

FOR CONTRACT NO.: 01-397554

INFORMATION HANDOUT

WATER QUALITY

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION**

WDID No. 1B05153WNME

PERMITS

STATE OF CALIFORNIA DEPARTMENT OF FISH AND GAME

NOTIFICATION NO.R1-09-0211

UNITED STATES ARMY CORPS OF ENGINEERS

NON-REPORTING NATIONWIDE 404 PERMIT

California Regional Water Quality Control Board
North Coast Region

William R. Massey, Chairman

www.waterboards.ca.gov/northcoast

5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403

Phone: (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135



Arnold
Schwarzenegger
Governor

Dan Skopiec
Acting Secretary

April 18, 2006

Mr. Gary Berrigan
CDOT Eureka
P.O. Box 3700
Eureka, CA 95501

Dear Mr. Berrigan:

Subject: Amendment to the Clean Water Act Section 401 Certification (Water Quality Certification) for the Confusion Hill Bypass Project

File: CDOT - Hwy 101, Confusion Hill Bypass
WDID No. 1B05153WNME

On March 6, 2006, we received your letter requesting amendments to Additional Conditions Nos. 4 and 13 of the Clean Water Act Section 401 Water Quality Certification (Water Quality Certification) that was issued for the Confusion Hill Bypass Project on February 16, 2006. The purpose of the project is to provide a safe and reliable transportation route around the Confusion Hill landslide area by relocating the highway from the east side of the South Fork Eel river to the west side. Your letter details potential problems with some of the language contained in Additional Conditions Nos. 4 and 13 and requests that these conditions be amended slightly to better clarify their intent.

Additional Condition No. 4 requires submittal of a Storm Water Pollution Prevention Plan (SWPPP) at least 30 days prior to the start of the project. Your letter recognizes the Regional Water Board's authority to require submittal of the SWPPP at least 30 days prior to the commencement of significant soil disturbance activities and the need for Regional Water Board staff to have adequate time to review the SWPPP and require changes. However, the requirement to submit the SWPPP prior to the start of the project is problematic because the time constraints associated with the authorized work window requires that CDOT begin staging and preparation activities well in advance of any significant soil disturbing activities. Regional Water Board staff recognize that Additional Condition No. 4 does not clearly define the start of the project and this condition shall be amended.

Your letter also suggests that the term "operation" in Additional Condition No. 13 is ambiguous. Additional Condition No. 13 states that fueling, lubrication, maintenance, operation, storage and staging of vehicles and equipment shall be outside waters of the United States and shall not result in a discharge or a threatened discharge to waters of the United States. Regional Water Board staff recognize this project involves certain authorized operations within waters of the United

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States. Regional Water Board staff agree that including the term "operation" in this condition is not appropriate for this project.

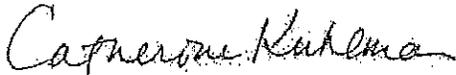
This letter serves as an amendment to the Water Quality Certification issued for the Confusion Hill Bypass project on February 16, 2006, revising and replacing Additional Condition Nos. 4 and 13 as outlined below:

Additional Condition No. 4: A copy of the Storm Water Pollution Prevention Plan (SWPPP) shall be submitted to the attention of Regional Water Board staff Dean Prat at least 30 days prior to the start of soil disturbance activities or other activities that could affect water quality.

Additional Condition No. 13: Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall be outside waters of the United States and operation of vehicles and equipment shall not result in a discharge or a threatened discharge to waters of the United States. At no time shall the applicant use any vehicle or equipment that leaks any substance that may impact water quality.

I hereby issue an amendment to Additional Condition Nos. 4 and 13 of the Water Quality Certification Order (WDID No. 1B05153WNMB) for the Highway 101, Confusion Hill Bypass Project and certify that the remainder of the Water Quality Certification sections of the Order are still valid. If you have any questions or comments, please contact Dean Prat at (707) 576-2801.

Sincerely,



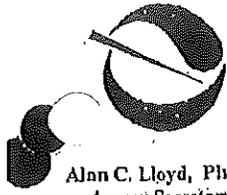
Catherine E. Kuhlman
Executive Officer

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cc: Ms. Jane Hicks, U.S. Army Corps of Engineers, Regulatory Functions, 333 Market Street,
San Francisco, CA 94599
U.S. Army Corps of Engineers, District Engineer, P.O. Box 4863, Eureka, CA 95502
Ms. Susan Leroy, CDOT Eureka, P.O. Box 3700, Eureka, CA 95501

California Regional Water Quality Control Board
North Coast Region

John W. Corbett, Chairman



Alan C. Lloyd, Ph.D.
Agency Secretary

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Arnold
Schwarzenegger
Governor

February 16, 2006

Ms. Susan Leroy
CDOT Eureka
1656 Union Street
Eureka, CA 95501

Dear Ms. Leroy:

Subject: Issuance of Clean Water Act Section 401 Certification (Water Quality Certification) for the Confusion Hill Bypass Project

File: CDOT – Hwy 101, Confusion Hill Bypass
WDID No. 1B05153WNME

This Order by the California Regional Water Quality Control Board, North Coast Region (Regional Water Board), is being issued pursuant to Section 401 of the Clean Water Act (33 USC 1341), in response to your request, on behalf of the California Department of Transportation (applicant), for Water Quality Certification for activities related to the Confusion Hill Bypass Project in Mendocino County. On November 29, 2005, the Regional Water Board received your application and a \$500.00 processing fee. On December 29, 2005, we sent you a letter stating the application was incomplete. You submitted additional information during the first week of January 2006, including a Notice of Determination and maps that show the area of potential impact from the project is larger than the area that was used to calculate the initial fee. On January 11, 2006, we deemed the application complete and posted information describing the project on the Regional Water Board's website for a 21-day public review and comment period. We did not receive any comments on this project. On January 12, 2006, we received an additional \$6510.00 that covers the remaining balance of the application fee.

Project Description: The project is located approximately 18.5 miles south of Garberville and 8 miles north of Leggett. Highway 101 currently bisects an ancient and active rockslide in the area known as Confusion Hill. The purpose of the project is to provide a safe and reliable transportation route around the landslide area by relocating the highway from the east side of the South Fork Eel River to the west side. Relocating the highway requires construction of two new bridges and a new section of highway between the new bridges. The existing section of highway will be de-commissioned following completion of the bypass.

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The south bridge will be a segmental, cast-in-place, pre-stressed box girder structure. The south bridge will be 43 feet wide, 1355 feet long, and 255 feet above the center of the river channel. The foundation for the south bridge will be constructed on cast-in-drilled-hole piles. The north bridge will be a cast-in-place pre-stressed box girder structure with pier shaft foundations. The north bridge will be 43 feet wide, 580 feet long, and 150 feet above the center of the river. Both bridges are designed such that all piers and associated foundations will be located above the 100-year flood elevation of the river and the new section of highway will be at least 150-feet above the river.

Temporary access roads and temporary bridges will be constructed at each end of the project to allow access for personnel and various construction equipment including cranes, drill rigs, and excavation equipment. The applicant has identified two 1.5-acre areas near each end of the project as places where activities related to construction of access roads and temporary bridges could impact waters of the United States. The temporary bridges will be constructed 3 feet above the elevation of the 100-year storm event or they will be designed to withstand the 100-year storm event and would be overtopped at the elevation of a 50-year storm event. Activities related to construction of the temporary bridges include rotating, vibrating, drilling or a combination of these methods to install sheet piles or casings and drilling holes into the bedrock to build support piers for the temporary bridges.

A seasonal temporary bridge may also be installed near the south bridge. A railroad flatcar or similar bridge deck will be placed on river rock abutments; or wooden, steel or concrete piles will be placed in the channel to support a wood deck. The river rock abutments may extend several feet into the channel. All the bridges are designed to allow for fish passage and passage for recreational boating.

A portable concrete batch-plant will be located near the southern end of Route 271 at an elevation above the 100-year storm event. A concrete pipeline or "slick line" may be used to transport concrete from the batch plant. A typical slick line is made of 6-inch diameter steel pipe; a secondary containment pipe or trough would be used to contain any concrete spills. All concrete wastes and water that contacts fresh concrete must be fully contained and disposed of properly in order to prevent any discharge to surface water or ground water.

All permanent and temporary impacts to waters of the United States from this project will occur within two designated 1.5-acre areas; however, the actual area of impact to waters of the United States is anticipated to be much smaller. The area of anticipated temporary impacts to waters of the United States from access road and temporary bridge placement and removal activities will be approximately 0.16-acre at each end of the project. All support piers installed for the temporary bridges will be removed to the level of bedrock. The only area of permanent impact to waters of the United States is anticipated to be from the sections of temporary bridge piers that will remain below the top of bedrock following removal of the temporary bridges. The area of permanent impact to waters of the United States from these pier remnants will be less than 0.01 acre. The new bridges and new highway section will not permanently impact waters of the United States.

The new section of highway will be placed in a large through-cut. Approximately 385,000 cubic yards of excess earthen material will be generated by excavation of the through-cut. The applicant has identified five areas along Highway 101 near the north end of the project that are above the elevation of the 100-year storm event where permanent disposal of the excess excavation material will occur. Best Management Practices (BMPs) for sediment and turbidity control will be implemented at the disposal areas during construction activities and all the disposal areas will be planted with native shrubs upon completion of the project.

The proposed project will not affect any wetlands. Existing vegetation will be preserved to the maximum extent possible and all disturbed areas will be seeded and replanted. To compensate for potential impacts this project may have on salmonids, a culvert modification project will be implemented on Red Mountain Creek to restore fish passage and provide access to historic spawning and rearing habitat.

Receiving Waters:	South Fork Eel River in the Benbow Hydrologic Subarea No. 111.32.
Filled or Excavated Area:	Area Temporarily Impacted: 0.32 acres of stream bank and stream channel Area Permanently Impacted: 0.01 acre of stream channel
Total Linear Impacts:	Length temporarily impacted: 150 feet Length permanently impacted: none

- Federal Permit: U.S. Army Corps of Engineers Nationwide Permit No. 33
- Compensatory Mitigation: To compensate for potential impacts to salmonids as a result of the Confusion Hill Bypass project construction activities, the applicant will fund a project to improve fish passage through the culvert at Red Mountain Creek. Highway 101 crosses Red Mountain Creek at the north end of the project where the new alignment will conform to the existing alignment. During a wide range of typical stream flows, the existing culvert at Red Mountain Creek prevents salmonids from accessing historic spawning and rearing habitat located upstream of the culvert. The fish passage improvement project will incorporate National Marine Fisheries Service and California Department of Fish and Game (CDF&G) fish passage criteria. The mitigation project is subject to approval by those agencies.
- Modifications to improve fish passage through the existing culvert will likely include installation of concrete/rock weirs (baffles) in the bottom of the culvert to reduce flow velocities through the culvert. The baffles are likely to be composed of large rocks and concrete. The existing road leading to the culvert outlet will be used to gain access to through the culvert and inlet area.
- Noncompensatory Mitigation: Noncompensatory mitigation for this project includes the use of BMPs for waste handling, sediment and turbidity control, and heavy equipment use and concrete use near a waterway. The applicant has applied for a Lake or Streambed Alteration Agreement (1600 Permit) from the CDF&G.
- CEQA Compliance: The California Department of Transportation, as the lead agency for CEQA, certified an Environmental Impact Report (SCH# 200405201) for this project on December 15, 2005.
- Standard Conditions: Pursuant to Title 23, California Code of Regulations, Section 3860 (23 CCR 3860), the following three standard conditions shall apply to this project:
- 1) This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Section 13330 of the California Water Code and 23 CCR 3867.
 - 2) This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy

Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to 23 CCR 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

- 3) The validity of any nondenial certification action (actions 1 and 2) shall be conditioned upon total payment of the full fee required under 23 CCR 3833, unless otherwise stated in writing by the certifying agency.

Additional Conditions:

Pursuant to 23 CCR 3859(a), the applicant shall comply with the following additional conditions:

- 1) The applicant shall notify the Regional Water Board in writing at least five working days (working days are Monday – Friday) prior to the commencement of the project, with details regarding the schedule of operations, to allow staff the opportunity to be present onsite and to answer any public inquiries that may arise regarding the project.
- 2) All conditions listed in this Water Quality Certification must be included in the Plans and Specifications prepared by the applicant for the Contractor. All conditions shall be implemented according to the submitted application and this Water Quality Certification.
- 3) A copy of this permit must be provided to the contractor and all subcontractors conducting the work, and a copy must be in their possession at the work site. It is the applicant's responsibility to ensure that the contractor and all subcontractors are provided a copy of this permit.
- 4) A copy of the Storm Water Pollution Prevention Plan (SWPPP) shall be submitted to the attention of Regional Water Board staff Dean Prat at least 30 days prior to the start of the project.
- 5) The Red Mountain Creek mitigation project shall be completed by October 31, 2010. The applicant shall notify the Regional Water Board in writing at least five working days (working days are Monday – Friday) prior to the commencement of the Red Mountain Creek mitigation project, with details regarding the schedule of operations, to allow staff the opportunity to be present onsite and to answer any public inquiries that may arise regarding the project.

- 6) The Red Mountain Creek mitigation project shall comply with all conditions in this Water Quality Certification.
- 7) Adequate BMPs for sediment and turbidity control shall be implemented and in place prior to, during, and after construction in order to ensure that no silt or sediment enters surface waters.
- 8) If, at any time, an unauthorized discharge to surface waters occurs, or any water quality problem arises, the project shall cease immediately and Regional Water Board staff shall be notified promptly.
- 9) No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete washings, oil or petroleum products, or other organic or earthen material from any construction or associated activity of whatever nature, other than that authorized by this permit, shall be allowed to enter into or be placed where it may be washed by rainfall into waters of the State.
- 10) All materials used for cleaning concrete from tools and equipment, and any wastes generated by this activity, shall be adequately contained to prevent contact with soil and surface water and shall be disposed of properly.
- 11) When operations are completed, any excess material or debris shall be removed from the work area and disposed of properly. No rubbish shall be deposited within 150 feet of the high water mark of any stream.
- 12) If construction dewatering is found to be necessary, the applicant will use a method of water disposal other than disposal to surface waters (such as land disposal) or the applicant shall apply for coverage under the General Construction Dewatering Permit and receive notification of coverage to discharge to surface waters.
- 13) Fueling, lubrication, maintenance, operation, storage and staging of vehicles and equipment shall be outside of waters of the United States and shall not result in a discharge or a threatened discharge to waters of the United States. At no time shall the applicant use any vehicle or equipment, which leaks any substance that may impact water quality.

- 14) Project activities shall comply with provisions in the North Coast Region Water Quality Control Plan (Basin Plan).
- 15) The project site may be visited and assessed by Regional Water Board staff to document compliance with this certification.
- 16) All work within waters of the United States shall not commence until May 15th and shall be completed prior to October 31st.
- 17) All activities, BMPs, and associated mitigation will be conducted as described in this Permit and the application submitted by the applicant for this project.
- 18) The applicant shall take photos of all areas disturbed by project activities, including all excess materials disposal areas, after the first rainfall event that generates visible runoff from these areas in order to demonstrate that erosion control measures have been successful. A report containing these photos shall be submitted within 60 days of the first rainfall event that generates runoff from the disturbed areas.
- 19) Visual observations of the South Fork Eel River shall be conducted whenever a project activity has the potential to mobilize sediment and increase the turbidity of the South Fork Eel River. Field turbidity measurements shall be collected whenever a project activity causes turbidity of the South Fork Eel River to be increased above background concentrations in order to demonstrate compliance with receiving water limitations.

Whenever turbidity in the South Fork Eel River is increased above background as a result of project activities, turbidity measurements shall be collected upstream (within 50 feet) of project activities (background) and downstream (within 100 feet) of the source of turbidity. The frequency of turbidity monitoring shall be a minimum of every hour during periods of increased turbidity and shall continue until turbidity measurements demonstrate compliance with receiving water limitations and turbidity levels are no longer increasing as a result of project activities. If turbidity levels are greater than 20 percent above background 100 feet downstream of the source of turbidity, all necessary steps shall be taken to install, repair, and/or modify BMPs to control the source(s) of sediment and the overall distance from the source of

turbidity to the downstream extent of the increased turbidity (20 percent above background) shall be measured.

Turbidity monitoring results shall be reported to appropriate Regional Water Board staff by telephone within 1 hour of taking any turbidity measurement that shows turbidity levels are 20 percent above background 100 feet or more downstream of the source of turbidity. All recorded visual observation and all field turbidity measurements collected for the purpose of this condition shall be submitted in a report to the Regional Water Board by November 15th each year and within 45 days of project completion.

- 20) This Order is not transferable. In the event of any change in control of ownership of land presently owned or controlled by the applicant, the applicant shall notify the successor-in-interest of the existence of this Order by letter and shall forward a copy of the letter to the Regional Water Board at the above address.

To discharge dredged or fill material under this Order, the successor-in-interest must send to the Regional Water Board Executive Officer a written request for transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, address, and telephone number of the person(s) responsible for contact with the Regional Water Board. The request must also describe any changes to the Project proposed by the successor-in-interest or confirm that the successor-in-interest intends to implement the Project as described in this Order.

Water Quality Certification: I hereby issue an order [23 CCR Subsection 3831(e)] certifying that any authorized discharge from the Confusion Hill Bypass Project, (Facility No. 1B05153WNME) will comply with the applicable provisions of sections 301 ("Effluent Limitations"), 302 ("Water Quality Related Effluent Limitations"), 303 ("Water Quality Standards and Implementation Plans"), 306 ("National Standards of Performance"), and 307 ("Toxic and Pretreatment Effluent Standards") of the Clean Water Act [33 USC Subsection 1341 (a)(1)], and with other applicable requirements of State law. This discharge is also regulated under State Water Resources Control Board Order No. 2003 - 0017 - DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification" which requires compliance with all conditions of this Water Quality Certification.

Except as may be modified by any preceding conditions, all certification actions are contingent on: a) the discharge being limited and all proposed mitigation being completed in strict compliance with the applicant's project description, and b) compliance with all applicable requirements of the Regional Water Board's Water Quality Control Plan for the North Coast Region (Basin Plan).

Expiration:

The authorization of this certification for any dredge and fill activities expires on February 16, 2011. Conditions and monitoring requirements outlined in this certification are not subject to the expiration date outlined above, and remain in full effect and are enforceable.

Please notify Dean Prat of our staff at (707) 576-2801 prior to construction (pursuant to Additional Condition No. 1 above) so that we can answer any public inquiries about the work.

Sincerely,



Catherine Kuhlman
Executive Officer

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Enclosure:

State Water Resources Control Board Order No. 2003-0017 - DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification"

cc: Ms. Jane Hicks, U.S. Army Corps of Engineers, Regulatory Functions, 333 Market Street,
San Francisco, CA 94599
U.S. Army Corps of Engineers, District Engineer, P.O. Box 4863, Eureka, CA 95502

STATE WATER RESOURCES CONTROL BOARD

WATER QUALITY ORDER NO. 2003 - 0017 - DWQ

STATEWIDE GENERAL WASTE DISCHARGE REQUIREMENTS FOR
DREDGED OR FILL DISCHARGES THAT HAVE RECEIVED
STATE WATER QUALITY CERTIFICATION (GENERAL WDRs)

The State Water Resources Control Board (SWRCB) finds that:

1. Discharges eligible for coverage under these General WDRs are discharges of dredged or fill material that have received State Water Quality Certification (Certification) pursuant to federal Clean Water Act (CWA) section 401.
2. Discharges of dredged or fill material are commonly associated with port development, stream channelization, utility crossing land development, transportation water resource, and flood control projects. Other activities, such as land clearing, may also involve discharges of dredged or fill materials (e.g., soil) into waters of the United States.
3. CWA section 404 establishes a permit program under which the U.S. Army Corps of Engineers (ACOE) regulates the discharge of dredged or fill material into waters of the United States.
4. CWA section 401 requires every applicant for a federal permit or license for an activity that may result in a discharge of pollutants to a water of the United States (including permits under section 404) to obtain Certification that the proposed activity will comply with State water quality standards. In California, Certifications are issued by the Regional Water Quality Control Boards (RWQCB) or for multi-Region discharges, the SWRCB, in accordance with the requirements of California Code of Regulations (CCR) section 3830 et seq. The SWRCB's water quality regulations do not authorize the SWRCB or RWQCBs to waive certification, and therefore, these General WDRs do not apply to any discharge authorized by federal license or permit that was issued based on a determination by the issuing agency that certification has been waived. Certifications are issued by the RWQCB or SWRCB before the ACOE may issue CWA section 404 permits. Any conditions set forth in a Certification become conditions of the federal permit or license if and when it is ultimately issued.
5. Article 4, of Chapter 4 of Division 7 of the California Water Code (CWC), commencing with section 13260(a), requires that any person discharging or proposing to discharge waste, other than to a community sewer system, that could affect the quality of the waters of the State,¹ file a report of waste discharge (ROWD). Pursuant to Article 4, the RWQCBs are required to prescribe waste discharge requirements (WDRs) for any proposed or existing discharge unless WDRs are waived pursuant to CWC section 13269. These General WDRs fulfill the requirements of Article 4 for proposed dredge or fill discharges to waters of the United States that are regulated under the State's CWA section 401 authority.

¹ "Waters of the State" as defined in CWC Section 13050(e)

IT IS HEREBY ORDERED that WDRs are issued to all persons proposing to discharge dredged or fill material to waters of the United States where such discharge is also subject to the water quality certification requirements of CWA section 401 of the federal Clean Water Act (Title 33 United States Code section 1341), and such certification has been issued by the applicable RWQCB or the SWRCB, unless the applicable RWQCB notifies the applicant that its discharge will be regulated through WDRs or waivers of WDRs issued by the RWQCB. In order to meet the provisions contained in Division 7 of CWC and regulations adopted thereunder, dischargers shall comply with the following:

1. Dischargers shall implement all the terms and conditions of the applicable CWA section 401 Certification issued for the discharge. This provision shall apply irrespective of whether the federal license or permit for which the Certification was obtained is subsequently deemed invalid because the water body subject to the discharge has been deemed outside of federal jurisdiction.
2. Dischargers are prohibited from discharging dredged or fill material to waters of the United States without first obtaining Certification from the applicable RWQCB or SWRCB.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on November 19, 2003.

AYE: Arthur G. Baggett, Jr.
Peter S. Silva
Richard Katz
Gary M. Carlton
Nancy H. Sutley

NO: None.

ABSENT: None.

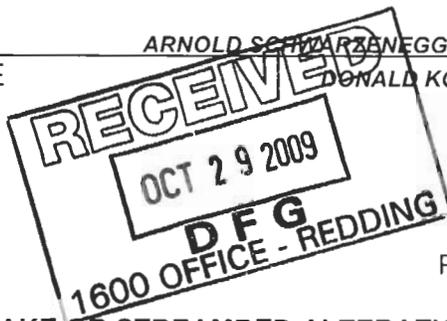
ABSTAIN: None.


Debbie Irvin
Clerk to the Board



California Natural Resources Agency
 DEPARTMENT OF FISH AND GAME
 Northern Region
 601 Locust Street, Redding, CA 96001
www.dfg.ca.gov

ARNOLD SCHWARZENEGGER, Governor
 DONALD KOCH, Director



NOTIFICATION NO. R1-09-0211

Page 1 of 10

AGREEMENT REGARDING PROPOSED LAKE OR STREAMBED ALTERATION

THIS AGREEMENT, entered into between the State of California, Department of Fish and Game, hereinafter called DFG, and **Mr. Steven Blair, representing the California Department of Transportation**, hereinafter jointly and severally called the "Responsible Party," is as follows:

WHEREAS, pursuant to Division 2, Chapter 6 of the California Fish and Game Code (Code), the Responsible Party, on **June 16, 2009**, notified DFG of the intention to divert or obstruct the natural flow of, or change the bed, channel, or bank of, or use material from the streambed of, the following waters: **Red Mountain Creek, tributary to the South Fork Eel River**, in the County of **Mendocino**. These waters are located in **Section 17, T24N, R17W, Mount Diablo Base and Meridian**, on the **Noble Butte and Piercy USGS 7.5-minute quadrangles**; and

WHEREAS, DFG has determined that without implementation of the conditions contained within this Agreement, such operations may substantially adversely affect existing fish and wildlife resources including, but not limited to: **Chinook salmon (*Oncorhynchus tshawytscha*)**, **coho salmon (*O. kisutch*)**, **steelhead trout (*O. mykiss*)**, **foothill yellow-legged frog (*Rana boylei*)**, other non-game and game fishes, amphibians, reptiles, aquatic invertebrates, mammals, birds, and other aquatic and riparian species.

THEREFORE, DFG hereby proposes measures to protect fish and wildlife resources during the Responsible Party's work. The Responsible Party hereby agrees to accept and conduct all activities in accordance with the following:

ADMINISTRATIVE PROVISIONS:

- 1) If the Responsible Party's work changes from that stated in the notification specified above, this Agreement is no longer valid and a new notification shall be submitted to DFG. Failure to comply with the provisions of this Agreement and with other pertinent Code sections, including but not limited to Sections 5650, 5652, 5901, 5937, and 5948, may result in prosecution.
- 2) Nothing in this Agreement authorizes the Responsible Party to trespass on any land or property, nor does it relieve the Responsible Party of responsibility for compliance with applicable federal, state, or local laws or ordinances. A consummated Agreement does not constitute DFG endorsement of the proposed operation, or assure DFG's concurrence with permits required from other agencies.
- 3) The provisions contained in this Agreement constitute the limit of activities agreed to and resolved by this Agreement. The signing of this Agreement does not imply that the Responsible Party is precluded from doing other activities at the site. However, activities not specifically agreed to and resolved by this Agreement shall be subject to separate notification pursuant to Code Section 1600 *et seq.*
- 4) In accordance with Code Section 1605, the Responsible Party may request one extension of this Agreement, provided that the request is made in writing prior to the expiration of its original

term. DFG shall grant the extension if the appropriate extension fee is paid unless it determines that the Agreement requires modification because the measures contained in the Agreement no longer protect the fish and wildlife resources because the activity may substantially adversely affect. If the Responsible Party fails to request the extension prior to the Agreement's termination then the Responsible Party shall submit a new notification with fees and required information to DFG. Any activity conducted under an expired Agreement is a violation of Code Section 1600 *et seq.*

5) The Responsible Party shall provide a copy of this Agreement to all contractors, subcontractors, and the Responsible Party's project supervisors. Copies of the Agreement and any amendment thereto shall be readily available at work sites at all times during periods of active work and must be presented to any DFG personnel, or personnel from another agency upon demand.

