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RE: Klamath Forest Alliance Comments to the North Coast 2008 Integrated Report for the 303(d) List of Impaired Waters Bodies and Recommendations of Water Bodies to add to the 303 (d) List in the Future

Date: March 20, 2009

To: North Coast Regional Water Quality Control Board – Attention Matt St. John

I) **Introduction** - The Klamath Forest Alliance thanks you for providing us with this opportunity to comment on the North Coast 2008 Integrated Report for the 303(d) List of Impaired Waters. We are also providing you with additional water bodies that are impaired and should be added to the 303(d) list. Please see our following comments.

II) Pending Decision by the Regional Water Quality Control Board (Water Board) on California 303 (d) List of Impaired Water Bodies

1) Decision ID 13974: List Mainstem Klamath River from Iron Gate to Scott River for cyanobacteria hepatotoxic microcystins AND Decision ID 13971: List Mainstem Klamath River from Scott River to Trinity River for cyanobacteria hepatotoxic microcystins

The Klamath Forest Alliance **supports** the decision to list the mainstem Klamath River for microcystins. The mainstem Klamath River can be polluted by the toxigenic hepatotoxin microcystin during the hot summer months, particularly in August and September.

Critical ceremonies occur during this time period that require bathing in the River water. Traditionally, tribal medicine men drank the River water. This is also the time of year when tribal fishermen are in the River for subsistence fishing. Since they still practice the traditional style of dipnet fishing, it requires them to spend long hours in backwaters and eddies, where the blooms are likely to be the most toxic. Mussels in the River were shown to be toxic and unfit for human consumption as cited in your fact sheets LOE ID 25846 and 25847. Mussels are an important subsistence food for the tribal people living on the Klamath River. The effect of microcystin on other Tribal Trust species is still undetermined and needs to be studied. It is imperative that the

microcystins be eliminated from the Klamath River to protect Cultural Use and Subsistence Fishing beneficial uses.

Non-tribal fishing and water contact recreation interests are also at risk of exposure of dangerous levels of microcystin that occur in the Klamath River during August and September. Whitewater boating and people swimming are in close contact with the Klamath River when microcystin is present. Children accompanying their families on picnics and swimming in the Klamath River pose an even higher risk of having impacts from microcystin, as their bodies are smaller, developing and they are more likely to ingest water.

To protect these cultural and recreational beneficial uses, the Klamath River should be listed for not only microcystin but also the toxigenic cyanobacteria *Microcystis aeruginosa* that produces microcystin.

2) **Decision ID 9638: List Lake Shastina for Mercury**

The Klamath Forest Alliance **supports** the recommendation to list Lake Shastina for Mercury. Mercury contamination is a very important public health issue. Lake Shastina is used as a drinking water supply, for water contact recreation, and for recreational fishing. All of these beneficial uses are at a high risk of having severe impacts by the presence of mercury in the system.

3) **Decision ID 13197: List Klamath River from Beaver Creek to the Scott River for Sediment AND Decision ID 13198: List Klamath River from O'Neil Creek to Elk Creek for Sediment**

The Klamath Forest Alliance s**upports** the recommendation to list the Klamath River for sediment in the proposed reaches. In addition, the Klamath River and associated tributaries should **also** be listed for sediment from the Scott River to O'Neil Creek and from Elk Creek to the Trinity River for sediment. There are very few watersheds from Beaver Creek to Trinity River that are not impacted by land management. Several factors may affect sediment transport and deposition in watersheds including roads, logging, mining, and fire management practices. In particular, any watershed with roads and/or the occurrence of catastrophic fires should be included in the listing. Of all the tributary watersheds between Beaver Creek and the Trinity, only Fort Goff and Portuguese Watersheds could be exempted from the listing. All others are impaired water bodies.

Examples of road failures and catastrophic fires are found in watersheds between Elk Creek and the Trinity River. An example of roads negatively effecting watersheds is Rock Creek which is upriver of Somes Bar. Road failures led to a huge slug of sediment that effectively blocked fish passage into the creek except for the lower ½ mile. An example of catastrophic fire damage by poor fire management practices is found at Dillon Creek. Fires have been occurring more frequently and with more intensity since 1994. Recently a large fire burned through Dillon Creek in summer 2008. During a storm event in March 2009, Dillon Creek was transporting noticeable sediment into the Klamath River (Figure 2).

Figure 2. Photograph of the confluence of Dillon Creek (foreground) and Klamath River during a storm event in March 2009. Photograph was taken by A. Corum, Karuk Fisheries Biologist March 16, 2009.

4) <u>Decision ID 9540 Salmon River – Delist Wooley Creek for Temperature</u>

The Klamath Forest Alliance **opposes** the delisting or removal of Wooley Creek from the 303 (d) list of impaired water bodies in California. We are aware that the Water Board is in the process of removing Wooley Creek, a key component of the Salmon River watershed, from the 303(d) list. In early March of this year, we first learned that the Wooley Creek Hydrologic Sub-Area had been removed from the Salmon River Hydrologic Area in order to pursue its delisting. Our following response provides you with our reasoning as to why each of the "Lines of Evidence" currently being used by the Water Board to justify delisting Wooley Creek is incorrect and does not support a sound rational for delisting . Our reasons for the Water Bond to not delist Wooley Creek include:

<u>Incorrect Lines of Evidence</u>

1) LOE 21154 Road Density

Although the density of roads in the Wooley Creek watershed is low, there are several miles of roads in the watershed that exist in the lower elevation areas. Some are maintained by the USFS and some are not. In addition, several miles of road were recently decommissioned in the lower portion of the Wooley Creek watershed, in Gates and Steinacher Creek, which cause a much higher overall ERA/TOC than has been portrayed. Preliminary reports indicate

that there has been and there continues to be significant runoff and sedimentation problems in this area, which is in the lower portion of Wooley Creek.

No long term monitoring is being performed to document these problems and no information is currently on record for the affects of the current road management on water temperature in Wooley. The short and long term impacts of road management in Wooley Creek should be documented and incorporated into any final recommendations prior to the Water Board making a decision for delisting Wooley Creek. In addition all road related problems in the Wooley drainage should be prioritized for restoration.

