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 30, 2012

In response refer to:
2012/02029

Lieutenant Colonel John K. Baker
Department of the Army
San Francisco District, U.S. Army Corps of Engineers
1455 Market Street
San Francisco, California 94103-1398

Dear Colonel Baker:

Thank you for your April 17, 2012, request for formal consultation on the U.S. Army Corps of Engineer's (Corps) proposed permitting of culvert and bank repair within Bear Valley Creek, Marin County, California (Corps reference: File number 2012-00011N). The enclosed biological opinion contains NOAA's National Marine Fisheries Service's (NMFS) analysis of the effect of the implementation of the proposed project on threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) and endangered CCC coho salmon (*O. kisutch*) designated critical habitat, in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended.

Endangered Species Act Consultation

Steelhead may be present within the action area, and Bear Valley Creek is designated critical habitat for CCC coho salmon. As explained within the biological opinion, coho salmon are not expected within the action area, and thus are not included within the effects analysis. NMFS concludes that the project is not likely to jeopardize the continued existence of CCC steelhead or adversely modify CCC coho salmon designated critical habitat. However, NMFS anticipates take of CCC steelhead 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 CCC coho salmon managed under the Pacific Coast Salmon Fishery Management Plan.

The proposed project will adversely affect EFH, but all feasible conservation measures/Best Management Practices are being implemented and, therefore, we have no further EFH Conservation 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,

For Rodney R. McInnis
Regional Administrator

Enclosure

cc: Chris Yates, NMFS, Long Beach
David Demko, NPS Point Reyes National Seashore, Point Reyes
Roberta Morganstern, U.S. Army Corps of Engineers, San Francisco
Copy to File - ARN 151422SWR2012SR00247

Enclosure

BIOLOGICAL OPINION

ACTION AGENCY:	The United States Army Corps of Engineers
ACTION:	Bear Valley Trail Upper Culvert and Streambank Repair Project, Marin County, California.
CONSULTATION CONDUCTED BY:	National Marine Fisheries Service, Southwest Region
TRACKING NUMBER:	2012/02029
DATE ISSUED:	**July 30, 2012**

I. CONSULTATION HISTORY

On April 19, 2012, NOAA's National Marine Fisheries Service (NMFS) received the U.S. Army Corps of Engineers' (Corps) April 17, 2012, letter requesting initiation of formal consultation under section 7 of the Endangered Species Act (ESA) for excavation and construction activities on Bear Valley Creek, Marin County, California. The Corps determined the project would adversely affect listed salmonids and their critical habitat in Bear Valley Creek because the project would capture and relocate fish from the work area, and potentially increase instream turbidity levels. NMFS was originally informed of the Project at a March 22, 2012, Marin County project coordination meeting. NMFS initiated formal consultation on April 19, 2012.

II. PROPOSED ACTION

The Corps proposes to issue a Nationwide Permit under Section 404 of the Clean Water Act to the National Park Service, Point Reyes National Seashore (NPS) for excavation and fill in jurisdictional waters during culvert replacement, step pool construction, and bank stabilization work within the Bear Valley Creek watershed, Marin County, California (hereafter referred to as the "Project"). The existing culvert, located where the Bear Valley Trail crosses Bear Valley Creek, is in danger of failing, and also does not currently meet NMFS' and California Fish and Game's (CDFG) fish passage design criteria. The bank repair site is located downstream of the culvert; through the use of bio-engineering techniques, the NPS will stabilize a chronically eroding bank that is undercutting the Bear Valley Trail and conveying sediment into the creek. The Project will take place during summer 2012, and is expected to last several days. Instream work will be restricted to the period between July 1 and October 15, or first rainfall. NMFS does not anticipate any interdependent or interrelated actions associated with the proposed action.