6) DFG reserves the right to enter the project site at any time to ensure compliance with measures and/or monitoring of this Agreement, provided DFG: a) provides 24 hours advance notice; and b) allows the Responsible Party or representatives to participate in the inspection and/or monitoring. This condition does not apply to DFG enforcement personnel.

7) All provisions of this Agreement remain in force throughout the term of the Agreement. Any provisions of the Agreement may be amended or the Agreement may be terminated at any time provided such amendment and/or termination are agreed to in writing by both parties. Mutually-approved amendments become part of the original Agreement and are subject to all previously negotiated provisions.

8) It is understood DFG will enter into this Agreement for purposes of establishing protective features for fish and wildlife. The decision to proceed with the project is the sole responsibility of the Responsible Party. It is further agreed all liability and/or incurred cost related to or arising out of the Responsible Party's project and the fish and wildlife protective measures of this Agreement, remain the sole responsibility of the Responsible Party. The Responsible Party agrees to hold harmless the State of California and DFG against any related claim made by any party or parties for personal injury or any other damages.

9) This Agreement is not intended as an approval of a project or of specific project features by DFG. Independent review and recommendations will be provided by DFG as appropriate on those projects where local, state, or federal permits or other environmental reports are required.

10) Suspension and Cancellation. DFG may suspend or cancel this Agreement if DFG determines that circumstances warrant suspension or cancellation. The circumstances that might warrant suspension or cancellation include, but are not limited to, the following:

a) Failure by the Responsible Party, or his/her employees, agents, representatives, contractors, and/or subcontractors, to comply with any of the terms and measures of this Agreement.

b) DFG determines that the information the Responsible Party provided to DFG to develop this Agreement, or the information contained in a notification, is incomplete or inaccurate.

c) DFG obtains new information that shows the work authorized by this Agreement could substantially adversely affect fish and wildlife resources, notwithstanding Responsible Party's compliance with the Agreement.

d) DFG determines that measures to protect fish and wildlife resources different from those included in this Agreement are necessary to protect those resources.

e) There is a substantial change in conditions. For purposes of this Agreement, "substantial change in conditions" shall mean one or more of the following: 1) the work described in this Agreement is substantially changed; 2) conditions affecting fish and wildlife resources substantially change; and/or 3) the work conducted under this Agreement have adversely affected, or will adversely affect, fish and wildlife resources, notwithstanding that Responsible Party has complied, or will comply with, the terms and measures of this Agreement.

Scope of Suspension. At the discretion of DFG, any action to suspend this Agreement may be limited in scope to address the specific problem or problems resulting in the suspension. Hence, DFG may limit the suspension to specified work or specified areas. DFG shall notify Responsible Party of any suspension of the Agreement, or any part thereof, in writing. Any suspension shall take effect immediately upon receipt of such notice by Responsible Party, or in accordance with the instructions contained in the notice. Such notice will identify the reason or reasons for the suspension, the actions necessary to correct the problem, and the scope of the suspension.

Reinstatement Following Suspension. DFG may lift any suspension when it has determined that Responsible Party has adequately addressed the problem or problems resulting in the suspension and that reinstatement of the Agreement will not cause harm to fish and wildlife resources.

Other Laws Regarding Habitat and Species Protection.

11) The U.S. Army Corps of Engineers (Corps) has permitting requirements for certain instream projects under Section 404 of the Federal Clean Water Act. If this project features the placement of dredged or fill materials into the channels of streams (below the ordinary high water mark) that are waters of the United States, a permit may be required by the Corps. If your project needs a permit from the Corps, you will also need to obtain a Water Quality Certification pursuant to Section 401 of the Federal Clean Water Act from the Regional Water Quality Control Board (Regional Water Board). In addition, if your project will involve disturbance within or discharges of pollutants to waters of the State of California, the Regional Water Boards may require a permit, whether or not the Corps requires a permit. If there is any question regarding the possibility of the project meeting the above limitations, the Responsible Party should contact the Corps and the Regional Water Board prior to beginning work. This Agreement in no way represents permitting requirements by the Corps or the Regional Water Board. It is the responsibility of the Responsible Party to contact the Corps, and to comply with the provisions of any Section 404 permit issued, if required by the Corps. Similarly, it is the responsibility of the Responsible Party to contact the Regional Water Board and to comply with the provisions of any Section 401 Certification, Regional Water Board Waste Discharge Requirements or waiver of Waste Discharge Requirements issued by the Regional Water Board.

12) The Responsible Party may have certain other responsibilities pursuant to the Federal Endangered Species Act resulting in mitigative project features required by the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service.

13) The Responsible Party shall comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the responsibility of the Responsible Party to ensure compliance.

OPERATIONAL PROVISIONS

NOTIFICATION MATERIALS AND PROJECT DESCRIPTION

14) Responsible Party's notification (Notification of Lake or Streambed Alteration, received June 16, 2009, together with all maps, plans, photographs, drawings, and all other supporting documents submitted with notification to describe the activity) are hereby incorporated by reference into this Agreement. Responsible Party shall conduct project activities within the work areas and using the mitigative features described in the notification and supporting documents, unless such project activities, work areas or mitigative features are modified by the provisions of this Agreement, in which case the activities shall be conducted as described in this Agreement.

The work under this Agreement is limited to the construction of fish passage improvement structures at the Red Mountain Creek crossing of US Highway 101 as mitigation for fisheries impacts associated with the Confusion Hill Roadway Relocation Project. All work shall be in accordance with submitted plans and diagrams and any subsequent revisions approved by the DFG in writing. Specific work includes restoration of an access road to the site, construction of a temporary diversion to dewater the work area, installation of boulder clusters and concrete weirs within the existing culvert, and construction of a rock weir at the culvert outlet:

Access Road

The first item of work will be to restore approximately 265 linear feet of a decommissioned portion of the access road. This will require removal of invasive species, including French broom and greater periwinkle, as well as several trees. Additional invasive species adjacent to the road may also be removed. Restoration of the access road will include minimal earth work, and placement of imported rocky material. The road will be constructed using a bulldozer and excavator. Temporary silt fence will be placed on disturbed embankments. The road design will allow for natural drainage by out-sloping the roadbed. The road will be treated with erosion control upon completion of the project.

Water Diversion

After the access road has been completed, the temporary creek diversion dam will be constructed manually above the inlet of the culvert. Personnel will hike through the culvert to the inlet where they will place a temporary diversion berm to create a barrier to the flow. Water will be diverted into a minimum 12" diameter stream diversion conduit (pipe) along the edge of the culvert to a point immediately downstream of the work area. Qualified biologists with experience handling anadromous salmonids will be on site during the dewatering of the culvert to capture and relocate stranded salmonids and amphibians.

In-Culvert Work

The two-ton RSP rocks will be stored at the Confusion Hill staging area above the culvert. A backhoe or bobcat will utilize the access road to transport rock into the culvert. The two-ton rocks will be bonded and cabled together in clusters of three and placed within the culvert as indicated on the approved plans. A total of nine boulder clusters are proposed. A small concrete pump will be parked near the outlet of the culvert and concrete will be pumped up to the concrete weir forms. Concrete weirs will be placed within the culvert as indicated on the approved plans. A total of eight weirs are proposed. No concrete will come into contact with the creek. A portable concrete washout facility will be used to transport concrete waste material to a disposal site away from the creek.

In-Stream Weir

At the culvert outlet, an arched rock weir will be constructed from ¼ ton RSP to help increase low-flow water depths in the culvert and prevent the formation of drops greater than 12 inches at the culvert outlet. The rock weir will be constructed across the stream bed with an apex upstream, and will be keyed into the stream banks with additional two-ton RSP for support.

IMPACTS

15) Permanent impacts shall be limited to the removal of several trees where the access road is extended to the culvert outlet. Temporary impacts include the loss of aquatic habitat during diversion and dewatering, as well as the potential for minor incidental take of listed and special status species during capture and relocation efforts. A temporary increase in sediment may occur when the construction diversion is removed following completion of the work. The Responsible Party shall not temporarily impact more than **632 linear feet** of stream channel habitat.

PROJECT TIMING AND COORDINATION

16) The Responsible Party shall notify DFG, in writing, at least seven (7) days prior to initiation of construction (project) activities and at least seven (7) days prior to completion of construction (project) activities. Notification shall be faxed to DFG at (530) 225-0324, Attn: Craig Martz, Staff Environmental Scientist, and shall reference Agreement No. R1-09-0211.

17) All work on the stream banks or within the stream channel, shall be confined to the period commencing June 15, and ending October 15, of any year in which this Agreement is valid, provided the stream is dry or at its lowest flow. If weather conditions permit and the stream is dry or at its lowest flow, the Responsible Party may perform work within the stream channel or on the banks after October 15, provided a written request is made to DFG at least 5 days before the proposed work period variance. Written approval from DFG for the proposed work period variance must be received by the Responsible Party prior to the start or continuation of work after October 15.

18) If work is performed within the stream channel or on the banks after October 15 as provided above, the Responsible Party shall do all of the following:

- Stage erosion and sediment control materials at the work site.

- Monitor the seventy-two (72) hour forecast from the National Weather Service.
- When the 72-hour forecast indicates a probability of precipitation of 60% or greater, or at the onset of any precipitation, ground-disturbing activities shall cease and erosion control measures shall be implemented to stabilize exposed soils and prevent the mobilization of sediment into the stream channel or adjacent wetlands.

HABITAT AND SPECIES PROTECTION

19) All conditions and mitigation measures set forth in the Biological Opinion and Incidental Take Statement (File No. 151422SWR04SR9151) issued to the Federal Highway Administration by the National Marine Fisheries Service and DFG's Consistency Determination (CESA No. 2080-2006-012-03) issued to the California Department of Transportation pertaining to work in Red Mountain Creek shall become part and parcel to this Agreement.

20) Prior to beginning work, Responsible Party shall submit final engineering designs for all structures related to fish passage to the National Marine Fisheries Service and DFG for review and approval. Work shall not proceed until plans are approved in writing.

21) Responsible Party shall hire a qualified biologist(s) with experience in identifying, collecting, handling, and relocating anadromous salmonids and resident amphibians. The biologist(s) shall be on-site during all diversion and dewatering activities and shall ensure that all salmonids and amphibians within the dewatered portions of the culvert and channel are captured and relocated safely. Responsible Party shall notify Staff Environmental Scientist Craig Martz via fax (530-225-0324) or email cmartz@dfg.ca.gov at least 7 days prior to dewatering and relocation activities to allow DFG an opportunity to observe the activities.

22) Captured salmonids and amphibians shall be handled with extreme care during rescue and relocation activities. Captured salmonids shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream and shall not be removed from this water except when released. To avoid predation, the biologist shall use at least two containers to segregate young-of-the-year fish from larger age-classes. Captured salmonids shall be relocated as soon as possible to a suitable instream location with habitat conditions that will allow for survival of both relocated fish and fish already present.

23) Responsible Party shall identify the number, species, and general size class, of all anadromous fish and native amphibians that are captured and relocated during dewatering activities. DFG shall be notified within 24 hours of any mortalities that occur during relocation.

PETROLEUM, CHEMICAL AND OTHER POLLUTION

24) Staging, storage, and re-fueling areas for machinery, equipment, and materials shall be located outside of the stream a minimum distance of 150 feet from waters of the State. All portable concrete washout facilities must be located at least 50 feet from any watercourse.

25) Except as authorized in this Agreement, no equipment or machinery shall be operated within any flowing stream.

26) Any equipment or vehicles driven and/or operated within or adjacent to the stream channel shall be checked and maintained daily to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life, wildlife, or riparian habitat.

27) If operating vehicles in wetted portions of the stream channel cannot be avoided, the Responsible Party shall, at a minimum, do the following:

a. check and maintain vehicles on a daily basis to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life, wildlife, or riparian habitat;

b. minimize the number of passes through the stream to avoid increasing the turbidity of the water to a level that is deleterious to aquatic life; and

c. allow the work area to "rest" after each individual pass of the vehicle that causes a plume of turbidity above background levels, resuming work only after the stream has reached the original background turbidity levels.

28) All activities performed in or near a stream shall have absorbent materials designated for spill containment and clean up activity site for use in case of accidental spill. Clean-up of all spills shall begin immediately. The Responsible Party shall immediately notify the State Office of Emergency Services at 1-800-852-7550. DFG shall be notified by the Responsible Party and consulted regarding clean-up procedures.

29) No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, asphalt, paint or other coating material, oil or petroleum products or other organic or earthen material from any construction, or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

30) At all times when the Responsible Party is pouring or working with wet concrete there shall be a monitor onsite whose sole purpose is to inspect the forms and ensure that no fugitive concrete or other debris enters into the active channel.

CONSTRUCTION DEWATERING

31) All work within the stream channel shall be performed in isolation from the flowing stream.

32) Dewatering activities shall be implemented in accordance, and otherwise consistent with the most current edition of DFG's California Salmonid Stream Habitat Restoration Manual. The most current edition of the manual is available at <http://www.dfg.ca.gov/nafwb/index.html>.

33) A coffer dam, berm, or other flow barrier, approved by DFG, shall be constructed to temporarily divert the flow around the project site.

34) Measures shall be taken immediately downstream of the work site to capture suspended sediment. Silt catchment fences shall be installed or a filter berm of clean river bedload shall be constructed. Silt fences and other non-native materials shall be removed from the stream following completion of the project. Berms constructed out of native bedload may be left in place after breaching, provided they do not impede the stream flow or fish passage.

35) Barrier construction shall be adequate to prevent seepage into or from the work area. Diversion berms shall be constructed of onsite bedload of low silt content, inflatable dams, sand bags, or other materials approved by DFG. Barriers shall not be made of earth or other substances subject to erosion unless first enclosed by sheet piling, rock rip-rap, or other protective material. The enclosure and the supportive material shall be removed from the work site when the work is completed, and removal shall proceed from downstream in an upstream direction. Clean bedload may be left in the stream, but the barrier must be breached to return the stream flow to its natural channel and to provide fish passage.

36) Any turbid water pumped from the work site shall be disposed of in an upland location where it will not drain directly into any stream channel.

37) Dewatering shall be done in a manner that prevents the discharge of material that could be deleterious to fish, plant life, or bird life into waters of the state and maintains adequate flows to downstream reaches during all times natural flow would have supported aquatic life. Such flows shall be of sufficient quality and quantity to support fish and other aquatic life above and below the diversion. Normal flows shall be restored to the affected stream immediately upon completion of work at that location.

VEGETATION REMOVAL

38) Except where provided for within this Agreement, the removal of native vegetation from the streambed or streambanks is prohibited without prior written approval from the Department. The work area shall be identified to all workers, as represented in plans.

39) Removal of native vegetation shall be kept to the minimum amount needed to provide equipment access to the work site. Wherever possible, native trees adjacent to the access road shall be retained and limbed to provide adequate road width.

40) Invasive species encountered during construction shall be removed and properly disposed of to prevent infestation of new areas.

EROSION AND SEDIMENT CONTROL

41) The project shall at all time feature adequate erosion and sediment control devices to prevent the degradation of water quality.

42) Gravel used for projects shall be clean, pre-washed, uncrushed natural river rock. Gravel must be washed at least once and have cleanliness value of 85 or higher (California Test No. 227). Particle size shall be graded with at least 98% passing a 3-inch screen, 60-80% passing a two (2) inch screen, and 0-5% passing a half (½) inch screen (% by dry wt) or approved by DFG. Gravel must be completely free of oils or any other petroleum based material, clay, debris, and other types of organic matter. Gravel may be stockpiled near the project site, but mixing with any earthen material is prohibited.

43) The Responsible Party shall prevent the discharge of sediment, and/or muddy, turbid, or silt-laden waters, resulting from the project, into the stream channel. Where necessary to prevent such discharge, the Responsible Party shall properly install and maintain sediment barriers (including but not limited to filter fabric fencing, fiber mats, rice straw or fiber wattles or

rolls) capable of preventing downstream sedimentation/turbidity. Said devices shall be cleaned of all trapped sediment as necessary to maintain proper function. Recovered sediment shall be disposed of where it shall not return to the waters of the State. Said devices shall be completely removed from the channel, along with all temporary fills, upon completion of operations.

44) Soils exposed by project operations shall be mulched to prevent sediment runoff and transport. Mulches shall be applied so that not less than 90% of the disturbed areas are covered. All mulches (except hydro-mulch) shall be applied in a layer not less than two inches deep. All mulches shall be kneaded or tracked-in with track marks parallel to the contour, and tackified as necessary to prevent excessive movement. All exposed soils and fills, including the downstream face of the road prism adjacent to the outlet of culverts, shall be reseeded with a mix of native grasses common to the area, free from seeds of noxious or invasive weed species, and applied at a rate which will ensure establishment.

45) Soils adjacent to the stream channel that are exposed by project operations shall be adequately stabilized when rainfall is reasonably expected during construction, and immediately upon completion of construction, to prevent the mobilization of such sediment into the stream channels or adjacent wetlands. National Weather Service forecasts shall be monitored by the Responsible Party to determine the chance of precipitation.

46) Upon DFG determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation, shall be halted until effective DFG approved control devices are installed, or abatement procedures are initiated.

EQUIPMENT ACCESS

47) Vehicles shall not be driven, or equipment operated, in water covered portions of a stream, or where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed, except as otherwise provided for in this Agreement to complete authorized work.

48) Staging/storage areas for equipment and materials shall be located outside of the stream.

49) Structures and associated materials not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.

ROCK SLOPE PROTECTION (RSP) AND INSTREAM STRUCTURES

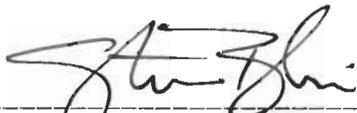
50) RSP, boulder clusters, and rock weirs shall consist of clean rock, competent for the application, sized and properly installed to resist washout. RSP slopes shall be supported with competent boulders keyed into a footing trench with a depth sufficient to properly seat the footing course boulders and prevent instability (typically at least 1/3 diameter of footing course boulders). RSP slopes and footing trenches shall feature an underlayment of appropriate grade geo-textile fabric to protect fill from tractive forces. Excavation spoils shall not be side-cast into the channel nor is any manipulation of the substrate of the channel authorized except as herein expressly provided. Boulder clusters shall be bonded, cabled together and anchored to resist movement during high stream flows. Rock weirs constructed within the stream channel shall be keyed into the stream bed and banks to increase stability.

This Agreement becomes effective on the date of Department's signature and terminates on December 31, 2010.

CONCURRENCE

RESPONSIBLE PARTY

CALIFORNIA DEPARTMENT OF FISH AND
GAME



(Signature)



Kenneth C. Moore
Habitat Conservation Program Manager
Northern Region

Steven Blair

(Print Name)

12/07/09

(Date)

Project Manager, Caltrans

(Title/Organization)

10-27-09

(Date)



DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

SEP 29 2009

REPLY TO

Regulatory Division

SUBJECT: File Number SPN-2009-00246 N

Mr. Steve Blair
California Department of Transportation (Caltrans)
PO Box 3700
Eureka, California 95502-3700

Dear Mr. Blair:

This letter is written in response to your June 11, 2009 request for a Department of the Army authorization for the Red Mountain Creek Fish Passage Project. This project is located at Post Mile 100.46 on Highway 101, between Garberville and Leggett, in Mendocino County, California.

The Red Mountain Fish Passage Project was developed to mitigate for the Confusion Hill Relocation Project on Highway 101. The Confusion Hill Project is currently under construction and will relocate a segment of Highway 101 around the South Fork Eel River and will include several span bridge structures.

The Red Mountain Creek Fish Passage Project will include the restoration of an access road to the creek and the installation of concrete weirs and rock clusters in the creek's culvert under Highway 101. The weirs and rock clusters will be installed in order to reduce flow velocities in the culvert to create more favorable conditions for fish passage. A temporary stream diversion will be necessary during the construction of the concrete weir and rock cluster installation. The access road will remain in place for maintenance purposes once work in the creek is complete.

The access road will be cleared, requiring the removal of native trees and some invasive species (such as French broom and periwinkle). The re-establishment of the access road to the creek will include some minor earth-work to outslope the roadbed. The road will be surfaced with gravel and other erosion control measures applied.

The temporary diversion dam will be constructed above the inlet of the culvert by hand. Gravel bags and impermeable plastic will be used to create the barrier. Water will be diverted with a 12-inch or larger pipe around the work area. An arched weir will be constructed across the stream bed and will be keyed-in to the stream bank with 2-ton rock slope protection rocks for support. A concrete washout facility will be used to rinse trucks and equipment that will enter

the site to pour concrete for the weir forms. After the concrete weirs cure and rock clusters are positioned in the channel, the temporary stream diversion will be removed and disposed of off-site.

Based on a review of the information you submitted, your project qualifies for authorization under Department of the Army Nationwide Permit 27 for Aquatic Habitat Restoration, Establishment, and Enhancement Activities (72 Fed. Reg. 11092, March 12, 2007), pursuant to Section 404 of the Clean Water Act (33 U.S.C. Section 1344). See Enclosure 1. All work shall be completed in accordance with the plans and drawings titled "Layout L-2", "Construction Details C-1", and "Construction Details C-2", in the "State of California Department of Transportation, Project Plans for Construction on State Highway on Route 101 in Mendocino County at Red Mountain Creek", dated April 11, 2008.

The project must be in compliance with the General Conditions cited in Enclosure 2 for this Nationwide Permit authorization to remain valid. Non-compliance with any condition could result in the suspension, modification or revocation of the authorization for your project, thereby requiring you to obtain an Individual Permit from the Corps. This Nationwide Permit authorization does not obviate the need to obtain other State or local approvals required by law.

This authorization will remain valid for two years from the date of this letter unless the Nationwide Permit is modified, suspended or revoked. If you have commenced work or are under contract to commence work prior to the suspension, or revocation of the Nationwide Permit and the project would not comply with the resulting Nationwide Permit authorization, you have twelve (12) months from that date to complete the project under the present terms and conditions of the Nationwide Permit. Upon completion of the project and all associated mitigation requirements, you shall sign and return the Certification of Compliance, Enclosure 3, verifying that you have complied with the terms and conditions of the permit.

To ensure compliance with this Nationwide Permit authorization, the following special conditions shall be implemented:

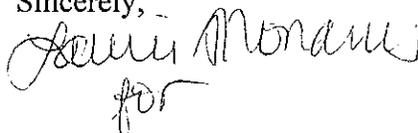
1. Corps permit does not authorize you to take an endangered species. In order to legally take a listed species, you must have a separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit or a Biological Opinion (BO) under ESA Section 7 with "incidental take" provisions with which you must comply). The U.S. Fish and Wildlife Service (FWS) BO dated November 14, 2005, and the National Marine Fisheries Service (NOAA-Fisheries) BO dated November 4, 2005, for the Confusion Hill Project, contains mandatory terms and conditions to implement reasonable and prudent measures to avoid "incidental take" of northern spotted owl (*Strix occidentalis caurina*), coho salmon (*Oncorhynchus kisutch*), steelhead (*O. mykiss*), and Chinook salmon (*O. tshawytscha*). These terms and conditions also apply to the Red Mountain Creek Fish Passage Project. Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take authorized by the attached biological opinions, whose terms and conditions are

incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the opinions, where a take of the listed species occurs, would constitute an unauthorized take and it would also constitute non-compliance with this Corps permit. The FWS and NOAA-Fisheries are the appropriate authority to determine compliance with the terms and conditions of their biological opinions and with the ESA.

2. You shall adhere to the terms and conditions of the February 16, 2006, Clean Water Act Section 401 Water Quality Certification, (and its April 18, 2006 amendment) issued by the North Coast Region of the California Water Resources Control Board (WDID no. 1B05153WNME).
3. All work occurring below the ordinary high water mark of Red Mountain Creek, shall be confined to the low-flow period during summer months (from May 15 to October 31).
4. Environmentally sensitive areas (ESA) shall be clearly delineated on the construction plans and demarcated in the field with high-visibility fencing prior to commencement of construction activities. ESA fencing shall be properly maintained throughout the duration of the project. The ESA shall be off limits to construction activity and personnel at all times.
5. No debris, oil, petroleum products, concrete, or other organic material resulting from construction activities shall be allowed to enter or be placed where it may be washed by rainfall or runoff into areas subject to the jurisdiction of the Corps. A concrete pump located outside of the creek channel shall be used to fill the weir forms and a concrete washout facility shall be placed along Route 101, away from the vicinity of the creek to wash vehicles and equipment.
6. Once work in the creek channel is complete, the temporary diversion structure materials, pipe, and other construction waste materials shall be removed from the channel.
7. In the event of any unanticipated discoveries of potential cultural/historic resources, you shall immediately halt work in the vicinity of the discovery and contact the appropriate regulatory authorities. You shall complete consultation pursuant to 36 CFR 800 to the satisfaction of the SHPO prior to resuming work.
8. You shall provide a post-construction report 45 days after the completion of construction activities. The report shall include a description of the work that was done and photos of the site after construction.

Should you have any questions regarding this matter, please call Andrea Meier of our Regulatory Division at 415-503-6798. Please address all correspondence to the Regulatory Division and refer to the File Number at the head of this letter. If you would like to provide comments on our permit review process, please complete the Customer Survey Form available online at <http://per2.nwp.usace.army.mil/survey.html>.

Sincerely,

A handwritten signature in cursive script, appearing to read "Jane M. Hicks", written in black ink.

Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copies furnished with vicinity maps:

US EPA, San Francisco, CA
US FWS, Arcata, CA
US NMFS, Santa Rosa, CA
CA DFG, Yountville, CA
CA RWQCB, Santa Rosa, CA

Nationwide Permit 27 - Aquatic Habitat Restoration, Establishment, and Enhancement Activities

Activities in waters of the United States associated with the restoration, enhancement, and establishment of tidal and non-tidal wetlands and riparian areas and the restoration and enhancement of nontidal streams and other non-tidal open waters, provided those activities result in net increases in aquatic resource functions and services. To the extent that a Corps permit is required, activities authorized by this NWP include, but are not limited to: the removal of accumulated sediments; the installation, removal, and maintenance of small water control structures, dikes, and berms; the installation of current deflectors; the enhancement, restoration, or establishment of riffle and pool stream structure; the placement of in-stream habitat structures; modifications of the stream bed and/or banks to restore or establish stream meanders; the backfilling of artificial channels and drainage ditches; the removal of existing drainage structures; the construction of small nesting islands; the construction of open water areas; the construction of oyster habitat over unvegetated bottom in tidal waters; shellfish seeding; activities needed to reestablish vegetation, including plowing or discing for seed bed preparation and the planting of appropriate wetland species; mechanized land clearing to remove non-native invasive, exotic, or nuisance vegetation; and other related activities. Only native plant species should be planted at the site. This NWP authorizes the relocation of non-tidal waters, including non-tidal wetlands and streams, on the project site provided there are net increases in aquatic resource functions and services. Except for the relocation of non-tidal waters on the project site, this NWP does not authorize the conversion of a stream or natural wetlands to another aquatic habitat type (e.g., stream to wetland or vice versa) or uplands. This NWP does not authorize stream channelization. This NWP does not authorize the relocation of tidal waters or the conversion of tidal waters, including tidal wetlands, to other aquatic uses, such as the conversion of tidal wetlands into open water impoundments.

