MEMORANDUM REPORT

To: State Water Resources Control Board
Attn: Gaylon Lee, Division of Water Quality
From: Quartz Valley Indian Community
Date: December 14, 2009
Re: Comments on State Water Resources Control Board Resolution 2009-0064 Regarding U.S. Forest Service Management Oversight

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These comments are provided on behalf of the Quartz Valley Indian Community (QVIC), a federally-recognized Tribe living within the California portion of the Klamath River basin. The Quartz Valley Indian Reservation (QVIR) is located in the Scott River Basin, a major tributary to the Klamath River, ancestral lands encompasses both the Scott and Shasta River watersheds. Following the Klamath River's disastrous September, 2002 adult salmon kill the Tribe began to work proactively on recovering water quality by providing sound scientific research and data interpretation to assist government agencies concerned with programs that impact the river. The Tribe views State and federal Clean Water Act (CWA) compliance as a key means for assuring the future of the Klamath basin's salmon and the Tribes' reliance on this vital fish resource.

THE ESSENTIAL PROBLEM WITH THE SWRCB 'S RESOLUTION NO. 2009-0064

From earliest beginnings 60 years ago, California law has placed responsibility for streamflow quantity decision-making in a Sacramento-based entity (the State Engineer, former State Water Rights Board, today's State Water Resources Control Board – SWRCB) and responsibility for water quality management in the several regional water quality control boards.

Since Congress' specific commitment to the nationwide abatement of non-point sources of water pollution in 1987 there has been a workable sorting out of roles and responsibilities among the SWRCB and the regional boards. Total maximum daily load (TMDL) plans, for example, have been scoped, developed and adopted, including plans for their implementation, at the regional board level. The SWRCB then reviews the regional boards' work products to make sure that they comply with law, improves as necessary and certifies them as complete and enforceable.

Perhaps no regional board in the state has been more intensely involved in the development of complex and urgent TMDLs than the North Coast Regional Water Quality Control Board (NCRWQCB), driven, as it has been, by the State's timetable-sensitive responsibilities under the *Pacific Coast Federation of Fishermen's Associations, et al. v. Marcus* Consent Decree.

The *PCFFA v. Marcus* case concerns, in the main, the loss of the beneficial use of coldwater fish production, much of it to timber production and related forest management activities, in nearly 20 major North Coast river basins.

The NCRWQCB has been engaged daily for the past 12 years in the assessment of water quality information; the identification of water quality restoration needs; the negotiation and development of TMDL-driven plans for the recovery of water quality, including the recovery of Pacific salmon resources, in the *PCFFA v. Marcus* river basins. Several of these Pacific salmon species are listed as threatened under the State and federal Endangered Species Acts.

A very great deal of the analysis performed, the water quality restoration planned, and the new watershed protection responsibilities negotiated by the NCRWQCB and its staff involve the staffs of the North Coast's National Forests and the extensive lands they manage within the *PCFFA v. Marcus* river basins. This includes, of course, the Klamath River basin within which the member Tribes of the Klamath Basin Tribal Water Quality Work Group – the Yurok, Hoopa Valley, Karuk, Quartz Valley Indian Community and Resighini Rancheria peoples – have lived, and subsisted in large part from the salmon and other vital products of the River, since time immemorial.

The QVIC has worked in close collaboration with the NCRWQCB and Forest Service field staffs during these dozen years of *PCFFA v. Marcus*-driven water quality assessment, restoration planning and negotiation. This work continues, under newly-crafted memoranda of agreement between the NCRWQWG and USFS, and formal consultations and daily working meetings between the USFS and the Tribes.

This work – this collaboration – which has been a long time coming, will be destroyed by the transfer of water quality control regulation and administration from the regional board to the SWRCB.

We have reviewed the SWRCB staff's rationale – Resolution 2009-0064's "whereas" clauses - and we find them incorrect in many, many regards and the basis for the proposed shift of responsibility from the field to Sacramento to be, overall, specious.

ON-THE-GROUND PROBLEMS WITH RESOLUTION 2009-0064 AND WITH MEETING THE INTENT OF THE STATE'S 1981 MAA WITH THE USFS

QVIC has reviewed the State Water Resources Control Board Resolution 2009-0064 and the USFS (2000) *Water Quality Management for Forest System Lands in California, Best Management Practices* and provides comments below. Comments reflect tribal concerns regarding "on the ground" problems with the implementation of Best Management Practices (BMPs) (USFS 2000) and meeting the intent of previous 1981 State Water Resources Control Board and U.S. Forest Service agreement or following extensions covering the Klamath-Trinity basin.

As pointed out by the Quartz Valley Indian Community (2009) letter in August, the Work Group has chronicled major problems with both private and public land timber harvest and grazing in comments on the Scott, Salmon and Klamath River TMDLs (QVIC 2006, 2007, 2008, 2009, Karuk Tribe 2009, Yurok Tribe 2009).

USFS management in the Klamath-Trinity Basin has impacted Pacific salmon very negatively at a time when the Klamath River ecosystem is acutely stressed due to agricultural and dam impacts (QVIC 2009b).

The QVIC have established a good working relationship with the North Coast Regional Water Quality Control Board (NCRWQCB) and see signs of progress in abating non-point source attendant with National Forest management. It appears that the SWRCB would cut Regional Board staff and try to have fewer staff handle USFS oversight state-wide when increased oversight and enforcement would be more appropriate. Tribes in the California portion of the Klamath Basin cannot allow further lax oversight of USFS lands given the potential loss or diminishment of critical salmon and steelhead refugia (U.S. EPA 2003). Tribes are sovereign Nations and should not be considered just another stakeholder. If the SWRCB is to supplant NCRWQCB authority, then the QVIC demands a government to government relationship with the SWRCB and agreements in writing that define specific staff detailed to meet tribal concerns regarding USFS Klamath-Trinity basin management.