2) LOE 21155 % of Human Disturbance

This LOE is based on the statement that, "Much less than 15% of the Wooley Creek watershed has been or is currently disturbed by human activities." This is incorrect . Although 95% of the watershed is designated Wilderness Area, there are both past and current human disturbances.

Fire Management and Exclusion- The primary human impact to Wooley Creek has been 100 years of fire suppression, beginning with the Weeks Act in 1911. The Salmon River Community Wildfire Protection Plan states that, "Much of the Salmon River watershed is at risk of **unnaturally** severe fire. Years of fire suppression have had its effect on the fuels build up of the area. Fire suppression has contributed to the increased fire risk and damage from fire in our forests." Because of fire suppression (a human activity), the fire history in Wooley Creek is unnatural. There has been 82% of the Wooley Creek watershed has been affected by wildfires in the past 100 years . Much of that area has burned and/or reburned in the past 5 years.

The exclusion of natural fire by the USFS has created conditions that affect water temperatures in Wooley Creek. The unnatural vegetation regime, overstocked with conifers, has reduced the base flows in Wooley Creek. Additionally, the resulting wildfires have reduced riparian vegetation and increased sedimentation. All of these factors directly affect water temperatures. The long term impacts to water temperature as a result of 100 years of altering the natural fire regime should be identified and included in the delisting process, prior to a final determination.

Fire suppression and lack of traditional management practices have led to devastating fires and a reduction of species and habitats critical to a healthy ecosystem. These events culminated at Medicine Mountain in the Wooley Creek watershed during the summer of 2008. In 1994, fires on Medicine Mountain took down stands of tan oak trees. Tan oak acorns are an important subsistence food for the Karuk people. Traditional fire management that occurred prior to contact included active management of the watershed. Traditionally, the fallen debris would have been cleaned up. This practice reduced ladder fuels, so that consequent fires would burn slow with beneficial effects. However, due to poor management practices, the fuel was not cleaned-up. When a fire went through the same area in 2008, it was catastrophic. Because of the unmanaged fuel load, the area burned so hot that it turned the area into "moonscape". Important habitat was destroyed including beautiful tan oak stands and medicinal princess pines.

Grazing Management - There are two grazing permits for the Wooley Creek watershed. One is managed by the Klamath National Forest and the other is managed by Six Rivers National Forest. Grazing of cows has an impact on water quality. Examples of this include reduction of riparian vegetation, destabilization of hillslopes in delicate headwater areas, increased introduction of E. coli into the water system, and spreading of nonnative plant species. Data shows that Wooley Creek has been impacted by extensive livestock grazing. Historically, Wooley Creek was intensively grazed by both sheep and cattle, which no doubt had a long term impact on riparian reserves, potentially increasing water temperatures. Currently 11% of the Wooley Creek watershed is held in cattle grazing allotments (see attached map). Although specific data for the Wooley Creek grazing allotment does not exist, we have accounts from local wilderness users stating that runoff off both nutrients and sediment in these areas is severe during first flush events.

According to a report by Spence et al. (1996), "Grazing results in the removal of natural vegetation, the alteration of plant-community composition, and the modification of soil characteristics, which in turn affect hydrologic and erosional processes. Effects are particularly acute in the riparian zone, where livestock tend to congregate, attracted by water, shade, cooler temperatures, and an abundance of high quality forage Devegetated riparian zones reduces shading and increases summer stream temperatures - often in streams that are where temperatures are near the upper limit of the tolerable range for salmonids." Cattle grazing is authorized by the USFS and is likely to persist in the Wooley Creek watershed into the future. Short and long term impacts related to grazing are not documented and included in the delisting process prior and must be to have an informed final determination.

3) LOE 26643 Natural Receiving Water Temp

This LOE relies on the assumption that Wooley Creek has not been altered by human activities, and therefore the water temperature does not exceed natural receiving levels. Based on our argument that much more than 15% of the Wooley Creek Watershed has been affected by human activities, the natural receiving water temperature of Wooley Creek has been altered. In which case, its MWAT values of 16.1-25.6 C are well above the 16C recommendation for fish health laid out in the Evaluation Guideline.

The LOE also states that "There are no known environmental conditions (e.g., seasonality, land use practices, fire events, storms, etc.) that are related to these data." The data collected during July-October 2006 was taken during a severe wildfire event. Heavy smoke inversions in 2006 reduced water temperatures. That statement is therefore incorrect.

Even with below average water temperatures, temperatures for much of the summer of 2006 were in exceedance of the Evaluation Guidelines. A de-listing would indicate suitable temperatures exist for the beneficial uses established. The cold-water fishery is an important beneficial use to the Karuk Tribe and other fishing interests.

Temperature data was requested and received from Six Rivers National Forest for lower Wooley Creek. The data set was from 7/6/2006-10/9/2007. A 7-day average of daily maximums (7DADM) was calculated for this data set. The EPA criteria listed in the Wooley

Creek Fact Sheet for LOE ID 26643 was a 16 C 7DADM. The 16 degrees C MWMT criterion is recommended by US EPA Region 10 to (1) safely protect juvenile salmon and trout from lethal temperatures; (2) provide upper optimal conditions for juvenile growth under limited food during the period of summer maximum temperatures and optimal temperatures for other times of the growth season; (3) avoid temperatures where juvenile salmon and trout are at a competitive disadvantage with other fish; (4) protect against temperature induced elevated disease rates; and (5) provide temperatures that studies show juvenile salmon and trout prefer and are found in high densities. EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards. EPA 910-B-03-002. U.S. Environmental Protection Agency Region 10 Office of Water, Seattle, WA.

Of the 445 calculations, 157 exceeded the EPA criteria. This occurred between July and September for both 2006 and 2007 (Figure 1). Therefore, temperatures in Wooley Creek are not protective of juvenile salmonids during the hot summer months.

