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Mr. George Sexton
Klamath-Siskiyou Wildlands Center
P.O. Box 102
Ashland, OR 97520

Re: Fruit Growers Supply (FGS) Habitat Conservation Plan (HCP) and Draft Environmental Impact Report

Dear Mr. Sexton,

You have requested that I review the *Fruit Growers Supply Company Multi-Species Habitat Conservation Plan (HCP)* (CH2M Hill 2009) and the *Draft Environmental Impact Statement (DEIS) for Authorization for Incidental Take and Implementation of Fruit Growers Supply Company's Multi-Species Habitat Conservation Plan* (NMFS & USFWS 2009) and to offer a professional opinion as to whether measures are sufficient to maintain and restore coho salmon (Oncorhynchus kisutch) and other Pacific salmon species. In addition to my comments, I have supplied you with electronic copies of most of the literature cited in this paper so that FGS and NMFS may look into points raised at greater depth. Because of the limited time allowed for this review, I will refer to the papers I have supplied where supporting arguments are fully developed.

In short, I find the measures under the FGS HCP as described in the DEIS to be insufficient and not in compliance with known best-science approaches to forest management that maintain aquatic health and are compatible with restoration of Pacific salmon species (FEMAT 1993, Spence et al. 1996). In fact, coho salmon in the project area are in "Jeopardy" of extinction (QVIC 2008, 2009) and this project elevate the already high risk of local extirpation of coho.

"Implementation Classes" in HCP for watersheds with coho or that pose risk to coho are wrong and particular corrections are offered below. The HCP and subsequent ITP permit will not remediate water quality problems and; therefore, will be out of compliance with the Scott and Lower Klamath TMDLs (NCRWQCB 2006, 2009). A major portion of protections are based on California Forest Practice Rules (CFPR), and more recent Threatened and Impaired (T&I) watershed rules, but neither have succeeded in preventing Pacific salmon loss, including coho (Ligon et al., 1999, Dunne et al. 2001, Collison et al. 2003, Higgins 2009).

Cumulative effects thresholds are already exceeded in the Middle Klamath Basin and Scott River Basin, including in coho salmon bearing watersheds like French, Sugar and Moffett Creeks as well as the East Fork Scott River and actions under this HCP will further elevate these risks. Key actions such as decreasing road densities and road stream crossings to recognized thresholds of acceptable risk (NMFS 1995, 1996, SRNF 2003, KNF 2003) will not take place. FGS says it will only repair and maintain roads when doing timber harvests, which means road failures and associated landslides will likely remain common place during large storm events with the company only doing repairs in that area when logging.

My Qualifications

I have been a consulting fisheries biologist with an office in Arcata, California since 1989 and my specialty is salmon and steelhead restoration. Near the beginning of my career I authored fisheries elements for *Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program* (Kier Associates 1991) and also wrote substantial portions of the Mid-term evaluation of the Klamath River Basin Fisheries Restoration Program (Kier Associates 1999). In addition I co-authored the northwestern California status review of Pacific salmon species on behalf of the American Fisheries Society (Higgins et al. 1992). I have helped build and maintain the Klamath resource Information System or KRIS (www.krisweb.com), which is a fisheries, water quality and watershed information database. The KRIS system was originally devised to track restoration success in the Klamath and Trinity River basins, but has been applied to another dozen watersheds in northwestern California with clients, including the California Department of Forestry (CDF) as part of the North Coast Watershed Assessment Planning effort.

Since 2004 I have assisted the Klamath Basin Water Quality Work Group, which is comprised of the environmental departments of five federally recognized Indian tribes, in reviewing Clean Water Act (CWA) related documents (see www.klamathwaterquality.com). The Scott River and Klamath River TMDL comments I assisted with are most relevant to the FGS HCP because they are both waterbodies recognized as impaired under the CWA and harbor endangered salmonids, including coho salmon (QVIR 2006, 2007). I have also assisted with comments on the California Department of Fish and Game *Scott River Coho Salmon Watershed-wide Incidental Take Permit for Agricultural Activities* (QVIC 2009) and on Klamath National Forest proposed land use in the lower Westside Scott (QVIC 2006). Both provide context for evaluation of cumulative watershed effects levels and Pacific salmon status that are relevant to the FGS HCP.