Reversion. For enhancement, restoration, and establishment activities conducted: (1) In accordance with the terms and conditions of a binding wetland enhancement, restoration, or establishment agreement between the landowner and the U.S. Fish and Wildlife Service (FWS), the Natural Resources Conservation Service (NRCS), the Farm Service Agency (FSA), the National Marine Fisheries Service (NMFS), the National Ocean Service (NOS), or their designated state cooperating agencies; (2) as voluntary wetland restoration, enhancement, and establishment actions documented by the NRCS or USDA Technical Service Provider pursuant to NRCS Field Office Technical Guide standards; or (3) on reclaimed surface coal mine lands, in accordance with a Surface Mining Control and Reclamation Act permit issued by the OSM or the applicable state agency, this NWP also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its documented prior condition and use (i.e., prior to the restoration, enhancement, or establishment activities). The reversion must occur within five years after expiration of a limited term wetland restoration or establishment agreement or permit, and is authorized in these circumstances even if the discharge occurs after this NWP expires. The five year reversion limit does not apply to agreements without time limits reached between the landowner and the FWS, NRCS, FSA, NMFS, NOS, or an appropriate state cooperating agency. This NWP also authorizes discharges of dredged or fill material in waters of the United States for the reversion of wetlands that were restored, enhanced, or established on prior-converted cropland that has not been abandoned or on uplands, in accordance with a binding agreement between the landowner and NRCS, FSA, FWS, or their designated state cooperating agencies (even though the restoration, enhancement, or establishment activity did not require a section 404 permit). The prior condition will be documented in the original agreement or permit, and the determination of return to prior conditions will be made by the Federal agency or appropriate state agency executing the agreement or permit. Before conducting any reversion activity the permittee or the appropriate Federal or state agency must notify the district engineer and include the documentation of the prior condition. Once an area has reverted to its prior physical condition, it will be subject to whatever the Corps Regulatory requirements are applicable to that type of land at the time. The requirement that the activity result in a net increase in aquatic resource functions and services does not apply to reversion activities meeting the above conditions. Except for the activities described above, this NWP does not authorize any future discharge of dredged or fill material associated with the reversion of the area to its prior condition. In such cases a separate permit would be required for any reversion.

Reporting: For those activities that do not require pre-construction notification, the permittee must submit to the district engineer a copy of: (1) The binding wetland enhancement, restoration, or establishment agreement, or a project description, including project plans and location map; (2) the NRCS or USDA Technical Service Provider documentation for the voluntary wetland restoration, enhancement, or establishment action; or (3) the SMCRA permit issued by OSM or the applicable state agency. These documents must be submitted to the district engineer at least 30 days prior to commencing activities in waters of the United States authorized by this NWP.

Notification. The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 27), except for the following activities: (1) Activities conducted on non-Federal public lands and private lands, in accordance with the terms and conditions of a binding wetland enhancement, restoration, or establishment agreement between the landowner and the U.S. FWS, NRCS, FSA, NMFS, NOS, or their designated state cooperating agencies; (2) Voluntary wetland restoration, enhancement, and establishment actions documented by the NRCS or USDA Technical Service Provider pursuant to NRCS Field Office Technical Guide standards; or (3) The reclamation of surface coal mine lands, in accordance with an SMCRA permit issued by the OSM or the applicable state agency. However, the permittee must submit a copy of the appropriate documentation. (Sections 10 and 404)

Note: This NWP can be used to authorize compensatory mitigation projects, including mitigation banks and in-lieu fee programs. However, this NWP does not authorize the reversion of an area used for a compensatory mitigation project to its prior condition, since compensatory mitigation is generally intended to be permanent.

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Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as appropriate, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/ or Coastal Zone Management Act consistency for an NWP.

1. *Navigation.* (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. *Aquatic Life Movements.* No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

3. *Spawning Areas.* Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. *Migratory Bird Breeding Areas.* Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. *Shellfish Beds.* No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48.

6. *Suitable Material.* No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. *Water Supply Intakes.* No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. *Adverse Effects From Impoundments.* If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. *Management of Water Flows.* To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. *Fills Within 100-Year Floodplains.* The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. *Equipment.* Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.
12. *Soil Erosion and Sediment Controls.* Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
13. *Removal of Temporary Fills.* Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.
14. *Proper Maintenance.* Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.
15. *Wild and Scenic Rivers.* No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).
16. *Tribal Rights.* No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
17. *Endangered Species.* (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed. (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. (c) Non-federal permittees shall notify the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. (d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species specific regional endangered species conditions to the NWPs. (e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide Web pages at <http://www.fws.gov/> and <http://www.noaa.gov/fisheries.html> respectively.
18. *Historic Properties.* (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. (b) Federal permittees should follow

their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the preconstruction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed. (d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete preconstruction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. (e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

19. *Designated Critical Resource Waters.* Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment. (a) Discharges of dredged or fill material into waters of the United States are not authorized by NWP's 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. (b) For NWP's 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWP's only after it is determined that the impacts to the critical resource waters will be no more than minimal.

20. *Mitigation.* The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal: (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site). (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal. (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require preconstruction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project specific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Since the likelihood

of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered. (d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal adverse effects on the aquatic environment. (e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs. (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses. (g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity specific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan. (h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

21. *Water Quality.* Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

22. *Coastal Zone Management.* In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

23. *Regional and Case-By-Case Conditions.* The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

24. *Use of Multiple Nationwide Permits.* The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

25. *Transfer of Nationwide Permit Verifications.* If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: "When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

(Transferee) _____

(Date) _____

26. *Compliance Certification.* Each permittee who received a NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include: (a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions; (b) A statement that any required mitigation was completed in accordance with the permit conditions; and (c) The signature of the permittee certifying the completion of the work and mitigation.

27. *Pre-Construction Notification.* (a) *Timing.* Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity: (1) Until notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) If 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 17 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 18 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) is completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee cannot begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2). (b) *Contents of Pre-Construction Notification:* The PCN must be in writing and include the following information: (1) Name, address and telephone numbers of the prospective permittee; (2) Location of the proposed project; (3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided result in a quicker decision.); (4) The PCN must include a delineation of special aquatic sites and other waters of the United States on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the United States, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, where appropriate; (5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. (6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and (7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act. (c) *Form of Pre-Construction Notification*: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used. (d) *Agency Coordination*: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWP and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. (2) For all NWP 48 activities requiring pre-construction notification and for other NWP activities requiring preconstruction notification to the district engineer that result in the loss of greater than 1/2-acre of waters of the United States, the district engineer will immediately provide (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy of the PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the preconstruction notification. The district engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each preconstruction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (4) Applicants are encouraged to provide the Corps multiple copies of pre-construction notifications to expedite agency coordination. (5) For NWP 48 activities that require reporting, the district engineer will provide a copy of each report within 10 calendar days of receipt to the appropriate regional office of the NMFS. (e) *District Engineer's Decision*: In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any conditions the district engineer deems necessary. The district engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan.

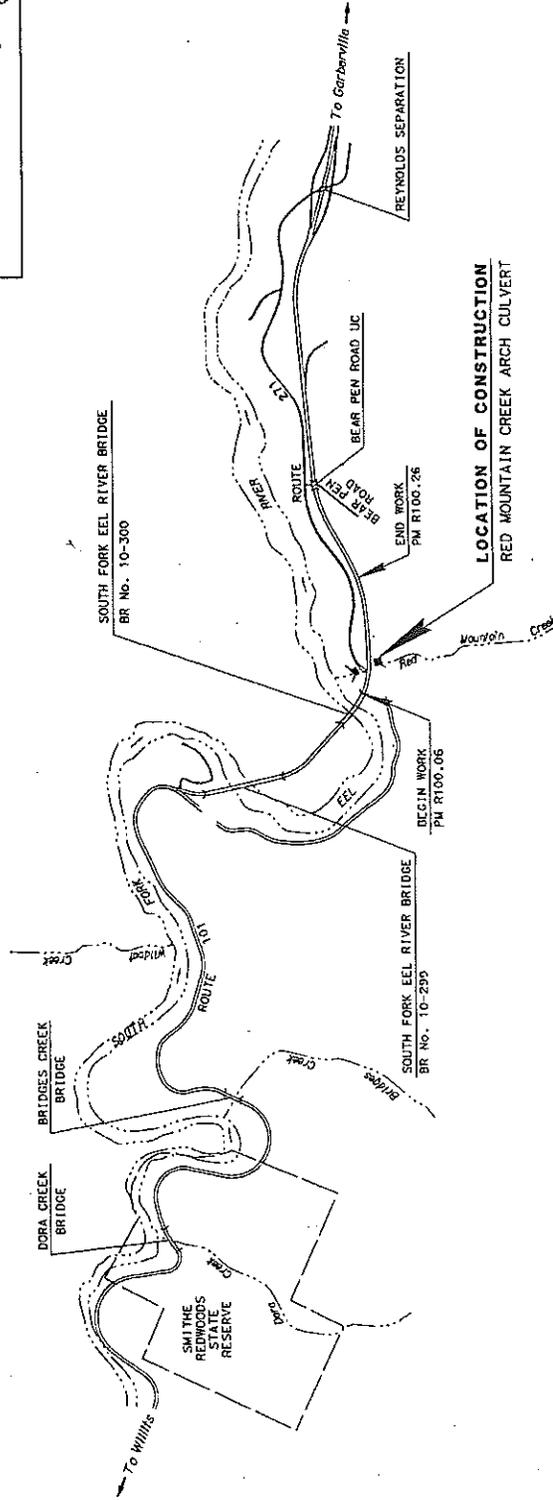
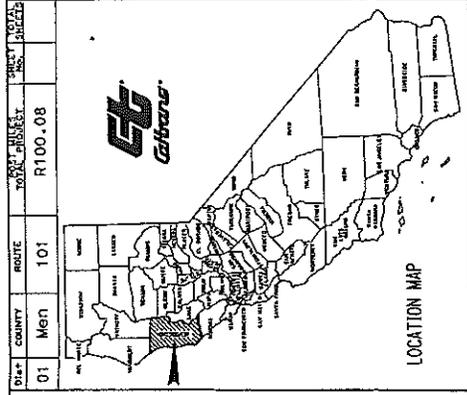
28. *Single and Complete Project*. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

INDEX OF PLANS

STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
 PROJECT PLANS FOR CONSTRUCTION ON
 STATE HIGHWAY
 ON ROUTE 101 IN MENDOCINO COUNTY
 AT RED MOUNTAIN CREEK

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

Draft 1/23/2009



PROJECT ENGINEER DATE
 REGISTERED CIVIL ENGINEER
 PLANS APPROVAL DATE
 THE STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
 CONTRACT NO. EA 000000

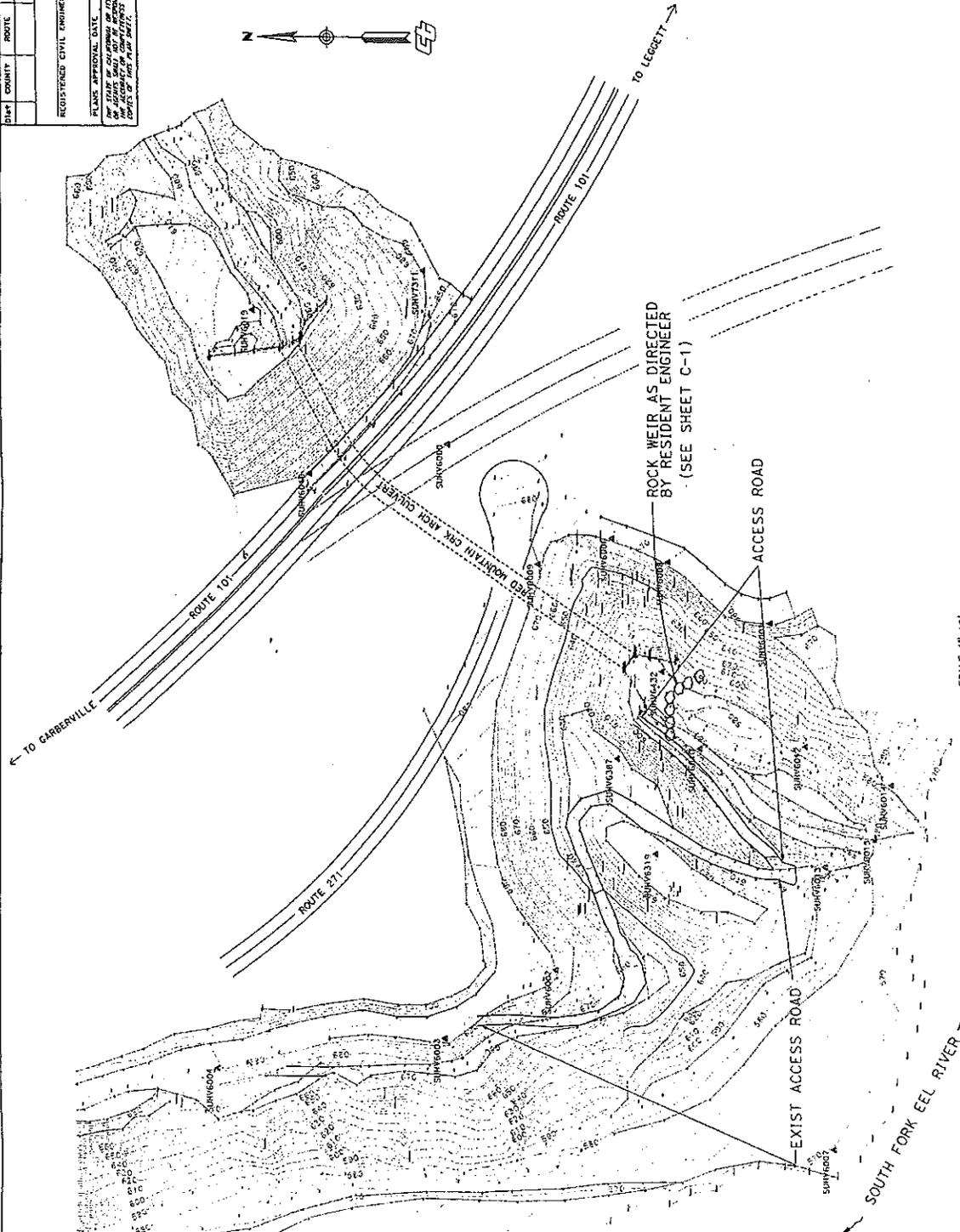
DATE PLOTTED: 03/11/17	00-00-00
PROJECT NO. 1117	EA 000000
CONTRACT NO. CU 00000	EA 000000
CALTRANS WEB SITE IS: HTTP://RRRR.DOT.CA.GOV/	RELATIVE NUMBER SCALE 15.74 INCHES
ORDER LAST REVISED 4/7/2008	THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO CONTRACTORS."

DATE	COUNTY	ROUTE	POST MILES	TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER	DATE

PLANS APPROVAL DATE	
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THE STATE OF CALIFORNIA, BY ITS OFFICERS OF PUBLIC WORKS, HAS REVIEWED THESE PLANS AND APPROVES THEM FOR THE PURPOSES OF THIS PLAN SHEET.



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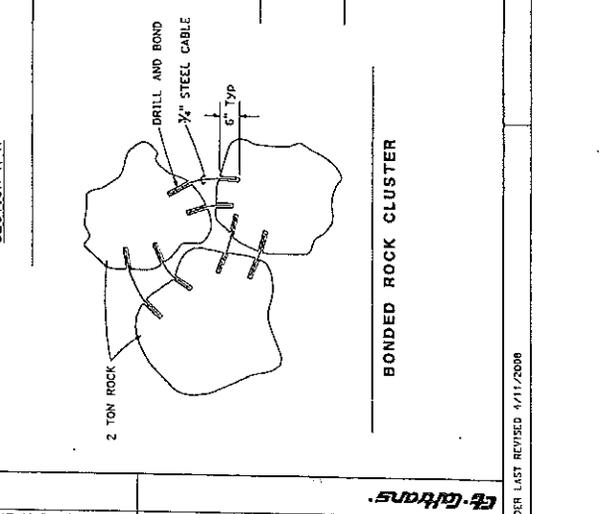
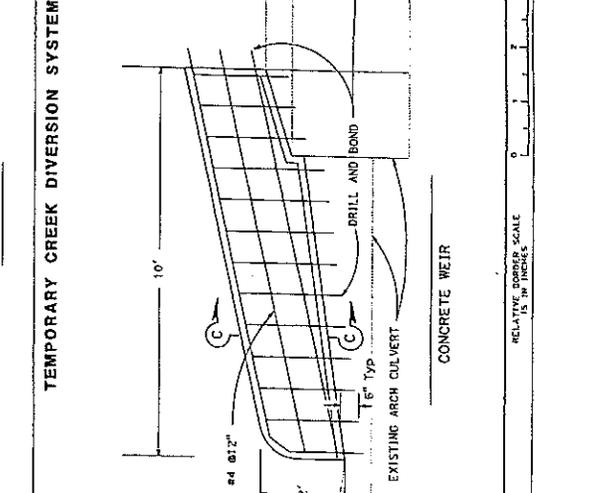
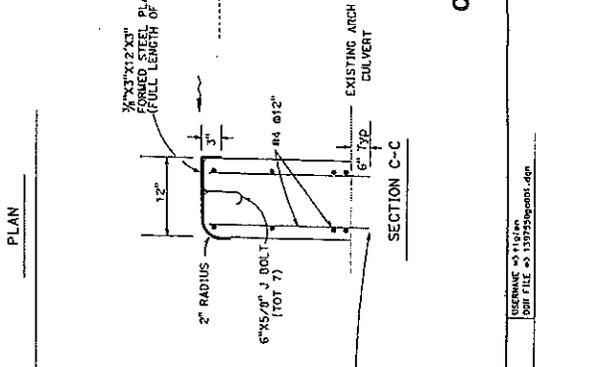
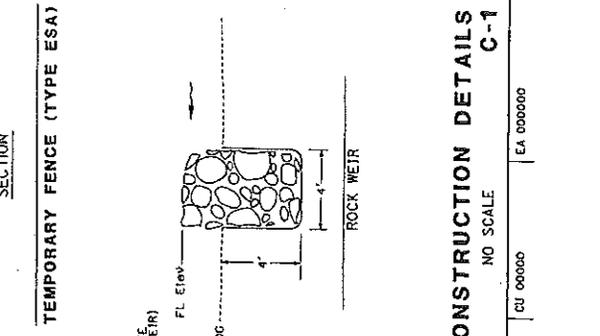
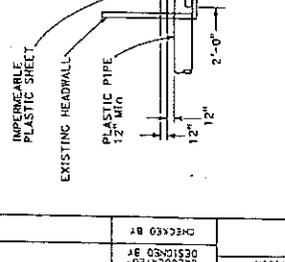
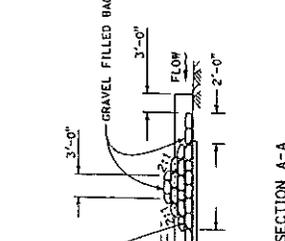
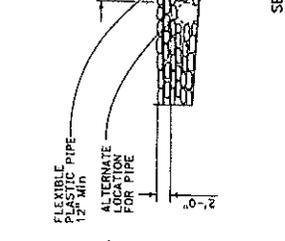
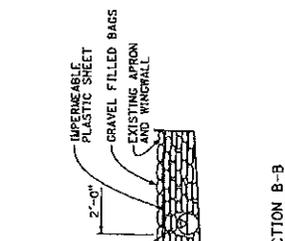
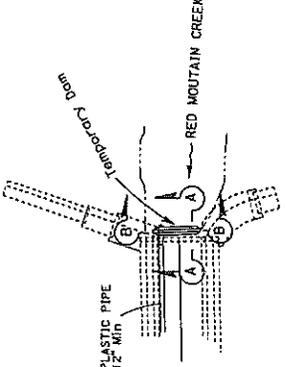
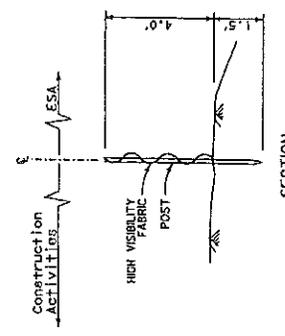
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 THE REGISTERED PROFESSIONAL ENGINEER
 OFFICE OF THE REGISTERED PROFESSIONAL ENGINEERS
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ROADWAY QUANTITIES

LOCATION	ROADWAY EXCAVATION	EMBANKMENT	IMPORTED ROCKY MATERIAL	RSP (2 TON METHOD A)	RSP (1 TON METHOD B)	RSP (1/2 TON METHOD B)	RSP (1/4 TON METHOD B)	CABLE GATE	CLASS 2 CONCRETE	BAR REINFORCING	STEEL	MISC IRON AND STEEL	TEMPORARY FENCE (TYPE ESA)	INSTALL ROCK CLUSTERS	EROSION CONTROL	WATER POLLUTION CONTROL
61000.06	1000	25	1000	60	10	10	10	10	1000	1000	1000	1000	250	5	10	20
TOTAL	1000	25	1000	60	10	10	10	10	1000	1000	1000	1000	250	5	10	20

(N/P) - NOT A SEPARATE PAY ITEM, FOR INFORMATION ONLY.



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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DATE PLOTTED 11/11/2006
 TIME PLOTTED 11:20
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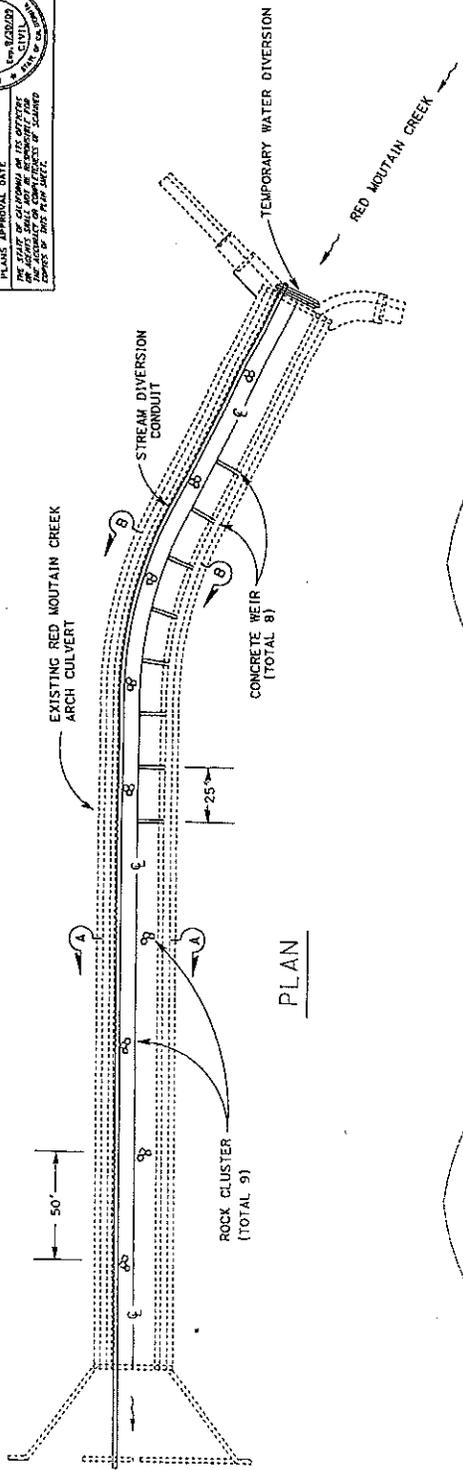
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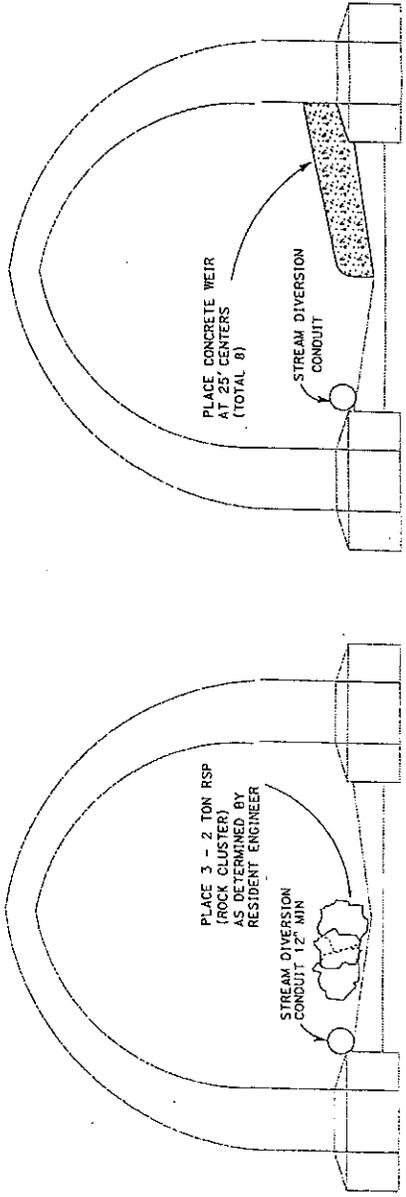
DATE	COUNTY	ROUTE	TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
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REGISTERED CIVIL ENGINEER	DATE	PROJECT NO.	PROJECT NAME
SEYMOUR A. HUNTER			

PLANS APPROVAL DATE	APPROVED BY



PLAN



SECTION A-A

SECTION B-B

CONSTRUCTION DETAILS C-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	CHECKED BY	DATE REVISED	REVISED BY	DATE REVISED

NO SCALE
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REVISION LAST REVISED 4/11/2008

INCORPORATE ALL REVISIONS
DATE FILED AS 12/15/2008

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DATE PLOTTED 14-DEC-2008
TIME PLOTTED 11:13:38



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Arcata Fish and Wildlife Office

1655 Heindon Road

Arcata, CA 95521-5582

Phone: (707) 822-7201 Fax: (707) 822-8411



In Reply Refer To:
1-14-2004-2004

NOV 14 2005

Gene K. Fong
Division Administrator
Federal Highway Administration
California Division
650 Capitol Mall, Suite 4-100
Sacramento, California 95814

Subject: Formal Consultation on the Proposed Confusion Hill Bypass Project, on U.S.
Highway 101, Mendocino County (EA 01-397510, Document # P52532)

Dear Mr. Fong:

This correspondence transmits the Fish and Wildlife Service's (Service's) biological opinion, based on our review of the Federal Highway Administration's (FHWA's) proposed action, construction of the Confusion Hill Bypass Project, located between post miles (PM) 98.9 and 100.8, on U.S. Highway 101, in Mendocino County, California, and its effects on the threatened northern spotted owl (*Strix occidentalis caurina*) (spotted owl). This document is prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act). In addition, this correspondence transmits the Service's concurrence with your determination of effects resulting from the proposed action on the threatened bald eagle (*Haliaeetus leucocephalus*), and our finding that the proposed action may affect, but is not likely to adversely affect the threatened marbled murrelet (*Breachyrampus marmoratus*). We received your May 24, 2005, request for consultation on May 27, 2005.