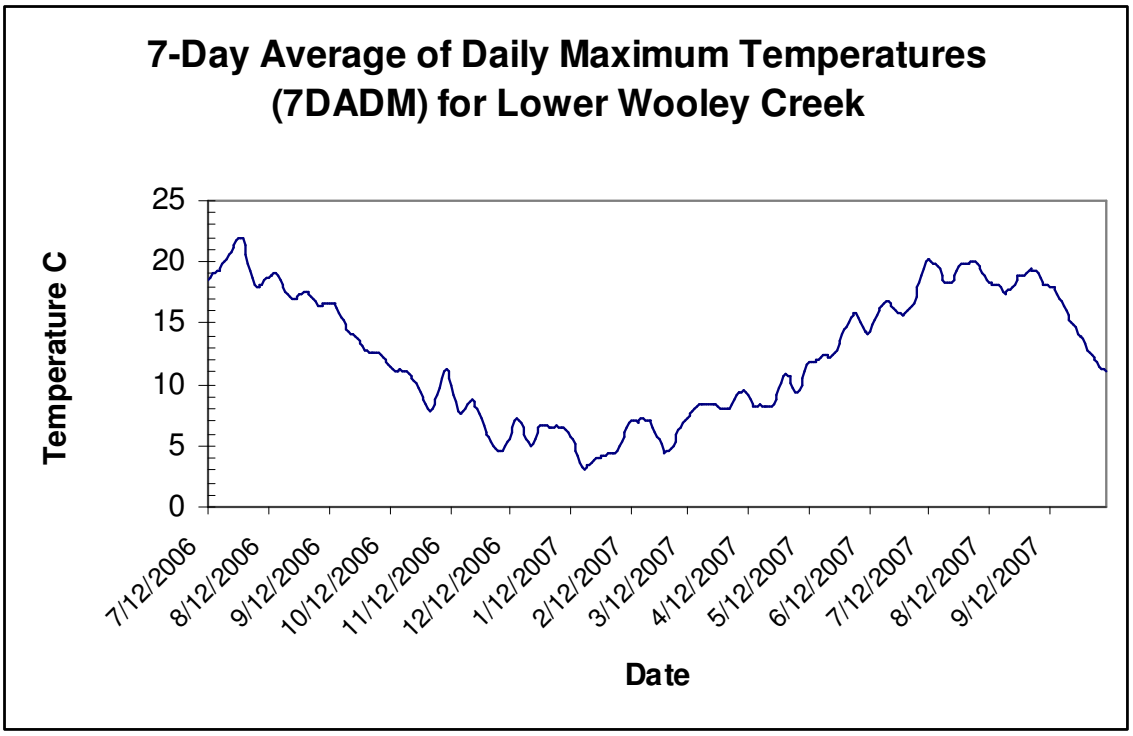

Figure 1. 7-day average of daily maximum temperature for lower Wooley Creek. Calculations were done by Karuk Tribe Water Quality. Data was provided by Six Rivers National Forest.

Wooley Creek is not meeting the temperature criteria for the protection of the cold-water fishery. High temperatures are known to be deleterious to anadromous fish. Current runs of anadromous fish species in Wooley Creek are demonstrably lower than historic runs (USFS and Karuk Tribal records on Spring Chinook and Summer Steelhead). According to the NRC report on Klamath Fisheries, "The principal habitat for spring-run Chinook salmon and summer steelhead in the Salmon River drainage today is Wooley Creek (Moyle et al. 1995, Moyle 2002). Although Wooley Creek has suitable habitat for Spring Chinook, the population is critically low. The reasons for this remain somewhat

mysterious. There has been inadequate assessment of the relationship between high water temperatures, which exceed standards, and the human caused short and long term impacts in Wooley Creek that we have documented in this submission.

Even though a large portion of the Wooley Creek watershed is designated as a wilderness area now, it is and has been impacted and disturbed by human activity. There is active management occurring in over 15% of the watershed. Fire (suppression) management by the National Forests has resulted in large-scale fires in recent years in the Wooley drainage. These un-naturally large fires, due to suppression, have the ability to effect stream temps through loss of canopy and increases in sediment yield to the stream. The Wooley Creek wilderness also has 2 grazing permits, one managed by the Six-Rivers NF and the other by the Klamath NF. Grazing has the potential to negatively effect this watershed. Although specific data for the Wooley Creek grazing allotment does not exist, data does exist for the Shackleford and Kidder grazing allotments and it is important to see what types of impacts have been documented which respect to grazing on another KNF managed allotment, which is geographically very close in proximity to Wooley.

The information provided in the *Shackleford and Kidder Creek Allotments Draft EA* and in KNF BMP water quality reports (1999-2006) grazing sections show a pattern of failure to meet effectiveness criteria for bank stability and disturbance of lentic habitat. Kidder Creek and Shackleford Allotments both had 20-30% bank erosion in meadow reaches and nearly 10% of the stream bottom had been physically trampled by cows. The latter information also indicates that cattle defecate in streams, adding nutrients and, potentially, pathogens. Pathogens, nutrient and flow data were collected in 2007 by the QVIR EPD. High loads of both nitrogen and *E.coli* were detected in the Shackleford headwaters in 2007 (QVIR Monitoring and Assessment Report). The pattern of bank failure along 20-30% of stream banks within all Scott River grazing allotments, and those in other Ranger Districts, indicates a KNF-wide problem with grazing management (KNF, 1999-2006).

Table 1 shows the frequency of failure to meet effectiveness (FE) standards or the 4 inch stubble height criteria, signaling over-grazing (OG), in the Kidder Creek and Shackleford Allotments. BMP effectiveness criteria are not being met in the Kidder Creek or Shackleford Allotments, nor are they met in most other Scott River Ranger District allotments.

Allotment	1998	2001	2002	2003	2004	2005	2006
Kidder Creek	OG	OG	OG		OG	OG	OG
Shackleford		OG		OG	OG	FE	

Table 1. Summary of Kidder Creek and Shackleford Allotments failure to meet effectiveness monitoring standards (FE) or over-grazing (OG) (stubble height less than 4 ").

In addition, the current closed canopy conditions found in many areas of Wooley Creek prevent the ability for snow to build up on the ground underneath the overstory forest. The removal of fire from Wooley Creek has lead to the reduction the large oak tree component in the forest strata. The removal of these large oaks has caused the canopy to close in and not allow snow to build up on the ground. Snow underneath an overstory has a slower release time in the summer. This has reduced base flows and caused increased water temperatures in Wooley Creek at the peaking times of the summer, typically found in late July and early August.

