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November 17, 2006

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California Department of Fish and Game,

Please find the enclosed the comments submitted by the Quartz Valley Indian Reservation (QVIR). We would like to thank you for this opportunity to provide comments during the DEIS scoping process on the Shasta and Scott ITP and Environmental Check List.

The Reservation is located in both Scott and Shasta Valley's. The health of the fishery in these two water sheds is critical to the health and survival of the way of life of our native people, within the Shasta and Scott and the entire lower-Klamath basin.

We understand the need to compromise and work together with the agricultural community and their established way of life. However, we feel this document is in no way a compromise of two sides and regret that tribe's have not been involved from the beginning of this process.

We will continue to provide our technical comments in a hope that they are considered when preparing the final EIS. If a true desire to restore the fishery in both the Scott and Shasta Valley's exists, then we would expect a final EIS to include some of the issues we have presented.

Thank you.

Sincerely,

Harold Bennett
Tribal Vice-Chairman
Quartz Valley Indian Reservation

Shasta River Scoping Comments
Technical Memorandum

The California Department of Fish and Game (CDFG) issued a Notice of Preparation (NOP) of a Draft Environmental Impact Statement (DEIS) for a Shasta River Watershed-Wide Coho Salmon Incidental Take Permitting Program on 11 October of this year.

An Incidental Take Permit (ITP) is required by the California Endangered Species Act (CESA) to be obtained by any party planning to engage in any land- or water use which might cause harm to any species listed for protection under the California Endangered Species Act (CESA).

Coho salmon (Oncorhynchus kisutch) were found to require protection as a threatened species, under the terms of the federal ESA, throughout their range in northwestern California and southern Oregon, by the National Marine Fisheries Service more than a decade ago (Weitkamp et al., 1995). The California Department of Fish and Game eventually reached a similar conclusion and moved to list coho under the CESA statutes in 2003 (CDFG, 2002). In response to the State's listing, a *Draft Shasta Valley Resource Conservation District Master Incidental Take Permit Application* was filed with CDFG in April 2005 (SVRCD, 2005).

The comments provided are drawing on both the 2005 *SVRCD Draft ITP* and the recently-released *Environmental Check List and Initial Study* (*Initial Study*) (CDFG, 2006). These documents are intertwined. The *Shasta River Total Maximum Daily Loads (TMDL's) for Temperature and Dissolved Oxygen* (NCRWQCB, 2006) is also referenced here, along with the comments on that document offered last spring by the Quartz Valley Indian Community (QVIC, 2006). The QVIC document is provided as Appendix A to these scoping comments because it provides excellent background information on the factors that limit salmon populations, including their water quality needs, and recommendations for monitoring and restoring cold water fish populations.

Because neither the *SVRVD Draft ITP* nor the CDFG *Initial Study* adequately characterize the status of the coho salmon species in northwestern California; streamflow issues related to that status; the role of groundwater extractions on stream habitat; or anything resembling a best-science approach to coho salmon protection and restoration (see: Bradbury et al., 1994), background discussion on these issues is provided here.

AN OVERVIEW OF CDFG'S INCIDENTAL TAKE PERMITTING PROCESS

A fundamental flaw in CDFG's approach to the proposed permitting of the incidental take of coho salmon in the Shasta River watershed is that it will not succeed in protecting coho

salmon and it will not, therefore, satisfy CDFG's CESA authority for issuing such a permit in the first place.

The basic authority for these incidental take permits (California Fish and Game Code Section 2081) states, in part, that

> (c) No permit may be issued pursuant to subdivision (b) if issuance of the permit would jeopardize the continued existence of the species. The department shall make this determination based on the best scientific and other information that is reasonably available, and shall include consideration of the species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of (1) known population trends; (2) known threats to the species; and (3) reasonably foreseeable impacts on the species from other related projects and activities.

The *Initial Study* fails to meet the stated CESA requirements for the use of best available science; it does not properly characterize the true risk of coho salmon extinction; and it does not acknowledge that the continuation of existing land- and water uses in the watershed will, in all likelihood, cause further decline of coho salmon in the Shasta River. Because the ITP does not address issues like the excessive diversion of streamflow and the over-extraction of groundwater, flow-related water quality problems in the Shasta River will not be resolved and coho salmon will likely continue to decline, or will become extinct altogether. The actions that CDFG would permit will, in fact, jeopardize "the continued existence of the species".

CDFG's use of SVRCD Draft ITP submission date as the baseline conditions for the application of CEQA may just meet the minimum requirements of CEQA but it fails altogether to comport with the department's duties under the State and federal endangered species acts and legislative mandates such as the Fisheries Restoration Act of 1985 (CF&G Code Section 2760, et seq.), which contemplates not only the prevention of further salmon population declines in the state, but planning and implementation, by the department, of a doubling of salmon numbers, "primarily through the improvement of stream habitat".

The preponderance of scientific evidence found in 1995 that Shasta River basin coho salmon required the protection of State and federal endangered species acts because dams, land use and water extraction activities had so profoundly changed habitat quality that the species was – and it remains to this day -- on the verge of extinction. Maintaining the Shasta River coho salmon population at its current depleted level will most likely only postpone their extinction until they are overcome by genetic drift or stochastic events (Rieman et al., 1993).