Implementation Classes of Watersheds

Including Bogus and Moffett Creeks in the Class B is in error. Bogus Creek has coho salmon (USFWS 1998) and Moffett Creek has appropriate gradient and a documented history of occurrence (Kier Associates 1999) and should remain a target for coho restoration. The East Fork Scott River has coho salmon (QVIC 2009) and FGS holdings in this watershed are mistakenly placed in Class C (no coho).

Slope Stability Measures

Major problems with landslides and mass wasting exist in the Scott and Middle Klamath River basins as exemplified by over 435 miles of channel scour from torrents in January 1997 storm on Klamath National Forest (de la Fuente and Elder 1998), including major problems in basins where FGS operates. There is no prohibition of operating equipment, logging or road building across landslide zones, but rather unenforceable narrative about professional geologic consultant judgment. Instead the well tested shallow landslide stability model (Dietrich et al. 1998) needs to be employed. Kier Associates (2005) analyzed the lower Westside Scott River basin and found "A computer analysis showed that 80% (231 of 290) of active landslides intersect with 7% of the part of the landscape marked as very high in risk." Land use activities should be kept off such features to avoid catastrophic mass wasting, instead even road and landing construction can take place in mass wasting hazard zones (MWHZ) with "approval from a professional geologist or certified engineering geologist." This is exactly the kind of lax rules and enforcement that has been ineffective in preventing erosion and saving salmon (Dunne et al. 2001, Collison et al. 2003).

The DEIS also states: "Avoid heavy equipment operations on slopes greater than 65 percent or slopes greater than 50 percent where the erosion hazard rating (EHR) is high or extreme, without approved explanation and justification prior to use" and "Prohibit heavy equipment operations on slopes steeper than 50 percent leading directly to a watercourse or lake without flattening sufficiently to dissipate water flow or trap sediment." Inner gorge mass wasting is a huge source of sediment (Spence et al. 1996) and yet with the professional opinion of a consultant that works for them, FGS will log and build roads in the inner gorge. The following information is on inner gorge and landslide risk delineation.

Pacific Watershed Associates (PWA 1998) also recognized 65% as a very high risk category for landsliding, but found that inner gorge failures in Bear Creek in the Lower Eel River drainage occurred on slopes of 50% slope or less in some cases.

Shaw and Vageois (1999) studied landslides and slope classes in Oregon and found slopes with concave slopes to have a "high hazard" rating for debris slides when slope exceeded 60% but the "high hazard" rating was also given to flat slopes with a steepness greater than 70%.

Shaw and Johnson (1995) made the following qualified generalization about slope class and landslide risk:

> "The threshold gradient at which mass movement occurs, however, varies with the regional geology, climate, topography, and land-use practices. This variability precludes making too many generalizations; however it appears from field evidence that many slopes over 47% (25 degree) in the Pacific Northwest are susceptible to shallow, rapid landsliding. In wet climates, landslides can occur on even gentler slopes. On the Western Olympic Peninsula, for example, shallow landslides are triggered on 25% (14 degree) slopes due to increased soil moisture and corresponding loss of soil strength during the wet winter months."

Similarly, instead of prohibiting side casting on steep slopes that is a notorious source of landslides and sediment, the language in the HCP is "Minimize the placement of sidecast on slopes greater than 65 percent." This type of language is not enforceable.

Roads

The HCP has the following passage on roads:

> "To this end, the applicant would use existing roads whenever feasible, strive to minimize total mileage, minimize disturbance to natural features, avoid wet areas and unstable areas, and minimize the number of watercourse crossings. Future road construction in the Plan Area is anticipated to consist primarily of short, temporary spurs designed to locate landings at stable areas outside of riparian reserves. These temporary roads would generally be utilized for one harvest season, and then decommissioned. New road construction is anticipated to average less than 1 mile per year. All new roads and landings would be constructed in accordance with practices specified in the CFPRs.
>
> Road inventories would not be conducted in a systematic and prioritized manner and would only cover the area identified in the individual THPs. However, it is likely that over the next 50 years, nearly all road segments would be inventoried through the THP process. Repair and upgrades of road-related sediment sources would be limited to the THP area and appurtenant roads; therefore, many large-scale repairs could go unrepaired for several years if they are not associated with a THP."

In other sections of the FGS HCP and DEIS tables show their ownership and surrounding watersheds have extensive road networks. Leaving them in an unrepaired state will lead to culvert plugging, road failure and even stream capture and should not be allowed. FGS and surrounding land owners should be made to decommission roads and reduce their network for where it can be maintained. The road density for all FGS watersheds and lands is useful, but there is no explanation of the relative risk represented. Values range as high as 7.2 miles of road per square mile of watershed (mi./mi.^{2}) and are the average overall in FGS watersheds is 5.4 mi./mi.^{2}. The following information is provided to better understand related risk.