U.S. FOREST SERVICE KLAMATH-TRINITY BASIN PERFORMANCE MIXED UNDER PRIOR MAA

National Forests within the Klamath-Trinity show highly variable compliance with BMPs and in meeting water quality objectives due to different approaches to watershed management.

The Six Rivers National Forest (SRNF) is a model for improving watershed management to maintain and restore conditions favorable to Pacific salmon. SRNF manages Middle Klamath tributaries to foster advancing recovery from past logging damage, the last Lower Klamath Basin refugia in upper Blue Creek is protected as part of their holdings and their Horse Linto Creek restoration project in the Lower Trinity Basin is one of the most successful in the region (Kier Associates 1999). SRNF transportation planning, road erosion control and decommissioning and management of recreational vehicles sets a standard that all California National Forest should meet. Figure 1 shows an example of their transportation system maps that are available for public use on the internet. The SRNF also actively conducts focused monitoring to discern habitat trends and produces timely publication of results.

Alternatively, the Klamath National Forest has conducted intensive logging on steep unstable terrain, including salvage logging after fires, and has a vast road network that it is reluctant to reduce. As a consequence, KNF experienced 437 miles of stream scour attendant during the January 1997 flood (de la Fuente and Elder 1998) and massive sediment yield is likely to continue without prompt action. Figure 2 shows flood damage in the lower Westside Scott River basin where debris torrents coming from roads, clearcuts and landings widened and warmed creeks that formerly served as refugia. Multiple crossing failures in rain-on-snow zone were a major problem (de la Fuente and Elder 1998).

KNF (2000) watershed analyses often have appropriate recognition of thresholds of risk for road densities (Figure 3) or other watershed conditions; however, road decommissioning is slow and the road network on the forest remains much more extensive than can be maintained. Whether it is the NCRWQCB staff or the SWRCB staff operating out of Sacramento, road densities on National Forest lands must be reduced immediately to reduce risk to refugia. Leaving roads on the landscape is setting up additional major sediment delivery and this should not be handled under a waiver of waste discharge or MOU invoking BMPs without clear written timelines for road decommissioning and reduction of densities as well as a major reduction in the number of road-stream crossings.

The QVIC (2007b) noted that proposed KNF (2007) grazing management in meadow areas at the headwaters of Shackleford Creek would damage fish and wildlife resources and pose a risk of water pollution in an area of high recreational use. The bank erosion, riparian vegetation decrease, trampling of the stream bed and deposit of cattle waste into Shackleford Creek are inconsistent with the State of California's *Scott River TMDL* (NCRWQCB, 2006) and does not comply with the North Coast Regional Water Quality Control Board's *Basin Plan* (NCRWQCB, 2009). The Environmental Analysis (KNF 2005) The Draft EA fails to meet requirements governing the U.S. Forest Service, including the National Forest Management Act (NFMA), Klamath National Forest (KNF) Land and Resource Management Plan (LRMP), and the Aquatic Conservation Strategy (ACS).

KLAMATH NATIONAL FOREST WATERSHED HEALTH IS DETERIORATING

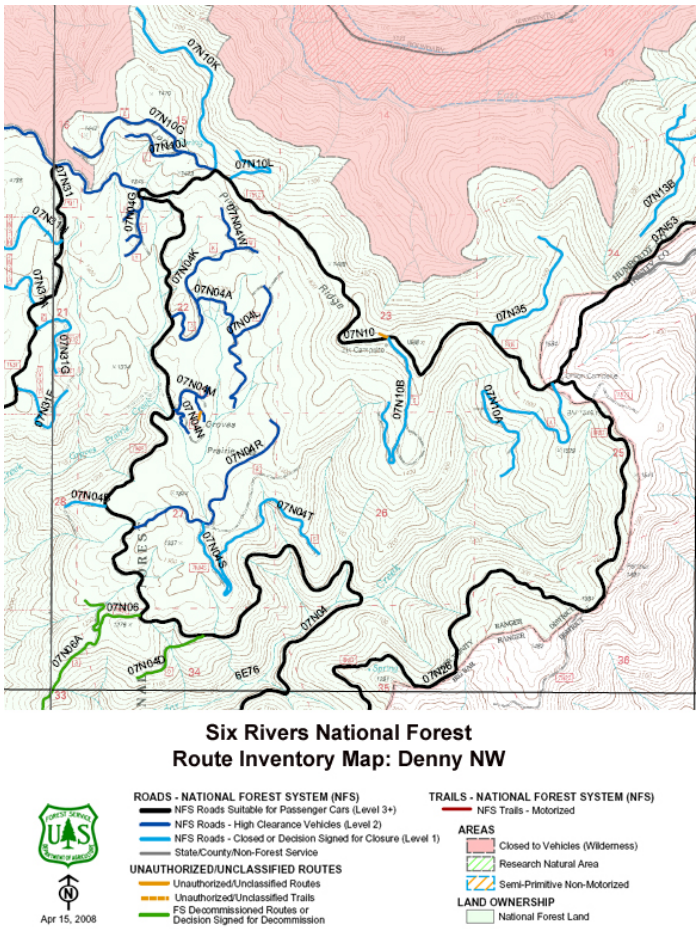

Figure 1. Six Rivers National Forest transportation map for the New River and Denny NW USGS quadrangle available on the internet. Not roads in unstable locations are slated for decommissioning and many are closed to prevent damage by ORVs. Available at: http://fs.usda.gov/Internet/FSE_DOCUMENTS/fsm9_027551.pdf