To meet the requirements of CEQA, the DEIS must consider past, current and future environmental effects. By setting baseline conditions as those existing in April 2005, CDFG fails to consider the past activities degrading coho salmon habitat, such as the development and operation of Dwinnell Dam; the over-diversion of surface water, the growing over-extraction of groundwater, and water pollution generated by agricultural activities (NAS, 2003). CDFG's entire DEIS is, to the contrary, limited to assessing the impacts of narrowly-defined ITP-related restoration activities and it skips all mention of those land- and water-use actions which are degrading coho habitat in the Shasta River watershed. By concentrating on

narrow restoration measures, and ignoring the adverse impacts of current land- and water uses, the DEIS fails CEQA's test to consider cumulative environmental impacts which, taken together, are significant in their nature.

The *Initial Study* does not recognize the *Shasta TMDL* (NCRWQCB, 2006) and there is no indication that the substantial body of technical information concerning pathways to coho salmon protection and restoration (Kier Associates, 1991; 1999; NAS, 2003) were ever reviewed or used by CDFG. Ideally the Shasta River watershed-wide ITP would work in conjunction with the TMDL because water quality problems are the major reason for coho salmon decline in the basin. Given the present weaknesses the CDFG ITP process, water quality problems issues identified in the State's TMDL will remain unattended and jeopardy to Shasta River coho salmon will continue.

Actions taken under the *SVRCD Draft ITP* and *Initial Study* focus only on coho salmon, which is not the only Pacific salmon species at risk in the Shasta River basin nor, for that matter, the one of greatest economic importance. This single-species "tunnel vision" fails to protect steelhead trout (O. mykiss) and Chinook salmon (O. tshawytscha), as well as coho salmon.

Were CDFG to continue in its present approach to approve the watershed-wide ITP as proposed, it is essentially permitting a number of activities that violate State and federal law, including:

- the failure to release adequate flows from Dwinnell Dam to maintain fish life in the Shasta River, a violation of CFG Code Sections 5937 and 5946.
- The extraction of groundwater that is directly connected to surface water requires a State Water Resources Control Board (SWRCB) water rights permit, yet none was obtained when the flow from Big Springs was first tapped in the late 1980's, destroying essential Shasta River salmon and steelhead refuge habitat (Kier Associates, 1999).
- The listing of the Shasta River as impaired under the Clean Water Act (NCRWQCB, 2005) recognizes the river's impaired polluted condition; mandates the need for a TMDL water quality recovery plan; and mandates the cooperation of agencies of State government beyond those with primary responsibility for water pollution abatement.

The issuance of a watershed-wide ITP as proposed by CDFG will shield activities in the Shasta River watershed which are inimical to coho salmon protection and restoration from effective and necessary legal challenge.

SUMMARY COMMENTS ON THE *SVRCD DRAFT ITP* APPLICATION

The *Initial Study* is written in response to the 2005 submittal of the S*VRCD Draft ITP* but it does not take advantage of the detailed information from it concerning the specific actions to be taken. What follows here is a brief summary of the *SVRCD Draft ITP*. More details concerning its stipulations are, then, included in a later section that reviews the elements of the *Initial Study* itself (which begins on page 6 of these comments).

In general, the *SVRCD Draft ITP* is well written and comprehensive. It provides a frank discussion of factors known to limit coho salmon in the Shasta River, a reach by reach description of stream impairment, and some good suggestions on how to remedy the problems posed by agricultural operations to coho recovery. The schedule for implementation stretches over several years, but some actions to improve conditions for coho, such as excluding cattle from riparian zones, would begin immediately.

The *SVRCD Draft ITP*, however, has some critical short-comings that are likely to confound coho recovery**:** the lack of jurisdiction of the State Watermaster concerning riparian water rights, the inability to quantify and control groundwater extractions, and a lack of solutions related to fish passage and water pollution associated with the operation of Dwinnell Dam. The goals of the ITP appear to be realistic, but at the same time target conditions should meet the needs of coho salmon – which in some cases they do not. The timeframe for the implementation of SVRCD *Draft ITP* actions is variable. Table 1 lists various restoration and planning measures, together with the deadline for their completion.

Table 1. Actions recommended by the Shasta Valley ITP (SVRCD, 2005) and timeframes for their implementation.

Action	**Final Deadline**
Minimum riparian setback of 35 feet	Immediately upon CDFG Approval of ITP
Drought Year Plan	Within 1 yr. of CDFG Approval of ITP
Ramped Diversion Plan	In Place 1/1/2008
Screen All Diversions	Within 2 yrs. of signing on to ITP
Develop Coho Migrant Index	2008
Minimum D.O. of 6 ppm	2008
Coho reaches fenced or fencing in progress	2008
Cease use of gravel diversion dams	2009
Fish passage at major diversion dams	2010
Decrease temperature 5 ^{o} F	2015
Flows never < 20 cfs	2015

COHO POPULATION VIABILITY ISSUES AND TARGETS FOR RECOVERY

The *SVRCD Draft ITP* provides information from the Shasta River Rack counting station fish counts and radio tagging studies that indicate that coho salmon returns likely range from merely dozens in some years to the low hundreds. Minimum viable population levels to retain genetic diversity range from 200 to 500 individuals (Gilpin and Soule, 1986; Riggs, 1990), so it is likely that Shasta River coho are at critically low survival levels.
The CDFG *Initial Study* makes no mention whatsoever of Shasta River coho salmon population status. Data from Shasta River downstream migrant traps show that coho salmon are at very low levels (Figure 1) and there are indications of weak year classes similar to those recognized in the Scott River Basin (QVIC, 2005). Although downstream migrant trapping results show a community dominated by salmonids, catfish out-numbered coho salmon juveniles in the trap. This indicates that water quality is beginning to favor warm water species

and that impoundments within the Shasta River basin are a source of invasive predators that are a threat to juvenile coho.