4) LOE 21156 Sediment

This data does not include the effects of the 2008 wildfires in Wooley Creek, which burned over 10,000 acres. The sediment production in the lower portion of Wooley Creek has also been greatly increased due to recent road management and particularly decommissioning actions.

In addition, we question the results of a model that requires landslide/mass-wasting volumes of 200% over background conditions, and surface erosion volumes of 400% over background conditions, before the impacts become a cause for concern.

Conclusion for Wooley Delisting - In conclusion for the Wooley Creek delisting determination, Wooley Creek does have road impacts that are not documented and put this watershed at a level of concern. Water temperatures are impacted by human activities currently and cumulatively from the past and do not meet the temperature criteria for the protection of the cold-water fishery. These temperatures have been altered by decades of fuel and grazing management and therefore does not warrant a de-listing. Sediment levels and thresholds are a great concern in Wooley Creek. The Klamath Forest Alliance opposes the de-listing of Wooley Creek. We ask that the Water Board decide not to delist Wooley Creek at the present time.

If the Water Board proceeds with delisting, we recommend that a resolution be made stating that Wooley Creek will continue to be managed under the guidelines currently laid out in the Salmon River TMDL and Implementation Plan.

III) Impaired Water Bodies that Should be Added to the 303 (d) List

1) Scott River

Data collected by the QVIR Environmental Program in 2007 and 2008 indicates additional impairments beyond temperature and sediment (current listing) of the Scott River and tributaries. Water quality parameters, the sampled locations and the years sampled that do not meeting the NC Basin water quality objectives are:

1. *E.coli* (2007, 2008)– Shackleford Creek, Sniktaw Creek and Scott River mainstem
2. dissolved oxygen (2007, 2008) and pH – Scott River mainstem
3. specific conductivity (2008) – Scott River mainstem

Nutrient data (TN, TP) collected in 2007 and 2008 from the Scott mainstem and Shackleford Creek also exceeds the Nutrient Numeric Endpoints (NNE) developed for the USEPA by Tetratech (2006). In addition, water samples collected in 2007 from the Marble Mountain wilderness lakes of the Shackleford drainage indicate nutrient and bacteria loading (TN, TP and *E.coli*) is occurring during the summer sampling season.

E.coli poses a serious threat to human health. Tribal members fully submerge themselves during sweats and the public enjoys recreation (swimming, boating, kayaking, snorkling) in the Scott mainstem, tributaries and head-water wilderness lakes. Data indicates the highest concentrations of *E.coli* are occurring during the summer season when these activities are most likely to occur, see Figure's 2, 3, 4. We recommend this parameter for immediate listing and hope that we can coordinate something with your staff to explore the most appropriate options for 2009.

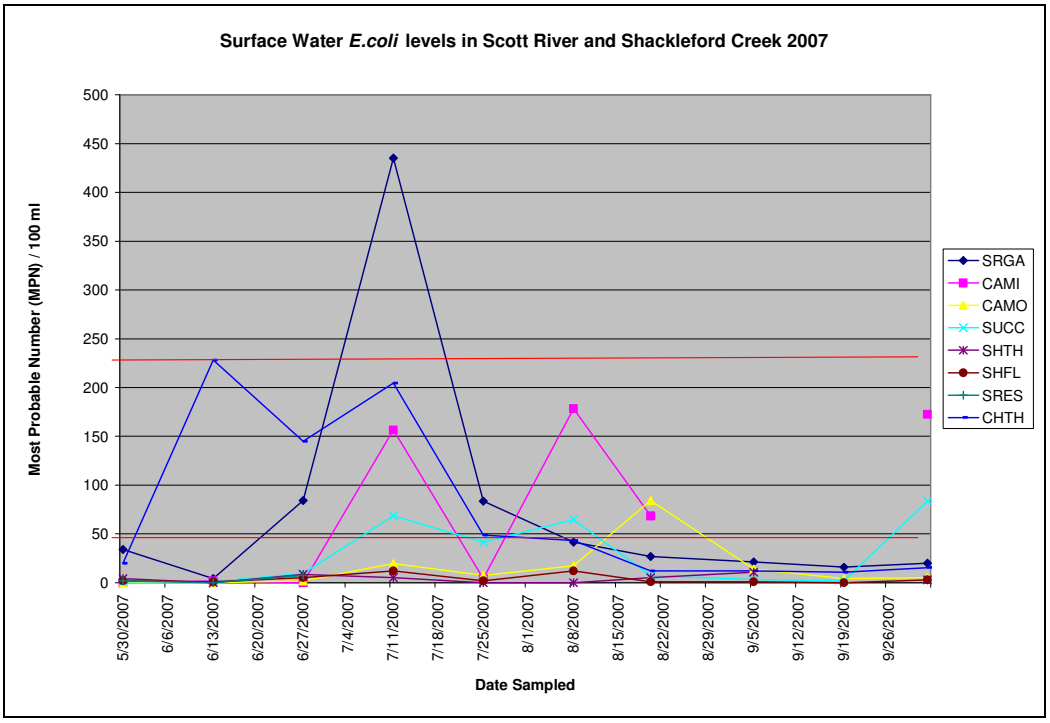

Figure 2 *E.coli* results for Shackleford Creek (CAMI, CAMO, SUCC, SHTH, SHFL, SRES and CHTH) and the Scott River (SRGA) in 2007. The top red line is the federal (U.S. EPA 1986) single exceedance value, 235 MPN. The bottom red line is the NCRWQCB (2007) *Basin Plan* objective of a median value of 50 MPN with at least 5 equally spaced sampling events within 30 days.