The Klamath TMDL (NCRWQCB 2009) clearly defines the need to protect cold water refugia. The zero increase in sediment target for Middle Klamath tributaries will help achieve that objective, if there is sufficient and prompt action, particularly on public lands. QVIC (2009b) cited USFS Region 5 hydrologist Barry Hill (2009) to point out that cumulative effects risk has actually increased on the Klamath National Forest (KNF) in recent years and that there are now 50 watersheds recognized as over cumulative effects thresholds:

> "The Klamath National Forest had 45 watersheds above TOC in 2004, based on three separate models. Since 2004, two watersheds on the Klamath NF have gone over the TOC threshold due to timber harvests and 13 have gone over threshold due to wildfires. During the same period, six watersheds that were above TOC fell below threshold due to passive recovery and four watersheds fell below threshold due to road treatments. The current total of watersheds over TOC is therefore 50."

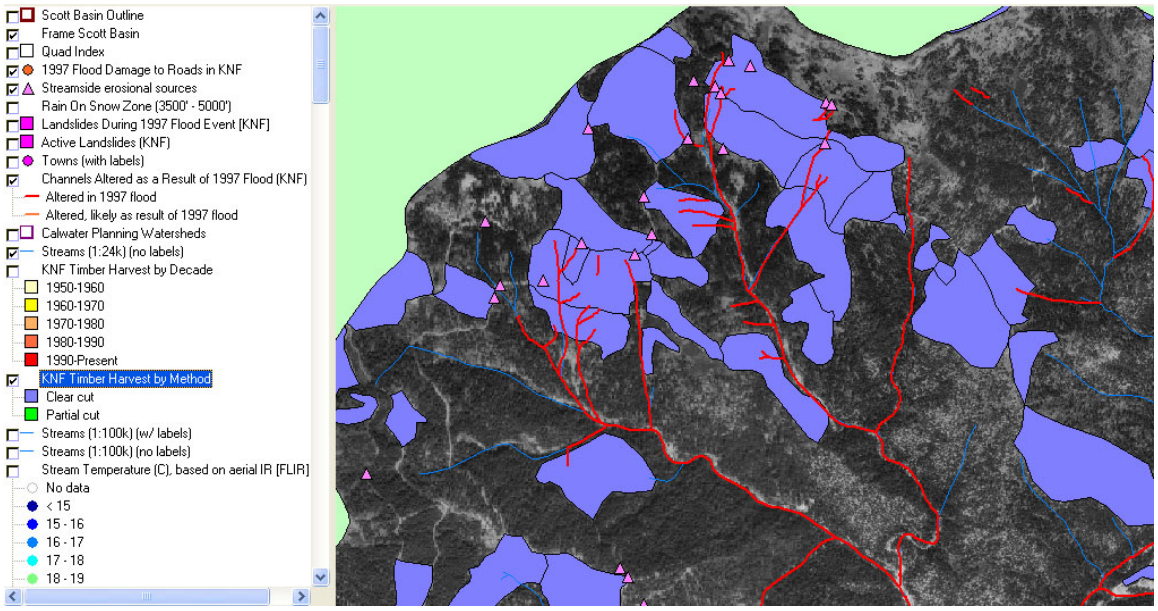

Figure 2. This map shows the overlap of Klamath National Forest clear cut timber harvests in the 1980's and 1990's (blue), sites of road and crossing failures (pink triangles) and channels scoured by debris torrents (red lines).

It is obvious that it is not time to lessen oversight of KNF as the trends in watershed health are declining and there is clear lack of compliance under the pre-existing MOU. The QVIC demands that any state level pre-emption of NCRWCB authority deal specifically with reversing these trends and require monitoring and timely reporting to the tribes and the public by Klamath National Forest or USFS Region 5.