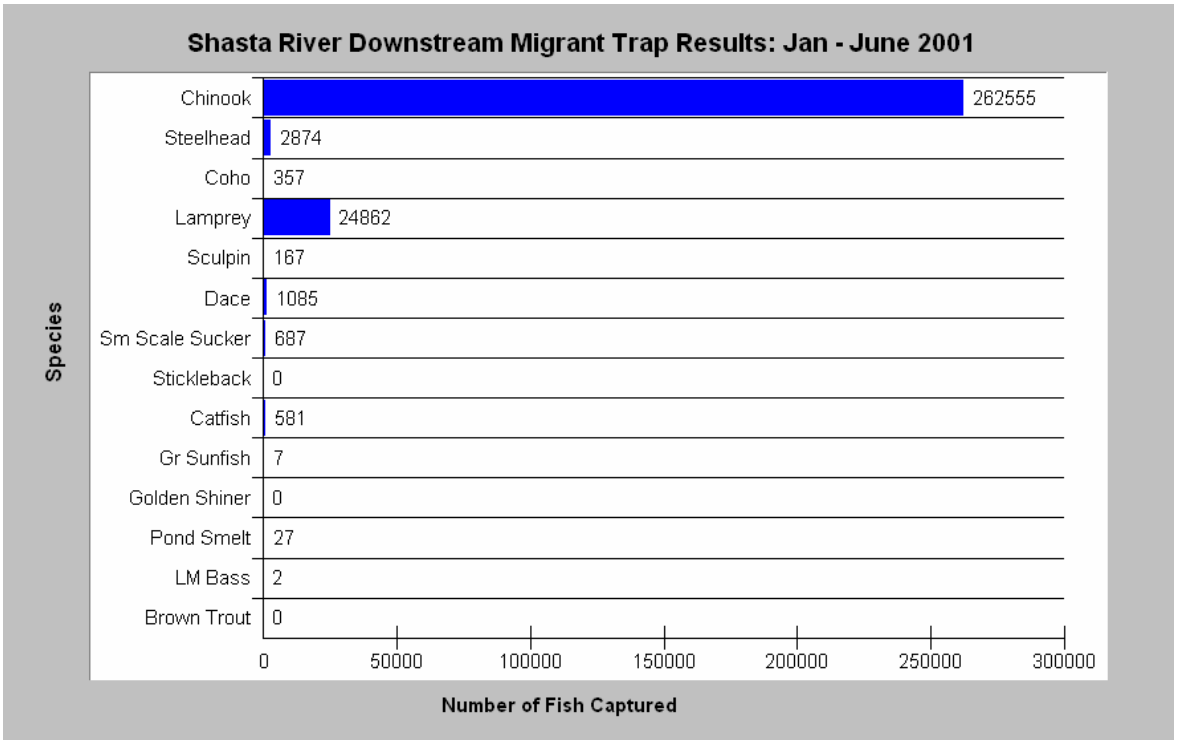

Figure 1. Downstream migrant trapping results from the Shasta River from January to June 2001. Data provided by CDFG (Chesney, 2002) and chart from KRIS V 3.0.

The *SVRCD Draft ITP* correctly assumes that yearling coho juveniles seen moving upstream from the Klamath into the lower Shasta River indicate an interaction with a larger population group or a metapopulation (Rieman et al. 1993). If this plasticity extends, as well, to spawning then interchange between small populations in different tributaries may be helping Shasta River coho maintain their genetic diversity. The CDFG DEIS needs to discuss the overall Klamath Basin coho salmon population condition, metapopulation function, and potential interactions between Shasta River coho salmon stocks and those nearby.

Increased adult coho returns since 2000, when compared to those of the 1980s, are attributed by the *SVRCD Draft ITP* to improvement of Shasta River habitat conditions, but it may well also be associated with improved ocean conditions and wet on-land cycles associated with the Pacific decadal oscillation cycle (Hare et al., 1999; Collison et al., 2003). Ocean conditions off California, Washington and Oregon switched to more favorable conditions in about 1995 and a shift to unfavorable conditions is likely to occur between 2015 and 2025 (Collison et al, 2003). When ocean conditions become unfavorable and a drier on-land climate returns, freshwater habitat conditions will have to have been improved or the risk of Shasta River coho extinction will be substantially increased (see Appendix A for more in depth discussion). The CDFG DEIS needs to discuss how a switch of the PDO in 2015-2025 may impact coho salmon and their on-shore habitat in terms of their prospects for survival.

The *SVRCD Draft ITP* takes the position that habitat conditions in the Shasta River watershed were likely less favorable for coho than were coastal streams. On the contrary, before the development of agriculture in the Shasta, the icy flows from springs likely provided ideal habitat conditions for adult and juvenile salmonids, including coho salmon, year around (NAS, 2003).

Because tributaries of the mid-reaches of the Shasta River often lack surface flow due to almost complete year-round diversion, the *SVRCD Draft ITP* raises questions as to whether these were ever viable coho streams. Groot and Margolis (2001) indicate that coho prefer streams with a gradient of 2% or less. Streams like Julian Creek, Willow Creek, Oregon Slough and the Little Shasta River all have suitable gradient and, therefore, would likely have been inhabited by coho before agricultural development.