The proposed action is not located within critical habitat designated or proposed for any listed or proposed species, and will not affect any primary constituent element of critical habitat. Therefore, critical habitat need not be addressed further in this consultation.

This consultation is based on information you provided in the May 2005 biological assessment and appendices (BA) submitted with your request, telephone conversations between staff biologists of the Service's Arcata Fish and Wildlife Office (AFWO) and the California Department of Transportation (Caltrans) District 1, field visits to the site of the proposed

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construction project, and other sources of information. A complete administrative record of this consultation is on file at this office.

Consultation History

Caltrans contacted the Service on January 18, 2001, for an emergency consultation on the proposed repairs to an active slide at Confusion Hill. Caltrans provided a draft biological assessment to AFWO during November 2002, to provide information about ongoing work at Confusion Hill after an earthquake in January 2001. It was determined that a Programmatic Agreement for Storm Damage and Maintenance would be developed in order to address the potential impacts to marbled murrelet and northern spotted owl resulting from maintenance and emergency work that has occurred at the project site since 2001, and is ongoing.

During June 2002, Ms. Sherry Douglas of Caltrans and Mr. Ray Bosch of AFWO coordinated a review, through technical assistance, of the installation of a rock containment fence at the rock slide needed to protect public safety.

On July 23, 2003, Ms. Susan Leroy and Mr. Wes Kohler of Caltrans and Mr. Bosch met at the project site to discuss biological resources and impacts. Two additional interagency site visits were conducted during that year to discuss potential impacts to biological resources.

Mr. Ken Hoffman of AFWO provided technical assistance to Caltrans through telephone conversations during 2004 regarding the presence of spotted owls near the proposed construction area.

On May 27, 2005, AFWO received a request for formal consultation, dated May 24, 2005, from FHWA. That request included a biological assessment prepared by Caltrans, dated May 2005.

On August 30, 2005, Ms. Leroy and Mr. Bosch discussed by telephone the results of the 2005 surveys for murrelets and spotted owls. They also discussed the possible changes to the determination of effects for the murrelet, based on lack of detections of the species in both survey years of the 2-year protocol. Given the lack of any known sightings of murrelets near the proposed action, a determination of may affect but not likely to adversely affect would be considered by the Service, for reasons described later in this correspondence.

On September 20, 2005, Mr. Bosch transmitted via email a draft biological opinion to Ms. Leroy for Caltrans review and comment. On October 3, 2005, Ms. Leroy provided Caltrans comments on the draft biological opinion to Mr. Bosch via email. These comments included the written report for the 2005 survey season for the spotted owl. Ms. Leroy provided additional comments on October 4, 2005, also via email.

Concurrence

You have determined that the proposed action may affect but is not likely to adversely affect the bald eagle, and that it may affect and is likely to adversely affect the marbled murrelet. The following discussion documents the Service's finding regarding your determinations.

A detailed description of the proposed action is included within the biological opinion which follows this concurrence, and will not be repeated here. Briefly, Caltrans proposes to bypass a major rockslide, on U.S. Highway 101 in northern Mendocino County, that places travelers and maintenance workers at substantial risk and results in frequent, unpredictable road closures. The proposed bypass will entail the construction of two major bridges over the South Fork of the Eel River in northern Mendocino County, as well as construction of bridge approaches and intervening highway segments in steep, forested terrain. The proposed action will also entail the closing and decommissioning of the portion of the existing highway bypassed by the new road and bridge structures. The project will require the use of various types of heavy equipment and explosives, and will require the removal of old growth, mature and younger trees consisting of a mixture of conifers, including redwood (*Sequoia sempervirens*) and Douglas-fir (*Pseudotsuga menziesii*), as well as live oaks and other species.

Bald Eagle

Bald eagles historically bred throughout California. Their current breeding distribution in the state is primarily within the mountain and coastal areas of northern California. However, the species has been reintroduced in some locations in southern California. Most of the northern California population are residents; approximately half of the state's population winters at large communal roosts in the Klamath Basin in northern California and southern Oregon.

No eagles are known to nest or communally roost near the proposed action. The habitat to be removed has the potential to provide future nesting or communal roosting habitat for eagles. Eagles are currently known to forage along this portion of the South Fork Eel River, and at least one individual is known to occasionally roost during the winter months at the project site. The proposed action may degrade the quality of this roost site, but many similar sites where single eagles may roost are thought to exist (by Caltrans) throughout the canyon of the South Fork Eel River. Caltrans anticipates that this roosting eagle will voluntarily relocate to other roost sites.

The Service concurs with your determination that the proposed action may affect but is not likely to adversely affect the bald eagle, based on the following factors:

- No currently occupied, suitable nesting habitat for the bald eagle will be removed, degraded or downgraded. Bald eagles are not known to nest in the vicinity of the proposed action. All known nests are associated with reservoirs and larger river systems a considerable distance from the proposed action. No historic records exist of eagles nesting in the action area.
- Eagles have been seen flying during winter months near the action area. However no roost sites in common use are known from the area. Foraging activities are not concentrated in or near the action area. Therefore, the proposed action will not remove or degrade habitat used for communal roosting or foraging by eagles. A single eagle roosts occasionally near the project site. This site will be degraded; however, other roosts sites are available along the South Fork Eel River.

- The proposed action will not result in noise or visual disturbance to the species, since no nesting or communal roosting is known from the area, and timing restrictions will be applied in the event future nesting is documented.
- The proposed action will not result in injury or death of any individuals of the species.
- The action will not result in adverse effects to any primary constituent element of critical habitat, as critical habitat has not been designated for the species.

Marbled Murrelet

In your correspondence, you determined that the proposed action may affect and is likely to adversely affect the murrelet. You based your determination on the removal of trees of sufficient size to provide suitable nesting habitat, and on the elevated noise levels generated by project construction in areas immediately adjacent to and within forest habitat potentially suitable for murrelet nesting. Since receiving your request for consultation, additional information regarding murrelet presence indicates that murrelets are very unlikely to nest in or near the proposed action. Therefore, the Service does not agree with your determination. However, the Service would agree that the proposed action may affect, but is not likely to adversely affect, the murrelet. The following discussion supports the Service's finding.

The proposed action will remove or otherwise impact five large redwood trees in the southern portion of the proposed project having the potential to support nesting by marbled murrelets, should they occur there, in adjacent, larger trees. Three trees greater than 36 inches dbh would be removed, one tree 40 inches dbh would be removed, and one tree 36 inches dbh would be degraded. None of the trees directly affected currently has branches of sufficient size to support nest structures of murrelets. Opening the overstory canopy would indirectly affect the quality of nesting habitat in the remaining large trees by compromising the microclimate and canopy closure along the new highway alignment. The proposed action also has the potential to adversely affect murrelets in the action area through increases in noise levels in nesting habitat, both during the construction period as well as during future use of the highway in its new alignment and approach to the south bridge. The sources of elevated noise levels would include the use of heavy construction equipment and power tools within suitable nesting habitat, use of explosives and impact pile drivers from adjacent areas in the construction zone, and through future vehicular traffic using the new highway on its new alignment through the stand of potential nesting habitat.

Despite having suitable habitat conditions to support nesting murrelets, murrelets do not appear to occupy the area of the proposed action. The proposed action, located within 10 miles straight line distance to the Pacific Ocean, lies within Inland Zone 1. This Zone was described as being that portion of the landscape likely to support breeding murrelets in suitable nesting habitat, or to have the potential to do so. However, based on the survey data cited below, this portion of Zone 1 does not appear to be occupied by murrelets.

The California Department of Parks and Recreation has no records of marbled murrelet detections in the project vicinity. The U.S. Forest Service Pacific Southwest Research Station

BIOLOGICAL OPINION

The following biological opinion addresses the effects of the proposed action on the northern spotted owl. No other species has been determined by FHWA to be adversely affected by the proposed action. Hence, no other species need be addressed by this opinion.

DESCRIPTION OF THE PROPOSED ACTION

Proposed Construction Activities

A complete description of the proposed action, including construction activities and equipment necessary to complete this action, can be found in the May 2005 EA and its appendices. That document is hereby included by reference. The following discussion provides a brief description of the construction activities most pertinent to this consultation. The reader is referred to the EA for complete details and additional clarification regarding the proposed activities.

Caltrans, in cooperation with FHWA, proposes to construct a bypass around a major rock slide area on U.S. Highway 101, between kilometer post (KP) 159.2 (post mile [PM] 98.9) and KP 162.2 (PM 100.8), in Mendocino County. This rockslide has been in existence for decades, but has gradually increased in extent and severity in recent years, and currently consists of at least four active debris flows above the existing road. Seismic activity in the area and winter storm-induced slides have resulted in sudden failure of portions of the rockslide, resulting in road closures and unsafe conditions. Significant road closures have occurred during the past 3 to 10 years, resulting in substantial delays in interregional travel, and a safety risk to the traveling public and maintenance workers at the site. The largest and northernmost debris flow caused eight highway closures between December 2002 and May 2003. The existing highway consists of a narrow, 2-lane roadbed with minimal shoulders; design speed is as low as 50 km/hr (30 mph) in the segment to be bypassed.

The overall project would involve construction of a 2-lane conventional highway facility that would bypass the slide by crossing and re-crossing the South Fork of the Eel River to the west of the existing alignment. The new highway will comprise two 2-lane bridges, a through-cut of an intervening ridge, and re-connections to the existing 4-lane freeway to the north and 2-lane highway to the south. The proposed realignment will be 2.7 km (1.7 mi) in length. Caltrans anticipates that field construction will start by March of 2007 and will be completed by December 2009.

The project will require the removal of up to 292,000 cubic meters (380,000 cubic yards) of earth and rock to create the road slope and bridge supports. Blasting may be utilized on the peninsula where rock is encountered during excavation and at the north bridge abutments. Retaining walls and access roads will be necessary. The two bridges will be constructed from temporary trestles crossing the river at two locations. Several methods of trestle construction available to the contractor would require the use of pile driving hammers, heavy equipment, and/or drilling rigs. Trestles may be in place year-round for up to three years.

conducted surveys near Piercy (about five highway miles north) and at Standish-Hickey State Recreation Area (about three highway miles south) in 1988. No murrelets were detected during the surveys. No records of marbled murrelet sightings exist in the California Natural Diversity Database within the two USGS 7.5-minute series quadrangles covering the action area. The Bureau of Land Management conducted extensive surveys for the marbled murrelet in the Kings Range. Only a single flyby was detected and no murrelets were found to occupy the area.

Whereas Confusion Hill is not part of the Kings Range, murrelets that might nest near Confusion Hill would likely access the area from the west, near the Kings Range, rather than flying the substantially more lengthy route around the range. The closest known nest sites for murrelets are located nearly 20 river miles north of Confusion Hill in Humboldt Redwoods State Park.

Surveys of suitable habitat completed specifically for this project have detected no murrelets there. Surveys were completed for both the 2004 and 2005 breeding season according to current protocol standards. No detections or occupancy behavior were recorded.

Based on this new information, the Service does not concur with your determination that the proposed project may affect and is likely to adversely affect the marbled murrelet. Rather, we find, based on a review of all current information regarding murrelet occupancy of the South Fork Eel River area, that the proposed action may affect but is not likely to adversely affect this species. This concurrence is based on the following factors:

- Despite the presence of suitable habitat conditions at Confusion Hill, including within the action area proposed for the alignment of the Confusion Hill Bypass, protocol survey data and other survey information suggest that murrelets are not present in and do not occupy the vicinity of the project.
- Although the action area is well within the Inland Zone 1 breeding range of the murrelet, the habitat there, even under natural conditions, is substantially drier than encountered elsewhere in Inland Zone 1, such as Humboldt Redwoods State Park. Very large redwoods, the tree species predominantly used by murrelets for nesting in California, are generally localized in distribution along the South Fork Eel River to a streamside band, to small groves on riverside benches, or to scattered individuals within mixed species forest.
- The area is further hindered from being murrelet nesting habitat by the substantial topographic barrier represented by the Kings Range. Extensive surveys there have recorded but a single detection of murrelets flying over potentially suitable habitat in the Kings Range. No murrelets have been detected in any surveys along the South Fork Eel River south of Humboldt Redwoods State Park, which is located a substantial distance from the proposed action.

Therefore, the Service concludes that the likelihood that marbled murrelets would occupy the action area and be affected by the proposed action is discountable, and finds that the proposed action may affect, but is not likely to adversely affect, the marbled murrelet.

Temporary or permanent roads would be created or improved to access construction sites on the peninsula on the west side of the river or bridge sites, and would require the removal of brush and trees up to 11 inches diameter-at-breast-height (dbh).

Five disposal sites have been identified for the optional use of the contractor. All are located immediately adjacent to existing highways on partially vegetated, previously disturbed sites within 2 miles of the footprint of the proposed bridge and highway construction.

Staging areas have been identified for use by contractors. All are within or immediately adjacent to the project footprint, or adjacent to optional disposal sites.

Construction of the south bridge will necessitate the use of a tower crane and piles in the river bed. The bridges will utilize a cantilever construction built on Cast in Drill Hole (CIDH) methods. The north bridge will be constructed from falsework erected on trestles. Blasting may be necessary during construction of the north bridge.

A temporary concrete batch plant will be located at the north end of the project adjacent to State Route 271 which parallels U.S. Highway 101 on the west side.

The construction contractor will largely determine specific construction equipment and vehicles to be used on the project. Equipment expected to be used may include large bulldozers, pile drivers, backhoes, earthmovers, pick-up trucks, dump trucks, backhoes, excavators, water trucks, truck-mounted drills, concrete delivery trucks and pumps, graders, asphalt concrete paving machines, rollers, and service vehicles. Other machinery and vehicles likely to have similar effects may also be used.

The project would occur within a Caltrans right-of-way across privately owned lands; no Federal lands occur there. The South Fork of the Eel River is classified as Recreational under the Wild and Scenic Rivers Act.

Construction of the bypass will require the removal of up to 4.5 acres of forested habitat, including approximately 1.9 acres of habitat that functions for nesting, roosting or foraging by spotted owls. At least 5 large old-growth redwood trees would be removed from within the old-growth redwood stand at the south end of the project. Tree removal would occur in the alignment approaching the south end of the south bridge. Additional tree removal would occur on the peninsula and at the approaches to the north bridge, but these trees are substantially smaller in size, ranging from sapling to less than 36 inches dbh. The species to be removed at the south approach are redwoods; trees to be removed on the peninsula and north approaches include Douglas-fir, live oaks, and smaller redwoods.

Those portions of the site not dedicated to permanent highway infrastructure would be restored to a natural setting following completion of construction by re-grading and re-vegetating with native species or non-native species found to be non-persistent. New access roads would be re-contoured to the existing slope unless needed for future maintenance forces or if preferred open by the private landowner. All trestle and falsework would be removed.

The existing roadway alignment will be decommissioned following completion of the new bypass. The proposed project limits of the decommissioning are PM 99.35 to PM 100.37. A map of the proposed decommissioned area is provided in Appendix B of the BA. Between PM 99.48 and PM 100.17, all non-natural features will be removed. Between PM 99.35 and 99.48, the roadway will be relinquished to Mendocino County to maintain local access. Caltrans will retain possession from PM 100.17 to PM 100.37 for local access and for use as a disposal site. Decommissioning of the existing roadway is not anticipated to require the cutting of any large trees over and above those necessary to complete the bypass roadway.

Helicopter use and other noise sources during decommissioning the roadway will be similar to those occurring during bridge and highway construction of the bypass. Helicopter use will not include flights over the ridge line of Confusion Hill or over the old-growth forest at the south end of the project. A work window of August 1 - January 31 is proposed for potential helicopter work associated with removal of the wire mesh from the slide area.

Minimization Measures

Mature forests are a scarce and valuable resource for several species, including spotted owls. The following measures were developed by Caltrans and proposed for incorporation into the proposed project plan to reduce potential effects:

- Three alternative build alignments plus a no-build alignment were considered as part of the environmental analysis for this proposed action. These three alternatives included two additional alignments that bridged the South Fork Eel River, and a single alternative that would reconstruct the existing highway on a newly contoured mountain slope after removal of unstable and potentially unstable rock and soil. The three alternative alignments were withdrawn from further consideration for several reasons. One of these reasons is that each would have resulted in substantially greater impacts to mature and old-growth forests and, hence, represented greater impacts to northern spotted owls.
- All work to be completed in the old growth redwood stand at the southern end of the project area will be done to avoid impacting root systems of the remaining old growth redwoods. Other measures, such as the deployment of hand methods, and use of environmentally sensitive area fencing, will be used to minimize impacts to residual large trees along the highway alignment.
- Helicopters will be used only when necessary for project work during the highway relocation. Potential uses for the helicopter include taking equipment to the peninsula and decommissioning of the existing roadway. However there are several other ways that these types of work can be performed, which would be equally time sensitive and less expensive than using a helicopter.
- When the helicopter needs to be used, it will not fly over the stand of trees in the south portion of the project that contains larger sized redwood trees. This will lessen noise impacts to spotted owls that have the potential to use that parcel of forest.

- The helicopter will travel over the ridge line of Confusion Hill as little as possible, if at all, to avoid disturbance to the historic spotted owl nest site located there.
- Helicopter use during road decommissioning for removal of the wire mesh will occur outside the breeding season, August 1 to January 31.
- Little or no night work will take place. The only likely instance in which night work would occur is during a continuous concrete pour that lasts longer than one construction work shift, and during construction of the roadway conforms.
- The project area will be revegetated with native species.

Conservation Measures

When used in the context of the Act, "conservation measures" represent actions pledged in the project description that the action agency will implement to further the recovery of the species under review. Caltrans is not proposing to include any conservation measures as part of the proposed action.

Action Area

The action area is defined at 50 CFR 402.02 to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action". This analysis area enables the Service to more fully understand the cumulative, interrelated, and interdependent effects of the action within a more appropriate landscape context.

The action area for this proposed action is located in a rural area of Mendocino County, California in the Coast Range Mountains between the communities of Benbow and Leggett. The action area includes the existing roadway of U.S. Highway 101 between PM 98.9 and PM 100.8, and the new alignment that crosses to the west side of the river.

Areas to be directly affected by the proposed project include the existing road alignment, the proposed new road alignment, and disturbed road cuts, shoulders, and turnouts. This portion of the action area is also referred to as the "construction footprint." The action area also extends into a band of natural habitat immediately adjacent to both sides of the road, to a distance of up to one-half mile. This portion of the action area may be subject to elevated sound levels generated by the construction activities, including blasting, pile driving, helicopter use, heavy machinery, and other sources. Part of this area has also been subject to past timber felling and removal to reduce the risk of catastrophic failure of the slide area in the short term.

STATUS OF THE SPECIES

STATUS OF THE NORTHERN SPOTTED OWL

Legal Status

The Service listed the northern spotted owl under the Act as a threatened species on June 26, 1990, due to widespread habitat loss across the entirety of its range and the inadequacy of existing regulatory mechanisms to provide for its conservation (USFWS 1990b).

Life History

Taxonomy

The northern spotted owl is one of three subspecies currently recognized by the American Ornithologists' Union, and is the subspecies with the most northerly distribution. The taxonomic separation of these three subspecies is supported by genetic (Barrowclough and Gutiérrez 1990), morphological (Gutiérrez et al. 1995) and biogeographic information (Barrowclough and Gutiérrez 1990). More detailed accounts of the taxonomy, ecology, and reproductive characteristics of the spotted owl are found in the 1987 and 1990 U.S. Fish and Wildlife Service Status Reviews (USFWS 1987, 1990a); the 1989 Status Review Supplement (USFWS 1989); the Interagency Scientific Committee (ISC) Report (Thomas et al. 1990); the Forest Ecosystem Management Assessment Team (FEMAT) Report (Thomas and Raphael 1993); the final rule designating the spotted owl as a threatened species (USFWS 1990b); and Scientific Evaluation of the Status of the Northern Spotted Owl (Courtney et al. 2004).

Physical Description

The northern spotted owl, the largest of the three subspecies of spotted owl, is medium sized, approximately 46-48 cm in length and 490-850 g in weight (Gutiérrez et al. 1995). The body is dark brown, with a barred tail and white spots on the head and breast. A prominent facial disk surrounds dark brown eyes. Three age classes are distinguishable, based on plumage characteristics (Forsman 1981, Moon et al. 1991). The spotted owl closely resembles the barred owl (*S. varia*), a congeneric species with which it occasionally hybridizes (Kelly et al. 2003). Hybrids exhibit characteristics of both species (Hamer et al. 1994).

Current and Historical Range

The current range and distribution of the spotted owl extends from southern British Columbia through western Washington, Oregon, and California, as far south as Marin County (USFWS 1990a). The southeastern boundary of its range is the Pit River area of Shasta County, California. The range of the spotted owl is partitioned into 12 physiographic provinces (provinces), based upon recognized landscape subdivisions exhibiting different physical and environmental features (Thomas et al. 1993). These provinces are distributed across the range as follows: four provinces in Washington (Washington Cascades East, Olympic Peninsula, Washington Cascades West, Western Lowlands); five provinces in Oregon (Oregon Coast

Range, Willamette Valley, Oregon Cascades, West, Oregon Cascades East, Klamath Mountains); and three provinces in California (California Coast, California Klamath, California Cascades). The current range of the spotted owl is similar to its historical range where forested habitat still exists. The relatively contiguous distribution is influenced by the natural insularity of habitat patches within the geographic provinces and by natural and man-caused fragmentation of vegetation. The spotted owl is extirpated or rare in some areas within its historic range, such as southwestern Washington. Timber harvest activities have eliminated, reduced or fragmented spotted owl habitat sufficiently to decrease overall population densities across its range, particularly within the coastal provinces where habitat reduction has been concentrated (Thomas and Raphael 1993).

Behavior

Spotted owls are territorial. However, home ranges of adjacent pairs may overlap (Forsman et al. 1984, Solis and Gutiérrez 1990), which suggests that the area defended is smaller than the areas used for foraging. Territorial defense is primarily effected by hooting, barking and whistle type calls.

Spotted owls are monogamous and usually form long-term pair bonds. "Divorces" occur but are relatively uncommon. There are no known examples of polygyny in this species, although associations of three or more birds have been reported (Gutiérrez et al. 1995).

Habitat Relationships

Home Range

Spotted owl home range size varies by province. Home range generally increases from south to north, which is likely in response to decreasing habitat quality (USFWS 1990a). Home range size is linked to habitat type, availability, and abundance of prey (Zabel et al. 1995).

Based on available radio-telemetry data (Thomas et al. 1990), the Service estimated median annual home range size for the spotted owl by province. Because the actual configuration of the home range is rarely known, and may change from year to year, a circle representative of the median home range size approximates the provincial home range. The circle centers upon a spotted owl activity center, with an area approximating the provincial median annual home range. For example, estimated home range area varies from 3,340 acres (based on a 1.3-mile radius area) in California to 14,271 acres (based on a 2.7-mile radius circle) in Washington. The Service approximates the area most heavily used by spotted owls during the nesting season, identified as the core area, by a 0.7-mile-radius circle (985 acres). The nest tree, location of pre-fledged juveniles, or most significant location of the pair determines the center of the circle. Spotted owls in northern California focused their activities in core areas that ranged from about 167 to 454 acres, with a mean of about 409 acres; approximately half the area of the 0.7-mile radius circle (Bingham and Noon 1997). Spotted owls maintain smaller home ranges during the breeding season and often dramatically increase their home range size during fall and winter (Forsman et al. 1984, Sisco 1990).

Although differences exist in natural stand characteristics that influence provincial home range size, habitat loss and forest fragmentation caused by timber harvest effectively reduce habitat quality in the home range. A reduction in the acreage of suitable habitat results in a reduction in spotted owl abundance and nesting success (Bart and Forsman 1992, Bart 1995).

Habitat Use

Forsman et al. (1984) report that spotted owls have been observed in the following forest types: Douglas-fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), grand fir (*Abies grandis*), white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), Sierra red fir (*Abies magnifica shastensis*), mixed evergreen, mixed conifer hardwood (Klamath montane) and redwood (*Sequoia sempervirens*). Use of these types coincides with appropriate forest structure (see below). In parts of the Oregon Coast Range, spotted owls have been recorded in pure hardwood stands (Glenn et al. 2004). In California, spotted owls are found from near sea level in coastal forests to approximately 2130 m (7000 ft) in the Cascades (Gutiérrez 1996). The upper elevation limit at which spotted owls occur decreases with increasing latitude in Oregon and Washington (Lint et al. 2005). In all areas, the upper elevation limit at which spotted owls occur corresponds to the transition to subalpine forest, which is characterized by relatively simple structure and severe winter weather (Gutiérrez 1996).

Roost sites selected by spotted owls have more complex vegetation structure than forests generally available to them (Barrows and Barrows 1978, Forsman et al. 1984, Solis and Gutiérrez 1990). These habitats are usually multi-layered forests having high canopy closure and large diameter trees in the overstory.