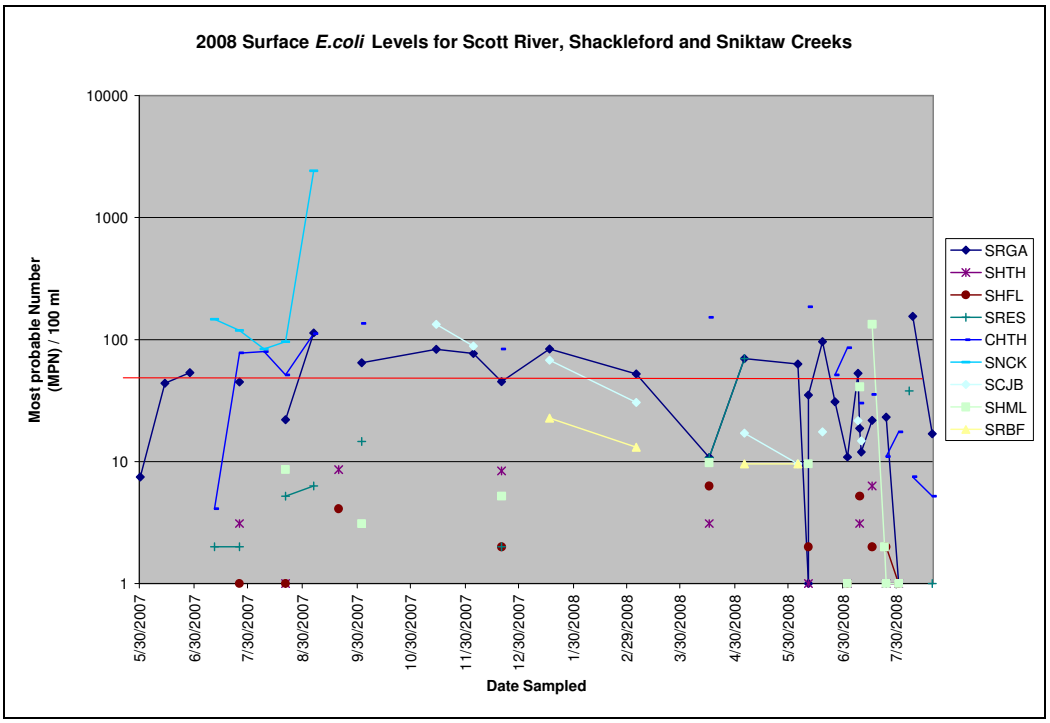

Figure 3 *E.coli* results for all sites sampled on Scott River (SRGA, SRJB, SRBF), Shackleford (SHTH, SHFL, SRES, CHTH), Mill (SHML) and Sniktaw Creeks (SNCK) in 2008. The red line is the NCRWQCB (2007) *Basin Plan* objective of a median value of 50 MPN with at least 5 equally spaced sampling events within 30 days.
*note this graph is a logarithmic scale

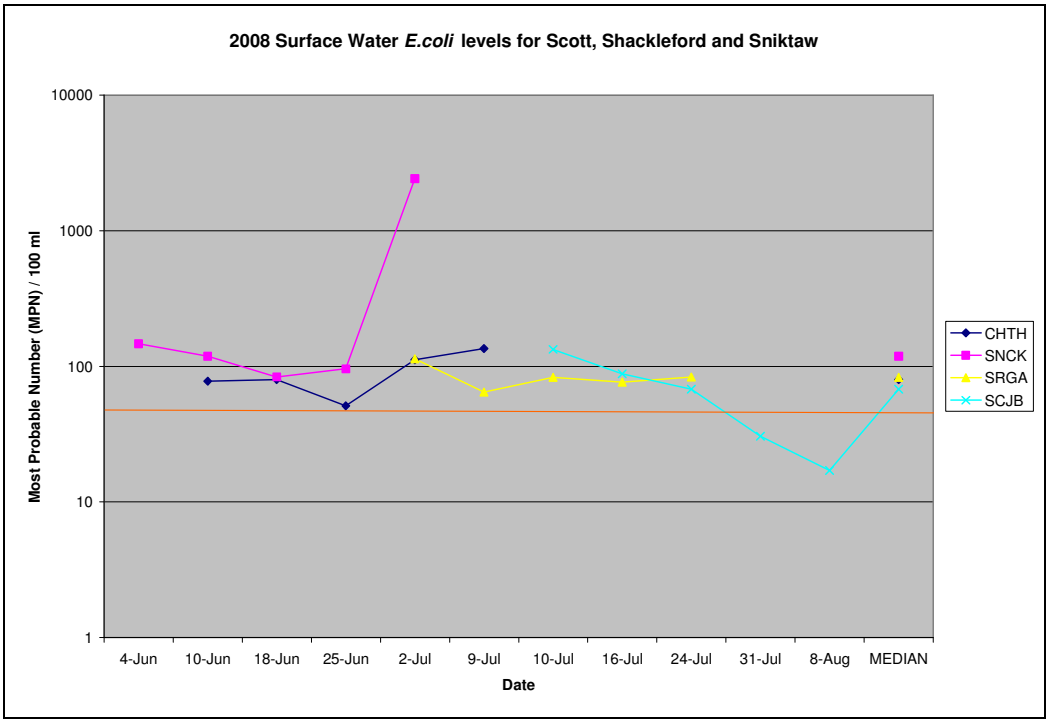

Figure 4 *E.coli* results targeted for comparison to state objective. Selected sites included Scott River (SRGA, SRJB), Shackleford (CHTH) and Sniktaw Creeks (SNCK) in 2008. The red line is the

NCRWQCB (2007) *Basin Plan* objective of a median value of 50 MPN with at least 5 equally spaced sampling events within 30 days.
*note - graph is a logarithmic scale
*note - calculated median values per site are graphed on the far right (see x-axis)

Data and analysis can be found in the 2007 Quartz Valley Tribal Water Quality and Assessment Report.

2) <u>Shasta River</u>

We would like to request that Dwinnell Reservoir (aka Lake Shastina) in the Shasta River Valley be considered for addition to the 303(d) Impaired Waterbodies List for nutrients, dissolved oxygen and pH.

We did not contribute new data for your consideration regarding Dwinnell Reservoirs listing, because we believe that sufficient data to support this action can be found in the North Coast Regional Water Quality Control Board funded *Lake Shastina Limnology* (Vignola and Deas 2005) study. Data therein and narrative clearly indicate that the water body is not meeting Basin Plan standards and is; therefore, subject to listing as impaired for nutrients, dissolved oxygen and toxic algae.

The Regional Board has designated beneficial uses for Dwinnell Reservoir, the Shasta River and the Klamath River that include Native American cultural use, water contact recreation, non-contact water recreation, commercial and sportfishing, subsistence fishing, cold freshwater habitat and habitat for rare, threatened, or endangered species. An objective analysis of existing evidence strongly supports the conclusion that Dwinnell Reservoir is an impediment to achievement of most of these objectives. Action on Dwinnell Reservoir is needed to prevent loss of Pacific salmon species, such as coho salmon, given the now recognized effects of global warming and predicted patterns of climate and ocean productivity (see Cumulative Effects to the Klamath River below).