The *SVRCD Draft ITP* works under the assumption that coho juveniles entering the mainstem Klamath River as young-of-the-year have almost zero survival, but such an assumption may well not be correct. The Karuk Department of Natural Resources routinely sees coho salmon juveniles using very small tributary streams where they were not spawned and these cold water tributaries may represent important refugia during times when the mainstem Klamath River water quality conditions are poor (Watercourse Engineering, 2005). Were the Klamath Hydroelectric Project dams removed, there would likely be a substantial improvement in water quality (QVIC, 2006b) and a resulting much increased rate of survival of Shasta River coho juveniles during out migration down the Klamath River. This prospect also needs to be addressed in the forthcoming DEIS.

The *SVRCD Draft ITP* suggest that attaining a survival rate of 85 juveniles per adult female spawner will avoid "take" and will meet ESA requirements, based on studies from other West Coast coho studies. Maintaining a population at a very low level engenders much higher risk of population loss. Alternatively, a strategy of opening up spawning areas and expanding access by coho to additional suitable habitat enable expansion of the population to a more sustainable and stable level (Rieman et al., 1993). In order to maintain the viability of the Shasta River coho population into the future, an annual return of at least 500 adults must be attained (Gilpin and Soule, 1990; Higgins et al., 1992). The *Initial Study* fails to address the present status or future viability of the Shasta River coho salmon population. The DEIS must address these critical issues and include tangible measures for species recovery, including monitoring to support adaptive management.

DETAILED COMMENTS ON CDFG'S *INITIAL STUDY*

The CDFG (2006) *Initial Study* for issuance of a Shasta River watershed-wide ITP was reviewed and the following comments refer specifically to passages from that document.

Baseline Conditions: As mentioned above, a flaw in the *Initial Study* (p 6) is setting the environmental baseline conditions as those which existed at the time the *SVRCD Draft ITP* application was filed in 2005. Baseline conditions are typically defined in scientific studies as

those that existed prior to human impacts. NAS (2003) describes historic habitat conditions in the Shasta River prior to European colonization as ideal for all species of Pacific salmon. Cool spring water emerging on the Shasta Valley floor piped by lava tubes from the shoulders of Mt. Shasta provided high summer base flows. Baseline conditions would have included access for spawning and rearing to headwater areas of the Shasta River and tributaries like Eddy Creek above the present site of Dwinnell Dam. Many important tributaries, such as Parks Creek (Figure 2) and the Little Shasta River, had perennial flow and were viable salmonid habitat.

Access for Inspection: The *Initial Study* (p 11) states that non-enforcement personnel must be allowed access to all lands covered under the watershed-wide ITP. The delegation of responsibility to the SVRCD of reporting infractions and the need for advance notice before even non-enforcement personnel make inspections calls into question CDFG's willingness to enforce the ITP. This is especially troubling given that inadequate enforcement by CDFG and others of existing law precipitated the need to list Shasta River coho salmon under the State and federal endangered species acts.

Avoidance and Minimization of Impacts

Stockwater Access: The *Initial Study* (p. 12) stipulates that stock access to the Shasta River and cattle crossing must be restricted after October 31. Fall Chinook salmon historically entered the Shasta River in mid-September and are actively spawning throughout October. Klamath River fall Chinook escapement in recent years shows an alarming downward trend (see Appendix A) and any actions taken under the coho salmon ITP that allow negative impacts to Chinook salmon would be unwise. This is just one example of problems caused by using a single species approach in the ITP process.

Flows: The requirement that all diversions must have flow gauges and that data collected by the California Department of Water Resources (DWR) Watermaster must be shared in a timely manner with CDFG is a step in the right direction. However, as pointed out by NAS (2003):

> "The 1932 adjudication of surface waters in the basin, as currently administered, is insufficient to supply the quantity and quality of water necessary to sustain salmonid populations in the basin."

The fact that riparian water rights below Dwinnell Dam are not part of the adjudication means that the State Watermaster has no authority over them. Riparian land holders may divert water from the stream without regulation, which means that there is no enforcement mechanism for protecting instream flows, even if conservation measures were implemented.

Figure 2. Parks Creek running dry during the summer of 2003 near the point of diversion where most of its flow is diverted into Dwinnell Reservoir. Copyrighted photo used by permission of Michael Hentz.

The DEIS needs to acknowledge that flows in the Shasta River have fallen well below those needed to support salmonids and to maintain water quality. Flows in the lower Shasta River often drop below 20 cubic feet per second (cfs) (Figure 3), which is the target for minimum instream flows in the *SVRCD Draft ITP*. That target is to be met by 2015, but there is no scientific support for that level of flow with regard to restoring cold water fisheries.

Ground water extraction for irrigation and domestic use have significantly decreased surface flows in the Shasta River with major consequences for salmonid carrying capacity (NAS, 2003). Appropriative water rights are required when ground water diversion affects surface flows directly, but no permits have been requested nor issued despite widespread recognition of the problem. The *SVRCD ITP* recommends that "groundwater usage affecting surface flows should be incorporated into water management activities" but offers no specific required action. Uncontrolled ground water extraction has the potential to offset benefits of other ITP efforts. Enforcement action is needed to stop the present illegal diversion of groundwater, and flows from Big Springs must be restored. The *Shasta River TMDL* (NCRWQCB, 2006) recommends an increase in flows at Big Springs to 45 cfs to improve water quality. NAS (2003) stated that "small increases in flow could reduce transit time substantially and thus increase the area of the river that maintains tolerable temperatures." This needs to be pointed out in CDFG's DEIR.

