Trees intercept sunlight before it reaches buildings and surfaces that radiate heat, such as asphalt and brick. Trees provide shade and cooling for both the outside and inside of the buildings they cover, thereby reducing the energy required for air conditioning. During the long drought of the past few years the residents of Chico have reduced landscape irrigation applications drastically. Trees that have no tap roots have suffered, even died, during this period while trees with deeper tap roots have, like valley oak trees, done well. Valley oak typically has several vertical roots that tap groundwater and pull the water up to shallow horizontal root branches. Vertical root depth has been measured as deep as 80 feet in some individuals. Best growth is attained when water tables are about 33 feet (10 m) below the surface.[4] Increased demand on Sacramento

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[1] McManus, Dan (DWR) et. Al, , Sacramento Valley Water Resource Monitoring, Data Collection and Evaluation Framework. Pgs. 5-6 (2007)

[2] Wilson, Bert, Las Pilitis Nursery_Valley Oak. http://www.laspilitas.com/nature-of-california/communities/central-oak-woodland (2013)

[3] CHICO'S HERITAGE TREE PROGRAM pdf.(2012)

[4] Howard, Janet L. 1992. Quercus lobata. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, http://www.fs.fed.us/database/feis/plants/tree/quelob/all.html

Valley aquifers, including demands associated with groundwater substitution water transfers to areas south of the delta, may lower water tables beyond the reach of shade trees that are dependent on accessible shallow groundwater. According to the USDA Forest Service, Pacific Southwest Research Station, "San Joaquin Valley trees require irrigation because of the region's arid climate. Once planted, 15-gallon trees will typically require 100-200 gallons per year during the establishment period. However, as trees mature their water use can increase to 1,000 gal or more, with a concomitant increase in annual costs." [5]

The Water Fix promises to reduce fishery constraints on Delta exports and thereby increase demand on Sacramento Valley water systems, including aquifer systems. A declining aquifer can injure residents by eliminating shade trees, decreasing recreationally valuable streamflow and increasing water supply expenses.

Intermittent stream tributaries of the Sacramento River were wetter longer prior to the development of groundwater extraction infrastructure. [6] According to Dan Wendell, Nature Conservancy spokesman, "The Sacramento Valley still has water levels that are fairly shallow. There are numerous perennial streams and healthy ecosystems, and the basin is largely within a reasonable definition of sustainable groundwater yield. However, since the 1940s, groundwater discharge to streams in this area has decreased by about 600,000 acre-feet per year due to groundwater pumping, and it's going to decrease an additional 600,000 acre-feet in coming years under 2009 status quo conditions due to the time it takes effects of groundwater pumping to reach streams. It takes years to decades, our work is showing." [7] Mr. Wendell explains that "This represents a loss of 1.2 million acre-feet of stream flow. This is real water. This is streamflow that would have otherwise ended up in the Delta. And our current estimates are that 400,000 acre-feet of this 1.2 MAF per year is lost export capacity. This represents a very real decrease in the yield of the Central Valley Project and the State Water Project. Surface water rights impacts occur very early in groundwater development, when modest water level declines of only 20 to 40 feet can result in significant depletion of streamflow and even perhaps loss of perennial flow." The Nature Conservancy analysis indicates that increased demand on an aquifer can decrease surface water flows and thereby cause people that have long-standing rights to divert surface water to increase groundwater pumping.

These streams are important in the life cycle of salmon which are an important fish to both valley and mountain forest ecosystems. According to Dr. Paul Maslin, "Nonnatal rearing of juvenile Chinook salmon was documented in several intermittent tributaries to the Sacramento river. The data suggests that juvenile chinook rearing in the tributaries grew faster and were heavier for their length than those rearing in the main stem. Faster growing fish smolt earlier…Juvenile

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[5] McPherson, E. Gregory, et al, Tree Guidelines for San Joaquin Valley Communities, Pg 22/68, https://www.itreetools.org/streets/.../Streets_CTG/CUFR_38_Inland_Valleys_CTG.pdf (1999)

[6] Hennigan, Bob, personal communication, (2012).

[7] Wendell, Dan; Maven's Notebook, Groundwater Management Workshop, https://mavensnotebook.com/2014/04/28/groundwater-management-workshop-part-1-sustainable-groundwater-management-panel/ (2014),

chinook entering the tributaries early in the year, such as winter and spring run, probably derive the most benefit from tributary rearing."[8] The precarious status of the winter/spring run salmon in the region requires attention to what are now intermittent streams, a critical natural habitat that is dependent on groundwater for base flow. Salmon are important keystone members of the Sacramento Valley ecosystem in their own right. The nutritional value of spawned salmon reverberates throughout the terrestrial plant and animal members of this ecosystem.

Humans have unwisely developed massive groundwater extraction infrastructure before installing prerequisite monitoring infrastructure. The conjunctive water use in the Sacramento Valley basin envisioned by the "willing sellers", the USBR and DWR to fill the increased reliability offered by the Fix tunnels is premature.

The WaterFix is designed to eliminate constraints on Delta pumping associated with reverse flow. These constraints have reduced opportunities for willing sellers of Sacramento Valley water to market water to willing buyers south of Delta. The aforementioned Long Term Water Transfers Program includes plans to conduct up to 600,000 acre feet of groundwater substitution water transfer sales. Implementing the Water Fix will increase opportunities for irrigation districts to participate in these groundwater substitution water sales. Creating water delivery infrastructure prior to implementing pre-requisite shallow aquifer baseline and monitoring infrastructure can result in damage to existing users.

The Fix is a giant project that requires detailed analysis of the source of the water, the Sacramento Valley Watershed. In 2007 water experts from DWR, NCWA and elsewhere drafted the Sacramento Valley Water Resource Monitoring, Data Collection and Evaluation Framework cited above. "In order to identify potential habitat impacts associated with potential changes in water management practices, a program-specific network of shallow monitor monitoring wells must be developed to detect changes in water levels over the shallowest portion of the aquifer." These monitoring requirements, known by experts for over 10 years, have not been implemented anywhere in the area of origin of the water that would fill the Fix tunnels. The environment and the economic vitality of Sacramento River basin requires prerequisite groundwater management monitoring protocol be implemented prior to the elimination of transfer constraints through the WaterFix.

Executed on 27 December, 2017 in Chico, California

James R. Brobeck

[8] Maslin, Paul, Et al, Intermittent Streams as Rearing Habitat for Sacramento River Chinook Salmon (Oncorhynchus tshawytscha). (1998).