Pacific Salmon populations in the Shasta River have been dramatically reduced by the construction of Dwinnell Reservoir (Figure 5) and problems are compounded by illegal groundwater withdrawal (see Cumulative Effects to the Klamath River below). Dwinnell Dam has blocked Shasta River fish passage 40 miles upstream of the Klamath River since 1928, blocking dozens of miles of salmon and steelhead prime spawning and rearing habitat (Figure 6). Fall Chinook salmon run trends show more than 80,000 fish in the 1930's, reflecting the carrying capacity of the river before Dwinnell Dams construction.

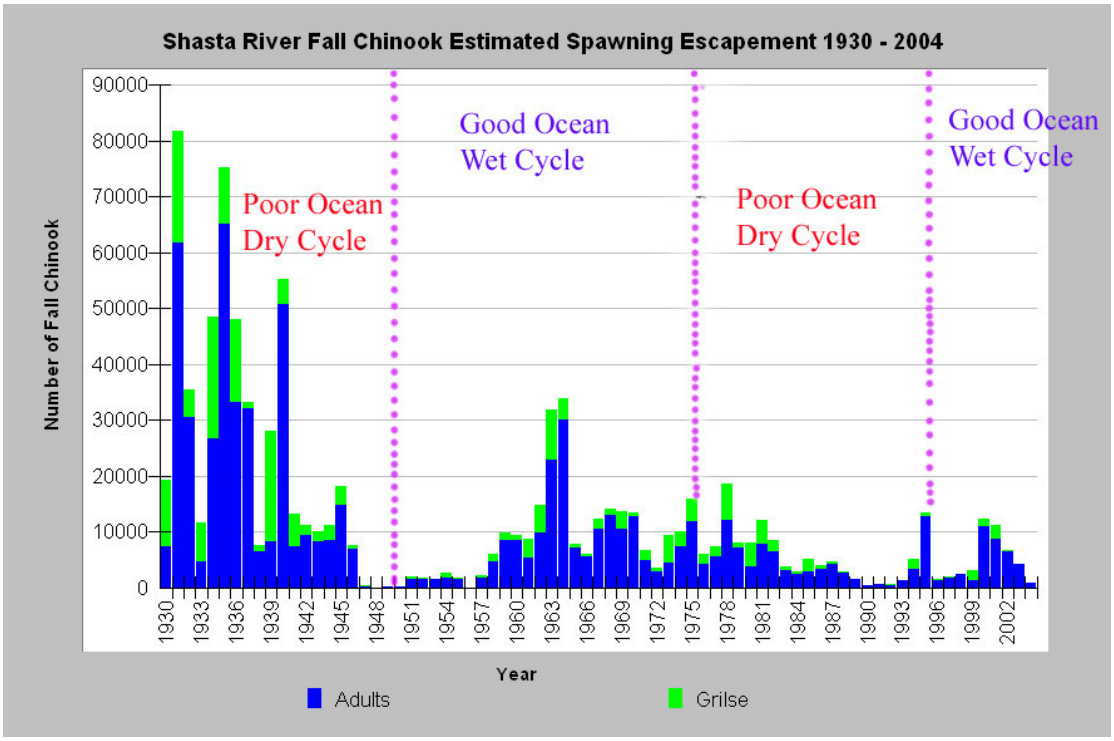

Figure 5. Shasta River fall Chinook salmon runs continue to dwindle, despite effects of ocean and climatic conditions (Hare et al. 1999) as a result of diminishing habitat quality and access. Data from CDFG and cycle periods based on Collison et al. (2003).

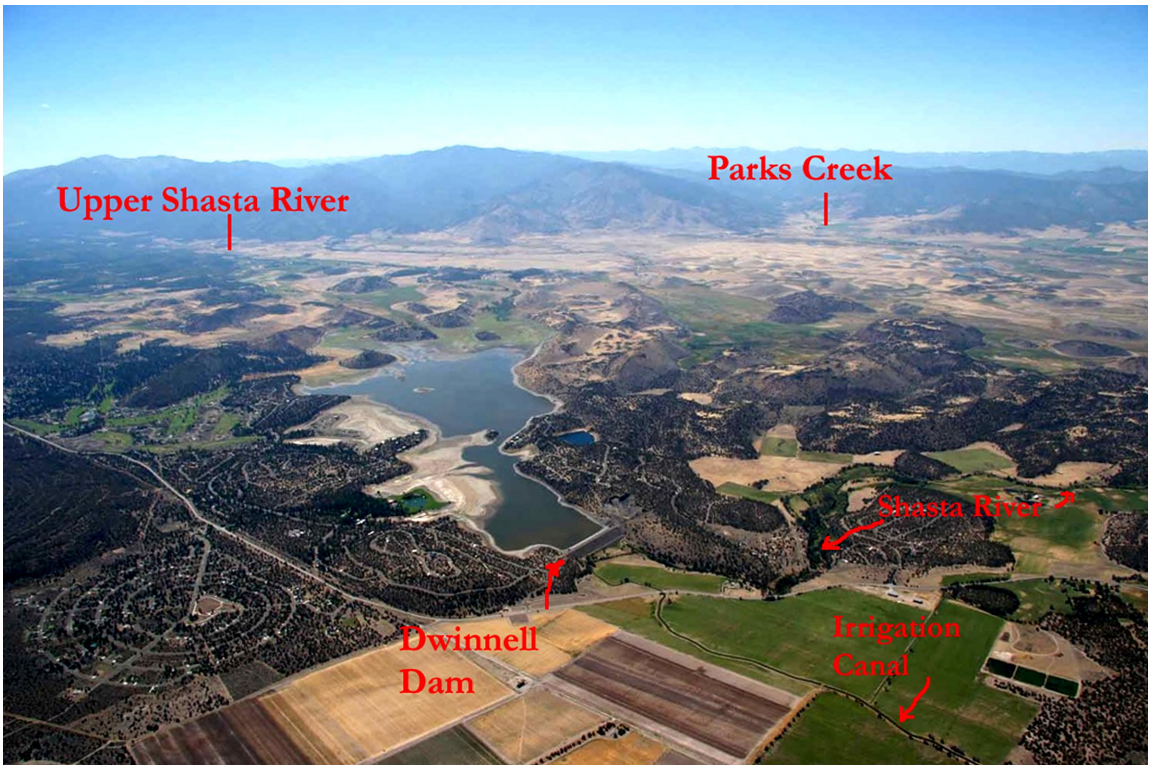

Figure 6. Dwinnell Reservoir is at the center of this photograph with formerly productive salmon and steelhead runs where they are currently blocked in the upper Shasta River and Parks Creek areas labeled.

