UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

July 19, 2010

In response reply to:
2009/02916

Lieutenant Colonel Torrey A. DiCiro
Department of the Army
San Francisco District, U.S. Army Corps of Engineers
1455 Market Street, 16th Floor
San Francisco, California 94103-1398

Dear Colonel DiCiro:

Thank you for your May 21, 2009, request for formal consultation on the U.S. Army Corps of Engineer's (Corps) proposed permitting of excavation maintenance in Bear Valley Creek, Marin County, California (Corps reference: File number 2009-00115N). The enclosed biological opinion describes NOAA's National Marine Fisheries Service's (NMFS) analysis of the effect of the implementation of the proposed project on endangered Central California Coast (CCC) coho salmon (*Oncorhynchus kisutch*) and threatened CCC steelhead (*O. mykiss*), and their designated critical habitat, in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended.

Endangered Species Act Consultation

Coho salmon and steelhead are present within the action area, and Bear Valley Creek is designated critical habitat for CCC coho salmon and CCC steelhead. In the enclosed biological opinion, NMFS concludes that the project is not likely to jeopardize the continued existence of CCC coho salmon and CCC steelhead or adversely modify their designated critical habitat. However, NMFS anticipates take of these species as a result of the project. An incidental take statement with non-discretionary terms and conditions is included with the enclosed biological opinion.

Essential Fish Habitat Consultation

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires all Federal agencies to consult with NMFS on all actions, or proposed actions, permitted, funded, or undertaken by the agency that may adversely affect essential fish habitat (EFH). Only species managed under a Federal fishery management plan are covered by the Magnuson-Stevens Act. The proposed project will occur within an area identified as EFH for

fish species managed under the Pacific Coast Salmon Fishery Management Plan. The proposed project will be undertaken with design considerations that minimize potential effects of the project on EFH. As such, NMFS anticipates the proposed project will result in no more than minimal adverse effects to EFH, and thus NMFS has no EFH conservations recommendations to provide.

Please contact Rick Rogers at (707) 578-8552 if you have any questions concerning this section 7 consultation and EFH consultation, or if you require additional information.

Sincerely,

Rodney R. McInnis
Regional Administrator

Enclosure

cc: Chris Yates, NMFS, Long Beach, CA
Ruth Pratt, Marin County Department of Public Works, San Rafael, CA
Sahrye Cohen, U.S. Army Corps of Engineers, San Francisco, CA
Copy to File - ARN 151422SWR09SR00280

Enclosure

BIOLOGICAL OPINION

ACTION AGENCY:	The United States Army Corps of Engineers
ACTION:	Maintenance cleaning of Bear Valley Creek channel and drainage ditch, Marin County, California.
CONSULTATION CONDUCTED BY:	National Marine Fisheries Service, Southwest Region
FILE NUMBER:	2009/2916
DATE ISSUED:	July 19, 2010

I. CONSULTATION HISTORY

On May 26, 2009, NOAA's National Marine Fisheries Service (NMFS) received the U.S. Army Corps of Engineers' (Corps) May 21, 2009, letter requesting initiation of formal consultation under section 7 of the Endangered Species Act (ESA) for excavation and dredging activities on Bear Valley Creek and Silver Hills Creek, Marin County, California. NMFS joined personnel from the Corps, Marin County Department of Public Works (applicant), and the U.S. Fish and Wildlife Service at the proposed work site on June 29, 2009, to further discuss the proposed action. NMFS initiated formal consultation on May 26, 2009; however, the applicant requested via email that the consultation be delayed due to anticipated changes to the proposed action. NMFS received details regarding the changes on April 13, 2010, and subsequently restarted consultation.

II. PROPOSED ACTION

The Corps proposes to issue a Nationwide Permit under Section 404 of the Clean Water Act to the Marin County Department of Public Works (applicant) for excavation and fill in jurisdictional waters during culvert maintenance activities within two stream channels in the Lagunitas Creek watershed, Marin County, California (hereafter referred to as the "Project"). Accumulated sediment and vegetation will be removed, a natural channel form and wetlands will be reconstructed, and three small sediment retention basins will be built. The Project will take place during summer 2010, and is expected to last several days. Instream work will be restricted to the period between June 15 and October 15, or first rainfall. NMFS does not anticipate any interdependent or interrelated actions associated with the proposed action.

More specifically, the Project involves excavation and maintenance of 868 linear feet of waters of the U.S within Bear Valley Creek and Silver Hills Creek. The Project area is partially

tidal/brackish wetland and partially freshwater wetland, and is adjacent to the White House Pool parking lot on Sir Francis Drake Boulevard (SFDB). Accumulated sediment and vegetation will be removed from within the SFDB culvert and downstream channel to the confluence of Bear Valley Creek with Lagunitas Creek, a distance of approximately 415 feet. As part of the sediment-removal activity, the applicant will reconstruct a natural channel and create adjacent functional wetland habitat in Bear Valley Creek. Due to the density of the riparian corridor in this lower reach, sediment excavation and channel reconstruction will be performed by machinery working within the dewatered channel (dewatering plans are explained further below). Additionally, approximately 435 linear feet of drainage ditch paralleling SFDB (connecting all flow in Silver Hills Creek to Bear Valley Creek), and 18 linear feet of ditch above SFDB and parallel to Bear Valley Road will be dewatered and excavated of accumulated sediment, although work at these locations can be accomplished with machinery stationed on the road surface. Finally, three small (approximately 6 feet long x 10 feet wide x 4 feet deep) sediment retention basins would be created within the excavated area in the drainage ditch paralleling Bear Valley Road to trap future sediment before it accumulates within the channel further downstream. Sediment will later be removed from the basins on an "as needed" basis when the channel is naturally dry during late summer.