Spotted owls nest almost exclusively in trees. Like roosts, nest sites are found in forests having complex structure dominated by large diameter trees (Forsman et al. 1984, Hershhey et al. 1998). Even in forests that have been previously logged, spotted owls select forests having a structure (i.e., larger trees, greater canopy closure) different than forests generally available to them (Follard 1993, Buchanan et al. 1995, Hershhey et al. 1998).

Foraging habitat is the most variable of all habitats used by territorial spotted owls (Thomas et al. 1990). Descriptions of foraging habitat have ranged from complex structure (Solis and Gutiérrez 1990) to forests with lower canopy closure and smaller trees than forests containing nests or roosts (Gutiérrez 1996).

Habitat Selection

Spotted owls generally rely on the structures and characteristics of older forested habitats for nesting, roosting, foraging, and dispersal. These characteristics include (Thomas et al. 1990, USFWS 1990a):

- A multi-layered, multi-species canopy dominated by large overstory trees;
- Moderate to high canopy closure;
- A high incidence of trees with large cavities and other types of deformities;
- Numerous large snags;

- An abundance of large, dead wood on the ground; and
- Open space within and below the upper canopy for spotted owls to fly.

Forested stands with high canopy closure also provide thermal cover (Weathers et al. 2001), as well as protection from predation. Recent landscape-level analyses in portions of the Klamath Province suggest that a mosaic of late-successional habitat interspersed with other vegetation types may benefit spotted owls more than large, homogeneous expanses of older forests (Zabel et al. 2003, Franklin et al. 2000, Meyer et al. 1998). In redwood forests along the coast range of California, spotted owls may be found in younger forest stands with structural characteristics of older forests (Thomas et al. 1990). However, spotted owls do not generally appear to select for stands of intermediate or younger ages (Solis and Gutiérrez 1990, Thomas et al. 1990).

In mixed conifer forests of the East Cascades province in Washington, 27 percent of nest sites were in old-growth forests, 57 percent in the understory reinitiation phase of stand development, and 17 percent in the stem exclusion phase (Buchanan et al. 1995). In the West Cascades province in Oregon, 50 percent of spotted owl nests were in late-successional (greater than 80 years old) or old-growth stands, and none were found in stands less than 40 years old (Irwin et al. 2000).

Ward (1990) reported that spotted owls foraged in areas that had lower variance in prey densities (prey were more predictable in occurrence) within older forests and near ecotones of old forest and brush seral stages. Zabel et al. (1995) showed that spotted owl home ranges are larger where flying squirrels (*Glaucomys sabrinus*) are the predominant prey. Conversely, home ranges are smaller where woodrats (*Neotoma* spp.) are the predominant prey.

In the Western Washington Cascades, spotted owls used mature/old forests dominated by trees greater than 50 cm diameter-at-breast height (dbh) with greater than 60 percent canopy closure more often than expected for roosting during the non-breeding season. They used young forest (trees 20-50 cm dbh with greater than 60 percent canopy closure) less often than expected based on availability (Harter et al. 2002).

Reproductive Biology

Adult spotted owls exhibit high annual survival rates and are relatively long-lived (USFWS 1992a and Anthony et al. 2004). Spotted owls do not typically reach sexual maturity until after 2 years (Miller et al. 1985 and Thomas et al. 1990). Adult females lay an average of two eggs per clutch, with a range of one to four eggs. Spotted owl pairs typically do not nest every year, nor are nesting pairs successful every year (USFWS 1990a). The small clutch size, temporal variability in nesting success, and somewhat delayed maturation all contribute to the relatively low fecundity of this species (Gutiérrez 1996).

In the Douglas-fir (*Pseudotsuga menziesii*) region, nest sites are usually located within stands of old-growth and late-successional forest dominated by Douglas-fir, and they contain structures such as cavities, broken tree tops, and mistletoe (*Arceuthobium* spp.) brooms (Forsman et al. 1984, Blakesley et al. 1992, LaHaye and Gutiérrez 1999). In general, courtship and nesting behavior begins in February to March with nesting occurring from March to June; however,

timing of nesting and fledging varies with latitude and elevation (Forsman et al. 1984). After young fledge from the nest, they depend on their parents until they are able to fly and hunt on their own. Parental care continues post-fledging into September (USFWS 1990b), and sometimes into October (Forsman et al. 1984). During this time, the adults may not roost with their young during the day, but they respond to begging vocalizations by bringing food to the young (Forsman et al. 1984).

Some spotted owls, known as "floaters", do not demonstrate territorial behavior, but either remain as residents within the territory of a pair or move among territories (Gutiérrez 1996). Floaters have special significance in spotted owl populations because they may buffer the territorial population from decline (Franklin 1992). Little is known about floaters other than that they exist and typically do not respond to calls as vigorously as territorial birds (Gutiérrez 1996).

Dispersal Biology

Natal dispersal of spotted owls from Oregon and Washington typically begins during mid- to late-September, and shows remarkable synchrony across broad areas (Forsman et al. 2002). When data from many dispersing spotted owls are pooled, the direction of dispersal away from the natal site appears random (Miller 1989, Ganey et al. 1998, Forsman et al. 2002). Dispersal direction from individual territories, however, may be non-random in response to the local distribution of habitat and topography (Forsman et al. 2002). Natal dispersal occurs in stages, with juvenile spotted owls settling in temporary home ranges between bouts of dispersal (Forsman et al. 2002). Median natal dispersal distance is about 10 miles for males and 15.5 miles for females (Forsman et al. 2002, see also Miller 1989, Ganey et al. 1998). Successful dispersal of juvenile spotted owls may depend on their ability to locate unoccupied suitable habitat in close proximity to other occupied sites (LaHaye et al. 2001).

Breeding dispersal occurs among a small proportion of adult spotted owls; these movements were more frequent among females and unmated individuals (Forsman et al. 2002). Breeding dispersal distances were shorter than natal dispersal distances and are apparently random in direction (Forsman et al. 2002).

Large non-forested valleys are apparent barriers to natal and breeding dispersal; forested foothills between valleys may provide the only opportunities for dispersal (Forsman et al. 2002). The degree to which extensive water bodies, such as the Columbia River estuary and Puget Sound, function as barriers to dispersal is unclear. Analysis of genetic structure of spotted owl populations suggests adequate rates of gene flow may occur across the Puget Trough between the Olympic Mountains and Washington Cascades, and across the Columbia River between the Olympic Mountains and the Coast Range of Oregon (Haig et al. 2001). Both telemetry and genetic studies indicate inbreeding is rare.

Dispersing juvenile spotted owls experience high mortality rates, exceeding 70 percent during their first year in some studies (USFWS 1990b, Miller 1989). Leading known causes of mortality are starvation, predation, and accidents (Miller 1989, USFWS 1990b, Forsman et al. 2002). Parasitic infection may contribute to these causes of mortality (Forsman et al. 2002). In a study on habitat use by dispersing juvenile spotted owls in the Oregon Coast Range, Klamath

and Western Oregon Cascades Provinces (Miller et al. 1997), mature and old-growth forest were used slightly more than expected, compared to availability, during the transient phase and nearly twice its availability during the colonization phase. Dispersing juvenile spotted owls used closed pole-sapling-sawtimber habitat roughly in proportion to availability in both phases; they used open sapling and clearcuts less than expected based on availability during colonization.

Food Habits

Spotted owls are mostly nocturnal (Forsman et al. 1984), but may forage opportunistically during the day (Laymon 1991, Sovern et al. 1994). Composition of prey in the spotted owl's diet varies regionally, seasonally, annually, and locally, likely in response to prey availability (Laymon 1988, Ganey 1992, Vermer et al. 1992, Carey 1993, Ward and Block 1995, Forsman et al. 2001). Northern flying squirrels and woodrats are usually the predominant prey, in biomass and in frequency (Barrows 1980; Forsman et al. 1984; Ward 1990; Bevis et al. 1997; Forsman et al. 2001, 2004), with a clear geographic pattern of diet, paralleling differences in habitat (Thomas et al. 1990). Northern flying squirrels are generally the dominant prey item in the more mesic Douglas-fir/western hemlock forests characteristic of the northern portion of the range. Woodrats are generally the most abundant prey item in the drier mixed conifer/mixed evergreen forests typically found in the southern portion of the range (Forsman et al. 1984, Thomas et al. 1990, Ward et al. 1998, reviewed by Courtney et al. 2004). These prey items were found to be approximately equally abundant in the southwest interior of Oregon (Forsman et al. 2001, 2004).

Other prey species, such as the red tree vole (*Arborimus longicaudus*), red backed voles (*Clathronomys gapperi*), mice, rabbits and hares, birds, and insects, may be seasonally or locally important (reviewed by Courtney et al. 2004). For example, Rosenberg et al. (2003) showed a strong correlation between annual reproductive success of spotted owls (number of young per territory) and abundance of deer mice (*Peromyscus maniculatus*) ($r^2 = 0.68$), despite the fact they only made up 1.6±0.5 percent of the biomass consumed. However, it is unclear if the causative factor behind this correlation was prey abundance or a synergistic response to weather (Rosenberg et al. 2003). Ward (1990) also noted that mice were more abundant in areas selected for foraging by owls. Nonetheless, spotted owls deliver larger prey to the nest and eat smaller food items, perhaps to reduce foraging energy costs. Therefore, managers should not underestimate the importance of smaller prey items such as *Peromyscus* in the spotted owl diet (Forsman et al. 1984, 2001, 2004).

Population Dynamics

The spotted owl is a relatively long-lived species, produces few but relatively large young, invests significantly in parental care, experiences later or delayed maturity, and exhibits high adult survivorship. The spotted owl's long reproductive life span allows for some eventual recruitment of offspring, even if recruitment does not occur each year (Franklin et al. 2000). Annual variation in population parameters for spotted owls has been linked to environmental influences at various life history stages (Franklin et al. 2000). In coniferous forests, mean fledgling production of the California spotted owl (*S. o. occidentalis*), another closely related subspecies, was higher when minimum spring temperatures were higher (North et al. 2000), a

relationship that may be a function of increased prey availability. Across their range, spotted owls have previously shown a pattern of alternating years of high and low reproduction (Franklin et al. 1995). For reasons unknown, highest reproduction has occurred during even-numbered years. Annual variation in breeding may relate to weather conditions and fluctuation in prey abundance (Zabel et al. 1996). Forsman et al. (1996) provided the results of multiple studies showing the effects of weather, specifically temperature and precipitation, on northern spotted owl productivity.

A variety of factors may regulate spotted owl population levels. These factors may be density-dependent (e.g., habitat quality, habitat abundance) or density-independent (e.g., weather). Interactions may occur among factors. For example, severe weather may prove more detrimental to individual spotted owls in fragmented or otherwise poor quality habitat than those living in high quality, contiguous habitat. As habitat quality decreases, density-independent factors may have more influence on variation in rate of population growth, which tends to increase variation in the rate of growth (Franklin et al. 2000). A consequence of this pattern is that, at some point, lower habitat quality may cause the population to be unregulated and decline to extinction (Franklin et al. 2000).

Threats

Reasons for Listing

The Service listed the spotted owl as threatened throughout its range "due to loss and adverse modification of suitable habitat as a result of timber harvesting and exacerbated by catastrophic events such as fire, volcanic eruption, and wind storms" (USFWS 1990a). More specifically, significant threats to the spotted owl included low or declining populations; limited or declining habitat; fragmented or isolated distribution of habitat and populations; isolation of provinces; predation and competition; lack of coordinated conservation measures; and vulnerability to natural disturbance (USFWS 1992a). The Service characterized the threats within each province as severe, moderate, low, or unknown. Declining habitat was recognized as a severe or moderate threat to the spotted owl in all 12 provinces, isolation of provinces within 11 provinces, and declining populations in 10 provinces. Consequently, these three factors represented the greatest concern range-wide to the conservation of the spotted owl. Limited habitat was considered a severe or moderate threat in nine provinces, and low populations a severe or moderate concern in eight provinces, suggesting that these factors are a concern throughout the majority of the range. The Service rated the vulnerability to natural disturbances as low in five provinces.

The degree to which predation and competition poses a threat to the spotted owl was unknown in more provinces than any of the other threats, and indicates a need for additional information. Few empirical studies exist to confirm that habitat fragmentation contributes to increased levels of predation on spotted owls (Courtney et al. 2004). However, great horned owls (*Bubo virginianus*), an effective predator on spotted owls, are closely associated with fragmented forests, openings, and clearcuts (Johnson 1992, Laidig and Dobkin 1995). As mature forest harvest continues, great horned owls may colonize fragmented forests, thereby increasing spotted owl vulnerability to predation.

New Threats

Barred Owls

Since the listing of the spotted owl under the Act, new information suggests that hybridization with the barred owl is less of a threat (Kelly and Fossman 2004) and competition with the barred owl is a greater threat than previously anticipated (Courtney et al. 2004). Since 1990, the barred owl has expanded its range south into Marin County, California and the central Sierra Nevada Mountains, such that it is now roughly coincident with the range of the northern spotted owl and the California spotted owl (Courtney et al. 2004). Further, notwithstanding the likely bias in survey methods towards underestimating actual barred owl numbers (Courtney et al. 2004), barred owl populations appear to be increasing throughout the Pacific Northwest, particularly in Washington and Oregon (Zabel et al. 1996, Dark et al. 1998, Wiedemeier and Horton 2000, Kelly et al. 2003, Pearson and Livezey 2003, Anthony et al. 2004a). Barred owl numbers now may exceed spotted owl numbers in the northern Washington Cascades (Kuntz and Christopherson 1996) and British Columbia (Dunbar et al. 1991) and appear to be approaching spotted owl numbers in several other areas, including Redwood National and State Parks in California (Schmidt 2003). Barred owl populations in the Pacific Northwest appear to be self-sustaining based on current density estimates and apparent distribution (Courtney et al. 2004).

Barred owls apparently compete with spotted owls through a variety of mechanisms: prey overlap (Hamer et al. 2001), habitat overlap (Hamer et al. 1989, Dunbar et al. 1991, Henter and Hicks 2000, Pearson and Livezey 2003), and agonistic encounters (Leskiw and Gutiérrez 1998, Pearson and Livezey 2003). New information on encounters between barred owls and spotted owls comes primarily from anecdotal reports that corroborate initial observations that barred owls react more aggressively towards spotted owls than vice versa (Courtney et al. 2004). Limited circumstantial evidence exists documenting barred owl predation on spotted owls (Leskiw and Gutiérrez 1998, Johnston 2002). Information collected to date indicates that encounters between these two species tend to be agonistic in nature, and that the outcome is unlikely to favor the spotted owl (Courtney et al. 2004).

Although biologists initially thought barred owls were more closely associated with early successional forests than spotted owls (Hamer 1988, Iverson 1993), recent studies indicate that barred owls utilize a broader range of forest successional stages than do spotted owls (Courtney et al. 2004). The only study comparing spotted owl and barred owl food habits in the Pacific Northwest indicated that barred owl diets overlapped strongly (greater than 75 percent) with spotted owl diets (Hamer et al. 2001). However, barred owl diets were also more diverse than spotted owl diets, including species associated with riparian and other moist habitats, as well as more terrestrial and diurnal species.

Evidence that barred owls are causing the displacement of spotted owls is largely indirect, based primarily on retrospective examination of long-term data collected on spotted owls. Correlations between local spotted owl declines and barred owl increases have been noted in the northern Washington Cascades (Kuntz and Christopherson 1996, Henter and Hicks 2000, Pearson and Livezey 2003), on the Olympic peninsula (Wiedemeier and Horton 2000, Gremel 2000, 2003), in the southern Oregon Cascades (Johnston 2002), and in the coastal redwood zone in California

(Schmidt 2003).

Spotted owl occupancy was significantly lower in spotted owl territories where barred owls were detected within 0.8 km (0.5 mi) of the spotted owl territory center than in spotted owl territories where no barred owls were detected (Kelly et al. 2003). Kelly et al. (2003) found spotted owl occupancy to be significantly lower ($P < 0.001$) when barred owl detections occurred within 0.8 km of the spotted owl territory center. Occupancy was "only marginally lower" ($P = 0.06$) if barred owls were located more than 0.8 km from spotted owl territory centers. In a Roseburg, Oregon, study area, 46 percent of spotted owls moved more than 0.8 km, and 39 percent of spotted owls were not relocated in at least two years, after barred owls were detected within 0.8 km of the territory center. Observations provided by Gremel (2000) from the Olympic National Park are consistent with those of Kelly et al. (2003); he documented significant displacement of spotted owls following barred owl detections "coupled with elevational changes of northern spotted owl sites on the east side of the Park" (Courtney et al. 2004). Pearson and Livezey (2003) reported similar findings on the Gifford Pinchot National Forest where unoccupied spotted owl sites were characterized by significantly more barred owl sites within 0.8-km, 1.6-km, and 2.9-km from the territory center than in occupied spotted owl sites.

In two study areas in Washington, investigators found relatively high numbers of territories previously occupied by spotted owls, that are now apparently not occupied by either spotted or barred owls. Forty-nine of 107 territories in the Cascades (Henter and Hicks 2000), and 23 of 33 territories in the Olympic Experimental State Forest (Wiedemeier and Horton 2000) were no longer occupied by either species. Since the habitat was still present in these vacant territories, some factor or factors may be reducing habitat suitability or local abundance of both species. For example, weather conditions could cause prolonged declines in abundance of both species (Franklin et al. 2000). Because spotted owls have been reported anecdotally to give fewer vocalizations when barred owls are present, it is possible that these supposed vacant territories are still occupied by spotted owls that do not respond to surveys. Likewise, survey protocols for spotted owls are believed to under-detect barred owls (Courtney et al. 2004). Preliminary results from Olson et al. (2005) suggest that barred owl presence had a negative effect on spotted owl detection probabilities. Thus, some proportion of seemingly vacant territories may be an artifact of reduced detection probability of the survey protocol. Nonetheless, previously occupied territories apparently vacant of both *Strix* species suggests that factors other than barred owls alone are contributing to declines in spotted owl abundance and territorial occupancy (Courtney et al. 2004).

Two studies (Kelly 2001, Anthony et al. 2004a) attempted to determine whether barred owls affected fecundity of spotted owls in the long-term demographic study areas. Neither study was able to clearly do so, although the Wenatchee and Olympic demographic study areas showed possible effects (Anthony et al. 2004a). However, both studies described the shortfalls of their methods to adequately test for this effect. Iverson (2004) reported no effect of barred owl presence on spotted owl reproduction, but his results could have been influenced by small sample size (Livezey, in review). Barred owls had a negative effect on spotted owl survival on the Wenatchee and Olympic study areas and possibly an effect on the Cle Elum study area (Anthony et al. 2004a). Olson et al. (in press) found a significant but weak negative effect of barred owl presence on spotted owl reproductive output but not on survival at a Roseburg,

Oregon study area (Courtney et al. 2004).

Regarding interactions between barred and spotted owls, the uncertainties associated with methods, analyses, and possible confounding factors, such as the effects of past habitat loss and weather, warrant caution in interpretation of the patterns emerging from the data and information collected to date (Courtney et al. 2004). Further, data are currently lacking that would allow accurate prediction of how barred owls will affect spotted owls in the southern, more xeric, provinces in the California and Oregon Klamath region. In spite of these uncertainties, the preponderance of the evidence gathered thus far is consistent with the hypothesis that barred owls play some role in spotted owl population decline, particularly in Washington, portions of Oregon, and the northern coast of California (Courtney et al. 2004).

Although the barred owl currently constitutes a significantly greater threat to the northern spotted owl than originally thought at the time of listing (Courtney et al. 2004), it is unclear whether forest management influences the outcome of interactions between species (Courtney et al. 2004, summarized by Lint et al. 2005). The most recent summaries compiled on the barred owl (Courtney et al. 2004, Lint et al. 2005, USDI Fish and Wildlife Service 2004) do not provide recommendations on how to deal with this potential threat. In their status review of the northern spotted owl, the Service (U.S. Fish and Wildlife Service 2004) did not consider the increased risk to northern spotted owl populations due to the uncertainties surrounding barred owls and other factors sufficient to reclassify the subspecies as endangered at this time. Because it was not clear if additional protection of northern spotted owl habitat would reverse the population trends in some portions of the species' range, and because the results of their study did not identify the causes of those trends, Anthony et al. (2004) declined to make any recommendations to alter the current NWFP management strategy.

Wildfire

In 1994, the Hatchery Complex wildfires burned 17,603 ha in the Wenatchee National Forest, eastern Cascades, Washington, affecting six spotted owl activity centers (Gaines et al. 1997). Spotted owl habitat within a 2.9 km radius of the affected activity centers was reduced by 8 to 45 percent (mean = 31 percent) due to direct effects of the fire and by 10 to 85 percent (mean = 55 percent) due to delayed mortality of fire-damaged trees and insect caused tree mortality. Spotted owl habitat loss was greater on mid to upper slopes (especially south-facing) than within riparian areas or on benches (Gaines et al. 1997). Direct mortality of spotted owls was assumed to have occurred at one site. Data were too sparse for reliable comparisons of site occupancy or reproductive output between sites affected by the fires and other sites on the Wenatchee National Forest.

Two wildfires burned in the Yakama Indian Reservation, eastern Cascades, Washington, in 1994, affecting home ranges of two radio-tagged spotted owls (King et al. 1997). Although the amount of home ranges burned was not quantified, spotted owls were observed using areas that received low and medium intensity burning. No direct mortality of spotted owls was observed, even though thick smoke covered several spotted owl site centers for a week.

The short-term effects of wildfires on spotted owl demography are an important consideration

for resource managers. Bond et al. (2002) examined the demography of spotted owls post wildfire, in which wildfire burned through spotted owl nest and roost sites in varying degrees of severity. Depending on the severity of the burn, wildfires may have relatively little short-term impact on spotted owl demography (i.e., survival, reproduction and site fidelity). In a preliminary study conducted by Anthony et al. (2004) in the Klamath Province of Oregon, their sample of spotted owls appeared to be using a variety of habitat types within the Timbered Rock Fire, including areas that had experienced moderate burning.

At the time of listing there was recognition that catastrophic wildfire posed a threat to the spotted owl (USFWS 1990a). New information suggests fire may be more of a threat than previously thought. In particular, the rate of habitat loss in the relatively dry East Cascades and Klamath provinces has been greater than expected (see "Habitat Trends" below). However, the total amount of habitat affected by wildfires has been relatively small (Lint et al. 2005). We may be able to influence, through silvicultural management, how fire prone forests will burn, and the extent of the fire when the inevitable fire occurs. Such silvicultural efforts are currently being implemented throughout the spotted owl's range, in an attempt to overcome nearly 100 years of effective fire suppression. However, we now recognize that our ability to protect spotted owl habitat and viable populations of spotted owls from these large fires through risk-reduction endeavors is largely uncertain (Courtney et al. 2004). Lint et al. (2005) indicated that the NWFP recognized wildfire as an inherent part of managing spotted owl habitat in certain portions of the range. The repetitive design of the NWFP can help mitigate the risks associated with large-scale fire (Lint et al. 2005).

West Nile Virus (WNV)

WNV has killed millions of wild birds in North America since it arrived in 1999 (McLean et al. 2001, Caffrey 2003, and Marra et al. 2004). Mosquitoes are the primary carriers (vectors) of the virus that causes encephalitis in humans, horses, and birds. Mammalian prey may also play a role in spreading WNV among predators, like spotted owls. Owls and other predators of mice can contract the disease by eating infected prey (Garmendia et al. 2000, Konar et al. 2001). Recent tests of tree squirrels, including flying squirrels, from Los Angeles County, California, found over 70 percent were positive for WNV (R. Carney, pers. comm. 2004, cited in Courtney et al. 2004). One captive spotted owl in Ontario, Canada, contracted WNV and died.

Health officials expect that WNV will eventually spread throughout the area that includes the range of the spotted owl (Courtney et al. 2004), but it is unknown how WNV will ultimately affect spotted owl populations. Susceptibility to infection and mortality rates of infected individuals vary among bird species, and even within groups of species (Courtney et al. 2004). Owls appear to be quite susceptible. Breeding screech owls (*Megecrops asio*) in Ohio experienced 100 percent mortality (T. Grubb, pers. comm., cited in Courtney et al. 2004). In contrast, barred owls showed lower susceptibility (B. Hunter, pers. comm., cited in Courtney et al. 2004). Some level of innate resistance may occur (Fitzgerald et al. 2003), which could explain observations in several species of markedly lower mortality in the second year of exposure to WNV (Caffrey and Peterson 2002). Wild birds also develop resistance to WNV through immune responses (Deibel et al. 2001). The effects of WNV on bird populations at a regional scale have not been large, even for susceptible species (Caffrey and Peterson 2003),

perhaps due to the short-term and patchy distribution of mortality (K. McGowan, pers. comm., cited in Courtney et al. 2004) or annual changes in vector abundance and distribution.

Courtney et al. (2004) offer competing propositions for the likely outcome of spotted owl populations being infected by WNV. One proposition is that spotted owls can tolerate severe, short-term population reductions due to WNV, because spotted owl populations are widely distributed and number in the several hundreds to thousands. An alternative proposition is that WNV will cause unsustainable mortality, due to the frequency and/or magnitude of infection, thereby resulting in long-term population declines and extirpation from parts of the spotted owl's current range.

West Nile virus (WNV) has been identified as a potential threat of unknown magnitude to the spotted owl (Courtney et al. 2004), and has the potential to reduce the population numbers beyond the projected decline anticipated under the NWFPP (Lint et al. 2005). Thus far, no mortality in wild, northern spotted owls has been recorded. Habitat restoration and recovery for northern spotted owls is anticipated to take decades, due to the long-term regrowth and development of late-successional forest structure. As such, it is too early to evaluate the long-term effectiveness of conservation efforts and regulatory changes in conserving northern spotted owls. However, the WNV threat to the northern spotted owl may not be influenced by habitat management or improvement (USFWS 2004).

Sudden Oak Death

Sudden oak death was recently identified as a potential threat to the spotted owl (Courtney et al. 2004). The fungus-like pathogen *Phytophthora ramorum* that recently invaded from Europe causes this disease, and it is rapidly spreading. At the present time, sudden oak death is found in natural forest stands that include various oak (*Quercus* spp.) species from Monterey County to Humboldt County in California, and has reached epidemic proportions in oak and tan oak (*Lithocarpus densiflorus*) forests along approximately 300 km of that coast (Kizzo et al. 2002). It also occurs near Brookings, Oregon, killing tan oak, and causing dieback of closely associated wild rhododendron (*Rhododendron* spp.) and evergreen huckleberry (*Vaccinium ovatum*) (Goheen et al. 2002). It has been found in several different forest types and at elevations from sea level to over 800 m elevation. It poses a threat of uncertain proportion because of its potential impact on forest dynamics and alteration of key habitat components (i.e., hardwood trees), especially in the southern portion of the spotted owl's range (Courtney et al. 2004). However, the potential for management to address the additive effects of sudden oak death on habitat availability is unknown and substantial uncertainty about its effects mediated against placing too much weight on this factor in the USFWS Five-Year Review Evaluation (USFWS 2004).