To improve fish passage, the existing crushed culvert will be replaced with a larger, level, and embedded pipe-arch culvert. In addition, step pool structures will be created at the inlet and outlet of the new culvert. The new Upper Bear Valley Trail culvert will consist of a 32-foot long, approximately 11-foot wide by 7-foot high pipe-arch culvert (see Project Plans in Attachment A). The culvert will be embedded at least 25-percent of the height (1.5- and 2.0-feet, respectively) and require 2.0-feet of overburden. This will require raising the existing roadway grade approximately 0.5-feet. Riprap headwalls and sidewalls will be reconstructed around the inlet and outlet, reusing existing materials. Approximately 253-cubic yards of material will be excavated to accommodate the Upper Bear Valley Trail replacement culvert, generating a net excess of 53-cubic yards that will be reused at the eroding bank repair site discussed below.

Two step-pool structures, each consisting of four channel spanning rock steps (drop structures) and three intervening pools, will be constructed – one starting 17-feet upstream of the culvert and the other starting approximately 16-feet downstream of the culvert. The channel at each of these sites will be over-steepened after culvert replacement and the step-pools would be constructed in a closely spaced, staircase fashion, create a step-pool fishway. Step spacing in the upstream structure is approximately 8-feet, while rock step spacing in the lower structure is approximately 6-feet. At each step, the largest boulders will be located at either end of the structure and will also be keyed into the bank. For both structures, ½ to 1-ton boulders will be used to construct steps.

Bank stabilization and reconstruction is proposed at the bank erosion site located downstream of the culvert replacement site. The goals of the bank stabilization work are to stabilize the Bear Valley Trail that is currently being undermined by the eroding bank, reduce sediment input to Bear Valley Creek, and enhance fish rearing habitat. A bio-engineering approach to bank stabilization is proposed utilizing large wood revetments within the limits of bankfull stage and vegetated fill slopes. There are five primary components associated with the bank repair: 1) constructing a basal log revetment structure (*i.e.*, a group of logs placed at right angles to an eroded bank, and backfilled with soil) within the 35-foot eroded bank section in a fashion where logs are aligned perpendicular to the bank with rootwads exposed to flow; 2) backfilling on top of the log revetment to create a 2:1 (horizontal to vertical) slope between the top of the log revetment up to the existing edge of trail and covering the slope with a willow brush mattress; 3) installing approximately 30-foot log revetments along and parallel to the banks approaching and departing the scallop repair; 4) installing a large log deflector vane at the upstream end of the stabilized banks, to deflect flow away from the repaired bank; and 5) excavating a new low flow channel through an existing gravel bar (for a more detailed Project description, see NPS 2012).

Project machinery (excavators and loaders) will operate from both the top of stream banks and within the stream channel. To avoid turbidity impacts resulting from instream construction, the Project will require dewatering at both Project areas, which is expected to last for a period of up to 21 days at each site. The NPS proposes to construct at the top and bottom of each site two temporary cofferdams to isolate the work areas from flowing water. Once the cofferdams are in place, the NPS will capture and relocate fish and other aquatic organisms from the enclosed Project areas prior to dewatering the channel. During the construction, stream flow at the culvert site will be conveyed by hydraulic pump through pipes adjacent to the channel and discharged below the lower cofferdam; the bank repair site will utilize a similar setup, but instead will use a

gravity flow system. All 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. The NPS proposes implementing best management practices (BMP) aimed at minimizing turbidity during construction, such as including a filtration/settling system to deal with turbid discharge, use of sediment filtration fabric/turbidity curtains, *etc.* (see NPS 2012 for full description of BMPs).

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 two separate locations: the culvert replacement site and the streambank repair site downstream. For the culvert replacement site, the action area is the creek channel and riparian zone spanning from 100 feet above the current culvert to 100 feet below. Similarly, the action area for the bank repair site extends to 100 feet below the approximately 90-foot construction area (principal 30-foot scalloped, failed bank plus the surrounding 30-foot log revetments). The 100-foot buffers surrounding the work areas incorporate additional area that may be impacted by equipment maneuvering or post-completion turbidity effects.