As noted above, the Project will require dewatering the excavation areas, which is expected to last for a period of up to fifteen days. The applicant proposes to construct at the top and bottom of the Bear Valley Creek section two temporary cofferdams composed of native gravel and plastic sheeting. The upstream cofferdam will be constructed within the SFDB drainage ditch just upstream of its confluence with Bear Valley Creek, since the majority of flow entering the construction area emanates from the drainage ditch and not from the portion of Bear Valley Creek above of the culvert. The lower cofferdam will be constructed approximately 50 feet above the confluence of Bear Valley Creek with Lagunitas Creek. Once the cofferdams are in place, the Applicant will capture and relocate fish and other aquatic organisms from the enclosed Project area prior to dewatering the channel. During the Project, stream flow will be diverted around the construction zone utilizing high-density polyethylene pipe or flexible hose that would parallel the stream bank. Pump intakes will be appropriately screened to minimize the chance that fish are entrained during dewatering activities. All cofferdams, pumps, pipes, and sheet plastic will be removed from Bear Valley Creek upon Project completion; any clean native gravel used for the cofferdams may be left in the channel to augment available spawning habitat. Excavation work in Silver Hills Creek will be done when the channel is dry, and does not require cofferdams and dewatering procedures.

Action Area

By regulation, the action area includes "all areas to be affected directly or indirectly by the Federal action, and not merely that immediate area involved in the action" (50 CFR § 402.02). The Project action area encompasses the stream channel and riparian corridor of lower Bear Valley Creek between the SFDB culvert and Lagunitas Creek (approximately 415 feet), the drainage ditch parallel to SFDB connecting Silver Hills Creek and Bear Valley Creek (approximately 435 feet), and a portion of the ditch parallel to Bear Valley Creek Road that drains Silver Hills Creek (approximately 18 feet). The riparian corridor in lower Bear Valley Creek is in good condition and extends upland from the stream edge for over 20 feet in most

areas. Riparian habitat is lacking in the two ditches upstream of the SFDB culvert, due largely to the close proximity of SFDB and Bear Valley Creek Road that parallel the waterway in these reaches.

III. ANALYTICAL FRAMEWORK

A. Jeopardy Analysis

In accordance with policy and regulation, the jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which evaluates each species' range-wide conditions, the factors responsible for that condition, and the species' likelihood of both survival and recovery; (2) the Environmental Baseline, which evaluates the condition of the listed species in the action area, the factors responsible for that condition, and the relationship of the action area to the likelihood of both survival and recovery of the listed species; (3) the Effects of the Action, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on the species in the action area; and (4) Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the species.

The jeopardy determination is made by adding the effects of the proposed Federal action and any Cumulative Effects to the Environmental Baseline and then determining if the resulting changes in species status in the action area are likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the listed species in the wild.

The jeopardy analysis in this biological opinion places an emphasis on the range-wide likelihood of both survival and recovery of the listed species and the role of the action area in the survival and recovery of the listed species. The significance of the effects of the proposed Federal action is considered in this context, taken together with cumulative effects, for purposes of making the jeopardy determination. We use a hierarchical approach that focuses first on whether or not the effects on salmonids in the action area will impact their respective populations. If the populations will be impacted, we assess whether this impact is likely to affect the ability of the populations to support the survival and recovery of the Distinct Population Segment (DPS) or Evolutionary Significant Unit (ESU).

B. Adverse Modification Determination

This Biological Opinion does not rely on the regulatory definition of destruction or adverse modification of critical habitat at 50 CPR 402.02.[1] Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this Biological Opinion relies on four components: (1) the Status of Critical Habitat, which evaluates the range-wide condition of critical habitat for the Central California Coast (CCC) steelhead DPS and CCC coho salmon ESU, the factors responsible for those conditions, and the intended conservation

[1] This regulatory definition has been invalidated by Federal Courts.

value of the critical habitat overall; (2) the Environmental Baseline, which evaluates the condition of critical habitat in the action area, the factors responsible for that condition, and the conservation value of critical habitat in the action area; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on critical habitat in the action area and how that will influence the conservation value of affected critical habitat units; and (4) Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on critical habitat and how that will influence the conservation value of affected critical habitat units.

For purposes of the adverse modification determination, we add the effects of the proposed Federal action on critical habitat in the action area, and any Cumulative Effects, to the Environmental Baseline and then determine if the resulting changes to the conservation value of critical habitat in the action area are likely to cause an appreciable reduction in the conservation value of critical habitat range-wide. Similar to the hierarchical approach used above, if the proposed action will negatively affect critical habitat in the action area, we then assess whether the conservation value of the stream reach or river, larger watershed areas, and whole watersheds will be reduced. If these larger geographic areas are likely to have their critical habitat value reduced, we then assess whether or not this reduction will impact the value of the DPS or ESU critical habitat designation as a whole.