Inbreeding Depression, Genetic Isolation, and Reduced Genetic Diversity

The Service did not consider inbreeding and other genetic problems due to small population sizes an imminent threat to the spotted owl at the time of listing. Recent studies show no indication of reduced genetic variation and past bottlenecks in Washington, Oregon, or California (Barrowclough et al. 1999, Haig et al. in press, Henke et al. unpublished). However, in Canada, Harestad (2004) estimated the breeding population to be less than 33 pairs and annual

population decline may be as high as 35 percent. Canadian populations may be more adversely affected by issues related to small population size including inbreeding depression, genetic isolation, and reduced genetic diversity (Courtney et al. 2004). Low and persistently declining populations throughout the northern portion of the species range (see "Population Trends" below) may be at increased risk of losing genetic diversity.

Climate Change

Climate change, a potential additional threat to northern spotted owl populations, is not explicitly addressed in the NWFPP. Climate change could have direct and indirect impacts on northern spotted owls and their prey. However, the emphasis on maintenance of serial stage complexity and related species diversity in the Matrix under the NWFPP should contribute to the resiliency of the federal forest landscape to the impacts of climate change (Courtney et al. 2004).

Based upon a global meta-analysis, Parmesan and Yohe (2003) discussed several potential implications of global climate change to biological systems, including terrestrial flora and fauna. Results indicated that 62 percent of species exhibited trends indicative of advancement of spring conditions. Bird species manifest these trends in earlier nesting activities. Because the spotted owl exhibits a limited tolerance to heat relative to other bird species (Weathers et al. 2001), subtle changes in climate have the potential to affect this species. However, at this time, there is no agreed-upon, objective means to measure that potential.

Conservation Needs of the Northern Spotted Owl

Based on the above assessment of threats, the spotted owl has the following habitat-specific and habitat-independent conservation (i.e., survival and recovery) needs:

Habitat-Specific Needs

- Large blocks of suitable habitat to support clusters or local population centers of spotted owls (e.g., 15 to 20 breeding pairs) throughout the owl's range;
- Suitable habitat conditions and spacing between local spotted owl populations throughout its range to facilitate survival and movement;
- Suitable habitat distributed across a variety of ecological conditions within the spotted owl's range to reduce risk of local or widespread extirpation;
- A coordinated, adaptive management effort to reduce the loss of habitat due to catastrophic wildfire throughout the spotted owl's range, and a monitoring program to clarify whether these risk reduction methods are effective and to determine how owls use habitat treated to reduce fuels; and
- In areas of significant population decline, sustain the full range of survival and recovery options for this species in light of significant uncertainty.

Habitat-Independent Needs

- A coordinated research and adaptive management effort to better understand and manage competitive interactions between spotted and barred owls; and
- Monitoring to better understand the risk that WNV and sudden oak death pose to spotted owls and (for WNV) research into methods that reduce the likelihood or severity of outbreaks in spotted owl populations.

Conservation Strategy

Since 1990, various efforts have addressed the conservation needs of the spotted owl and attempted to formulate conservation strategies based upon these needs, beginning with the ISC's Conservation Strategy (Thomas et al. 1990). Several ensuing efforts continued to use the basic conservation strategy designed by Thomas et al (1990), including:

- The designation of critical habitat (USFWS 1992b),
- The preparation of a Draft Recovery Plan (USFWS 1992a),
- The Scientific Analysis Team report (Thomas et al. 1993),
- The report of the Forest Ecosystem Management Assessment Team (Thomas and Raphael 1993); and
- The Northwest Forest Plan (USDA/USDI 1994b).

Each conservation strategy was based upon the reserve design principles first articulated in the ISC's report, which are summarized as follows.

- Species well distributed across their range are less prone to extinction than species confined to small portions of their range.
- Large blocks of habitat, containing multiple pairs of the species, are superior to small blocks of habitat with only one to a few pairs.
- Blocks of habitat that are close together are better than blocks far apart.
- Habitat that occurs in contiguous blocks is better than habitat that is more fragmented.
- Habitat between blocks is more effective as dispersal habitat if it resembles suitable habitat.

Federal Contribution to Recovery

The NWFP is the current conservation strategy for the spotted owl on federal lands. It is designed around the conservation needs of the spotted owl and based upon the designation of a variety of land-use allocations whose objectives are either to provide for population clusters (i.e., demographic support) or to maintain connectivity between population clusters. Several land-use allocations, including Late-Successional Reserves (LSRs), Managed Late-Successional Areas (MSLAs), Congressionally Reserved Areas (CRAs), Managed Pair Areas, and Reserve Pair Areas, are intended to contribute primarily to supporting population clusters. The remaining land-use allocations, including Matrix, Adaptive Management Areas (AMAs), Riparian Reserves (RRs), Connectivity Blocks, and Administratively Withdrawn Areas (AWAs), provide connectivity among habitat blocks intended for demographic support.

The range-wide system of LSRs set up under the NWFP captures the variety of ecological conditions within the 12 different provinces to which spotted owls are adapted. This design reduces the potential for extinction resulting from large catastrophic events in one or more provinces. Multiple, large LSRs in each province reduce the potential that spotted owls will be extirpated in any individual province and reduce the potential that large wildfires or other large-scale events will eliminate all habitat within an LSR. In addition, LSRs are generally arranged and spaced to ensure a reasonable likelihood that spotted owls disperse among two or more adjacent LSRs. This network of reserves reduces the likelihood that catastrophic events will substantially reduce habitat connectivity and population dynamics among provinces.

Although FEMAT scientists predicted that spotted owl populations would decline in the Matrix over time, they expected populations to stabilize and eventually increase within LSRs as habitat conditions improved over the next 50 to 100 years (Thomas and Raphael 1993, USDA/USDI 1994a and 1994b). Based on the results of the first decade of monitoring, the NWFP's authors cannot determine if the declining population trend will be reversed because not enough time has passed to provide the necessary measure of certainty (Lint et al. 2005). However, the results from the first decade of monitoring do not provide any reason to depart from the objective of habitat maintenance and restoration as described under the NWFP (Lint et al. 2005). Other stressors, some already in action (e.g., barred owl), and some yet unrealized (West Nile virus), complicate the conservation of the spotted owl. Currently, the new reports generated on the science of the spotted owl offer few management recommendations to address the emerging threats facing the owl. The redundancy and flexibility of the system of NWFP land use allocations may prove to be the most appropriate strategy in responding to these unexpected challenges (Courtney et al. 2004).

Under the NWFP, the agencies anticipated a decline of northern spotted owl populations during the first decade of implementation. Recent reports (Courtney et al. 2004, Anthony et al. 2004a) identified greater than expected northern spotted owl declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California. The reports found no direct correlation between habitat conditions and changes in northern spotted owls at the metapopulation scale. In addition, no evidence currently exists to suggest that dispersal habitat is currently limiting (Courtney et al. 2004, Lint et al. 2005). Even with the

population decline, Courtney et al (2004) noted that there is little reason to doubt the effectiveness of the core of the NWFP conservation strategy.

According to the Service (U.S. Fish and Wildlife Service 2004), the current scientific information, including information showing northern spotted owl population declines, indicates that the spotted owl continues to meet the definition of a threatened species. That is, populations are still relatively numerous over most of its historic range, which suggests that the threat of extinction is not imminent, and that the subspecies is not endangered even in the northern part of its range where greater than expected population declines were documented.

Conservation Efforts on Non-Federal Lands

FEMAT noted that limited Federal ownership in some areas constrained the ability to form an extensive reserve network to meet conservation needs of the spotted owl. Thus, non-federal lands were an important contribution to the range-wide goal of achieving conservation and recovery of the spotted owl. The Service's primary expectations for private lands are their contributions to demographic support (pair or cluster protection) to and/or their connectivity with Federal lands. In addition, forest practice rules in effect in each state govern timber harvest, and provide protection of spotted owls and/or their habitat to varying degrees.

Washington: In 1993, the State Forest Practices Board adopted rules (Forest Practices Board 1996) that would "contribute to conserving the spotted owl and its habitat on non-Federal lands" based on recommendations from a Science Advisory Group which identified important non-Federal lands and recommended roles for those lands in spotted owl conservation (Hanson et al. 1993, Buchanan et al. 1994). Spotted owl-related Habitat Conservation Plans (HCPs) in Washington generally provide both demographic and connectivity support as recommended in these reports and the draft recovery plan (USFWS 1992a).

Oregon: The Oregon Forest Practices Act provides for protection of 70-acre core areas around known spotted owl nest sites, but it does not provide for protection of spotted owl habitat beyond these areas (ODF 2000). In general, no large-scale strategy or mechanism for spotted owl habitat protection currently exists for non-federal lands in Oregon. The four spotted owl-related HCPs currently in effect in Oregon address relatively few acres of land; however, they will provide some nesting habitat and connectivity over the next few decades.

California: In 1990, the State amended the State Forest Practice Rules (FPRs), which govern timber harvest on non-federal lands, to require surveys for spotted owls in suitable habitat and to provide protection around activity centers (CDF 2001). Under the FPRs, no timber harvest plan (THP) can be approved if it is likely to result in incidental take of Federally listed species, unless authorized by a federal HCP. The California Department of Fish and Game initially reviewed all THPs to ensure that take was not likely to occur; the Service took over that review function in 2000. Several large industrial owners operate under Spotted Owl Management Plans that have been reviewed by the Service; the plans specify basic measures for spotted owl protection. The Service has approved three HCPs that authorize take of spotted owls. Implementation of these plans will provide for spotted owl demographic and connectivity support to NWFP lands.

Current Condition of the Spotted Owl

The current condition of the species incorporates the effects of all past human and natural activities or events that have led to the present-day status of the species and its habitat (USFWS and NMFS 1998).

Range-wide Habitat and Population Trends

Habitat Trends

The Service has used information provided by the Forest Service, Bureau of Land Management, and National Park Service to update the habitat baseline conditions on Federal lands for spotted owls on several occasions since the listing of the spotted owl in 1990. The estimated 7.4 million acres used for the NWFP in 1994 (USDA/USDI 1994a) was believed to be representative of the general amount of spotted owl habitat on these lands. This baseline was used to track relative changes over time in the subsequent analyses. The plan's effectiveness monitoring program resulted in the production, in 2005, of a new map depicting suitable spotted owl habitat throughout the species' range (Litt et al. 2005). However, this new habitat map is not yet available for use in tracking individual actions. Therefore, the following analyses indicate changes to the baseline condition established in 1994. The Service is beginning a process to evaluate the map for future use of tracking habitat trends.

Currently, there are no reliable estimates of spotted owl habitat on other land ownerships. Consequently, consulted-on acres can be tracked but not evaluated in the context of change with respect to a reference condition on non-federal lands. However, the production of the monitoring program habitat map provides an opportunity to evaluate trends in non-federal habitat.

Range-wide Analysis 1994 - 2001

In 2001, the Service assessed habitat baseline conditions (USFWS 2001), the first assessment since implementation of the NWFP in 1994. This range-wide evaluation of habitat was necessary to determine if the rate of potential change to spotted owl habitat was consistent with the change anticipated in the NWFP. In particular, the Service considered habitat effects documented through section 7 consultations since 1994. In general, the analytical framework of these consultations focused on the reserve or connectivity goals established by the NWFP land-use allocations (USDA/USDI 1994a). The Service expressed these effects in terms of changes in acreage of suitable spotted owl habitat within these land-use allocations. The Service determined that actions and their effects were consistent with the expectations for implementation of the NWFP from 1994 through June 2001 (USFWS 2001).

Range-wide Analysis 1994 - 2004 (first decade of the NWFP)

This section updates the information considered in USFWS (2001), relying particularly on information in documents the Service produced pursuant to section 7 of the Act and information

provided by NWFP agencies on habitat loss resulting from natural events (e.g., fires, windthrow, insect and disease).

In 1994, about 7.4 million acres of suitable habitat were estimated to exist on federal lands. As of April 12, 2004, the Service had consulted on the proposed removal of 575,447 acres of spotted owl habitat range-wide, of which 190,429 acres occurred on federal lands managed under the NWFP. Federal lands were expected to experience an approximate 2.6 percent decline in suitable habitat due to all management activities (not just timber harvest) over the past decade, with about 167,134 acres¹ (approximately 2.3 percent) removed by timber harvest. These anticipated changes in suitable spotted owl habitat were consistent with the expectations for implementation of the NWFP.

Most management-related habitat loss on federal lands, considered range-wide, was concentrated in the Oregon physiographic provinces. In particular, the percentage of habitat to be removed from the Oregon Klamath Mountains province was relatively high (approximately 11 percent) in comparison to other provinces, most of which were characterized by less than a 4 percent decrease in habitat. Habitat removed from the Oregon Klamath Mountains province and the two Oregon Cascades provinces made up 44 percent and 36 percent, respectively, of the habitat loss range-wide since 1994. In summary, habitat loss in Washington accounted for 9.06 percent of the range-wide loss, but it only resulted in a loss of 0.73 percent of available habitat on Federal lands in Washington. In Oregon, habitat loss accounted for 82.37 percent of the range-wide losses, but only 4.13 percent of available habitat on Federal lands in Oregon. Loss of habitat on federal lands in California accounted for 8.57 percent of the losses range-wide, but only 1.34 percent of habitat on federal lands in California.

Since 1994, habitat lost due to natural events was estimated at approximately 168,301 acres range-wide. About two-thirds of this loss was attributed to the Biscuit Fire that burned over 500,000 acres in southwest Oregon (Roque River basin) and northern California in 2002. This fire resulted in a loss of approximately 113,451 acres of spotted owl habitat, including habitat within five LSRs.

Little information is available regarding spotted owl habitat trends on non-federal lands. Internal Service consultations conducted since 1992 have documented the eventual loss of 407,849² acres of habitat on non-federal lands. Most of these losses have yet to occur because they are part of large-scale, long-term HCPs.

Subsequent to the analysis for the first decade (1994-2004) of the NWFP, the Forest Service and Bureau of Land Management reported revised estimates of fire impacts. They also reported that not all effects anticipated during section 7 consultations actually occurred on the landscape, since the action agencies have not implemented some projects. Together these reports reduce the anticipated habitat loss during that decade. Therefore, the analysis above represents a reasonable, worst-case assessment. In addition, at the time of this assessment, we had no empirical information on increases in spotted owl habitat on any ownership resulting from

¹ Data compiled by the U.S. Fish and Wildlife Service, Northern Spotted Owl Coordination Group.

² Data compiled by the U.S. Fish and Wildlife Service, Northern Spotted Owl Coordination Group.

suitable habitat that had developed through forest succession and in-growth. The 2005 NWFP monitoring program's recently released reports suggests that approximately 315,000 to over 1 million acres of younger forests may have transitioned into late-successional forest condition, range-wide, since 1994.

Range-wide Analysis from 2004 (first decade) to the Present

This section updates the information considered in the first range-wide, decadal (1994-2004) analysis of the NWFP to the present writing of this BO. In 1994, about 7.4 million acres of suitable habitat were estimated to exist on Federal lands. As of April 2004, the Service had consulted on the removal of 575,447 acres of spotted owl habitat range-wide, of which 190,429 acres occurred on Federal lands managed under the NWFP. From April 12, 2004, to the present, the Service has consulted on the removal or downgrading of 15,455 acres of spotted owl habitat range-wide on Federal lands managed under the NWFP (190,429 acres consulted on for removal through April 12, 2004, subtracted from 205,884 acres consulted on for removal through July 19, 2005). This amount of habitat loss (0.21 percent) is consistent with the expectations for lumber management under the NWFP for the second decade of implementation, using the 2004 baseline of 7,038,368 acres of suitable habitat (1994 baseline with all suitable habitat losses subtracted out).

Currently, an estimated 4,876,646 acres of spotted owl habitat in Reserves receive protection under the NWFP.

Spotted Owl Numbers, Distribution, and Reproduction Trends

There are no estimates of the historical population size and distribution of the spotted owl within preferred habitat, although spotted owls are believed to have inhabited most old-growth forests throughout the Pacific Northwest prior to modern settlement (mid-1800s), including northwestern California (USFWS 1989). According to the final rule listing the spotted owl as threatened (USFWS 1990a), approximately 90 percent of the roughly 2,000 known spotted owl breeding pairs were located on federally managed lands, 1.4 percent were located on State lands, and 6.2 percent were located on private lands. The percent of spotted owls located on private lands in northern California was slightly higher (Forsman et al. 1984, USFWS 1989, Thomas et al. 1990).

Contreras (1994), using data from 1986-1992, tallied 3,753 known pairs and 980 singles throughout the range of the spotted owl. At the time the NWFP was initiated (July 1, 1994), BLM estimated 5,431 known locations or site centers of spotted owl pairs or resident singles; 851 sites (16 percent) occurred in Washington, 2,893 (53 percent) occurred in Oregon, and 1,687 (31 percent) occurred in California (BLM 1995). Because some areas were unsurveyed (USFWS 1992a, Thomas et al. 1995), and many remain so, the actual population of spotted owls across the range was believed to be larger than either count.

Because current survey coverage and effort are insufficient to produce reliable population-size estimates, researchers use other indices, such as demographic data, to evaluate trends in spotted owl populations. Analysis of demographic data can provide an estimate of the rate and direction

of population growth, identified by the parameter λ . A λ of 1.0 indicates a stationary population that is neither increasing nor decreasing, a λ less than 1.0 indicates a declining population, and a λ greater than 1.0 indicates a growing population.

In January 2004, at the spotted owl demographic meta-analysis workshop, two meta-analyses were conducted on the rate of population change using the re-parameterized Jolly-Seber method (λ_{RS}). One meta-analysis applied to all 13 study areas, and a second meta-analysis applied to the eight study areas included in the Effectiveness Monitoring Program of the NWFOP (Anthony et al. 2004a). Data were analyzed separately for individual study areas, as well as simultaneously across all study areas (true meta-analysis).

Estimates of λ_{RS} ranged from 0.896-1.005 for the 13 study areas, and all but one (Tye) of the estimates were <1.0 suggesting population declines for most areas (Anthony et al. 2004a) (Figure 1). There was strong evidence that populations on the Wenatchee, Cle Elum, Warm Springs, and Simpson study areas declined during the study, and there also was evidence that populations on the Rainier, Olympic, Oregon Coast Range, and H. Andrews study areas were decreasing (Figure 1). Precision of the λ_{RS} estimates for the Rainier and Olympic study areas were poor and not sufficient to detect a difference from 1.00. The estimate of λ_{RS} for the Rainier study area (0.896) was the lowest of all of the areas. Populations on the Tye, Klamath, South Oregon Cascades, Northwest California, and Hoopa study areas appeared to be stationary during the study, but there was some evidence that the South Oregon Cascades, Northwest California, and Hoopa study areas were declining ($\lambda_{RS} < 1.00$).

The weighted mean λ_{RS} for all of the study areas was 0.963 (SE = 0.009, 95 percent CI = 0.945-0.981), suggesting that populations over all study areas collectively were declining by about 3.7 percent per year from 1985-2003. The mean λ_{RS} for the eight demographic monitoring areas on Federal lands was 0.976 (SE = 0.007, 95 percent CI = 0.962-0.990), and the mean for non-Federal lands was 0.942 (SE = 0.016, 95 percent CI = 0.910-0.974), an average decline of 2.4 versus 5.8 percent per year, respectively. This suggests that spotted owl populations on Federal lands were declining but at a lower rate than elsewhere. However, interspersed of non-federal and federal land ownership on the study areas confounds this analysis.

The number of populations that have declined and the rate at which they have declined are noteworthy, particularly the precipitous declines on the four Washington study areas (Wenatchee, Cle Elum, Rainier, and Olympic). In these study areas, the population decline is estimated at 30-50 percent over 10 years. A similar decline is estimated for the Warm Springs study area in Oregon (Anthony et al. 2004a). Declines in adult survival rates may be an important factor contributing to declining population trends. Survival rates declined over time on five of the 14 study areas; four study areas in Washington, which showed the sharpest declines, and one study area in the Klamath province of northwest California (Anthony et al. 2004a). In Oregon, apparent survival for four of six study areas showed no time trends, and the remaining two study areas had weak non-linear trends. In California, two study areas showed no trend, one showed a slight decline, and one showed a significant linear decline (Anthony et al. 2004a). Like the trends in annual rate of population change, trends in adult survival rate showed clear declines in some areas, but not in others.

A small population of spotted owls occurs in British Columbia. This relatively isolated population apparently is declining sharply. Large areas of apparently suitable habitat are currently unoccupied (Courtney et al. 2004). Breeding populations have been estimated at fewer than 33 pairs. The species may be declining as much as 35 percent per year (Hafstad et al. 2004). The amount of interaction between spotted owls in Canada and the U.S. is unknown (Courtney et al. 2004). The Canadian population has reached the point where it is now vulnerable to stochastic demographic events that could cause further declines and perhaps extirpation; conditions are not likely to improve in the short term (Courtney et al. 2004).

STATUS OF NORTHERN SPOTTED OWL CRITICAL HABITAT

Legal Status

On January 15, 1992, the Service designated critical habitat for the spotted owl within 190 critical habitat units (CHUs) that encompass nearly 6.9 million acres across Washington (2.2 million acres), Oregon (3.3 million acres), and California (1.4 million acres) (USFWS 1992b). The spotted owl critical habitat final rule states (page 1823): "Section 7 analysis of activities affecting owl critical habitat should consider provinces, subprovinces, and individual CHUs, as well as the entire range of the subspecies". The rule goes on to assert the basis for an adverse modification opinion should be evaluated at the provincial scale.

Primary Constituent Elements

Primary constituent elements (PCEs) are defined as those physical and biological features of critical habitat essential to a species' conservation. PCEs identified in the spotted owl critical habitat final rule include those physical and biological features that support nesting, roosting, foraging, and dispersal (USFWS 1992b). Features that support nesting and roosting habitat typically include (Thomas et al. 1990)

- A moderate to high (60 to 90 percent) canopy closure;
- A multi-layered, multi-species canopy with large (> 30 inches diameter at breast height) overstory trees;
- A high incidence of large trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other evidence of decadence);
- Large snags;
- Large accumulations of fallen trees and other woody debris on the ground; and
- Sufficient open space below the canopy for owls to fly.

Foraging habitat generally consists of attributes similar to those in nesting and roosting habitat, but may not always support successfully nesting pairs (USFWS 1992b). Dispersal habitat, at minimum, consists of stands with adequate tree size and canopy closure to provide protection from avian predators and at least minimal foraging opportunities. Variations may occur over the owl's range, especially at drier sites in the east Cascades or in northern California (USFWS 1992b).

Conservation Role of Critical Habitat

The Service designated spotted owl critical habitat based on the identification of large blocks of suitable habitat well distributed across the range of the spotted owl. Critical habitat units were intended to identify a network of habitats that provided the functions considered important to maintaining stable, self-sustaining, and interconnected populations over the range of the spotted owl, with each CHU fulfilling a local, provincial, and range-wide role in spotted owl conservation. The Service expects most CHUs to provide suitable habitat for population support, designated some primarily for connectivity, and others to provide for both population support and connectivity.

The Federal agencies developed the NWFP using conservation principles similar to those used to designate critical habitat, and considered it to be the federal contribution to the conservation of spotted owls and its habitat in the United States. Specifically, the NWFP included late successional reserves (LSRs) to provide large blocks of suitable habitat capable of supporting multiple pairs of spotted owls. Standards and Guidelines of the NWFP establish that LSRs will be managed to protect and enhance late-successional and old-growth forests ecosystems. Riparian Reserves and other NWFP land use allocations provide for connectivity between reserves. Approximately 70 percent of suitable habitat in CHUs overlaps with NWFP LSRs on a range-wide basis and will therefore be managed to protect and enhance habitat characteristics.

Current Condition of Critical Habitat

Range-wide

In 1994, the FSEIS for the NWFP estimated that 3,141,987 acres of nesting, roosting and foraging (NRF) habitat existed within spotted owl CHUs on federally administered public lands. To assess changes to the baseline condition since implementation of the NWFP, the Service relies on information in section 7 consultations and available information on natural events. Within this document, effects to critical habitat refer to NRF habitat within spotted owl critical habitat.

Between 1994 and July 19, 2005, the Service has consulted on the removal or downgrading of 46,945 acres (1.49 percent) of critical habitat due to management-related activities across the range of the spotted owl. The majority of these consulted-on effects, 33,008 acres, have been concentrated in the Oregon Cascades West and Oregon Klamath Mountains Provinces. In addition, natural events (including fire and insect outbreaks) have resulted in the removal or downgrading of approximately 42,679 acres (1.39 percent) of critical habitat designated in 1994. In general, fires have had more of an impact to spotted owl critical habitat in the interior provinces of Washington and California and the southern and interior provinces of Oregon than the coastal provinces. Over 50 percent of spotted owl critical habitat removed or downgraded by fire can be attributed to the 1999 McGram Fire that burned in north-central California and the 2002 Biscuit Fire that burned in southwestern Oregon and northern California.

Most provinces experienced some degree of critical habitat loss between 1994 and December 2004, but the distribution of effects is disproportionate across the region. The majority of effects

to critical habitat (approximately 98 percent) have been concentrated in just six physiographic provinces (Washington East Cascades, Washington West Cascades, Oregon Klamath Mountains, Oregon Cascades East, Oregon Cascades West, and California Klamath). Of the remaining six provinces, one (Oregon Willamette Valley) had no designated critical habitat, one (Washington Western Lowlands) had no suitable habitat within critical habitat, and four provinces (Olympic Peninsula, Oregon Coast Range, California Coast Range, California Cascades) had less than one percent of their critical habitat removed or downgraded since 1994.

Provinces

Washington East Cascades

This province, which contains 18 CHUs, is located east of the Cascade Crest and includes the easterly extension of the spotted owl in Washington.