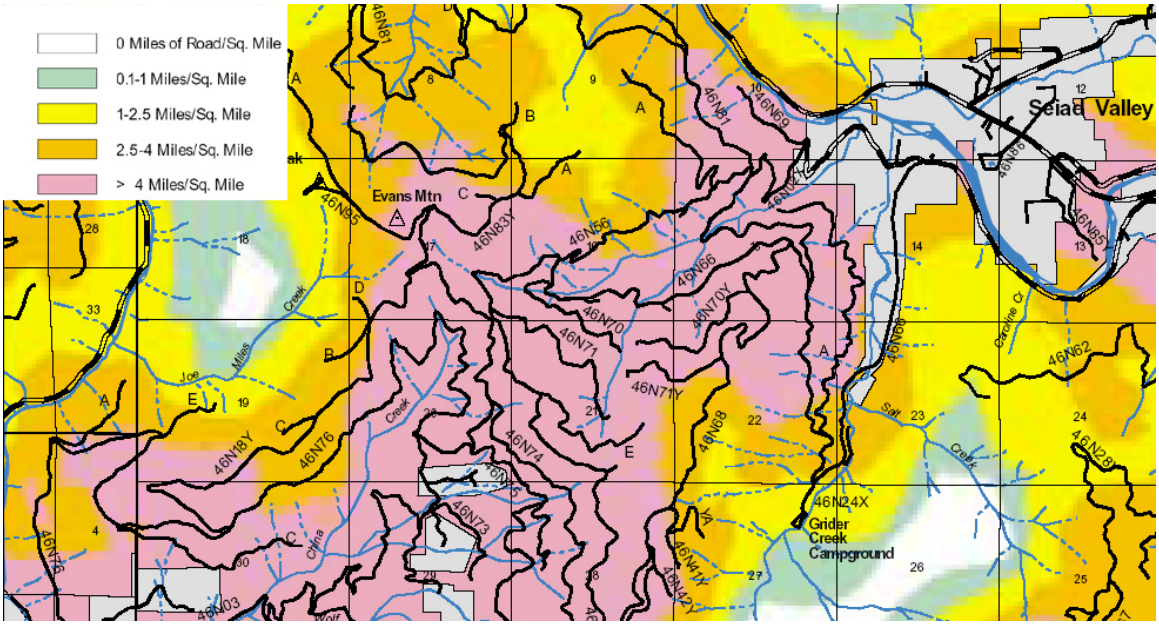

Figure 3. Map of road density in the Grider Creek watershed and adjacent areas with color assigned risk values: white and green (lower risk), yellow (intermediate), and orange (high) and pink (very high). From KNF (2000).

BATTLE CREEK CASE STUDY INDICATES MAJOR PROBLEMS WITH PRIVATE TIMBERLAND HARVEST OUTSIDE THE KLAMATH-TRINITY NEGATIVELY IMPACTING PACIFIC SALMON

The management of USFS Region 5 National Forest lands must have as a primary consideration the control of cumulative effects and damage to aquatic resources and Pacific salmon in watersheds of mixed ownership, particularly where there is significant private industrial timberland ownership (Ligon et al. 1999, Dunne et al. 2001, Collison et al. 2003). Higgins (2009) describes how disturbance by timber harvest on the northwestern California coast has caused a "press disturbance" that has caused coho salmon to drop to such low levels that they may be in an "extinction vortex." The QVIC attaches Kier Associates (2003a, 2009) as Appendices A & B, which is an analysis of upland conditions and aquatic resources in Battle Creek. The original work was carried out in cooperation with Terraqua (2004) in support of development of the *Battle Creek Watershed Assessment*.

The case study provides SWRCB and USFS staff with an in depth look at Sierra Nevada timber harvest driven cumulative watershed effects problems at a watershed scale that are constraining Pacific salmon recovery. Pool depths reported after the January 1997 storm (Terraqua 2004) are likely insufficient to allow winter run Chinook over-summering and they are the target of a multi-million dollar restoration effort in the Battle Creek basin (Ward and Kier 1999). Kier Associates (2003a, 2009) analysis relies on extensive use of GIS but also data collected at 50 locations throughout the Battle Creek watershed (Terraqua 2004). Data were collected following USFS Aquatic and Riparian Ecosystem Monitoring Protocols (AREMP) (Gallo 2002). Results from Battle Creek locations are referenced using the USFS (Reynolds 2001) Ecosystem Management Decision Support

(EMDS) model rating curves based on data analysis from hundreds of sites, including reference streams throughout the Pacific Northwest. The QVIC recommends that both AREMP and EMDS be employed throughout Region 5 as a requirement of any updated MOU (see also Monitoring below). The QVIC also strongly urges the SWRCB and USFS Region 5 to use all GIS tools and data, such as those provided by Kier Associates (2003, 2009), for on-going programs to control cumulative effects similar to recommendations of Dunne et al. (2001).

ALTERATION OF WATERSHED HYDROLOGY, GLOBAL WARMING AND RISK OF DAMAGING INCREASED PEAK DISCHARGE

The SWRCB and USFS must begin to factor in rising snow level elevations (Van Kirk and Naman 2008,) and the potential for rain-on-snow events at much higher elevations (Harris et al. 1997). The January 1997 storm exhibited rain-on-snow up to 7,000 feet in the Klamath Mountains (de la Fuente and elder 1998), above 7,000 feet in the Battle Creek watershed (Napper 2001) and to elevations of 11,000 feet elsewhere in the Sierras (Harris et al. 1997). Potential from damaging peak flows due to rain-on-snow events is known to increase with clear cuts and high road densities at susceptible elevations (Harr 1983, Berris and Harr 1987, Heeswijk et al. 1995).

In the nearby Scott River basin Van Kirk and Naman (2008) found that snow level had risen approximately 1,000 feet over the last 50 years as a result of climate change. Consequently, risk of peak flows related to cumulative effects from timber harvest and other land use activities should now factor in high elevation bedrock or naturally sparse vegetation areas that tend to build up snow packs that will now contribute to rain-on-snow driven higher peak flows.

The flow into Trinity Reservoir was higher during January 1997 than in 1964 or 1974 (Figure 4), the previous storms of record. In the event that the rainfall above Trinity Reservoir would have been more prolonged, substantial downstream damage might have resulted because the flow below Lewiston Dam would have had to go from 6,000 to whatever the inflow was into Trinity Reservoir (i.e. >70,000 cfs). Northwestern California change scene detection based on 1994 and 1998 Landsat scenes (Fischer 2003) shows active logging on private timberlands (Figure 5) in the rain-on-snow zone above Trinity Reservoir. The widespread change in a short period of time is taking place on private timberlands that can be clearly discerned because of the checker board pattern resulting from past railroad land grants. This type of activity needs attention from the SWRCB, CDF and the USFS because increased peak flows can threaten dams and public safety downstream of reservoirs.

Similar patterns of peak flow events are in evidence for the Sierra Nevada where the January 1997 storm was the highest flow ever recorded (Figure 6). Don Pedro reservoir filled to capacity causing the need to send water over the spillway at maximum capacity (Figure 7), which resulted in major channel scour downstream (Figure 8). It is unknown to what degree extensive clear cuts on private lands in the Sierra Nevada, including over 1 million acres by Sierra Pacific Industries alone, is factoring into increased peak flows.