C. Use of Best Available Scientific and Commercial Information

To conduct the assessment, NMFS examined an extensive amount of information from a variety of sources. Detailed background information on the biology and status of the listed species and critical habitat has been published in a number of documents including peer-reviewed scientific journals, primary reference materials, and governmental and non-governmental reports. Additional information regarding the effects of the Project's actions on the listed species in question, their anticipated response to these actions, and the environmental consequences of the actions as a whole was formulated from the aforementioned resources, the biological assessment for this Project, and Project meeting notes if applicable. For information that has been taken directly from published, citable documents, those citations have been referenced in the text and listed at the end of this document.

IV. STATUS OF THE SPECIES AND CRITICAL HABITAT

This biological opinion analyzes the effects of the proposed action on the following Pacific salmonids and critical habitat:

1. Endangered CCC coho salmon Evolutionarily Significant Unit (70 FR 37160; June 28, 2005);

2. Designated critical habitat for CCC coho salmon (64 FR 24049; May 5, 1999);

3. Threatened CCC steelhead Distinct Population Segment (DPS) (71 FR 834; January 5, 2006); and

4. Designated critical habitat for CCC steelhead (70 FR 52488; September 2, 2005)

A. Species Description and Life History

1. Coho Salmon

The life history of the coho salmon in California has been well documented (Shapovalov and Taft 1954; Hassler 1987; Weitkamp *et al.* 1995). In contrast to the life history patterns of other anadromous salmonids, coho salmon in California generally exhibit a relatively simple 3-year life cycle. Adult salmon typically begin the immigration from the ocean to their natal streams after heavy late-fall or winter rains breach the sand bars at the mouths of coastal streams (Sandercock 1991). Coho salmon are typically associated with small to moderately-sized coastal streams characterized by heavily forested watersheds; perennially-flowing reaches of cool, high-quality water; dense riparian canopy; deep pools with abundant overhead cover; instream cover consisting of large, stable woody debris and undercut banks; and gravel or cobble substrates (Sandercock 1991). Immigration continues into March, generally peaking in December and January, with spawning occurring shortly after arrival at the spawning ground (Shapovalov and Taft 1954).

The eggs generally hatch after four to eight weeks, depending on water temperature. Survival and development rates depend, in part, on fine sediment levels within the redd. Under optimum conditions, mortality during this period can be as low as 10 percent; under adverse conditions of high scouring flows or heavy siltation, mortality may be close to 100 percent (Baker and Reynolds 1986). McMahon (1983) found that egg and fry survival drops sharply when fines make up 15 percent or more of the substrate. The newly-hatched fry remain in the redd from two to seven weeks before emerging from the gravel (Shapovalov and Taft 1954). Upon emergence, fry seek out shallow water, usually along stream margins. As they grow, juvenile coho salmon often occupy habitat at the heads of pools, which generally provide an optimum mix of high food availability and good cover with low swimming cost (Nielsen 1992). Chapman and Bjornn (1969) determined that larger juveniles tend to occupy the head of pools, whereas smaller juveniles are found further down the pools. As the fish continue to grow, they move into deeper water and expand their territories until, by July and August, they reside exclusively in deep pool habitat. Preferred rearing habitat has little or no turbidity and high sustained invertebrate forage production. Juvenile coho salmon feed primarily on drifting terrestrial insects, much of which are produced in the riparian canopy, and on aquatic invertebrates growing within the interstices of the substrate and in leaf litter in pools. Juvenile coho salmon prefer well shaded pools at least 1 m deep with dense overhead cover; abundant submerged cover composed of undercut banks, logs, roots, and other woody debris; and preferred water temperatures of 12-15°celsius (C) (Brett 1952; Bell 1973; Reiser and Bjornn 1979; McMahon 1983), but not exceeding 22-25°C (Brungs and Jones 1977) for extended time periods. Growth is slowed considerably at 18°C and ceases at 20°C (Stein *et al.* 1972; Bell 1973).

In the spring, as yearlings, juvenile coho salmon undergo a physiological process, called smoltification, which prepares them for living in the marine environment. They begin to migrate downstream to the ocean during late March and early April; emigration usually peaks in mid-

May, if conditions are favorable. Emigration timing is correlated with peak upwelling currents along the coast. Entry into the ocean at this time facilitates more growth and, therefore, greater marine survival (Holtby *et al.* 1990).

2. Steelhead

Steelhead are anadromous fish, spending some time in both fresh- and saltwater. The older juvenile and adult life stages occur in the ocean, until the adults ascend freshwater streams to spawn. Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing into adults. General reviews for steelhead in California document much variation in life history (Shapovalov and Taft 1954; Barnhart 1986; Busby *et al.* 1996; McEwan 2001). Although variation occurs, in coastal California, steelhead usually live in freshwater for 2 years, then spend 1 or 2 years in the ocean before returning to their natal stream to spawn. Steelhead may spawn 1 to 4 times over their life. Steelhead from Tomales Bay and its tributaries typically immigrate to freshwater between October and April, peaking in January and February, and migrate to the ocean from January through June, with peak emigration occurring in April and May (Fukushima and Lesh 1998). Given the proposed construction period – June 15 through October 15 – and the life history of steelhead, only juvenile steelhead are likely to be present in the action area during construction. The remainder of this section is dedicated to that life stage.