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 Evolutionarily 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 CFR 402.02, which was invalidated by *Gifford Pinchot Task Force v. USFWS*, 378 F.3d 1059 (9th Cir. 2004), amended by 387 F.3d 968 (9th Cir. 2004). 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) coho salmon (*Oncorhynchus kisutch)* ESU, the factors responsible for those conditions, and the intended conservation 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. If the proposed action will negatively affect primary constituent elements (PCEs) of critical habitat in the action area we then assess whether or not this reduction will impact the value of the 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

Juvenile CCC steelhead have been observed in Bear Valley Creek during annual sampling surveys between 2005 and 2007 (NPS 2012). However, during those surveys only one juvenile CCC coho salmon was observed, suggesting that the likelihood of encountering a juvenile coho salmon during Project construction is low. Furthermore, three Bear Valley Creek culverts located downstream of the Project sites are failing, and likely impede the upstream migration of coho salmon (Reichmuth 2012). Therefore, coho salmon are unlikely to be present in the action area and impacts to individual CCC coho salmon will not be analyzed within this biological opinion. However, CCC coho salmon critical habitat does exist within the action area, and will be included in the effects analysis. CCC steelhead critical habitat has not been designated in Bear Valley Creek, including the action area. To summarize, this biological opinion analyzes the effects of the proposed action on the following Pacific salmonids and critical habitat:

1. designated critical habitat for CCC coho salmon (64 FR 24049; May 5, 1999) and

2. threatened CCC steelhead DPS (DPS) (71 FR 834; January 5, 2006).

A. Steelhead Description and Life History

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 1 to 2 years in central California, then spend an additional 1 to 3 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 – July 1 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 degree Celsius (°C). They can survive in water up to 27°C with saturated dissolved oxygen conditions and a plentiful food supply. Fluctuating diurnal water temperatures also aid in survivability of salmonids (Busby *et al*. 1996).

B. Status of Steelhead and Coho Salmon 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). 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 steelhead

Historically, approximately 70 populations[1] of steelhead existed in the CCC steelhead DPS (Spence *et al.* 2008, Spence *et al*. 2012). Many of these populations (about 37) were independent, or potentially independent, meaning they had a high likelihood of surviving for 100 years absent anthropogenic impacts (Bjorkstedt *et al.* 2005). 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 are 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). Some loss of genetic diversity has been documented and attributed to previous among-basin transfers of stock and local hatchery production in interior populations in the Russian River (Bjorkstedt *et al*. 2005). In San Francisco Bay streams, reduced population sizes and fragmentation of habitat has likely also led to loss of genetic diversity in these

[1] 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 interbreed 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).

populations. For more detailed information on trends in CCC steelhead abundance, see: Busby *et al*. 1996, NMFS 1997, Good *et al*. 2005, Spence *et al*. 2008, Williams *et al.* 2011.

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 remain present in most streams throughout the DPS, roughly approximating the known historical range, CCC steelhead likely possess a resilience that is likely to slow their decline relative to other salmonid DPSs or ESUs in worse condition. A 2005 status review concluded that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (Good *et al*. 2005). On January 5, 2006, NMFS issued a final determination that the CCC steelhead DPS is 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[2] (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 and 2009/10 adult CCC steelhead returns shows a decline in returning adults across their range compared to the last ten years (Jahn 2010). The most recent status update concludes that steelhead in the CCC steelhead DPS remains "likely to become endangered in the foreseeable future" (Williams *et al.* 2011), as new and additional information available since Good *et al.* (2005) does not appear to suggest a change in extinction risk. On December 7, 2011, NMFS chose to maintain the threatened status of the CCC steelhead (76 FR 76386).

2. <u>CCC coho salmon critical habitat</u>

The condition of CCC coho salmon 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[3]: 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). Diversion and storage of river and stream flow has dramatically altered the natural hydrologic cycle in many of the streams within

[2] Viable populations have a high probability of long-term persistence (> 100 years).

[3] 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.

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.