Regardless, the SWRCB and the USFS need to fully include climate change and hydrologic impacts of land management in defining BMPs going forward.

SETTING PRUDENT RISK LIMITS FOR TIMBER HARVEST AND ROADS

The QVIC has a highly evolved understanding of risk factors from timber harvest and road building and resultant potential for cumulative watershed effects (Ligon et al. 1999, Dunne et al. 2001, Collison et al. 2003) and damage to salmon streams. Thresholds of risk need to be applied across USFS lands in California that set limits for road densities, near stream roads, road-stream crossings and rates of watershed disturbance. Prudent risk limits to prevent cumulative effects and citations supporting these limits are also provided.

It is also past time that management was restricted on unstable soil types and steep slopes and the locations of such areas is well known (SNEP 1999) or can be predicted with models (Dietrich et al. 1998, Kier Associates 2005). QVIC comments on the Klamath TMDL (QVIC 2006, 2008, Yurok Tribe 2008, Karuk Tribe 2008) provide greater detail on the levels of prudent risk for watershed management. Decomposed granitic soils in the Klamath Mountains need to be recognized for their erodibility and any public or private land management restricted. The Battle Creek case study (Kier Associates 2003, 2009) points out similar problems with logging on decomposed rhyolitic soils on private lands, although management on nearby USFS lands with such terrain is restricted (Armentrout et al. 1999).

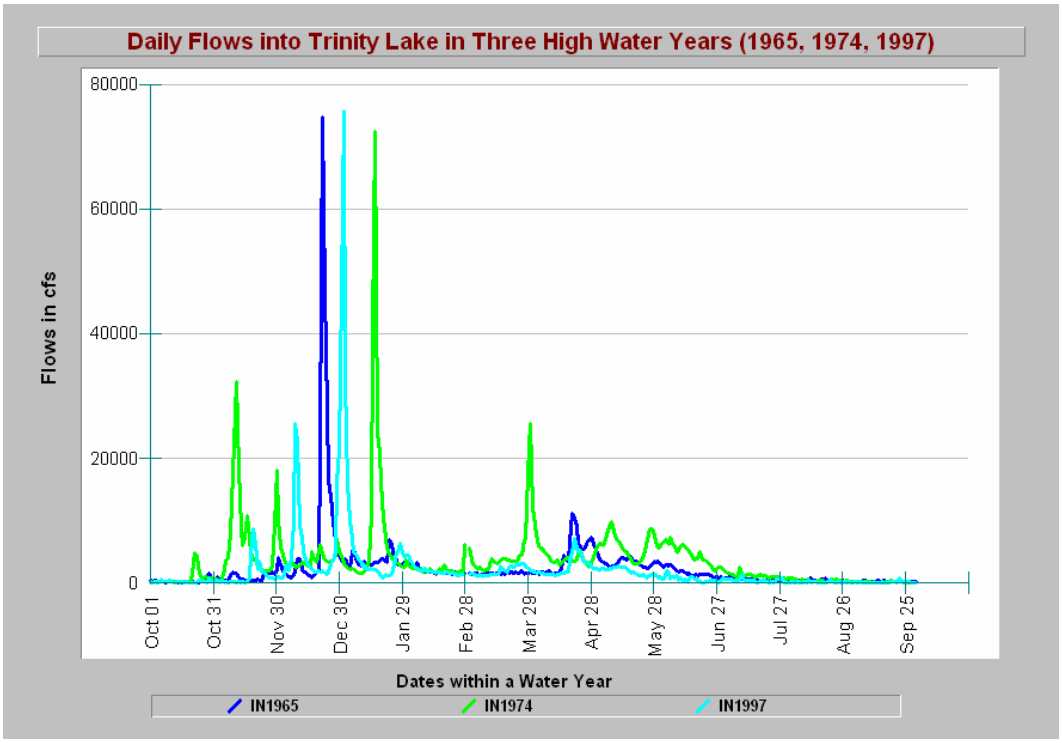

Figure 4. In-flow into Trinity Lake for 1964, 1974 and 1997 storms. Note that highest flow was from 1997, which was likely of lower recurrence interval (de la Fuente and Elder 1998).