Juvenile steelhead rear in edge-water habitats, moving gradually into pools and riffles as they grow larger. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation (Shirvell 1990; Meehan and Bjornn 1991). Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. Rearing steelhead juveniles prefer water temperatures of 7.2-14.4°C and have an upper lethal limit of 23.9°C (Barnhart 1986; Bjornn and Reiser 1991). Fluctuating diurnal water temperatures can aid salmonid survival in areas where daytime water temperatures are excessive (Busby *et al.* 1996).

B. Status of Species and Critical Habitat

In this opinion, NMFS assesses the status of each species by examining four types of information, all of which help us understand a population's ability to survive. These population viability parameters are: abundance, population growth rate, spatial structure, and diversity (McElhany *et al.* 2000). While there is insufficient information to evaluate these population viability parameters in a quantitative sense, NMFS has used existing information to determine the general condition of each population and factors responsible for the current status of each ESU or DPS.

We use these population viability parameters as surrogates for numbers, reproduction, and distribution, the criteria found within the regulatory definition of jeopardy (50 CFR 402.20). For example, the first three parameters are used as surrogates for numbers, reproduction, and

distribution. We relate the fourth parameter, diversity, to all three regulatory criteria. Numbers, reproduction, and distribution are all affected when genetic or life history variability is lost or constrained resulting in reduced population resilience to environmental perturbation at local or landscape-level scales.

1. CCC Coho Salmon

Historically, the CCC coho salmon ESU was comprised of approximately 76 coho salmon populations.[2] Most of these were dependent populations that needed immigration from other nearby populations to ensure their long term survival; the ESU likely contained 12 functionally independent populations (Bjorkstedt *et al.* 2005). Most of the populations in the CCC coho salmon ESU are currently doing poorly. Critically low adult and juvenile abundance is common, and some dependent populations have been extirpated, as further described below.

A comprehensive review of estimates of historic abundance and population decline of coho salmon in California is provided by Brown *et al.* (1994). They estimated that annual spawning numbers of coho salmon in California ranged between 200,000 and 500,000 fish in the 1940s, which declined to about 100,000 fish by the 1960s, followed by a further decline to about 31,000 fish by 1991. Brown *et al.* (1994) concluded that the abundance of California coho salmon had declined more than 94 percent since the 1940s, with the greatest decline occurring since the 1960s. More recent abundance estimates vary from approximately 600 to 5,500 adults (NMFS 2005). Recent NMFS status reviews (NMFS 2001, NMFS 2003, NMFS 2005) indicate that the CCC coho salmon are likely continuing to decline in number.

CCC coho salmon have also experienced acute range restriction and fragmentation. Adams *et al.* (1999) found that in the mid 1990s coho salmon were present in 51 percent (98 of 191) of the streams where they were historically present, and documented an additional 23 streams within the CCC coho salmon ESU in which coho salmon were found for which there were no historical records. Thirty four of the 76 historical populations identified by Bjorkstedt *et al.* (2005) no longer exist.

Recent genetic research in progress by both the NMFS Southwest Fisheries Science Center and the Bodega Marine Laboratory has documented a reduction in genetic diversity within subpopulations of the CCC coho salmon ESU (Bjorkstedt *et al.* 2005). The influence of hatchery fish on wild stocks has also contributed to the lack of diversity through outbreeding depression[3] and disease.

Available information suggests that CCC coho salmon abundance is very low, and the ESU is not able to produce enough offspring to maintain itself (population growth rates are negative).

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[2] Population as defined by Bjorkstedt *et al.* 2005 and McElhaney *et al.* 2000 as, in brief summary, a group of fish of the same species that spawns in a particular locality at a particular season and does not intebreed substantially with fish from any other group. Such fish groups may include more than one stream. These authors use this definition as a starting point from which they define four types of populations (not all of which are mentioned here).

[3] Outbreeding depression is the loss of genetic and behavioral diversity in a population through the introduction of parental genotypes that are not well adapted to local environments. Less native genetic material is passed to subsequent generations when native fish hybridize with hatchery fish instead of propagating with other purely native salmon.

CCC coho salmon have experienced range constriction/fragmentation, and lost genetic diversity, to the point where many dependent populations that once supported the species' overall numbers and geographic distribution have been extirpated. This suggests that independent populations that historically provided support to dependent populations via immigration have not been able to provide that support for several decades. Preliminary data from adult return counts and estimations in 2007/08 indicates a severe decline in returning adults across the range of coho salmon on the coast of California and Oregon compared to the same cohort in 2004/05. Ocean conditions are suspected as the principal short term cause because of the wide geographic range of declines (Southwest Fisheries Science Center 2008). Therefore, the near-term (10 - 20 years) viability of many of the extant independent CCC coho salmon populations (Garcia River, Gualala River, Russian River, and San Lorenzo River) is of serious concern. These populations may not have enough fish to survive additional natural and human caused environmental change. Populations categorized as historically dependent comprise the bulk of coho salmon remaining at the southern portion of the CCC coho salmon range, further compromising long-term survival in this area.

While the amount of data supporting these conclusions is not extensive, NMFS is unaware of information suggesting a more positive assessment of CCC coho salmon ESU condition. Recent reviews conclude that CCC coho salmon are presently in danger of extinction (NMFS 2005; Spence *et al.* 2008), and on June 28, 2005, NMFS changed the ESA designation of this ESU to endangered (70 FR 37160).