C. Additional Threats to CCC Steelhead CCC Coho Salmon Critical Habitat

Global climate change presents an additional potential threat to CCC steelhead and coho salmon critical habitat. Modeling of climate change impacts in California suggests that average summer air temperatures are expected to increase (Lindley *et al*. 2007). Heat waves are expected to occur more often, and heat wave temperatures are likely to be higher (Hayhoe *et al*. 2004). Total precipitation in California may decline; critically dry years may increase (Lindley *et al.* 2007, Schneider 2007). The Sierra Nevada snow pack may decrease by as much as 70 to 90 percent by the end of this century under the highest emission scenarios modeled (Luers *et al*. 2006). Wildfires are expected to increase in frequency and magnitude, by as much as 55 percent under the medium emissions scenarios modeled (Luers *et al*. 2006). Vegetative cover may also change, with decreases in evergreen conifer forest and increases in grasslands and mixed evergreen forests. The likely change in amount of rainfall in Northern and Central Coastal streams under various warming scenarios is less certain, although as noted above, total rainfall across the state is expected to decline. For the California North Coast, some models show large increases (75 to 200 percent) in rainfall amounts while other models show decreases of 15 to 30 percent (Hayhoe *et al*. 2004). Many of these changes are likely to adversely affect CCC steelhead and CCC coho salmon critical habitat by, for example, reducing stream flows during the summer and raising summer water temperatures. Estuaries may also experience changes detrimental to salmonids. Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Scavia *et al.* 2002). In marine environments, ecosystems and habitats important to sub adult and adult salmonids are likely to experience changes in temperatures, circulation and chemistry, and food supplies (Feely *et al.* 2004, Brewer 2008, Osgood 2008, Turley 2008). The projections described above are for the mid to late 21st Century. In shorter time frames, climate conditions not caused by the human addition of carbon dioxide to the atmosphere are more likely to predominate (Cox and Stephenson 2007; Smith *et al.* 2007).

V. ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem in the action area. The 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).

Bear Valley Creek drains a 4.1-square mile watershed in the northern portion of the Olema Valley in western Marin County, California, near the town of Olema. Bear Valley Creek is a perennial tributary to Lagunitas Creek, the largest subwatershed within the Tomales Bay watershed. Tomales Bay is the second largest estuary in California.

A. Status of Listed Species in the Action Area

National Park Service biologists have recently documented juvenile steelhead within Bear Valley Creek (NPS 2012). During electrofishing surveys in 2006 (1.4 km survey length) and 2007 (3.4 km survey), multiple age classes of steelhead were captured in every pool sampled. Sampled sites were located downstream of the action areas. However, steelhead are assumed to be present within both action areas since habitat conditions within those areas are similar to the sites where fish were sampled. Furthermore, steelhead can more readily pass through culverts lower in the system that impede coho salmon passage, and thus are more likely to be encountered within the upper reaches of the watershed (Reichmuth 2012).

B. Status of Salmonid Habitat/Critical Habitat within the Action Area

Much of Bear Valley Creek within the action area is aggraded with fine sediment eroded from upslope hillsides during a large 1982 storm event, and, as a result, habitat complexity is generally lacking in both action areas. Furthermore, Bear Valley Creek no longer exhibits the natural fluvial and geomorphic dynamics (*e.g.*, floodplain access, unconfined channel meandering, *etc*.) necessary for creating and maintaining complex salmonid habitat. Riparian habitat is generally degraded where Bear Valley Creek Trail parallels the creek, especially upstream of the culvert site where the channel is confined against the west hillside by the road.

C. Factors Affecting Species Environment within the Action Area

In the upper action area (culvert site), the stream channel is impacted by the alignment and function of the current culvert. The culvert is currently impassable to upstream migrating juvenile salmonids, and is a barrier to adult steelhead during all but high flow conditions. Furthermore, the current culvert was installed at an angle to the natural channel (*i.e.*, not aligned straight with the stream channel), which has caused streambank erosion adjacent to the culvert. Finally, the culvert is structurally failing, and could cause the release of the large volume of dirt over the culvert if it in fact failed.

The action area of the Project's bank repair portion contains high levels of fine sediment emanating from the eroding stream bank. Also, the close proximity of Bear Valley Trail to the action area has likely constrained the natural meandering pattern of Bear Valley Creek, inhibiting the natural fluvial and geomorphic processes that create and maintain instream aquatic habitat.