Between 1994 and December 2004, removal and degradation occurred on approximately 8,492 acres of critical habitat, or 2.6 percent of its provincial baseline. The majority of effects have been concentrated in the northern half of the province and resulted primarily from the Tyee, Needles, North 25 Mile, and Maple Fires. The largest of these fires, the Tyee, removed or downgraded approximately 3,600 acres of suitable habitat from WA-06, WA-09, and WA-11. The Maple Fire removed or downgraded an additional 300 acres of suitable habitat from to WA-06. The Needles and North 25 Mile Fires removed or downgraded approximately 2,500 acres (23 percent) and 474 acres (28 percent) of suitable habitat from WA-02 and WA-04, respectively. Collectively, the units impacted by these fires are important for the range-wide distribution of the spotted owl as they occur on the eastern and northeastern edge of the species range (USFWS 1991). Additionally, these CHUs provide essential habitat for intra-provincial connectivity (USFWS 1991).

Between January 2005 and July 19, 2005, and additional 3,601 acres of suitable habitat have been consulted on for removal or downgrade from critical habitat within the Washington East Cascades Province.

Washington West Cascades

This province, located west of the Cascade crest, contains 23 CHUs and includes the most acreage of critical habitat of any of the Washington provinces. Between 1994 and December 2004, the Service consulted on the removal or downgrading of approximately 4,594 acres of critical habitat within six CHUs, or one percent of the provincial baseline. Although impacts to five of these units have been relatively minor (less than 2.5 percent of their baseline), WA-39 has had 1,776 acres of suitable habitat (46 percent) consulted-on for removal or downgrading. The Service expects WA-39 to provide connectivity between the Western Cascades and Western Lowlands Provinces and improve the distribution of spotted owls and habitat in the portion of the province impacted by the 1980 Mount Saint Helens eruption (USFWS 1991). Fire has not resulted in measurable impacts to spotted owl critical habitat in this province.

Between January 2005 and July 19, 2005, section 7 consultations have not considered the

removal or downgrade of any additional acres of suitable habitat from critical habitat within the Washington West Cascades Province.

Oregon Klamath Mountains

The Oregon Klamath Mountains Province contains 16 CHUs, and provides the link between the Oregon Cascades West and Oregon Coast Ranges Province south into California.

Between 1994 and December 2004, this province has had more critical habitat removed or downgraded than any other province: 31,365 acres or 10 percent. In general, effects to critical habitat have been evenly distributed between those consulted upon (13,912 acres) and those attributable to fire (17,453 acres) effects. Although the distribution of consulted-on effects included 11 CHUs, approximately 36 percent of consulted-on effects occurred in two adjacent units (OR-74 and OR-75). Together, these units provide an east-west linkage in the southern portion of the Klamath Mountains Province and provide essential NRF, and dispersal habitat in a highly fragmented area (Tweten 1992). The Biscuit Fire accounts for the majority of fire effects in this province. This fire removed or downgraded approximately 23, 46, and 37 percent of the suitable habitat within OR-68, OR-69, and OR-70, respectively. These units were identified for their important contributions to inter- and intra-provincial connectivity and to provide essential NRF and dispersal habitat in areas where habitat is lacking (Tweten 1992).

Between January 2005 and July 19, 2005, the Oregon Klamath Mountains Province critical habitat baseline for consulted on activities that will remove or downgrade suitable habitat has been adjusted by 985 acres. This is usually due to modifications in proposed activities. Once projects are completed, and monitoring reports submitted, consulted on acres that are not affected are amended and the consultation is closed.

Oregon Cascades West

This province is located in the geographic center of the spotted owl's range and contains more critical habitat (over 894,000 acres) than any other province. It provides links with the Washington Cascades, Oregon Coast Range, and Klamath Mountains Provinces.

Between 1994 and December 2004, approximately 22,219 acres or 2.48 percent of its provincial baseline have been removed or downgraded. Consulted-on effects have been widely dispersed within 26 of the 29 CHUs in this province. In general, this has resulted in relatively small impacts to individual units. However, two adjacent units, OR-23 and OR-24, have experienced relatively concentrated effects having 215 acres (14.3 percent) and 946 acres (48.8 percent) removed or downgraded, respectively. Together, these units were identified as being important inter-provincial links between the Coast Ranges and the Oregon Cascades West Provinces (USFWS 1991). Fire has had limited effects to spotted owl critical habitat in this province: 1,216 acres or less than 0.5 percent of the provincial baseline have been removed or downgraded by fire.

Between January 2005 and July 19, 2005, the Oregon Cascades West Province critical habitat baseline for consulted on activities that will remove or downgrade suitable habitat has been

adjusted by 922 acres. As stated above, this is usually due to modifications in proposed activities. Once projects are completed, and monitoring reports submitted, consulted on acres that are not affected are amended and the consultation is closed.

Oregon Cascades East

The Oregon Cascades East Province provides the easterly extension of the spotted owl's range in Oregon and contains all or portions of 10 CHUs.

Between 1994 and December 2004, 8,584 acres or 6.18 percent of its provincial baseline have been removed or downgraded. The majority of these acres, approximately 6,878, are a result of several fires during 2002 and 2003. The impacts of these fires were concentrated in the central portion of this province where approximately 20 percent of the extant suitable habitat in OR-3 and OR-4 and over 36 percent of the suitable habitat in OR-7 were removed or downgraded. OR-3 and OR-4 were designated to maintain suitable habitat and support dispersal along the eastern slope of the Oregon Cascades (USFWS 1991). OR-7 provides a north-south link within the province and an inter-provincial link with the Oregon Cascades West Province. Consulted-on effects have been evenly distributed, occurring in 8 of 10 CHUs, and have resulted in less than a 5 percent reduction (through removal or downgrading) of suitable habitat within any individual CHU.

Between January 2005 and July 19, 2005, no additional acres of suitable habitat have been consulted on for removal or downgrade from critical habitat within the Oregon Cascades East Province.

California Klamath

The California Klamath Province contains all or portions of 36 CHUs and over 85 percent of spotted owl critical habitat in California.

Between 1994 and December 2004, habitat removal or downgrading occurred on approximately 10,483 acres of critical habitat (8.0 percent of the provincial baseline) within 14 CHUs in this province. The Mcgran Fire accounts for the majority of effects to these acres. This fire removed or downgraded 9,390 acres (22 percent) of the suitable habitat within CA-30; this CHU is located in the west/central portion of this province and links the interior subprovinces with the coastal provinces and is expected to provide for up to 24 spotted owl pairs over time (USFWS 1991). Two other small CHUs, CA-10 (9,637 acres) and CA-35 (12,470 acres) have had approximately 20 percent of their suitable habitat removed or downgraded from consulted-on actions. The primary function of these CHUs is to provide intra-provincial connectivity in the eastern and south-central portion of this province, respectively (USFWS 1991).

Between January 2005 and July 19, 2005, section 7 consultations for removal or downgrade from critical habitat has occurred on no additional acres of suitable habitat within the California Klamath Province.

Status in the Project Vicinity

Information for northern spotted owl territories in Mendocino County was obtained by Caltrans from the most current version of the California Department of Fish and Game (CDFG) database. This database is maintained by CDFG and tracks all known northern spotted owl territories throughout the state of California. Currently, the CDFG northern spotted owl database lists 556 territories in Mendocino County.

Crude density (i.e., the number of owls per square kilometer) has been calculated for several forest lands in northwestern California. The current density of northern spotted owls on Mendocino Redwoods Company lands is 0.272 owls/km². This density appears to be one of the greater densities throughout forest lands in northern California. The Biological Opinion for Pacific Lumber Company cites a density of 0.325 owls/km² (USFWS 1999c), the greatest known density reported for northern California. Lower densities were found in the Willow Creek study area in Humboldt County, 0.235 owls/km² (Franklin et al. 1990); Simpson lands in northern California, 0.209 owls/km² (Miller and Thome 1999); and Redwood National Park, 0.163 owls/km² (Tanner 1999).

Research in California indicates that several northern spotted owl study populations may be stable or slightly declining (Franklin et al. 1996, Franklin et al. 2002). A minimum population estimate for northern spotted owls in California during the late 1980s and early 1990s was 1,111 pairs (Gutiérrez et al. 1995). Although populations may be stable in northern California, northern spotted owl populations are declining across a large portion of their range due to destruction and fragmentation of old-growth habitat (Neon and McKelvey 1996). Fragmentation of old-growth and other late-successional forest habitat has isolated populations and reduced prey availability in areas of the northern spotted owls' range other than northern California (Thomas et al. 1990).

ENVIRONMENTAL BASELINE (in the Action Area):

Regulations implementing the Act (50 CFR §402.02) define the environmental baseline as 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 impact of State or private actions which are contemporaneous with the consultation process.

Distribution of Northern Spotted Owls in the Action Area

Historically, there have been several sightings of spotted owls within one mile of the project site. Spotted owls were first detected there in 1997 when a female and young were observed. A pair with a single young was found on May 24, 2000, at the same location. A male and female were reported about a half mile northeast of this location in 2001. In May 2002 and April 2003, the California Department of Fish and Game noted a pair of owls within 100 feet of the 2000 nest site, but nesting was not confirmed.

A two-year protocol survey of the action area and adjacent suitable habitats was begun in 2004 and completed in 2005. As described in the written report of survey year 2004 results (URS 2004), nine survey stations were established from which to conduct the surveys. These sites included two at disposal sites since dropped from consideration, six sites established at quarter-to-half-mile intervals along the current alignment to be bypassed, and a single site established within 100 feet of a known, historic spotted owl site near Red Mountain Creek. No other survey sites were established in the potentially affected area.

Results from the 2004 surveys indicate that the historic site near Red Mountain Creek is still occupied by at least a single owl. Nesting status could not be determined there, based on the lateness of surveys conducted in 2004, and the uncertainty of results.

Results from the 2005 surveys indicate that the historic site near Red Mountain Creek is currently occupied by an owl pair, and breeding was confirmed. No other spotted owl were detected during these surveys. During 2005, only six survey stations were established. Three stations surveyed during the 2004 season were not included. Changes to the project description between survey seasons eliminated the need to conduct surveys at two former sites initially proposed as work areas, but dropped from further consideration during subsequent planning.

Current Condition in the Action Area

Within a 0.7 mile radius of the known spotted owl activity center near Red Mountain Creek, there are currently 468 acres of available spotted owl foraging habitat, for a total of 47.5 percent of the area of that circle. Within 0.7 mile of the spotted owl activity center, there are currently approximately 80 acres of suitable nesting habitat, or approximately 8.1 percent of the area. Overall, the total combined habitat for these four habitats (nesting, roosting, foraging and dispersal) within 1.3 miles of the active spotted owl site center is 2,697 acres, or about 79.4 percent of the area.

Existing maximum noise levels within the action area are estimated to range from 55 to 60 dBA at the south end of the action area, and less than 40 dBA at the north end. Noise levels may approach 30 dBA during quiet periods, such as during night time and when vehicular traffic is infrequent.

EFFECTS OF THE ACTION

Scientific Basis for Evaluating Potential Effects

This section describes the scientific basis for analyzing the potential direct and indirect effects of human actions, including their interrelated and interdependent actions, on the northern spotted owl. While the implementation of most proposed actions, including the proposed Confusion Hill Bypass Project, would not result in all of the potential effects described herein, this discussion provides a general framework and understanding under which the proposed action considered in this biological opinion may be objectively analyzed.

Potential Effects of Habitat Modification

Site-Specific Effects

Forest and fire management practices have the potential to reduce the quantity and quality of spotted owl nest and roost sites. Spotted owls depend upon existing structures, such as cavities and broken tree tops, for nest sites. Silvicultural prescriptions and fire management activities which result in the removal of the oldest, most decadent trees or require removal of hazard trees and snags are likely to remove potential spotted owl nest sites (Blakesley et al. 1992). Further, prescriptions designed to reduce ladder fuels or release the growth of co-dominant trees often simplify vertical structure in the understory, where spotted owls perch for hunting or roosting (Forsman et al. 1984).

Timber harvest and fire management activities can contribute to changes in habitat microclimate by reducing overall canopy closure within nesting and roosting habitat. A reduction in canopy closure often results in reduced protection from environmental factors, such as rain, wind, snow, and temperature. Laboratory and field studies have determined that spotted owls are less heat tolerant than typical birds. Physiological limitations corroborate these observations (Weather et al. 2001).

Removing trees, snags, and downed wood can affect prey composition and/or availability by altering characteristics of the habitat upon which prey species depend. Because the amount of snags and down material on the forest floor is positively correlated with densities of some prey species, a reduction in the abundance of these components may contribute to localized, short-term declines in prey (Williams et al. 1992). Reductions in populations of these prey species could lower spotted owl recruitment.

Landscapes-Level Effects

Site-specific effects could change the function which forested stands provide for northern spotted owls. For the purposes of the following discussion, changes in habitat function resulting from cutting of trees and other vegetation are categorized as removal, downgrade, or degrade. Removal represents a complete loss of habitat function following an action. For example, an area functioned as nesting/roosting habitat; after habitat modification, the area does not provide any habitat function. Downgrade is a subset of the term removal and refers to a loss of habitat function and change from one habitat function to another. For example, if an area functioned as nesting/roosting habitat before habitat modification, but is capable of providing only foraging habitat post-project, this would be classified as downgrade. This term could also be used to signify a change in function from foraging to dispersal as well. Degrade, to be distinguished from downgrade, indicates a reduction in habitat quality, but not habitat function. For example, an area that functioned as foraging habitat prior to an action still provides foraging habitat after the effect, but prey abundance may be reduced due to a reduction in some structural components or vegetation.

Removal or downgrading of habitat within home ranges, especially when located close to the nest site, can reasonably be expected to negatively affect northern spotted owls. A reduction in

northern spotted owl productivity and survivorship occurs as the amount of suitable habitat within a spotted owl home range declines (Bart 1995). In northwestern California, survivorship of adult owls was greater where greater amounts of older forest were present around the activity forest, but reproductive success increased where the amount of edge between older and younger forest was relatively high (Franklin et al. 2000).

Research indicates that spotted owls in northern California focus their activities in heavily-used "core areas" that range in size from about 167 to 434 acres, with a mean of about 409 acres (Bingham and Noon 1997). These core areas, which included 60 to 70 percent of the owl telemetry locations during the breeding season, typically comprised only about 20 percent of the home range area. Therefore, habitat removal within core areas could have disproportionate effects on owls. Spotted owl abundance and productivity significantly decrease when the proportion of suitable habitat within 0.7 mile of an activity center falls below 500 acres, which represents 50 percent of the total 1,000 acres within 0.7 mile (O'Halloran 1989; Simon-Jackson 1989; Thomas et al. 1990). For the purpose of consultation, the Service identifies the following guidelines for the amount of suitable habitat needed to maintain essential behaviors, such as breeding, within the home range area: 500 acres within 0.7 mile of the activity center and 1,336 acres within 1.3 mile of the activity center.

Potential Effects of Noise Disturbance

Some activities, such as timber harvesting, road construction and decommissioning, landslide rehabilitation, trail maintenance, and fire management, use motorized equipment (e.g., helicopters, heavy equipment, or chainsaws) that introduces high levels of noise into the environment. This elevated noise level may have adverse effects on wildlife species by interfering with essential behaviors. The effects of noise on birds are difficult to determine (Knight and Skagen 1988) and quantify. Confounding factors include the tolerance level of individual birds, type and frequency of human activity, ambient sound levels, how sound reacts with topography and vegetation, and differences in how species perceive noise. Regardless of these difficulties, research conducted on a variety of bird species does suggest that disturbance can have a negative impact on their reproductive success (Tremblay and Ellison 1979; Belanger and Bedard 1989; Platt et al. 1990; Henson and Grant 1991). Disturbance can affect productivity in a number of ways, including interference of courtship (Bednarz and Hayden 1988), nest abandonment (White and Thunrow 1985), egg and hatching mortality, exposure and predation (Drent 1972; Swensen 1979), and altered parental care (Fyfe and Olendorf 1976; Bonolotti et al. 1984).

The few studies which examined responses of northern and Mexican spotted owls to several disturbance sources, such as helicopters, small chainsaw, and hikers, indicate that noise can disrupt owl behaviors, such as flushing from roosts and prey delivery rates (Delaney et al. 1999; Delaney and Grubb 2001; Swarthout and Steidl 2001). However, owl sensitivity varies with stimulus distance, location (i.e., aerial or ground), type, and timing, as well as individual tolerance (Delaney et al. 1999; Delaney and Grubb 2001; Swarthout and Steidl 2001).

Potential Effects of Injury or Mortality

In extreme cases, forest or fire management activities could result in direct injury or mortality of adults, eggs, or young. The potential for northern spotted owls to be struck and killed or injured by falling trees during harvesting or exposed to high levels of smoke during prescribed burning is confined to the area relatively close to the nest tree. Individual adult spotted owls reasonably can be expected to move from the area of disturbance and avoid injury or death. However, adult spotted owls which are incubating eggs or brooding young may be reluctant to leave the area (Delaney et al. 1999) and be vulnerable to injury or death. Young spotted owls are poor fliers immediately after leaving the nest; they develop their flight skills during their first months after leaving the nest. Thus, they are most vulnerable to being struck by falling trees during this time. Young are also susceptible to smoke inhalation. They may disperse prematurely in response to disturbance such as tree falling or smoke, thus increasing the likelihood of predation or starvation outside of the nest grove. Adults may abandon eggs in response to tree felling near the nest (Drent 1972; Swensen 1979; White and Thurow 1985). Forest management that includes falling trees may crack or destroy eggs.

The risk of injury to eggs and young can be avoided by implementing an operating restriction for all burning and harvest activities in suitable nesting and roosting habitat from February 1 through September 15. For projects cutting only trees less than 8 inches dbh the following modified limited operating restriction may be appropriate: 1) May 15 through July 9 allow only hand piling of down material; and 2) February 1 through May 14 and July 10 through September 15 allow cutting of trees less than 8 inches in size. The operating restriction from May 15 through July 9 is intended to avoid the period when the majority of young northern spotted owls are least mobile and most likely to be on the ground.

Effects of the Proposed Action

Potential effects of the proposed action to spotted owls within the action area include loss of suitable nesting, roosting and foraging habitat, and temporary noise and visual disturbance within occupied habitat during construction. Minimization measures identified earlier in this biological opinion will reduce adverse effects. The potential effects to the spotted owl from the proposed action, and reductions in the effects as a result of implementing the proposed minimization measures, are discussed below.

Construction within the action area will result in a substantial amount of habitat disturbance in native vegetation. Much of the area has been subjected to previous logging activities, but mature trees and old-growth trees are found within the forest matrix. The removal of this habitat will result in the loss of nesting, roosting, and foraging habitat for the spotted owl.

In addition, the proposed action may result in temporary construction impacts. All areas of temporary disturbance will be restored following project construction. Construction activities, including the removal and placement of fill, could increase the potential for invasive plant species to become established or spread through the action area. The majority of fill material will be derived from material removed for new road cuts associated with the project. With the implementation of Best Management Practices (BMPs) and minimization measures, the

proposed project is not expected to result in the promotion or introduction of invasive or non-native plant species.

Effects Due to Habitat Removal and Degradation

Provincial Home Range

A spotted owl provincial home range is approximated by a circle of radius 2.1 km (1.3 mi.). This circle encompasses the median area of a spotted owl home range within the California Coast Range province, as estimated through research, of approximately 1,352 ha (3,340 ac.). Provincial home ranges apply to nesting or territorial pairs as well as individual owls that demonstrate multi-year occupancy of suitable nesting habitat. The center of the provincial home range is identified by a known nest tree, location of fledglings, or other sign of spotted owl occupancy of a given area.

Project effects are based on the types of activities and their proximity to identified provincial home ranges. The threshold for harm to the spotted owl is defined as the loss of 60 percent or more of available suitable habitat as a result of the current action combined with previous actions in the area within the provincial home range. The home range is further defined by a more critical area of 405 ha (1,000 ac.), approximated by a 1.1 km (0.7 mi.) radius circle from the spotted owl activity center. The threshold within this critical area is the loss of 50 percent or more of suitable habitat as a result of the current action combined with previous actions in the area. Any suitable nesting/roosting habitat removal within the closest 28-ha (70-ac.) area to the activity center constitutes harm to spotted owls. This 70-acre core area can be approximated by a circle of radius 985 ft. (0.186 mi., 0.304 km).

The action area intersects one known provincial home range of a spotted owl. This home range has been surveyed and found to be occupied by a successfully breeding pair during several breeding seasons since 1997, and was documented as occupied again in 2004 and 2005 during surveys conducted specifically for the Confusion Hill Bypass Project.

The Service estimates the amount of suitable habitat available to this spotted owl site using habitat data from the California Department of Forestry and Fire Protection (CDFPP). The Service categorized these data into suitable habitat (i.e., nesting, roosting, and foraging) and non-suitable habitat (including dispersal, early seral, and non-habitat) based on canopy cover, average tree diameter, species, and crown diameter.

Currently, approximately 649.5 acres of spotted owl suitable habitat that functions for nesting, roosting, and foraging occurs within 0.7 mile of the known active owl site, which constitutes 66.0 percent of the area. Approximately 2,307 acres of suitable habitat that functions as spotted owl nesting, roosting, and foraging habitat occurs within 1.3 miles of the known active owl site, which constitutes 68.0 percent of the area. Figure 1 shows the extent of the provincial home range and suitable nesting, roosting and foraging habitat near this known nest site.

Approximately 4.5 acres of forested habitat would be removed as a result of constructing the Confusion Hill Bypass, including tree removal associated with the approved disposal sites. Of

this total, approximately 1.5 acres are classified as suitable foraging habitat for spotted owls. In addition, approximately 0.5 acre of spotted owl nesting habitat will be removed. The remaining 2.3 acres of tree removal does not function as suitable habitat for spotted owls.

As a result of the proposed action, the total suitable habitat that remains within 0.7 mile of the known site post-project will be approximately 640 acres, which constitutes 65.0 percent of the area. The total acreage of suitable habitat that will remain within 1.3 miles of the known site post-project will be approximately 2,298 acres, which constitutes 67.6 percent of the area. This constitutes removal of approximately 0.20 percent of the available suitable habitat within 0.7 mile of the known activity center, and about 0.06 percent of the available suitable habitat within 1.3 miles of the site center. The total available suitable habitat within both the 0.7-mile radius circle and the 1.3-mile provincial radius post-project will exceed levels (50 percent and 40 percent, respectively) that would constitute harm to the species. That is, neither criteria for harm due to habitat removal would be exceeded.

Site Center

Only one site center is located sufficiently close to the footprint of the construction such that loss of suitable habitat, should it occur within the core area, has the potential to harm owls nesting at that site. However, none of the removal of suitable habitat by this project occurs within the 70-acre core area for the known site. No other sites are likely to be located sufficiently close to proposed activities for any 70-acre core area to be affected, as determined by protocol surveys along the existing road alignment.

Unsurveyed Suitable Habitat

The results of surveys conducted during the 2004 breeding season were reported to the Service during this consultation (URS 2004). The final report for the 2005 season is not yet available. Nine calling stations were established during the 2004 survey season, including a single station in the vicinity of the reported nest site near Red Mountain Creek. All other survey stations were located on or near the roadway of U.S. Highway 101, including two south of the current project location near potential disposal sites. No survey stations were located on the west side of the South Fork Eel River, or on the top of Confusion Hill to the east of the slide area. Based on the known topography of the area, and the limitations this topography likely places on the ability of the observer to hear spotted owl calls and vice-versa, the Service concludes that substantial portions of the larger area around the project footprint may not have been completely covered during calling. In the report for the 2004 season, faint spotted owl responses were recorded at stations 3 and 4 that likely belonged to another owl or owls, and could not be attributed to the known owl site. These calls could indicate other owls near an historic owl site at the top of Confusion Hill. Since the areas west of the river and above Confusion Hill were not completely covered during the surveys, as required under the Service protocol, suitable habitat not within surveying distance of the nine survey stations (i.e., within one-quarter to one-half mile from the existing highway) would be considered suitable, unsurveyed, and potentially occupied by spotted owls.

Removal or degradation of suitable habitat during project implementation may adversely affect any spotted owl whose site center is located within the provincial radius distance of the removed or degraded habitat. The potential adverse effects of habitat removal or degradation on spotted owls in unsurveyed but suitable habitat can be estimated by the extent of habitat removal or degradation on an area approximated by a 1.3-mile buffer around the project footprint. The effects to the known site near Red Mountain Creek were described earlier in this document. The following paragraph describes the general effects to habitat within the buffered project area that would be in addition to the effects reported for the known site.

The buffered project area is estimated to include a total of approximately 5,010 acres. Within this area, approximately 3,156 acres, or 63.0 percent, represents suitable habitat for the spotted owl. Figure 1 shows the extent of the area considered in relation to the proposed action and the suitable nesting, roosting and foraging habitat within 1.3 miles of the project footprint. Following the removal of 2.0 acres of suitable habitat, the post-project area will contain approximately 3,146 acres of suitable nesting, roosting and foraging habitat, or about 62.8 percent of the buffered project area. Thus the removal of 2.0 acres of suitable habitat as a result of implementing the Confusion Hill Bypass project would remove only about 0.04 percent of the habitat in the general vicinity of the proposed action. More importantly, the proposed action would not lower the percentage of suitable habitat in the area to below 40 percent, and would not result in harm to owls there.

It is unlikely that owl sites exist within 0.7 mile of the existing or proposed highway alignment, other than the known site near Red Mountain Creek. No other owl sites have been located in this zone despite multiple years of survey, including protocol surveys completed during 2004 and 2005. The calling stations used during the 2004 and 2005 survey seasons, which included at least six stations within the action area, would likely have detected additional owls with site centers within the 0.7 mile distance of the existing road alignment. Extensive surveys conducted on private lands west of the South Fork Eel River have not detected owls within 1.3 miles of the proposed highway alignment or the existing highway alignment. Past surveys on the east side of the river have not detected any owl site centers within 0.7 mile of the existing alignment, other than the Red Mountain Creek site. Therefore, no additional effects to spotted owl inner circles can reasonably be attributed to the proposed action, as it is unlikely that surveys failed to detect owls that may have site centers located in this band.

Effects Due to Noise

Excessive noise generated by the proposed action has the potential to disrupt essential breeding behaviors of spotted owls, or result in reduced reproductive performance through adverse effects to nesting owls and their young. Based on surveys conducted during 2004 and 2005, only one spotted owl nest site is known to occur within 0.5 mile or less of the proposed action. Since these surveys were capable of detecting spotted owls within 0.5 mile of the locations of noise-generating activities, it is reasonable to conclude that only the single, known spotted owl site would potentially be disturbed by excessive noise. Owls located farther than 0.5 mile from the project footprint would not be affected by noise-generating activities, so surveys conducted as described in the URS (2004) report would be adequate for noise evaluation purposes.