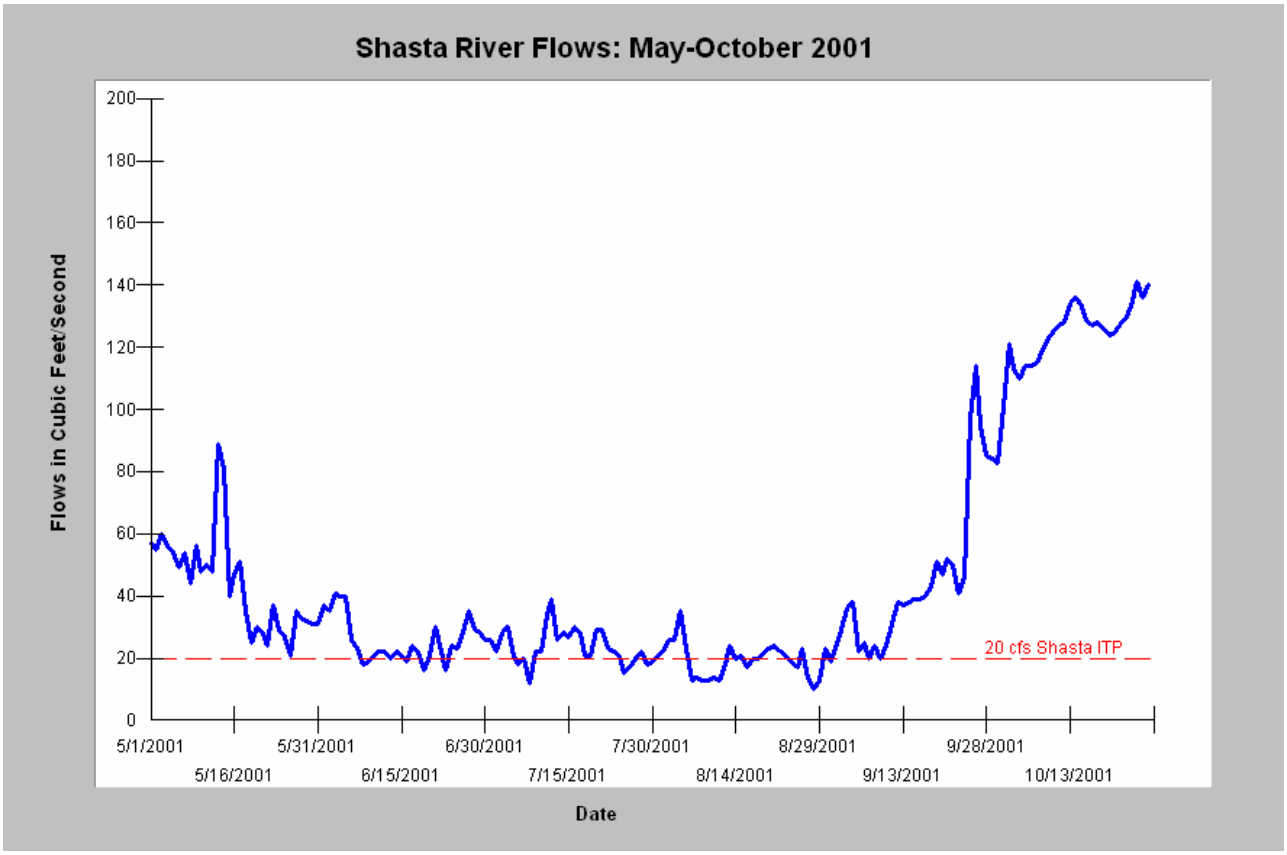

Figure 3. Average daily flow at the USGS Shasta River gauge for May through October 2001 show a pattern of extremely low flows with many days falling below 20 cubic feet per second.

Fish Screens/Fish Passage: The *Initial Study* (p 12) calls for screening of all agricultural water diversions and for the remediation of fish passage problems at diversions, which are positive and necessary steps. Fish passage problems associated with de-watering of lower Parks Creek and the Little Shasta River, however, go unmentioned.

Riparian Restoration: Although the *Initial Study* calls for restoring riparian areas and excluding cattle by constructing fences, the riparian buffer width in *SVRCD Draft ITP* application is only 35 feet, which is insufficient and scientifically insupportable. Poole and Berman (2001) noted the influence of riparian width on water temperature, with wider buffer strips more able to create cooler ambient air temperature over the stream and promote higher relative humidity. Bartholow (1989) showed that mean daily water temperature was most influenced in Western streams by air temperature over the stream, and secondarily by relative humidity, with shade ranking third in influence. Increased buffer widths would also increase the filter capacity for runoff from upland agricultural activity.

Gravel "Push Up" Dams: The *Initial Study* (p 12) calls for a transition from building temporary gravel dams to the use of pumps in most cases, which is a satisfactory approach.

Bank Stabilization: The *Initial Study* states that CDFG would require that all permittees under the watershed-wide ITP use living plant materials for bank stabilization, which is called "bioengineering" (CDFG, 2005). This is an ideal approach to preventing soil loss as fish habitat is maintained or improved.

Tailwater Recovery: Agricultural return flows in the Shasta River often are a source of thermal and nutrient pollution. The *Initial Study* calls for prioritizing agricultural return flows for capture and reuse on the land to decrease thermal and nutrient pollution. While this proposal commendable, implementation even at priority sites could take ten years or more. This measure deserves greater emphasis and urgency in the DEIR.

Dwinnell Dam: The *Initial Study* calls for the screening of the outflow from Dwinnell Reservoir to prevent escapement of warm water fishes and exploring the feasibility of improving flows and/or building a fish ladder over the dam. These proposed measures fall far short of what is necessary and show a lack of understanding of the profound problems caused by this impoundment. Shasta River spring Chinook salmon were likely extirpated by Dwinnell Dam (Kier Associates, 1991).