D. Previous Section 7 Consultations and Section 10 Permits in the Action Area

No previous section 7 consultations have occurred within the Project action area. NMFS concluded formal consultation under section 7 of the Endangered Species Act for excavation and dredging activities on Bear Valley Creek and Silver Hills Creek, Marin County, California, during July 2010 (PCTS reference 2009/02916). However, the action area for that consultation was located near the confluence of Bear Valley Creek and Lagunitas Creek several miles downstream of the current project, and thus the two action areas do not overlap.

VI. EFFECTS OF THE PROPOSED ACTION

A. Fish Relocation 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. Past fish sampling in mainstem Bear Valley Creek has documented average steelhead densities of eight (2007 survey) and 12 (2006) steelhead per pool sampled. Thus, using the assumption that up to three pools likely exist within each of the Project's two action areas (a reasonable assumption given the channel width) and that small numbers of steelhead may reside in adjacent riffle and run habitat, NMFS anticipates no more than 100 steelhead may be present within both dewatered sections combined.

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. Therefore, NMFS anticipates that no more than one juvenile steelhead may be killed during capture for relocation.

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 one percent of the total present at the Project site). Similar to above, NMFS estimates no more than one juvenile steelhead will be killed during dewatering.

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 (within approximately 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, short-lived.

C. Turbidity

Disturbing the streambed or bank during cofferdam construction and channel excavation/construction activities 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 interact with the newly contoured stream bank and culvert worksite. 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. Initial turbidity increases would most likely be noticed after the first storm event as high flows push newly mobilized sediment downstream. 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 (nephelopmetric turbidity units) downstream of newly replaced culverts increased an average of 19 percent (%) 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 one percent. 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 were less than 20 NTU.[4] 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. Critical Habitat Effects

Bear Valley Creek is designated critical habitat for CCC coho salmon. PCEs of designated critical habitat for CCC coho salmon in the project area include sites for migration, spawning and rearing. Essential features of designated critical habitat for coho salmon in freshwater consist of adequate (1) substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food, (8) riparian vegetation, (9) space, and (10) safe passage conditions (64 FR 24049). The potential effects of this project to designated critical habitat associated with construction include the temporary loss of rearing sites during dewatering and minor, short-term disturbance of the bed and banks. As discussed above, fish within the dewatered area will be relocated and sufficient habitat exists adjacent to the work site to support these individuals. The temporary loss of 300 linear feet of channel at each site for a three week period at each site is not expected to adversely affect essential physical or biological features associated with CCC coho salmon critical habitat, because the site is expected to fully return to its previous naturally functioning condition after the water diversion system is removed.

Upon completion of construction the proposed project will stabilize the eroding bank with habitat-forming bioengineering material (*e.g.*, large woody debris), improve riparian vegetation through stream bank tree planting, and restore adult and juvenile salmonid passage conditions through the road crossing. As noted above, the adjacent dirt road (Bear Valley Trail) on the west stream bank have limited the stream's natural geomorphic processes in the action area. The proposed project will help to maintain this condition, which restricts the stream's ability to efficiently create and maintain complex instream habitat. However, the continuation of some impaired stream function is not expected to reduce the value of critical habitat for coho salmon in

[4] Although NF Anker Creek turbidity below the newly replaced culvert was greater than 100 NTUs, the measured turbidity was nearly the same as the measured turbidity entering the culvert.

the action area because Bear Valley Creek naturally has low value as coho salmon habitat. Habitat is notably different than nearby coho-inhabited streams (*e.g.,* Olema Creek and Lagunitas Creek) (Reichmuth 2012). For example, substrate size and composition is notably different between the Lagnitas/Olema creeks and Bear Valley Creek, as are the gradient and floodplain characteristics. Based on its substrate size, gradient, and floodplain characteristics, Bear Valley Creek has little value as coho salmon habitat.

E. Beneficial Aspects of Project

The current failing culvert hinders upstream passage by adult steelhead, while the chronically eroding stream bank introduces sediment into Bear Valley Creek. Addressing both sites will improve both juvenile and adult fish passage, as well as the quantity and quality of instream habitat available to adult and juvenile steelhead.

VII. CUMULATIVE EFFECTS

Cumulative effects are defined in 50 CFR § 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation." Any future federal actions will be reviewed through separate section 7 consultation processes and not considered here.