2. CCC steelhead

Historically, approximately 48 populations of steelhead existed in the CCC steelhead DPS (Bjorkstedt *et al.* 2005). Many of these populations (about 20) were independent, or potentially independent, meaning they had a high likelihood of surviving for 100 years absent anthropogenic impacts. The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their viability (McElhaney *et al.* 2000; Bjorkstedt *et al.* 2005).

While historical and present data on abundance is limited, CCC steelhead numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to spawn in the rivers of this DPS in the mid-1960s, including 50,000 fish in the Russian River - the largest population within the DPS (Busby *et al.* 1996). Recent estimates for the Russian River are on the order of 4,000 fish (NMFS 1997). Abundance estimates for smaller coastal streams in the DPS indicate low but stable levels with recent estimates for several streams (Lagunitas, Waddell, Scott, San Vincente, Soquel, and Aptos creeks) of individual run sizes of 500 fish or less (62 FR 43937). For more detailed information on trends in CCC steelhead abundance, see: Busby *et al.* 1996, NMFS 1997, and NMFS 2005.

Some loss of genetic diversity has been documented and attributed to previous among-basin stock transfers and local hatchery production in interior populations in the Russian River (Bjorkstedt *et al.* 2005). Reduced population size and habitat fragmentation in San Francisco streams has likely also harmed genetic diversity in these populations.

CCC steelhead have experienced serious declines in abundance, and long-term population trends suggest a negative growth rate. This indicates the DPS may not be viable in the long term. DPS populations that historically provided enough steelhead immigrants to support dependent populations may no longer be able to do so, placing dependent populations at increased risk of extirpation. However, because CCC steelhead have maintained a wide distribution throughout the DPS, roughly approximating the known historical distribution, CCC steelhead likely possess a resilience that will likely slow their decline relative to other salmonid DPSs or ESUs in worse condition. The most recent status review concludes that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (NMFS 2005). On January 5, 2006, NMFS determined that the CCC steelhead DPS remained a threatened species, as previously listed (71 FR 834).

A more recent viability assessment of CCC steelhead concluded that populations in watersheds that drain to San Francisco Bay are highly unlikely to be viable, and that the limited information available did not indicate that any other CCC steelhead populations could be demonstrated to be viable (Spence et al 2008). Although there were average returns (based on the last ten years) of adult CCC steelhead during 2007/08, research monitoring data from the 2008/09 adult CCC steelhead returns indicate a decline in returning adults across their range compared to the last ten years (Jeffrey Jahn, NMFS, personal communication 2010).

3. Status of Critical Habitat

The condition of CCC coho salmon and CCC steelhead critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. NMFS has determined that currently depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat[4]: logging, agriculture, mining, urbanization, stream channelization, dams, wetland loss, and water withdrawals (including unscreened diversions for irrigation). Impacts of concern include altered stream bank and channel morphology, elevated water temperature, lost spawning and rearing habitat, habitat fragmentation, impaired gravel and wood recruitment from upstream sources, degraded water quality, lost riparian vegetation, and increased erosion into streams from upland areas (Weitkamp *et al.* 1995; Busby *et al.* 1996; 64 FR 24049; 70 FR 37160; 70 FR 52488). Diversion and storage of river and stream flow has dramatically altered the natural hydrologic cycle in many of the streams within the ESU. Altered flow regimes can delay or preclude migration, dewater aquatic habitat, and strand fish in disconnected pools, while unscreened diversions can entrain juvenile fish.

V. ENVIRONMENTAL BASELINE

The environmental baseline is the current status of species and critical habitat in the action area based on analysis of the effects of past on ongoing human and natural factors. The

[4] Other factors, such as over fishing and artificial propagation have also contributed to the current population status of these species. All these human induced factors have exacerbated the adverse effects of natural environmental variability from such factors as drought and poor ocean conditions.

environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal Projects in the action area that have already undergone formal or early section 7 consultation, and the impacts of State or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

A. Status of Listed Species in the Action Area

NMFS is unaware of any systematic fish surveys that have been completed for Bear Valley Creek or Silver Hills Creek. Although NMFS has failed to find any record of coho salmon inhabiting the Bear Valley Creek watershed, the low gradient channel characteristics found along much of mainstem Bear Valley Creek above the Project reach could likely support coho salmon spawning and rearing. National Park Service biologists have recently documented juvenile steelhead within the upper reaches of Bear Valley Creek, and juvenile steelhead were observed several years ago in the pool downstream of the culvert located at the intersection of Bear Valley Road and SFDB (Pratt 2009). However, much of the action area is severely aggraded with sediment, and both coho salmon and steelhead are unlikely to be present in high numbers because of poor habitat condition.

B. Salmonid Habitat/Critical Habitat within the Action Area

Bear Valley Creek is listed as critical habitat for CCC coho salmon. Within the action area, Bear Valley Creek, Silver Creek and the inter-connecting drainage ditch provide limited habitat for juvenile salmonids during low flow periods. Within the action area there is reduced surface flow in the summer and fall, and the stream and drainage ditch often become intermittent, leaving few or no residual pools. Some instream cover is likely provided during summer by instream woody debris and emergent or overhanging vegetation within the lower section of Bear Valley Creek below the SFDB bridge. Instream cover is generally lacking in the drainage ditch and lower portion of Silver Hills Creek. Overwinter habitat conditions are likely poor since the channel lacks habitat complexity and velocity refugia due to sediment aggradation. Based on current channel conditions, NMFS believes that CCC coho salmon critical habitat within the action area is degraded.