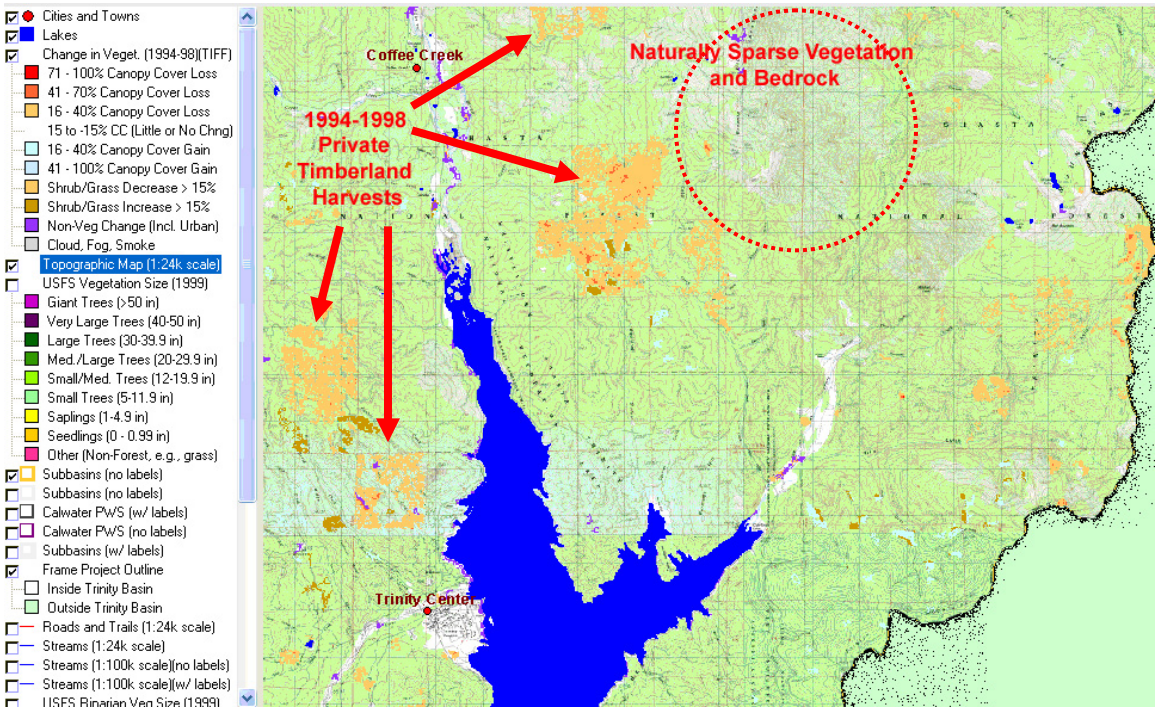

Figure 5. USGS topographic map overlain with CDF (Fischer 2003) change scene detection based on 1994-1998 Landsat images. Widespread canopy reduction in a short period of time adds to naturally high risk due to bare rock and sparse vegetation in the rain-on-snow zone.

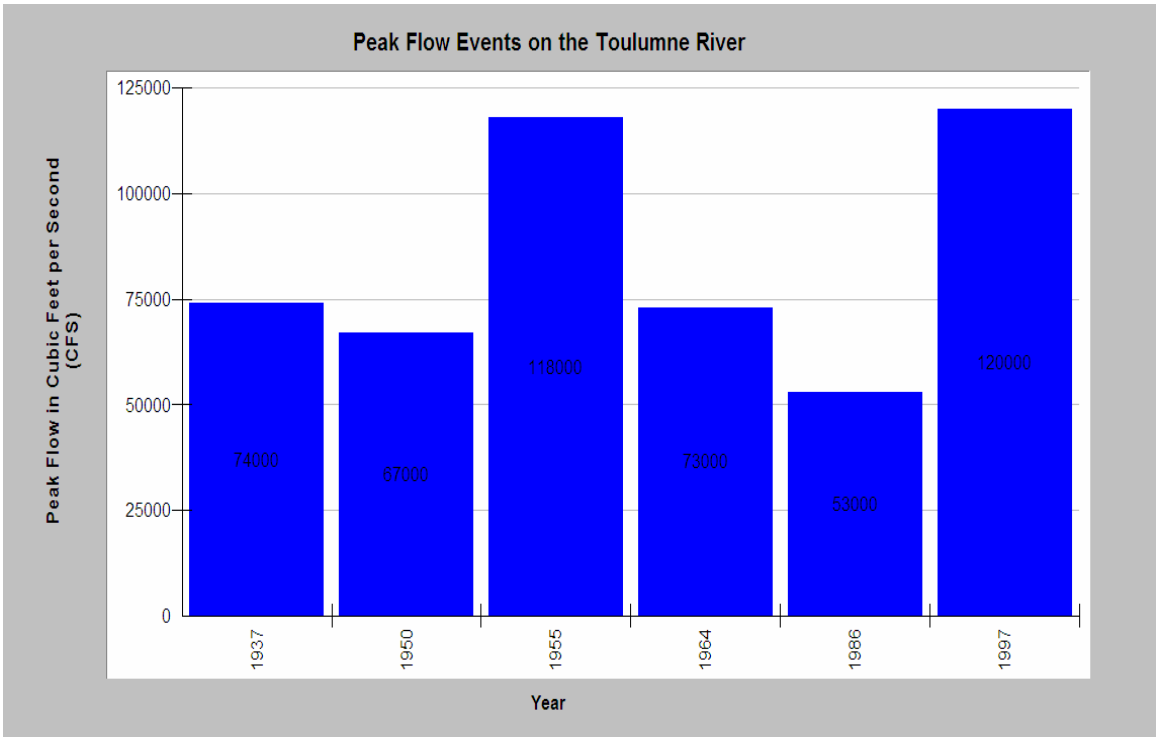

Figure 6. Peak flows in cubic feet per second (cfs) for the Tuolumne River for the period of record showing the January 1997 as having higher flows than the 1955 Flood.

Figure 7. Tuolumne River cascading down spillway of New Don Pedro Dam in January 1997. Photo from CDWR.

Figure 8. Channel scour effects downstream of Don Pedro Dam in March of 1997. Fish habitat improvement projects downstream of this site were obliterated.

MONITORING, TIMELY REPORTING AND DATA SHARING

The QVIC expects the SWRCB to standardize of monitoring techniques to insure understanding of relevance to Pacific salmon recovery (Kier Associates and NMFS

2008), such as the AREMP protocols (Gallo 2002) or other standard scientifically recognized techniques (Kier Associates and NMFS 2008). We are attaching a copy of the *Updated Guide to Reference Values used in the Southern Oregon / Northern California Coho Salmon Recovery Conservation Action Planning (CAP) Workbook* (Kier Associates and NMFS 2008) as Appendix C because it provides reference levels for aquatic habitat data with regard to suitability for salmonids. The shallow landslide stability (SHALSTAB) model (Dietrich et al. 1998) based on 10 meter DEMs also needs to be employed to screen risk of all slope disturbance in steep areas, similar to that analysis provided by Kier Associates (2005) for the Westside Scott River. SHALSTAB would be particularly useful in understanding prioritization of road decommissioning. The SWRCB-USFS MOU needs well defined study designs and requirements for trend monitoring and timely reporting, whether it is negotiated and overseen by state-wide or Regional Board staff.