The reservoir has no tail water release, which means it leaves a large segment of the Shasta River below it unsuitable for salmonids. This is clearly an impediment to attaining beneficial uses and results in violation of CDFG Code #5937. To provide more background information, please see our comments as well as the Klamath Riverkeeper and the Quartz Valley Indian Reservation comments comments on the proposed CDFG *Shasta River Watershed-wide Incidental Take Permit for Coho Salmon submitted in 2008*.

Current and historic practices related to the operation of Dwinnell Reservoir also include diverting all flow of lower Parks Creek, a major tributary of the Shasta River below the dam. This also impedes fish passage in and out of Parks Creek, which has substantial impacts on cold water fish related beneficial uses, including coho salmon, and adds cumulatively to the water quality problems of the mainstem Shasta River downstream of Dwinnell Reservoir.

Available Water Quality Data Showing Dwinnell Impairment

Temperature: Vignola and Deas (2005) show surface waters temperatures reaching 25^{o} C (77 ^{o} F) (Figure 7), which is lethal to Pacific salmon (Sullivan et al. 2000). The Basin Plan states that "At no time or place shall the temperature of any COLD water be increased by more than 5°F above natural receiving water temperature." The Shasta River before dam construction in the reach submerged was optimal salmon habitat and water temperatures would have been below 20^{o} C (68^{o} F). This is a clear violation of *Basin Plan* standards and, since the reservoir has a large surface area and summer air temperatures in summer exceed 100 ^{o} F, this cannot be mitigated. These warm waters would contribute to downstream existing thermal pollution in the Shasta River except that the waters of Dwinnell Reservoir are so foul that none can be released downstream without high risk of adverse effects on fish.

Nutrient Pollution: There are several lines of evidence provided by Vinola and Deas (2005) that show nutrient pollution in Dwinnell Reservoir. Dissolved oxygen data indicate clear violation of the *Basin Plan* standards (7.0 mg/l) from June (Figure 8) to September (Figure 9). Anoxia persists at depth into October (Vignola and Deas 2005), when fall Chinook salmon are spawning downstream.

Vignola and Deas (2005) identify problems with limnological nuisance algae that thrive in the warm stagnant waters of the Dwinnell Reservoir, including blue-green algae species that fix nitrogen and toxigenic *Anabaena flos-aquae.* Since these algae create their own nitrogen source from the atmosphere, and phosphorous in Dwinnell Reservoir is not limited because of volcanic formations upstream on the slopes of Mount Shasta, there is no way to prevent this nutrient pollution cycle.

The pH in Dwinnell Reservoir exceeds 9.0, which is over the Basin Plan standard: "The pH shall not be depressed below 6.5 nor raised above 8.5." Vignola and Deas (2005) point out that conversion of ammonium ions to dissolved ammonia rises exponentially over 8.5. Dissolved or unionized ammonia is toxic to Pacific salmon at very low levels and Vignola and Deas (2005) indicate that reservoir conditions likely create conditions lethal to all fish.

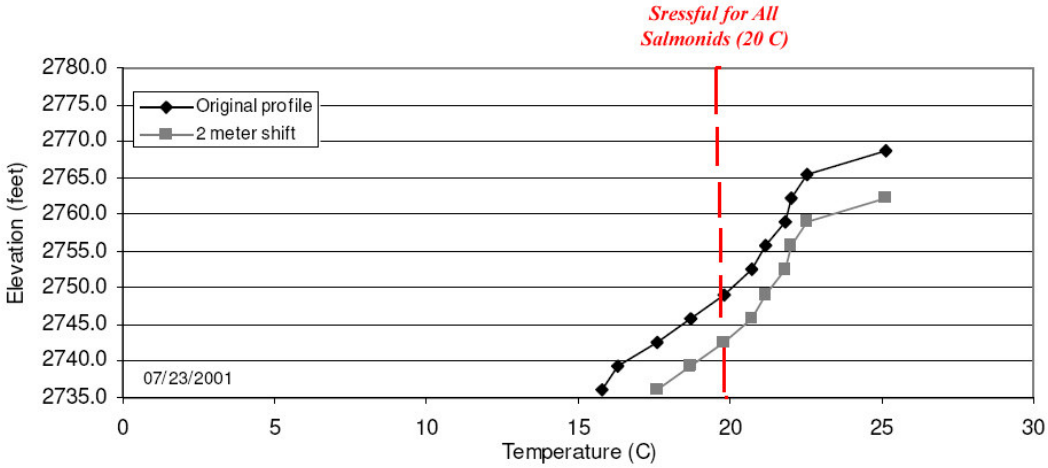

Figure 7. Dwinnell Reservoir surface water temperature (original profile) exceeds 25 C (77 F), which is in violation of Basin Plan standards. Adapted from Vignola and Deas (2005).