C. Factors Affecting Species Environment within the Action Area

The dominant factor affecting instream habitat within the action area is excessive sediment aggradation from anthropogenic erosion (rural roads and development) in the upper Bear Valley Creek watershed, most notably Silver Hills Creek. Furthermore, the close proximity of SFDB and Bear Valley Road to the stream channels within the action area has confined channel structure, simplified instream habitat condition, and eliminated much of the riparian corridor along these reaches.

VI. EFFECTS OF THE PROPOSED ACTION

A. Fish Relocation Activities

Data are not available to precisely quantify the number of steelhead and coho salmon that will be relocated prior to dewatering activities. Fish relocation activities will occur during the summer or early fall low-flow period after emigrating smolts have left, and before adults have immigrated to the proposed Project site. Due to the severely aggraded condition of the streams and ditches within the Project area, as well as the intermittent connectivity between the few viable sections of rearing habitat (*i.e.,* very limited pool habitat exists in the reach), the presence of significant numbers of rearing juvenile steelhead and coho salmon during Project construction is unlikely. On the contrary, NMFS expects the number of juvenile coho salmon and steelhead will be small, with a conservative estimate of no more than 50 individuals of both species encountered within the entire Project reach, with the majority of those fish being steelhead.

There is always the potential for injury or mortality when relocating juvenile salmonids. Fish collecting gear, whether passive (Hubert 1996) or active (Hayes *et al.* 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely depending on the method used, the ambient conditions, and the expertise and experience of the field crew. Data from two years of similar salmonid relocation activities in Humboldt County indicate that average mortality rate is below one percent (Collins 2004). Those fish that avoid capture may be exposed to risks described in the following section on dewatering.

Although sites selected for relocating fish should have ample habitat, in some instances relocated fish may endure short-term stress from crowding at the relocation sites. Relocated fish may also face increased competition for available resources such as food and habitat. Some of the fish released at the relocation sites may choose not to remain in these areas and may move either upstream or downstream to areas that have more habitat and a lower density of fish. Because relocated fish will have the opportunity to quickly relocate into adjacent areas, thereby minimizing competition and crowding stress, NMFS does not believe capture and relocation activities will reduce the fitness of individual fish.

B. Dewatering

Stream flow diversions could harm individual rearing juvenile steelhead by concentrating or stranding them in residual wetted areas before they are relocated (Cushman 1985). Rearing steelhead and coho salmon could be killed or injured if crushed during diversion and construction activities, though direct mortality is expected to be minimal due to relocation efforts prior to installation of the diversion. Fish that avoid capture in the Project work area will likely die during dewatering activities due to desiccation or thermal stress. NMFS expects that the total number of juvenile salmonids that will be killed as a result of stranding will be less than those killed during relocation (*i.e.*, less than 1% of the total present at the Project site).

NMFS anticipates temporary changes in stream flow within and downstream of the Project site during dewatering activities. These fluctuations in flow are anticipated to be small, gradual, and

short-term. Stream flow in the vicinity of the project site should be the same as free-flowing conditions, except during dewatering. Stream flow diversion and dewatering are expected to temporarily reduce or alter aquatic habitat. NMFS anticipates that only a small reach of stream habitat at the Project site will be dewatered for in-channel construction activities, representing a very minor portion of habitat currently utilized by steelhead and coho salmon within Bear Valley Creek.

Benthic (*i.e.*, bottom dwelling) aquatic macroinvertebrates within the construction site may be killed or their abundance reduced when creek habitat is dewatered (Cushman 1985). However, this effect will be temporary since construction activities will be relatively short-lived, and rapid recolonization (about one to two months) of disturbed areas by macroinvertebrates is expected following rewatering (Cushman 1985; Thomas 1985; Harvey 1986). In addition, the effect of lost macroinvertebrate production on juvenile salmonids is likely negligible, since food from upstream sources (via drift) would be available downstream of the dewatered areas (flow is diverted around the construction site). Based on these considerations, NMFS anticipates that any impacts to habitat, including CCC coho salmon critical habitat, caused by dewatering activities will be minor, and short-lived.

C. Turbidity

Disturbing the streambed or bank during cofferdam construction and channel excavation may temporarily increase turbidity levels within and downstream of the Project site. NMFS anticipates that short-term increases in turbidity may occur during cofferdam construction and removal, and the following winter when storm flows shape the newly excavated channel. Actual excavation work is unlikely to elevate instream sediment concentrations since the work will be performed within an isolated dry channel.

Sediment may affect salmonids in several ways. High concentrations of suspended sediment can disrupt normal feeding behavior and efficiency (Cordone and Kelly 1961; Bjornn *et al.* 1977; Berg and Northcote 1985), reduce growth rates (Crouse *et al.* 1981), and increase plasma cortisol levels (Servizi and Martens 1992). High turbidity concentrations can lower dissolved oxygen in the water column, reduce respiratory function, lower disease tolerance, and even cause fish mortality (Sigler *et al.* 1984; Berg and Northcote 1985; Gregory and Northcote 2003; Velagic 1995; Waters 1995). Even small pulses of turbid water will cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition and predation, decreasing survival. With regard to physical habitat condition, increased sediment deposition can fill pools and reduce the amount of cover available to fish, decreasing the survival of juvenile salmonids (Alexander and Hansen 1986).