NMFS does not anticipate any future State or private activities that are reasonably certain to occur within the action area. All of the Bear Valley Creek watershed is on Federal Parklands and activities in the watershed affecting the creek would likely require section 7 consultation under the ESA.

VIII. INTEGRATION AND SYNTHESIS

CCC steelhead are listed as threatened under the ESA. Degraded freshwater habitat is a primary stressor to both the DPS population at large, as well as the Bear Valley Creek population of steelhead. High sediment loads, impaired passage, and impaired channel function simplify instream habitat in Bear Valley Creek, and have likely depressed steelhead abundance.

The Project will likely directly impact individual CCC steelhead, and CCC coho salmon critical habitat. The number of impacted fish will likely be small (*i.e.,* less than 100 fish) due to the currently degraded rearing habitat conditions within the action area and a construction schedule that avoids adult and smolt migration periods. The vast majority of these fish will only experience impacts resulting from capture and relocation actions, which generally are limited to minor behavioral stresses (*e.g.,* short-term displacement from preferred habitat). Mortality rates during relocation and dewatering activities are likely very low, so the risk of mortality to any encountered salmonid is low. No more than two juvenile steelhead are likely to be killed.

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 steelhead DPS. It is unlikely that

the small potential loss of juveniles in 2012 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 population in Bear Valley Creek.

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 coho salmon critical habitat during the three-week work window, specifically impacting juvenile rearing habitat. However, the Project will ultimately improve critical habitat condition within the action area by abating chronic stream bank erosion and improving passage conditions. 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, 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. The impaired stream function resulting from the road/trail confining the channel in the action area is unlikely to significantly impair coho salmon critical habitat, since Bear Valley Creek habitat is largely unsuitable for coho salmon spawning and rearing. The slight loss of stream function likely impacts steelhead production, but given the recent capture of numerous, healthy steelhead during recent sampling in Bear Valley Creek, the effect impaired stream function has on the steelhead population is likely small. Finally, given that Bear Valley Creek is but a small, second order tributary within the larger CCC steelhead DPS, the small population-level effect realized within the creek is unlikely to have an appreciable effect at the larger DPS level.

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.

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 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 its designees to adhere to the terms and conditions of the incidental take statement, 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 actions 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

NMFS anticipates that no more than 100 juvenile steelhead will be captured and relocated from the action area during the construction period (June 15, 2012, through October 15, 2012). 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.

3. Provide NMFS with a fish relocation report.

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 NPS 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. 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.

   c. 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.

   d. 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 NPS will rectify conditions that adversely affect salmonids or their habitat in a timely manner, if they occur.

3. The following term and condition implements reasonable and prudent measure 3:

   a. The Corps must ensure that NPS provides a written report to NMFS by January 15 of the year following construction of the project. The report must be provided to NMFS Santa Rosa Area Office, Attention: Supervisor of Protected Resources Division, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528. The report must contain, at a minimum, the following information:

      i. Construction related activities -- The report must include the dates construction began and was completed; a discussion of any unanticipated effects or unanticipated levels of effects on salmonids, a description of any and all measures taken to minimize those unanticipated effects and a statement as to whether or not the unanticipated effects had any effect on ESA-listed fish; the number of salmonids killed or injured during the project action; and photographs taken before, during, and after the activity from photo reference points.

      ii. Fish Relocation -- The report must include a description of the location from which fish were removed and the release site including photographs; the date and time of the relocation effort; a description of the equipment and methods used to collect, hold, and transport salmonids; if an electrofisher was used for fish collection, a copy of the logbook must be included; the number of fish relocated by species; the number of fish injured or killed by species and a brief narrative of the circumstances surrounding ESA-listed fish injuries or mortalities; and a description of any problems which may have arisen during the relocation activities and a statement as to whether or not the activities had any unforeseen effects.

XI. REINITIATION NOTICE

This concludes formal consultation for the Corps proposed permitting of culvert and bank repair within Bear Valley Creek, Marin County, California. 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 must be reinitiated immediately.

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