Roads can contribute sediment through chronic surface erosion, but mass wasting triggered by roads is a much greater source. Hagans et al. (1986) estimated that 50 to 80% of the sediment that enters northwestern California streams stems from road-related erosion. Cedarholm et. al. (1981) found that road densities greater 4.2 miles of road per square mile (mi^2) of watershed yielded sediment levels 260% to 430% higher and increased fine sediment in salmon spawning gravels by 2.6 - 4.3 times over background levels. U.S. Forest Service (1996) studies in the interior Columbia River basin found that bull trout were not found in basins with road densities greater than 1.7 mi/mi2. They ranked the risk of road density of greater than 4.7 mi/mi^2 as Extremely High (Figure 1). National Marine Fisheries Service (1996) guidelines for salmon habitat characterize watersheds with road densities greater than 3 mi/mi^2 as "not properly functioning" while "properly functioning condition" was defined as less than or equal to 2 mi/mi^2 with no or few streamside roads. KNF (2003) watershed analyses and Six Rivers National Forest (SRNF 2003) road management plans have appropriate recognition of thresholds of risk for road densities and targets for decommissioning. These need to be the same on private land.

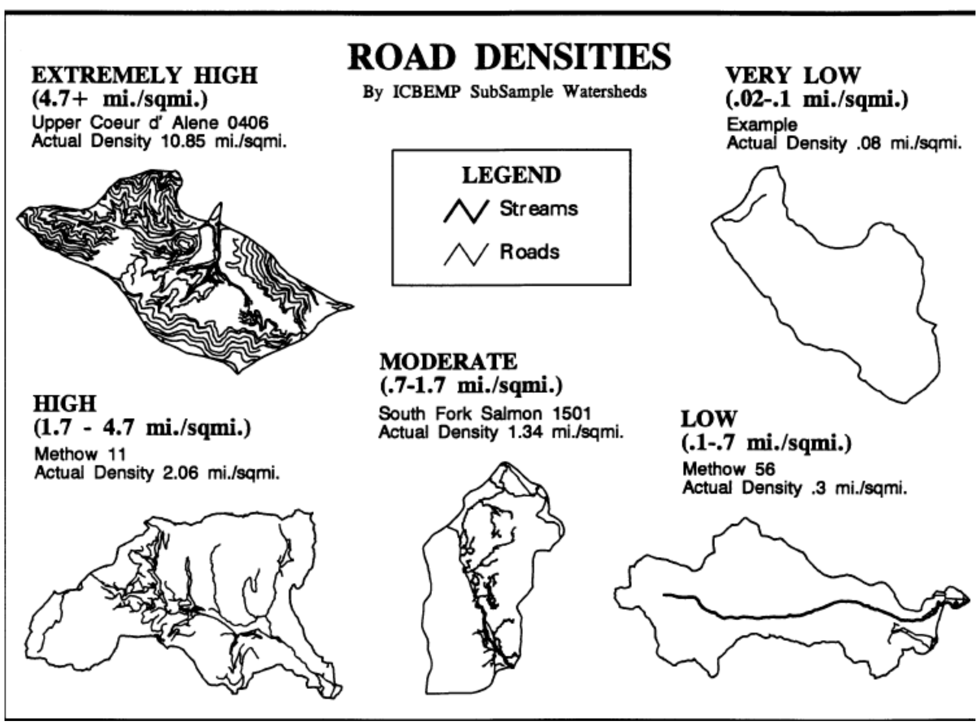

Figure 1. The USFS (1996) Interior Columbia River basin criterion for ecological and hydraulic risk from road densities is displayed here. Most FGS watersheds fall into the High and Extremely High category.

Roads constructed near streams are recognized as chronically contributing high amounts of fine sediment to streams (Cedarholm et al. 1981). These fines can infiltrate gravels and smother coho salmon eggs in the gravel and reduce the aquatic invertebrate production that is a major source of food for juvenile salmonids. There are no provisions in the FGS HCP for the systematic decommissioning or relocation of stream side roads that is an essential element of salmon recovery. Armentrout et al. (1999) point out that multiple high numbers of road crossings substantially elevate risk of sediment yield and recommend that road-stream crossings be reduced to two per mile or less. There is no discussion of this, yet de la Fuente and elder (1998) noted stream crossing failures as the highest mechanism of sediment delivery. Multiple crossing failures in rain-on-snow zone were a particular problem (de la Fuente and Elder 1998).