Turbidity levels in the action area are expected to be less intense than the conditions encountered in the above-mentioned studies. Dry season conditions also preclude sediment deposition from affecting the system at the time of construction. Initial turbidity increases would most likely be noticed after the first storm events as flow would push newly mobile sediment down the creek. Recent monitoring of newly replaced culverts detailed a range in turbidity changes downstream of newly replaced culverts following winter storm events (Humboldt County 2002, 2003 and 2004). During the first winter following construction, turbidity rates (NTU) downstream of

newly replaced culverts increased an average of 19% when compared to measurements directly above the culvert. However, the range of increases within the eleven monitored culverts was large (n=11; range 123% to -21%). Monitoring results from one and two year-old culverts were much less variable (n=11; range:12% to -9%), with an average increase in downstream turbidity of 1%. Although the culvert monitoring results show decreasing sediment effects as projects age from year one to year 3, a more important consideration is that most measurements fell within levels that were likely to only cause slight behavioral changes *[e.g.*, increased gill flaring (Berg and Northcote 1985), elevated cough frequency (Servizi and Marten 1992), and avoidance behavior (Sigler *et al.* 1984)]. Turbidity levels necessary to impair feeding are likely in the 100-150 NTU range (Harvey and White 2008; Gregory and Northcote 2003). However, only one of the Humboldt County measurements exceeded 100 NTU (NF Anker Creek, year one), whereas the majority (81%) of downstream readings was less than 20 NTU. Given the similar scope and disturbance effect of this Project and the culvert replacement projects noted above, NMFS anticipates Project turbidity effects will fall below the threshold necessary to injure or kill fish. Instead, the most likely result of Project turbidity levels will be minor behavioral responses (*e.g.*, avoidance, relocation, *etc.*) by affected fish that are unlikely to appreciably reduce their fitness.

D. Beneficial Aspects of Project

The current aggraded state of the culvert and stream channel/drainage ditches within the Project reach hinders upstream passage by adult steelhead and coho salmon, while also degrading pool volume and habitat complexity within the stream channel. Removing aggraded sediment will improve both juvenile and adult fish passage, as well as the quantity and quality of instream habitat available to adult and juvenile steelhead and coho salmon.

VII. CUMULATIVE EFFECTS

NMFS is not aware of any future State or private activities that are reasonably certain to occur within the action area.

VIII. INTEGRATION AND SYNTHESIS

The Project will likely directly impact CCC steelhead, CCC coho salmon, and their critical habitat. The number of impacted fish will likely be small, considering few salmonids are expected within the action area due to the currently degraded rearing habitat conditions and a construction schedule that avoids adult and smolt migration periods. Therefore, NMFS expects few salmonids are likely to be encountered during the Project. Furthermore, mortality rates during relocation and dewatering activities are likely below one percent, so the risk of mortality to any encountered salmonid is low.

Turbidity impacts will likely be temporary. Where turbidity effects exist, they will be minimized by fish relocation activities and specific project design considerations, such as construction site dewatering, BMP implementation, *etc.* The Project will isolate and degrade both coho salmon and steelhead critical habitat during the several-day work window, specifically impacting

juvenile rearing habitat. However, the Project will ultimately improve critical habitat condition within the action area by removing accumulated sediment and re-establishing a natural, tidally influenced stream channel supporting juvenile rearing and adult migration.

With regard to critical habitat, NMFS expects that the short-term loss of a small amount of stream bed and bank from dewatering the action area will not appreciably diminish the value of designated CCC coho salmon critical habitat. The disturbed area represents a very small portion of the overall Bear Valley Creek watershed, the current condition of that habitat is severely degraded, and the amount of time the habitat will be dewatered is fleeting. Instead, the restorative nature of the Project will likely improve critical habitat within the action area.

As noted above, few salmonids are expected within the action area. Any salmonids present in the action area during the construction window likely make up a small proportion from the Bear Valley Creek watershed or the CCC coho salmon ESU or CCC steelhead DPS. It is unlikely that the small potential loss of juveniles in 2010 will impact future adult returns, due to the relatively large number of juveniles produced by each spawning pair. Furthermore, the improved migratory habitat resulting from the Project will likely result in greater numbers of fish spawning in the watershed in future years, which should increase the steelhead and coho salmon population in Bear Valley Creek.

Therefore, due to the anticipated small number of coho salmon and steelhead likely affected by the Project, as well as the short-lived impacts to critical habitat within the Project reach, NMFS does not believe the Project will appreciably diminish the abundance, productivity, diversity, or spatial structure of the Lagunitas Creek population of CCC coho salmon and CCC steelhead. Conversely, the Project is likely to improve habitat conditions for these species, which in turn may improve population viability in the future.

IX. CONCLUSION

After reviewing the best available scientific and commercial data, the current status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NMFS' biological opinion that the Project is not likely to jeopardize the continued existence of threatened CCC steelhead or endangered CCC coho salmon.