Figure 4. Dwinnell Dam has blocked upper Shasta River spawning areas since 1928, looses 50% of the water it holds to evaporation and leakage (NAS, 2003) and contributes to water quality problems in the Shasta River.

The NCRWCB and UC Davis (2005) *Lake Shastina Limnology* report shows that Dwinnell Reservoir bears a striking similarity to Iron Gate and Copco reservoirs in the Klamath Hydroelectric Project (QVIR, 2006b). Nitrogen fixing blue-green algae grow at nuisance levels within the Dwinnell Reservoir (Figure 5) and contribute to significant water pollution problems. Temperatures and pH are high and dissolved oxygen may undergo significant depression related to algal photosynthesis and decomposition. The prevalence of warm water fish species in the reservoir is indicative of Dwinell's poor water quality.

The DEIS on the Shasta River watershed-wide ITP needs to recognize that remediation of water quality problems within Dwinnell Reservoir is not possible and that fish passage over the dam is both infeasible and undesirable. See discussions related to Iron Gate Reservoir in *Proposed Terms and Conditions for Relicensing of the Klamath River Hydroelectric Project* (QVIC, 2006b). NAS (2003) stated that the Shasta River has the greatest prospect in the Klamath Basin for salmonid restoration during the upcoming period of global warming and urges consideration of the removal of Dwinnell Dam. The complete lack of flow below Dwinnell Dam is illegal and it should motivate CDFG to advocate for dam removal.

Figure 5. This photo shows Dwinnell Reservoir, also known as Lake Shastina, which has significant blooms of nitrogen fixing algae. Copyrighted photo used with permission of Michael Hentz.

Mitigation Obligations of the SVRCD Under the ITP

Shasta River Water Bank: The *Initial Study* (p 14) would establish an unfavorable precedent of paying farmers and ranchers to leave water in the Shasta River and its tributaries during periods critical for coho salmon survival. Public trust protection is required under California law. Land and water users are obligated to protect common property resources, such as native, cold water fish species. Enforcement action is needed if sufficient stream flows to protect the public trust are not provided. Ironically, the envisioned water purchases or leases to benefit coho would likely not be sufficient to restore Chinook and steelhead. Thus, future negotiations and payments would be needed to improve flows for those species.

Retirement of some water rights through purchase might be a viable strategy, but only if adjudication were revisited and a mechanism put in place to prevent extraction of the conserved fish water by downstream riparian land owners. The *Initial Study* refers to the use of Water Code Section 1707 for securing water dedicated for instream flows, but there is no discussion of tangible measures to acquire such rights nor how they would be enforced.

Improve Instream Flows Through Increased Efficiency of Water Use: The call for improving flows and efficiency of water use in the *SVRCD Draft ITP* and the *Initial Study* are both positive steps. As noted above, however, flow increases would be geared only to coho salmon protection and would not likely benefit Chinook salmon and steelhead. Although the *Initial*

Study references California Water Code Section 1707 that would allow the dedication of water to instream flows for fish, insufficient detail is provided as to how such measures would be pursued, if at all.

Strategy for Dry and Critically Dry Years: According to the *Initial Study*, dry and critically dry years must be identified within one year of ITP approval. The proposed solution to maintain flows in dry and critically dry years is to increase pumping of ground water with payment from the Water Trust for pumping costs. Ground water extraction in the Shasta River basin is already depleting surface flows (Kier Associates, 1999; NAS, 2003), and this strategy is unlikely to succeed.

Coordinating Diversions: Shasta River flows may vary widely within any given day when irrigation is taking place, which may lead to short-term but critical low flow periods that do not show up in average daily flow summaries from USGS. The *Initial Study* calls for coordination of diversions through a Diversion Ramp-Up Management Plan. This is very good and much needed.

Off-stream Stock Water Development: The *Initial Study* (p 15) requires that at least two additional off-stream stock water systems be installed per year during the term of the watershed-wide ITP. The specific target for decreasing the need for stock water from surface water diversions concerns the migration of adult coho after the rains come (November 15). This again ignores critical Chinook salmon needs for additional flow for spawning throughout the month of October.

Spawning Gravel Enhancement: Gravel enhancement in key reaches for coho spawning is recommended in the *Initial Study* (p 16) and is likely needed. Gravel in the Shasta River basin has been depleted by dewatering in winter of streams such as Parks Creek, the construction and operation of Dwinnell Dam, and massive extraction of gravel in the vicinity of Yreka Creek for I-5 construction. A far better solution to replenishing the river's gravel supply, however, would be to restore natural recruitment through the removal of Dwinnell Dam and re-establishing flows in tributaries (See Restoration below).

Habitat Restoration Structures: The *Initial Study* calls for installation of habitat improvement structures in reaches of the Shasta River used by coho salmon. Kier Associates (1999) noted that poor water quality and lack of flow reduced use of habitat improvement projects on Bureau of Land Management (BLM) lands in the lower Shasta River known locally as "Salmon Heaven" (Figure 6). Consequently, investment in instream structures should be contingent on remediating water quality and water flow problems.

Large Diversions Identified as Barriers: To its credit, the *Initial Study* (p 17) specifically identifies three major, long-standing fish passage problems at large diversions and targets them for improvement or replacement.

Figure 6. This photo shows the Shasta River flowing through BLM land in the canyon reach in an area referred to as Salmon Heaven. Boulders were placed to improve fish habitat, but water quality is too poor to support salmonid juveniles during most of summer. Photo from KRIS Version 3.0 (TCRCD, 2003).