Monitoring results of damage in the lower Scott River and Middle Klamath tributaries and their subsequent recovery has not been forthcoming from KNF, despite more than a decade passing since the flood event. The Tribe recognizes the importance of cold water refugia at the mouths of Middle Klamath River tributaries (Belchik 1999, 2004, Deas et al. 2005) and in the Scott River (QVIC 2009b). However, the Tribe is concerned about data and report dissemination by the USFS. We see progress in the NCRWQCB MOA currently being negotiated with the USFS; however, if SWRCB staff take over for Regional Board staff, then the QVIC will expect that these same standards for reporting will be required at the state-wide level.

The SWRCB through multiple rounds of 319H funding in the Klamath River Basin from 1992 to 1998 sponsored the creation of a watershed information database, the Klamath Resource Information System (KRIS) (www.krisweb.com). Although originally published by the U.S. Fish and Wildlife Service in Yreka, subsequent versions for the Klamath-Trinity were funded through the Trinity River Restoration Program (TCRCD 2003), with the last update being Version 3.0 in 2003. KRIS projects now cover more than 70% of the North Coast and the KRIS Battle Creek project shows its utility in the Sierra Nevada. This KRIS database could easily be adapted to meet state-wide needs. Additionally, photo-points could be a powerful way for SWRCB staff and the public to check on stream habitat trends, and with only a GPS location, the photos could be linked for review on Google Earth. The QVIC demands transparency and data provision, including raw data (Collison et al. 2003), so that trend monitoring can be conducted and adaptive management can be carried out (Walters 1997, Walters and Hilborn 1978; Walters and Holling 1990, NAS 2004).

ADAPTIVE MANAGEMENT USEFUL, BUT ENFORCEMENT NEEDED TO PROMOTE ACTION

The National Research Council (2004), in recommending that adaptive management be used to recover the endangered fishes of the Klamath basin, described it as follows:

> "Adaptive management is a formal, systematic, and rigorous program of learning from the outcomes of management actions, accommodating change, and improving management (Holling 1978). Its primary purpose is to establish a

> continuous, iterative process for increasing the probability that a plan for environmental restoration will be successful. In practice, adaptive management uses conceptual and numerical models and the scientific method to develop and test management options."

As a result of the Northwest Forest Plan (FEMAT 1993), National Forests throughout the region have been collecting aquatic habitat data using AREMP (Gallo. 2002) methods, which allows analysis similar to that provided for Battle Creek (Kier Associates 2003, 2009). Using other standard scientific methods of data collection in conjunction with the Conservation Action Planning (CAP) database is another option (Kier Associates and NMFS 2008). The problem up to now is that when aquatic indicators are trending negatively, required corrective action under adaptive management has not been taken. Any new MOU must define what steps the SWRCB will take to enforce water quality standards and what length of time the USFS will have to respond. Previous agreements have not lead to sufficient enforcement and improvement will be needed, if adaptive management is to be actually practiced.

Given the onset of global warming (Van Kirk and Naman 2008) and the high level of existing cumulative effects documented above, the typical bureaucratic response of deferring action is inappropriate. The NAS (2004) characterized such an approach as follows:

> "In the deferred-action approach, management methods are not changed until ecosystems are fully understood (Walters and Hillborn 1978, Walters and Holling 1990, Wilhere 2002). This approach is cautious but has two notable drawbacks: deferral of management changes may magnify losses, and knowledge acquired by deferred action may reveal little about the response of ecosystems to changes in management. Stakeholder groups or agencies that are opposed to changes in management often are strong proponents of deferred action."

If action continues to be deferred on reducing USFS flood risk, losses will be magnified and Pacific salmon recovery will be significantly impeded.

FIRE RISK ASSUMPTIONS NEED TO BE QUESTIONED

Fire frequency is increasing and high intensity fires can cause major watershed damage, however, there are false assumptions that construe large, old trees to be a major fire risk. In fact, even-aged stands of previously managed forests tend to burn hotter and can cause stand replacing fires in adjacent old-growth stands. Fuels in old growth forests may be high, but moisture levels are as well and these can moderate fire risk. Consequently, forest health treatments such as thinning young forests from below may be some of the more effective measures for lessening fire risk in the long term.

There is a serious concern about backfires in the Klamath-Trinity set by fire fighting crews often lead by USFS staff from other states. While naturally caused fire usually starts on ridges and smolders downhill, back fires are often set at the bottom of the hill and create extremely high intensity fire that gains momentum as is burns uphill. Human

caused back fire effects not only negatively impact potential merchantable timber and forest health, they also elevate risk of erosion and sediment pollution to streams.

CLEAN WATER ACT, BASIN PLAN AND TMDL COMPLIANCE

QVIC have been working on multiple TMDLs in the Klamath-Trinity basin with the NCRWQCB. The NCRWQCB has included implementation plans in recently developed TMDL documents and integrated them into the North Coast Basin Plan (NCRWQCB 2009). The origin of the TMDL Consent Decree is a lawsuit filed in 1998 after a decade of inaction on cleaning up impaired waterbodies that had been listed at the time of the inception of the California 303d list. Now we have TMDL plans and still no action 20 years later. Regardless of whether it is State Board or NCRWQCB staff, it is time that tougher action was taken to force National Forests to move immediately to abate water pollution under the CWA through the TMDL.