After reviewing the best available scientific and commercial data, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NMFS' biological opinion that the Project is not likely to result in the destruction or adverse modification of designated critical habitat for CCC coho salmon.

X. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NMFS as an act which actually kills or

injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be undertaken by the Corps and its permittee for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps: (1) fails to assume and implement the terms and conditions, or (2) fails to require any permittee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to any permit, grant document, or contract, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement (50 CFR §402.14(i)(3)).

A. Amount or Extent of Take

The number of ESA-listed salmonids that may be incidentally taken during Project activities is expected to be very small, but cannot be accurately quantified due to: (1) the specific number of fish that may be present is unknown and (2) the specific number of fish that may be stranded is unknown. Therefore, take is quantified as: all fish present in the action area during the construction period (June 15, 2007, through October 15, 2009 or 2010), may be captured and relocated, with an expectation that the total represent no more than 50 fish. Any coho salmon or steelhead present during the construction window will need to be relocated. Based on the low mortality rates for typical relocation efforts, NMFS anticipates no more than two juvenile salmonids will be killed during relocation and dewatering efforts.

B. Effect of the Take

In the accompanying opinion, NMFS determined that this level of anticipated take is not likely to result in jeopardy to CCC coho salmon or CCC steelhead.

C. Reasonable and Prudent Measures

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of CCC coho salmon and CCC steelhead:

1. Undertake measures to ensure that harm and mortality to listed salmonids resulting from fish relocation and dewatering activities is low.

2. Undertake measures to minimize harm to listed salmonids resulting from excavation activities.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Corps, its permittee, and their contractors or designees must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1. The following terms and conditions implement reasonable and prudent measure 1:

   a. The applicant shall retain a qualified biologist with expertise in the areas of anadromous salmonid biology, including handling, collecting, and relocating salmonids; salmonid/habitat relationships; and biological monitoring of salmonids. The Corps shall ensure that all biologists working on this project be qualified to conduct fish collections in a manner which minimizes all potential risks to ESA-listed salmonids. Electrofishing, if used, shall be performed by a qualified biologist and conducted according to the *NMFS Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act* [available at: http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/final4d/electro2000.pdf].

   b. Prior to commencing construction, the applicant shall submit to NMFS for approval a plan for the cofferdam and diversion method. The plan shall be sent to the NMFS Santa Rosa Area Office, Attention: Rick Rogers, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528, or alternatively by email to rick.rogers@noaa.gov.

   c. A qualified biologist shall monitor the construction site during placement and removal of channel diversions and cofferdams to ensure that any adverse effects to salmonids are minimized. The biologist shall be on site during all dewatering events to ensure that all ESA-listed salmonids are captured, handled, and relocated safely. The biologist shall notify NMFS biologist Rick Rogers at (707) 578-8552 or rick.rogers@noaa.gov one week prior to capture activities in order to provide an opportunity for NMFS staff to observe the activities.

   d. ESA-listed fish shall be handled with extreme care and kept in water to the maximum extent possible during relocation activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream and fish shall not be removed from this water except when released. To avoid predation, the biologist shall have at least two containers and segregate young-of-year fish from larger age-classes and other potential aquatic predators. Captured salmonids will be relocated, as soon as possible, to a suitable instream location in which suitable habitat condition are present to allow for adequate survival of transported fish and fish already present.

e. If any salmonids are found dead or injured, the biologist shall contact NMFS biologist Rick Rogers by phone immediately at (707) 5758-8552 or the NMFS North Central Coast Area Office at (707) 575-6050. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length measured, and frozen as soon as possible. Frozen samples shall be retained by the biologist until specific instructions are provided by NMFS. The biologist may not transfer biological samples to anyone other than the NMFS North Central Coast Office without obtaining prior written approval from the North Central Coast Office, Supervisor of the Protected Resources Division. Any such transfer will be subject to such conditions as NMFS deems appropriate.

2. The following terms and conditions implement reasonable and prudent measure 2:

a. The Corps shall allow any NMFS employee(s) or any other person(s) designated by NMFS, to accompany field personnel to visit the construction site during activities described in this opinion.

b. A biologist shall monitor in-channel activities and performance of sediment control or detention devices for the purpose of identifying and reconciling any condition that could adversely affect salmonids or their habitat. The Corps and the applicant will rectify conditions that adversely affect salmonids or their habitat in a timely manner, if they occur.

c. Sediment shall be removed from sediment controls once it has reached one-third of the exposed height of the control. Whenever straw bales are used, they shall be staked and dug into the ground 12 centimeters (cm). Catch basins shall be maintained so that no more than 15 cm of sediment depth accumulates within traps or sumps.

d. Contractors must have a supply of erosion control materials onsite to facilitate a quick response to unanticipated storm events or emergencies.

e. Construction equipment used within the creek channel will be checked each day prior to work within the creek channel (top of bank to top of bank) and if necessary action will be taken to prevent fluid leaks. If leaks occur during work in the channel (top of bank to top of bank), Corps, its permittee, or their contractor will contain the spill and remove the affected soils.

XI. REINITIATION NOTICE

This concludes formal consultation on the proposed Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or

control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

XII. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or develop additional information.

NMFS offers the following Conservation Recommendation:

1. The Corps should identify and prioritize any maintenance and construction projects which, if implemented, can improve ESA-listed salmonid migration or in-stream environmental conditions.

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