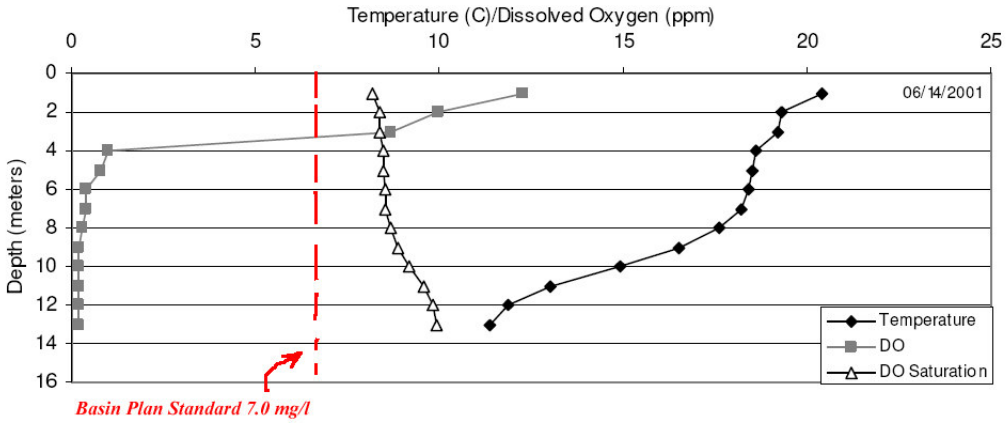

Figure 8. Dissolved oxygen and temperature profiles from Dwinnell Reservoir indicate anoxic conditions developing below 10 feet in violation of Basin Plan standards as early as June in 2001. This figure and Figure 5 are adapted from Vignola and Deas (2005).

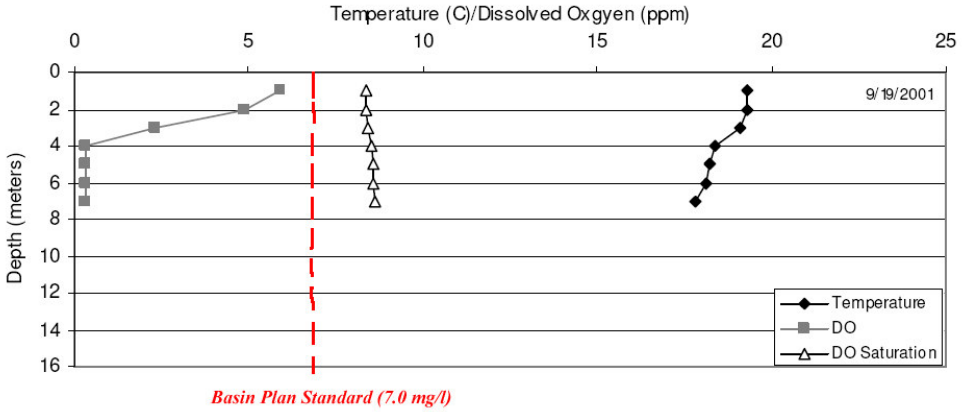

Figure 9. Dissolved oxygen and temperature profiles from Dwinnell Reservoir indicate anoxic conditions occurring nearer the surface in September 2001.

Cumulative Effects to the Klamath River

As the North Coast Board is aware, the Klamath River has shown severe signs of ecological distress bordering on collapse as indicated by the large adult fish kill of September 2002 (CDFG 2003, Guillien et al. 2003a, 2003b). Water Board staff is working on a water pollution abatement report and implementation plan under the TMDL process, but the health of the Klamath River cannot be restored without also getting adequate flows water back in the Shasta River and remediating its water quality problems. The Shasta River is suffering from acute nutrient pollution and temperature problems and the contributions to the Klamath River constitute nothing more than an agricultural tailwater (Figure 10). This promotes nutrient pollution in the Klamath River and can only be remediated by increased flows in the Shasta River.

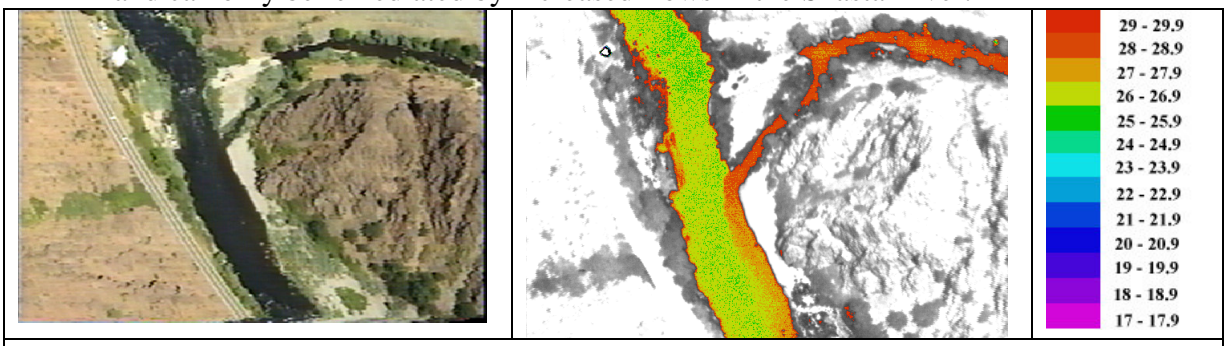

Figure 10. Day TV and Thermal Image Pair showing the confluence of the Klamath River (at left and the Shasta River (flowing right to left in the image). The Shasta River is approximately 29 degrees C and a warm water plume is observed into the Klamath River. (McIntosh an Li 1998)

Klamath River coho salmon are on the verge of extinction and all year classes in the Shasta River are weak. The adult fall Chinook salmon kill indicate that quick and decisive action is needed, particularly in light of global warming, to prevent the collapse of the Klamath River. . The National Academy of Sciences (2003) report on endangered

Klamath Basin fishes suggests that only Mt. Shasta will have more snow as global warming advances and that removal of Dwinnell Reservoir needs to be considered.

Scientists have also discovered that salmon runs of the Klamath River and the region shrink and swell with positive and negative ocean productivity and climate cycles (Hare 1998). The North Coast Regional Board funded another study that has bearing in the Independent Science Review Panel report (Collison et. Al. 2003) that noted that regional chances for salmon recovery need to be expeditiously pursued because the Pacific Decadal Oscillation Cycle is likely to swing from its current favorable condition to adverse sometime between 2015 to 2025. This suggests that if Dwinnell Reservoir is still in place, causing disconnection of Pacific salmon habitat and acute water pollution, that some salmon species will be wiped out. There has been a well documented decline in populations of coho, Chinook, steelhead, and lamprey in the Klamath Watershed. To us, water is life.

Closing

In closing, the Klamath Forest Alliance looks forward to your final decisions and upcoming work regarding the 303 (d) list for impaired water bodies in California. If you have any questions or would like any additional information or clarification for us on our comments or position, please let us know.

Respectfully,

Petey Brucker- Klamath River Program Coordinator

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