Monitoring and Adaptive Management Under the ITP

The responsibility for monitoring under the Shasta River watershed-wide ITP would fall to the SVRCD and DWR, with both having responsibility to report to CDFG. Provision of raw data to CDFG is required, which is a necessity in any science-based activity (Collison et al., 2003). The DEIS prepared by CDFG should include stipulations and descriptions of mechanisms for sharing of raw data with the State Water Boards, the Tribes and the interested public. While both implementation and effectiveness monitoring are called for, no specific monitoring activities are defined. In order to allow trend monitoring and adaptive management, the DEIS needs to require collection of water quality and fisheries data at the same locations and with the same methods already established. Study design for monitoring under the ITP should not be delegated to SVRCD staff nor should specific monitoring requirements be deferred for later action.

Potential Air Quality Impacts of the ITP

The Initial Study (p 26-35) discussion of air quality and potential impacts of ITP related activities extends for nine pages. It correctly concludes that restoration will have no

significant impact on air quality. Following a "boiler plate" Environmental Check List in this way leads to dozens of pages of unnecessary narrative on similar subjects.

Biological Resources and Impacts of ITP Implementation

CDFG recognizes that the Shasta River watershed-wide ITP will have potential impacts on other species. We note above that the *Initial Study* considers validating flow levels that target coho only and could incidentally harm Chinook salmon and steelhead, if approved. CDFG notes that riparian bird species could be temporarily displaced by riparian restoration activities. As discussed above, the true impact of continuing agricultural practices under the ITP on coho salmon is unaddressed in this section because of the *Initial Study's* limited focus on the environmental effects of implementing the ITP itself. The DEIS needs to discuss how maintaining current patterns of stream diversion with only minor changes for coho will avoid the risk of jeopardy to Shasta River Chinook salmon and steelhead populations as discussed above.

Geologic Hazards and ITP Implementation

This section in the *Initial Study* (p 39-47) provides some very interesting information on the geology of the Shasta River basin, but it is otherwise a digression from the subject at hand. One conclusion drawn is that "the project will not likely increase the potential for an eruption of Mt Shasta" or to increase earthquake risk. Really.

Potential for Release of Hazardous Materials During ITP Implementation

The *Initial Study* (p 47-52) concludes after a lengthy discussion that the implementation of the Shasta River watershed-wide ITP poses minimal risk of a release of hazardous materials into the environment. The possible "take" through exposure of coho salmon to hazardous materials such as pesticides or herbicides associated with normal agricultural operations is not discussed anywhere.

Hydrologic and Water Quality Impacts of ITP Implementation

Once again, the emphasis of the *Initial Study* on ITP implementation instead of upon the existing impacts to coho salmon makes the lengthy discussion of hydrologic and water quality conditions (p 54-77) of limited value. Major questions regarding water quality remain unanswered. For example, the *SVRCD Draft ITP* proposes improving Shasta River temperatures by lowering the mainstem water temperature by 5° F -- from 80.6° to 75.6° F at Montague-Grenada Road, by 2015. This modest improvement will not support coho salmon rearing and it shows the need to augment flows to attain water temperatures required by salmon as discussed by NAS (2003). U.S. Fish and Wildlife Service data on dissolved oxygen from the lower Shasta River (Figure 7) show that dissolved oxygen levels fall below those optimal for salmonids during summer and even into stressful ranges at night when algae is respiring. The DEIS needs to more fully characterize existing water quality problems as part of baseline discussions.

While the Initial Study states that ITP projects will not increase total impervious area (TIA), it has no recommendation for limits to protect the integrity of urbanizing streams, such as Yreka Creek. Increasing TIA can have substantial impacts on the diversity of fish species and water quality (May et al., 1996)