FGS HCP Fails to Control Cumulative Effects

Existing cumulative effects risk in Middle Klamath basins like Horse Creek are already very high (KNF 2000) yet there seems no discussion of this concept (Dunne et al. 2001) or acknowledgement of this condition. The FGS HCP repeatedly stresses that its lands are in steep headwater areas above reaches where salmon and steelhead spawn and rear, when in fact unstable headwater areas are among the greatest producers of sediment. When steep headwalls are logged, landslide occurrence may be delayed up to 8-30 years while roots rot out (Ziemer 1984). Slides from such areas then deliver large quantities of sediment and little large w2oody material (PWA 1998). May and Greswell (2003) noted more large wood was delivered from these areas than from the immediate riparian zones of streams and that logging in these headwater swales decreased large wood recruitment. Lack of logging restrictions on landslides and head walls in the FGS HCP will deprive the stream of wood and diminish pools needed by coho.

Numerous recent studies, such as Ligon et al. (1999), Dunne et al., (2001) and Collison et al. (2003), have explicitly pointed out that California FPRs have failed to protect Pacific salmon species because timber harvests are looked at individually and not in conjunction with all activities in a watershed. Dunne et al. (2001) described cumulative effects as follows:

> "Generally speaking, the larger the proportion of the land surface that is disturbed at any time, and the larger the proportion of the land that is sensitive to severe disturbance, the larger is the downstream impact. These land-surface and channel changes can: increase runoff, degrade water quality, and alter channel and riparian conditions to make them less favorable for a large number of species that are valued by society."

Dunne et al. (2001) warn that at risk populations can be lost, if cumulative effects are ignored and anthropogenic stressors continued:

> "The concern about cumulative effects arises because it is increasingly acknowledged that, when reviewed on one parcel of terrain at a time, land use may appear to have little impact on plant and animal resources. But a multitude of independently reviewed land transformations may have a combined effect, which stresses and eventually destroys a biological population in the long run."

Extensive channel damage, reduced large wood, lack of pools, high fine sediment levels and warm water temperatures plague the Scott River and its tributaries and Middle Klamath tributaries (Kier Associates 1991, 1999, QVIC 2008, 2009). Timber harvest in more than 25% of the watershed area of Oregon Coastal basins in less than 30 years caused loss of aquatic habitat diversity and fish communities to become dominated by one Pacific salmon species (Reeves et al. 1993). There is no discussion of prudent risk limits to harvest and the extensive clear cutting called for under the FGS HCP will cause further degradation. Change scene detection from Landsat images (Fischer 2003) in the Pat Ford Creek watershed, where FGS has major holdings, was more than 15% logged between 1994 and 1998 alone and the same imagery and extensive timber harvest in riparian zones of French Creek are evident, both of which imply very adverse activities with regard to salmonid conservation (QVIC 2005, 2006).

FGS and NMFS 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 (de la Fuente and Elder 1998). Jones and Grant (1996) found that roads increased the effective stream network and runoff resulting in damaging elevated peak flows. Patterns of high road densities in the rain-on-snow zone posed even greater risk, and many of FGS areas of high road density are at high elevations. The January 1997 storm exhibited rain-on-snow up to 7,000 feet in the Klamath Mountains (de la Fuente and elder 1998), which is above the normal zone of 3500-5000 feet. 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 1979). In the Middle Klamath and Scott River basin Van Kirk and Naman (2008) found that the snow level has 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. There is little discussion of this factor, but the location of FGS properties at higher elevation make this a critical shortcoming and activities are likely to contribute to increased peak flows and diminished base flows (Montgomery and Dietrich 1993). While maintaining high road density prolongs the window of risk, pulling culverts and decommissioning roads has shown to lessen channel damage and to promote salmon recovery (Harr and Nichols 1993). Tribal 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.

Although there is little discussion of the use of pesticides and herbicides associated with post-harvest activities to control competing vegetation, NMFS (2008) in a biological opinion to the U.S. Environmental Protection Agency has found that a number of substances routinely used are toxic to salmonids.