Flow depletion to the point of dewatering of the mainstem Scott River reaches and the failure to meet adjudicated levels in the Scott River canyon (USFS land management area) as required under the SWRCB (1980) adjudication (Figure 9) are annually dismissed on the basis that the USFS water right is a junior right. Table 1 shows the minimum water flow levels needed to protect fishlife per the USFS' adjudication of Scott River flows at the Scott River canyon. SWRCB are remiss in their public trust responsibilities for not assisting USFS in securing flows sufficient to maintain coldwater fish in the Scott River. Water quality problems associated with flow depletion on USFS lands in the lower Scott are documented in the *Quartz Valley Indian Reservation Water Quality Monitoring and Assessments Reports* from 2007 and 2008 (Bowman 2008 and 2009). Action should be taken to address this issue and to look broader and flow needs of USFS lands statewide.

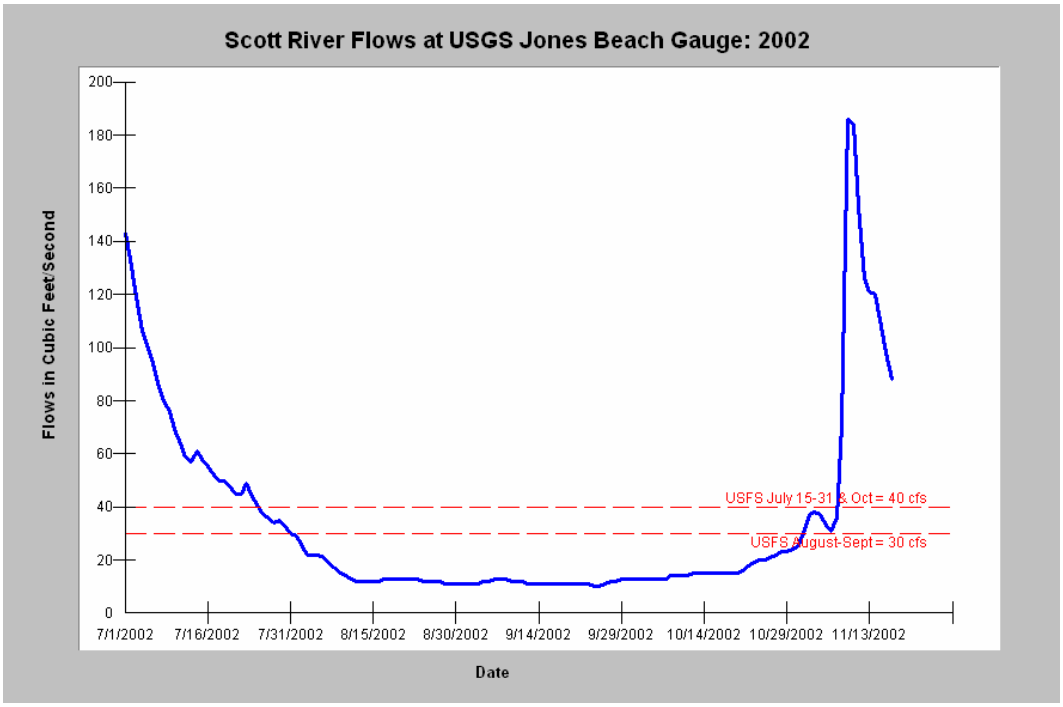

Figure 9. Jones Beach USGS flow gauge data from the irrigation season of 2002 show that flows failed to meet adjudicated levels for the USFS and flows needed for fish migration, spawning and rearing in August, September and October.

Table 1. Scott River Adjudication instream flow allotment for U.S. Forest Service needs for instream flow in Scott River canyon (CDWR, 1980 as cited in Kier Assoc., 1991).

Period	**Flow Requirement in Cubic Feet per Second**
November – March	200 cfs
April - June 15	150 cfs
June 16 - June 30	100 cfs
July 1 - July 15	60 cfs
July 16 - July 31	40 cfs
August – September	30 cfs
October	40 cfs

URGENCY FOR USFS ACTION NEEDED GIVEN PACIFIC DECADAL OSCILLATION CYCLE

The USFS in California has thousands of miles of roads and thousands of road-stream crossings that need to be decommissioned and removed before they fail and cause additional catastrophic sediment yield. Collison et al. (2003) point out that Pacific salmon populations in northern California fluctuate with climatic and oceanic cycles of productivity known as the Pacific decadal oscillation (PDO) cycle (Hare, 1998, Hare et al., 1999).

Positive ocean cycles coincide with wet on-land conditions for a period of about 25 years, then alternate with ocean conditions prone to warm El Nino events and periods of lesser

rainfall. Positive PDO conditions prevailed from 1950-1975 and negative ocean and dry on-land conditions prevailed between 1975-1995. Despite currently being in the productive ocean and wet climatic phase our coho salmon populations are not rebounding (Higgins 2009) and Chinook salmon in the Sacramento-San Joaquin basin are at their lowest ebb ever (Lindley et al. 2009).

Nonetheless, Collison et al (2003) point out that the current positive PDO conditions represent the best chance for us to restore Pacific salmon populations and that if fresh water habitat has not improved by the change back to poor ocean productivity and dry climate sometime from 2015-2025, then many stocks may go extinct.. Therefore, the SWRCB needs to prompt speedy USFS action to reducing erosion risk to salmon streams.

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