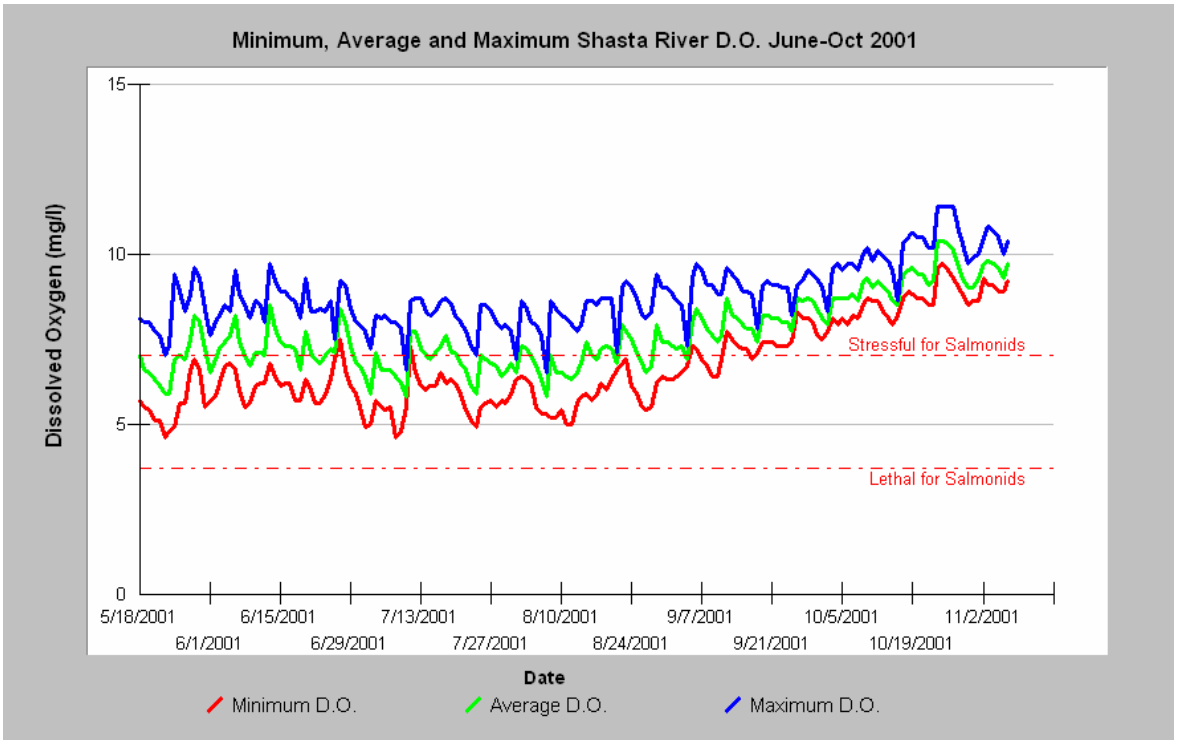

Figure 7. This chart shows the minimum, average and maximum dissolved oxygen of the Shasta River throughout summer in 2001, with highly stressful conditions for salmonids prevailing. Data from USFWS.

To meet with any significant success, the DEIS needs to coordinate actions with those recommended in the *Shasta River TMDL* (NCRWQCB, 2006) and to share responsibility and authority for the oversight of Shasta River water pollution abatement of restoration of cold water fisheries resources. It also needs to honestly address the issue of how flow affects water quality.

ACTIONS NEEDED TO RESTORE SHASTA RIVER ECOSYSTEM AND COHO SALMON

The *SVRCD Draft ITP* pays special attention to the Shasta River reach where Big Springs and Parks Creek converge, correctly characterizing it as refugia that should be a priority for protection and restoration. DWR (1981) noted that Big Springs Creek had the highest amount of Chinook salmon spawning in the Shasta River basin and cold water base flows from the springs sustained temperatures suitable for rearing salmonids throughout summer in the past (NAS, 2003).

Rieman et al. (1993) in their highly useful paper *Consideration of Extinction Risks for Salmonids* state:

> "Maintaining strong populations in the best possible habitats throughout the landscape and preserving the ecological processes characteristic of metapopulations are the best hedges against extinction."

NAS (2003) stated that ground water diversion had caused a major decline in flow in this reach as a result of ground water withdrawals. A midterm review of the State-federal cooperative Klamath Basin Fisheries Restoration Program (Kier Associates, 1999) pointed out that surface water withdrawals had increased as well.

In addition to water withdrawals, increased grazing in riparian zones and excavation with heavy equipment has increased bank erosion and sediment yield to Big Springs Creek and the Shasta River below (Kier Associates, 1999). The lower reaches of Parks Creek have numerous springs and could have been restored to highly suitable coho salmon habitat, but a land trade between a willing private land owner and the U.S. Bureau of Land Management, to enable government acquisition for that purpose, was vetoed by the Siskiyou County Board of Supervisors (Ronald Iverson, personal communication). Instead the riparian zone of lower Parks Creek is still heavily grazed and conditions there are very poor.

The *SVRCD Draft ITP* also recognizes that timber harvest in upper Parks Creek may be a source of fine sediment.

Bradbury et al. (1996) also recognize that the most important step in restoring Pacific salmon populations is to protect refugia. Unfortunately the trend for the most important reach of the Shasta River, which which includes Big Springs Creek and lower Parks Creek, has been toward a more degraded condition over recent years. Some mechanism must be found to limit ground water extraction and to restore some of the cold spring flow back to the Shasta River and its tributaries as recommended in the *SVRCD Draft ITP*.

Stream reaches at higher elevations above the current site of Dwinnell Dam would also likely be suitable for coho salmon, Chinook and steelhead and could serve as expanded habitat and additional refugia, if Dwinnell Dam were removed. Dwinnell Dam operations are not covered by the proposed ITP.

The *Draft Shasta Valley ITP* (SVRCD, 2005) will rely heavily on funding through the Natural Resources Conservation Service (NRCS) from the EQIP program. This source of funds has recently been used for the installation of groundwater pumps in the Scott River that may be hindering – certainly not helping – streamflow and fish habitat in that basin. NRCS policy is to not publicly disclose who receives funds, nor anything about the project, without the express written permission of the landowner. This lack of transparency hampers adaptive management and makes it more likely that money will be spent on things that enhance farm economics

while falling short of benefiting fish. The DEIS needs to stipulate that the location of restoration investments from any public agency be made public and that effectiveness monitoring related to such investments be pursued.

Wider riparian buffers may not be considered fully because of practical concerns of farmers and ranchers, i.e., that too much area would be lost to production. The ITP should recommend the use of conservation easements to obtain adequate compensation for farmers and ranchers to establish a sufficiently wide riparian zone. The ITP should commit to experiments to determine if microclimatic benefits and attendant stream cooling can be attained with wider buffers.

CONCLUSION

CDFG should consider taking a more global approach to Shasta River coho salmon conservation and recovery that would benefit all the Pacific salmon species concerned and fully remediate the watershed's water quality problems. The current approach of trying to mitigate current impacts, while maintaining the existing agricultural and water use practices will not likely prevent jeopardy of coho salmon under the proposed ITP, as required under CESA.

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