Unstable Soils

The HCP offers this discussion of erodible soils:

> "Soils derived from granitics are among the most erodible of soil types (Sommarstrom et al. 1990). Mineral reserves tend to be low in soils derived from granitics and drainage is excessive; thus, their ability to support coniferous vegetation is moderate. Granite residuum occurs in the northeast portion of the Klamath River management unit."

Once disturbed by road construction or harvest, decomposed granitic sands are too dry for re-establishment of forests and deep gullies that provide huge pulses' of sediment and also chronic erosion. In fact decomposed granitic soils in the Klamath Mountains need to be recognized for their erodibility and any public or private land management restricted, which the FGS HCP does not.

Misinformation on Fisheries

The fisheries information in the FGS HCP and DEIR is deficient in that it does not frankly characterize stocks of salmon and steelhead and frankly acknowledge their status. The Scott River coho population meets the CDFG (2008) standard for Jeopardy because two year classes are weak (QVIC 2008, 2009) and the distribution and abundance in all Middle Klamath tributaries is much diminished. Summer steelhead are barely mentioned and their presence in the lower Scott (QVIC 2009) annually is ignored as are potential cumulative effects of FGS harvest on them. Although Klamath River fall Chinook salmon are not ESA listed, returns of only 500-700 adults in 2004 and 2005 indicate that that population may be in trouble (QVIC 2005, 2006, 2008, 2009). High levels of decomposed granite sands in the Scott River gorge, stemming from logging roads and timber harvests, may diminish egg and alevin survival as sand is transported after redd construction during winter storms.

The FGS HCP makes the following assertion: "Current coho salmon distribution is only to the mouth of Moffett creek on the Scott River. Coho salmon above Moffett Creek are considered extirpated.

Given the distance upstream from known coho habitat in the Scott River (16.5 miles) and prevailing land use and rainfall and runoff patterns, it is highly unlikely that coho salmon could be restored to reaches in the Plan Area." This statement is simply not true as coho salmon are well distributed up the South Fork and the headwaters of the East Fork as well as in creeks such as Sugar and French Creeks.

FGS HCP Unlikely to Abate Water Pollution or to Meet TMDL Requirements

After acknowledgement of the impaired status of the Klamath and Scott Rivers, the FGS HCP characterizes the problem as follows:

> "The Stream temperatures in the Plan Area follow the same general seasonal pattern. Temperatures are cool early and late in the summer (May and September). The warmest stream temperatures typically occur during August, corresponding with the highest air temperatures. Although water temperatures in all streams appear to follow the same general seasonal pattern, temperatures can vary considerably among streams."

In fact, mainstem Klamath River and Scott River are lethal to salmonids, including coho salmon juveniles for much of the summer and fall and the cool mouths of tributaries are often the only areas where they can take refuge to survive in summer (Belchik 1999, 2003, US EPA 2003). If these areas are lost because of cumulative effects logging damage, the risk of extinction for coho and other Pacific salmon species will be greatly elevated (QVIC 2006, 2008). In order to prevent loss of refugia, the Lower Klamath TMDL states that there will be no net sediment discharge. In fact, activities under the FGS HCP will contribute sediment and to cumulative effects in Horse and Beaver Creeks and are not likely to meet TMDL objectives. These refugia are supporting coho juveniles that are not rearing in the tributaries themselves, so their importance to the Klamath metapopulation is extreme.

The lack of road maintenance, high road densities and crossings and coincidence of FGS holdings with the rain-on-snow zone, means Scott River that waves of sediment are likely with rain-on-snow events that will becoming increasingly common due to global warming (Van Kirk and Naman 2008). Logging on areas of high landslide risk, inner gorges and headwalls will continue to rob stream systems of large wood while increasing sediment pulses from FGS lands. As sediment from failing roads works its way down stream it will contribute to temperature problems and confound pollution reduction under the TMDL in that regard.

Note on Monitoring and Adaptive Management

Specific habitat data needs to be required of FGS and data need to be shared fully with all parties in order to insure that public trust is protected. These data can gauge the need for course correction based on habitat trends in the practice of adaptive management (Walters 1997, Walters and Hilborn 1978, Walters and Holling 1990). The tolerance and preference of coho salmon is known (Kier Associates and NMFS 2008) and whether habitats are more or less supportive of coho salmon over time can be measured. However, when water temperatures or sediment levels downstream are failing to meet standards, then activities may need to be delayed or scaled back. If regulatory agencies allow continued disturbance regimes from logging, then channels cannot recover nor can Pacific salmon (Reeves et al. 1995).

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