Pile driving activities would result in noise levels ranging from 40 to 65 dBA at this site. Worst-case maximum sound levels from uncontrolled blasting activities would be 52 dBA at the nest. These levels were predicted as worst-case, and would likely be 10-20 dBA lower because they would be conducted inside an underground shaft.

Helicopter activities during roadway decommissioning could result in maximum noise levels of 75 to 80 dBA at the known owl nest site, but may be much lower due to attenuation from the ridge that separates the known activity center from the project area. However, helicopter activities during road decommissioning are scheduled for outside the breeding season of the owl, so would have no effect on any nesting spotted owls.

Interrelated and Interdependent Activities

Regulations implementing the Act require the Service to consider the effect of activities which are interrelated and interdependent to the proposed action (50 CFR 402.02). The Act defines interrelated activities as those which are part of a larger action and depend upon the larger action for their justification, and interdependent activities as those projects which have no independent utility apart from the action that is under consideration.

The currently proposed project consists of constructing a new roadway on a bypass over two bridges around the active slide area. A future project consists of a road decommission of the existing U.S. Highway 101 roadway. This decommissioning, described generally in the biological assessment, will be planned in detail once the bypass is completed. The decommissioning of the existing roadway would not exist but for the construction of the bypass and is, therefore, an action that is interrelated and interdependent to the proposed action. The effects of the general description of the decommissioning are described in this biological opinion; the full effects of that action will undergo a separate section 7 consultation, if needed, during its planning and prior to its implementation.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur within the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Cumulative effects that could occur in the action area include final road decommissioning of the existing alignment, following completion of the bypass. However, this decommissioning is considered here as an interrelated, interdependent activity. Effects related to that decommissioning are considered in this consultation.

Since 2001, there have been four projects within the action area that have had effects on northern spotted owls. These projects have all been completed in emergency response to ongoing landslides and seismic events, and were intended to keep the existing highway open and safe for travelers, emergency response vehicles, and maintenance workers. These emergency responses and interim measures to secure the existing roadway have resulted in the removal of suitable

habitat for spotted owls within and immediately adjacent to the four slide chutes. Additional emergency or urgent repairs may be necessary until completion of the proposed bypass project, in the event that significant rock or debris slides occur at the slide. Any future responses will be addressed through additional emergency consultation. Once the proposed construction of the bypass is completed, and the existing highway is decommissioned, formal consultation on the impacts from emergency responses and interim safety measures will be completed to address the cumulative impacts related to the several emergency responses.

Future timber harvest is likely to occur in that portion of the action area not within the Caltrans right-of-way, and on private lands adjacent to the action area. However, no specific timber harvest plans are being considered in the action area that have not already been reviewed under the Service's private lands technical assistance program.

No other actions likely to result in cumulative effects to listed species are currently being implemented or planned in the action area at this time.

CONCLUSION

After reviewing the current status of the northern spotted owl, the environmental baseline for the action area, the effects of implementing the proposed construction of the Confusion Hill Bypass project in Mendocino County, and its cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the northern spotted owl. The Service reached this non-jeopardy conclusion based on the following factors:

1. The proposed action will remove suitable spotted owl nesting, roosting and foraging habitat. Most of this loss of habitat will be permanent. That is, those portions of the habitat that will be permanently maintained as roadway, cut banks, fill slopes, and other areas permanently unvegetated or maintained as low vegetation will never recover its function as suitable spotted owl habitat. Those portions of the construction site that are replanted to forest species will recover, over a period of decades to centuries, to a point where nesting, roosting or foraging functions may return. Despite this loss, the removal of suitable habitat has been reasonably minimized, in regards to the purpose and need of the action, through consideration of alternative alignments and implementation of minimization measures identified in the project description. After completion of the proposed action, the known active spotted owl site will still encompass more than 40 percent suitable habitat within the provincial home range (1.3 mile radius of the known nest), and within the 0.7 mile radius area will contain more than 50 percent suitable habitat. Other owl sites that may be located within 1.3 miles of the project footprint that were not detected during limited surveys, in 2004 and 2005 are unlikely to lose sufficient habitat to fall below provincial thresholds, based on the anticipated amounts of suitable habitat currently existing within 1.3 miles of the affected area. Finally, the regional scale of the effect is small, affecting only a single known site within this province.

2. No spotted owl nests are known to occur within a distance of the actual construction site such that they will be adversely affected by noise disturbance resulting from construction activities, under the proposed minimization measures.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as 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 the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, 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 that Act provided that such taking is in compliance with this Incidental Take Statement.

Any Reasonable and Prudent Measures described below are non-discretionary, and must be undertaken by the FHW A so that it becomes a binding condition of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. FHW A has a continuing duty to regulate the activity covered by this incidental take statement. If FHW A (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, FHW A must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement [50 CFR §402.120(3)].

AMOUNT OR EXTENT OF INCIDENTAL TAKE

The Service anticipates that no spotted owls are likely to be taken as a result of this proposed action. Implementing the proposed action would result in the removal of suitable habitat from within at least one known spotted owl provincial home range area, and would adversely affect the species. However, this removal would not rise to the level of harm to the species, and therefore would not constitute take of the species.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the northern spotted owl.

REASONABLE AND PRUDENT MEASURES

The Service finds that Reasonable and Prudent Measures are not necessary or appropriate to minimize the impacts of the anticipated incidental take on the northern spotted owl, and none are prescribed.

TERMS AND CONDITIONS

No Reasonable and Prudent Measures are prescribed. Therefore, no mandatory Terms and Conditions are required.

MONITORING REQUIREMENTS

No monitoring requirements are necessary.

REPORTING REQUIREMENTS

Upon locating a dead or injured northern spotted owl, initial notification must be made to the Service's Division of Law Enforcement in Chico, California at (530) 342-8724 and Michael Long, Field Supervisor, Arcata Fish and Wildlife Office at (707) 822-7200 immediately, and in writing within three (3) working days. Notification must include the date, time, and location of the carcass; cause of death or injury, if known; and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state for later analysis of cause of death. The finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed, unless to remove it from the path of further harm or destruction. Should any treated listed species survive, the Service should be contacted regarding the disposition of the animal. In the case of take or suspected take of northern spotted owl not exempted in this biological opinion, the Arcata Fish and Wildlife Office and the Division of Law Enforcement shall be notified within 24 hours.

COORDINATION OF INCIDENTAL TAKE WITH OTHER LAWS

The Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), of the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

CONSERVATION RECOMMENDATIONS

Section 7(o)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service provides Caltrans with the following conservation recommendations:

1. Portions of the habitat disturbed during construction of the Confusion Hill Bypass may be appropriate to restore to conditions that promote the future growth of suitable spotted owl habitat. To promote future suitable habitat, FHW A could limit the extent of tree removal to that

necessary for completing the construction work, replant disturbed areas as appropriate to local, native conifer, and hardwood tree species, and retain large woody debris within planted areas.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in your November 19, 2004, request. 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 agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please contact staff biologist Ray Bosch at (707) 822-7201 should you have further questions regarding this consultation.

Sincerely,



Michael M. Long
Field Supervisor

cc:
National Marine Fisheries Service, Santa Rosa, California (Attn: Dan Logan)
California Department of Fish and Game, Yountville (Attn: Corinne Gray)

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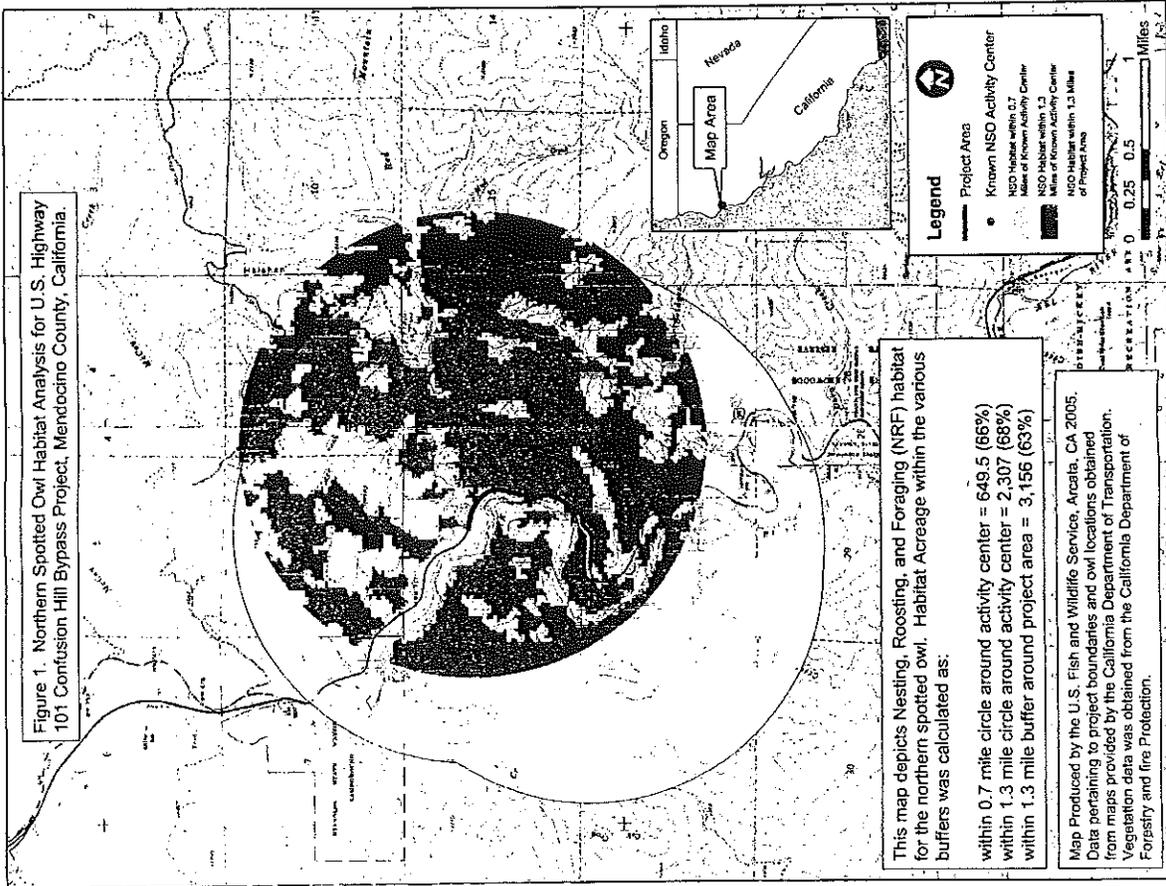
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Figure 1. Northern Spotted Owl Habitat Analysis for U.S. Highway 101 Contusion Hill Bypass Project, Mendocino County, California.



This map depicts Nesting, Roosting, and Foraging (NRF) habitat for the northern spotted owl. Habitat acreage within the various buffers was calculated as:

- within 0.7 mile circle around activity center = 649.5 (66%)
- within 1.3 mile circle around activity center = 2,307 (68%)
- within 1.3 mile buffer around project area = 3,156 (63%)

Map Produced by the U.S. Fish and Wildlife Service, Arcata, CA 2005. Data pertaining to project boundaries and owl locations obtained from maps provided by the California Department of Transportation. Vegetation data was obtained from the California Department of Forestry and Fire Protection.

Enclosure 3

Permittee: Mr. Steve Blair
California Department of Transportation (Caltrans)
PO Box 3700
Eureka, California 95502-3700

File Number: SPN-2009-00246 N

**Certification of Compliance
for
Nationwide Permit**

"I hereby certify that the work authorized by the above referenced File Number and all required mitigation have been completed in accordance with the terms and conditions of this Nationwide Permit authorization."

(Permittee)

(Date)

Return to:

Andrea Meier
U.S. Army, Corps of Engineers
San Francisco District
Regulatory Division, CESP-OR-R
1455 Market Street
San Francisco, CA 94103-1398



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

In response reply to:
1514225WXR0459151:DTL

NOV - 4 2005

Gene K. Fong
Division Administrator
United States Department of Transportation
Federal Highway Administration
980 Ninth Street, Suite 400
Sacramento, California 95814-2724

Dear Mr. Fong:

This document transmits NOAA's National Marine Fisheries Service's (NMFS) biological opinion (Enclosure) based on our review of the Federal Highway Administration's (FHWA) and California Department of Transportation's (CalTrans) proposed relocation of U.S. Highway 101 around the Confusion Hill roadside area in Mendocino County, California (FHWA reference: HDA-CA, File # 01-MEN-101, EA 01-397510, Document # P52534). The biological opinion describes NMFS' analysis of the effect of the proposed highway relocation and its effects on threatened Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*), threatened California Coastal (CC) Chinook salmon (*O. tshawytscha*), and threatened Northern California (NC) steelhead (*O. mykiss*), and designated critical habitat for those three species in accordance with the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*). In addition, this letter documents the result of NMFS' Essential Fish Habitat (EFH) consultation pursuant to section 305(b)(2) of the Magnuson-Stevens Fisheries Conservation and Management Act (MSFCMA).

Endangered Species Act Consultation

In the enclosed opinion, NMFS concludes that the proposed relocation of U.S. Highway 101 around Confusion Hill will adversely affect listed salmonids and take of listed species is anticipated; however, the proposed project is not likely to jeopardize the continued existence of ESA-listed salmonids. Furthermore, NMFS has concluded that the proposed project will not destroy or adversely modify designated critical habitat for SONCC coho salmon, CC Chinook salmon, or NC steelhead. An incidental take statement with non-discretionary terms and conditions is included with the enclosed biological opinion.



Essential Fish Habitat Consultation

NMFS has evaluated the proposed project for potential adverse effects to EFH pursuant to section 305(b)(2) of the MSFCMA. After reviewing the effects of the proposed project as described in the enclosed biological opinion, NMFS has determined that the proposed project will have a minimal adverse effect on EFH of Pacific Coast salmon in the South Fork Eel River watershed. Section 305(b)(4)(A) of the MSFCMA authorizes NMFS to provide EFH Conservation Recommendations that will minimize adverse effects of an activity on EFH. For this project, conservation measures were already included in the project description. In addition, the enclosed biological opinion contains non-discretionary terms and conditions that will minimize adverse effects to EFH. Therefore, NMFS has not provided EFH Conservation Recommendations for this proposed project.

If you have any questions about this ESA and EFH consultation, or if you require additional information, please contact Mr. Daniel Logan at (707) 575-6053.

Sincerely,

R. Rodney R. McInnis

R. Rodney R. McInnis
Regional Administrator

Enclosure

cc: Russ Strach, NMFS
Susan Leroy, CalTrans

Enclosure

BIOLOGICAL OPINION

ACTION AGENCY: California Department of Transportation and the Federal Highway Administration, California Division

ACTION: Relocation of Highway 101 at Confusion Hill in Mendocino County, California.

CONSULTATION CONDUCTED BY: National Marine Fisheries Service, Southwest Region

FILE NUMBER: 151422SWR04SR9151

DATE ISSUED: NOV - 4 2005

I. CONSULTATION HISTORY

On February 4, 2004, NOAA's National Marine Fisheries Service (NMFS) staff participated in the initial meeting of the Project Development Team for the proposed relocation of Highway 101 at Confusion Hill in Mendocino County, California. Other entities in attendance were: California Highway Patrol, California Department of Fish and Game (CDFG), California Department of Transportation (CalTrans), United States Fish and Wildlife Service, United States Army Corps of Engineers (Corps), County of Mendocino, and Mendocino Council of Governments. CalTrans proposed relocating a portion of Highway 101 from the east to west side of the South Fork Eel River (SFER) to avoid a geologic feature associated with large-scale landslides. CalTrans provided information on the environmental and design considerations for the project. On February 23, 2004, NMFS staff met with CalTrans and others at the proposed project site.

On May 7, 2004, CalTrans requested from NMFS a concurrence with CalTrans' determination that geotechnical surveys at the Confusion Hill site may affect, but would not likely adversely affect ESA-listed salmonids. On May 26, 2004, NMFS concurred in writing with CalTrans' determination. In a June 10, 2004, e-mail message and a June 18, 2004, telephone conversation CalTrans requested a minor modification to the geotechnical survey protocol. In a June 29, 2004, e-mail message, NMFS informed CalTrans that the minor modification to the geotechnical survey protocol would not affect NMFS' May 26, 2004, determination.

On June 16, 2005, NMFS received from FHWA a biological assessment and request for formal consultation. On July 5, 2005, NMFS received from CalTrans a preliminary geotechnical report related to the Confusion Hill site. On October 14, 2005, NMFS received a letter from CalTrans

(originally dated September 29, 2005) modifying the proposed pile placement protocol to minimize the potential barotrauma effects of the project. Also, CalTrans defined mitigation for impacts associated with the Highway 101 relocation at Confusion Hill.

This biological opinion is based on information provided to NMFS in the submitted document titled *Biological Assessment for impacts to Southern Oregon and Northern California Coast (SONCC) coho salmon, the California Coastal (CC) Chinook salmon, and the North Coast (NC) steelhead*, subsequent discussions and submissions, and other sources of scientific and commercial information. A complete administrative record of this consultation is on file in the NMFS Santa Rosa Area Office, Santa Rosa, California.

II. DESCRIPTION OF THE PROPOSED ACTION

The Federal Highway Administration (FHWA) proposes to provide funding to CalTrans to relocate Highway 101 between postmile (PM) 98.9 and 100.8 in Mendocino County, California (Figure 1). The proposed project would relocate the highway from the east side of the SFER to the west side of the SFER, and would necessitate construction of two access roads, two wet channel crossings, construction of two temporary trestles, two permanent bridges for Highway 101, falsework for one permanent bridge, two retaining walls, and a through-cut of a hillside. The existing location of that part of Highway 101 is not dependable due to frequent closures related to an active, large-scale landslide. Relocation of Highway 101 is critical to provide a route that will ensure safe travel for the public and emergency vehicle access. Slides closing Highway 101 at Confusion Hill result in detours of 250 miles. CalTrans proposes to decommission most of the existing Highway 101 between PM 98.9 and 100.8. CalTrans anticipates that the proposed construction actions will take three consecutive construction seasons to complete. The proposed work is scheduled to be implemented between 2006 and 2009. The proposed work windows for blasting and any actions in and near the stream channel is May 15 through October 31. Construction activities outside of the stream channel will occur during all months of the year once the project begins. Best management practices (BMPs) will be in place during all activities to minimize or avoid potential impacts to ESA-listed salmonids and critical habitat.

A. Description of Proposed Work

1. Access Roads

On the west side of the SFER, within the action area, is a hillside through which the new Highway 101 alignment will pass (Figure 1). North and South access routes to the west side of the SFER from the east side SFER will be used for construction of the abutments of both bridges, for preparation of the new west side roadbed, and construction of temporary trestles. These access routes approach the SFER near the locations of the two proposed permanent bridges. Having access to the west side SFER from both the north and south ends of the construction area increases construction efficiency and reduce the total construction time of the project. The existing north access road will be extended 130 feet (ft) from the terminal cul-de-sac on State

Route (SR) 271¹ down the embankment on the west side of Highway 101 (along the top of existing rock slope protection) along that section of the SFER. The road leading to the temporary access trestle from the south is an existing road, near the proposed placement of the south bridge abutment, that will not need to be extended. Some existing logging roads are present on the west side of the SFER and will be used for this project; new access roads on the west side of the SFER are not necessary. The existing logging roads will be improved to accommodate construction equipment and to handle stormwater runoff.

2. Wet Channel Crossings

Caltrans proposes two wet channel crossings of the SFER by construction equipment at both the north and south temporary trestles (see the following section). One crossing of equipment at each site will occur in the first year of construction and the second crossing will be during the last year of construction. A drill rig, vibration hammer (if used), and excavator will ford the river at the access points, both for installation and removal of the temporary trestles. Both water crossing sites will be at the shallowest riffles near the trestle sites. All other crossings of the SFER will be via the temporary trestle crossings.

3. Temporary Trestles

Construction on the bridges, through-cut, and retaining walls is anticipated to continue year-round, weather permitting, which will require access to the west side SFER during the winter when the river is experiencing high flows. Three temporary trestles will be needed for this project — one on the south end of the construction site and two on the north end. The installation of the trestles is scheduled for early May of the first year and removal by October 31 of the last year. The southern trestle and one of the northern trestles will be used to move equipment and materials across the SFER. The second northern trestle will be a high-elevation, year-round temporary structure installed in the footprint for the proposed northern bridge. The northern platform from which to support the falsework for the proposed northern bridge. The northern equipment and materials trestle will be used to remove materials from the through-cut excavation site. The falsework and northern access trestles must be separate to prevent vibrations from passing construction vehicles from damaging the concrete as it cures within the falsework.

The equipment and materials trestles at the south and north ends will be about 3 ft above the water surface elevation of a 100-year flow event and approximately 35 to 50 ft wide. These trestles will require up to 15 pilings for support, and will be built concurrently using the same methods. Although the falsework trestle is larger than the other two trestles, it will also be constructed using similar methods. The piles for all three trestles will be placed using either a vibration hammer or drill. Sheet pile cofferdams may be used to surround each span of piles (4-5 piles per span). The piles will be created on site by pumping cement into a casing which will be drilled or vibrated to the bedrock. All concrete will be contained in the casing. The casings may or may not be removed after the concrete has cured. All of the trestles will remain in place year-

¹ State Route 271 parallels Highway 101, between the SFER and Highway 101. The southern terminus of State Route 271 is located near Red Mountain Creek. The scale of the maps included in Figure 1 precludes the reader from viewing State Route 271.

round. All of the piles will be removed to the level of bedrock when the temporary trestles are dismantled in the last year of the project.

4. Bridge Construction

Construction of the two bridges is estimated to take approximately three years to complete; two construction seasons for the north bridge and three construction years for the south bridge. The bridge on the southern end of the project will be built using a segmental cantilevered bridge construction method. This method must be used because the maximum feasible height of falsework is approximately 150 ft, whereas the designed height of the south bridge is approximately 255 ft. The south bridge will be 1355 ft long and 43 ft wide and its foundations will be placed above the 100-year floodplain. The bridge foundation will be large diameter cast-in-drilled-hole (CIDH) piles; bridge columns will be constructed on these CIDH foundations. Once the columns reach full height, a set of traveling forms will be placed at the top of the column. As the bridge deck is built out from the column, the forms will move ahead supported by the previous work. A second set of traveling forms at the top of the column will move away from the column in the opposite direction. This leapfrog movement is continued from both columns until the bridge deck is completed.

Due to the height above the riverbed of the southern crossing, a tower crane will be installed to deliver materials to the traveling forms at each pier location. The tower crane will be supported on a platform with a pile foundation over the dry riverbed. The piles for the crane platform will be less than or equal to 36 inches in diameter and will be placed using the same technique used for the temporary trestles. At both CIDH foundations the possibility exists that there will be water in the pile shaft (a wet pile). In this event drilling mud will be used to stabilize the sides of the drilled shaft during drilling operations. The drilling mud will be completely contained in tanks and disposed of off site at an approved location. Blasting may also be utilized for permanent foundation work of the piers. The blasting would be performed within the shafts. Blasting for the southern abutment of the south bridge will not be necessary. Shoring for the abutment and shaft excavations on slopes will likely be required and typically consist of soil-nail walls.

The north bridge will be an incline-leg bridge 150 ft high, 180 ft long, and 43 ft wide. The bridge has two inclined piers with dimensions of 33 ft x 33 ft at the ground that flare to 33 ft x 72 ft at the top of the pier. The incline-leg piers will be on the banks above the elevation of 100-year flow events and will consist of rectangular shafts; anticipated construction of this element will include conventional mining techniques for shoring and bracing. Blasting may be required for this portion of the project. Water, if encountered, will be disposed of by means of pumping it into sediment containment basins located at ground level (above the 100-year floodplain).

The north bridge will be constructed using falsework. The falsework will temporarily support the bridge superstructure during construction. The falsework's foundation will consist of concrete pads, timber pads, and/or driven timber or steel piles. The foundations support a system of posts, beams, joists, and plywood forms. After the falsework and forms are constructed, reinforcing steel and concrete is placed to complete the bridge superstructure. Construction of

the bridge abutments will require excavation and backfill for footing placement. The abutment foundations will consist of either spread footings or a pile-supported footing. A tower crane to deliver materials may be installed above the 100-year floodplain.

5. Through-cut Excavation and Construction of Retaining Walls

To the north of the south bridge the alignment will cross the west side hillside via a large through-cut; the amount of material to be excavated and removed is approximately 380,000 cubic yards. The slopes will vary from a rate of 2:1 to 1/2:1 (near vertical) where deep bedrock exists. The alignment through the west side hillside includes a 184 ft radius curve and will require a 330 ft retaining wall along a shallow slide near the middle of the through-cut excavation. Blasting may also be utilized on the through-cut where rock is encountered during excavation. Clearing and grubbing along the proposed alignment and at abutments and pier locations will occur as necessary and will occur in the months prior to earth moving activities.

Excess material from the through-cut excavation will be disposed of at five disposal sites within the action area (Figure 1). The north bridge is a controlling feature in the scheduling of this project, as this is the shortest route by which to haul the excavated material from the through-cut to the disposal sites. All disposal sites are above water elevations reached during 100-year flow events.

6. Concrete Batch Plant

Due to the isolated location of the project, CalTrans will assemble a portable concrete batch plant to provide on-demand concrete for the project. The batch plant will be located near the southern end of SR 271 and will be located about 80 ft above the stream, above the elevation of a 100-year flow event. CalTrans will construct a "slick line," typically a 6-inch-diameter steel pipe, through which fresh concrete would be pumped. A secondary containment pipe or trough would be utilized to prevent concrete spills into the river.

7. Decommissioning Existing Roadway

About 64% of the existing Highway 101 between PM 98.9 and 100.8 will be decommissioned after traffic is routed to the new highway structures. All infrastructure of the old roadway is to be removed after the new roadway is completed. CalTrans proposes remove all non-natural features of the existing roadway (including culverts, walls, viaduct, fencing, bin walls, rock catchment mesh, asphalt, concrete, and all associated back fill), provided that the roadway is safe to deconstruct. Also, CalTrans will create a series of terraced sedimentation basins below the active debris flow at PM 99.70, within the road prism of the deconstructed roadway. The purpose of constructing these basins is to intercept sediment from the active landslide before it enters the SFER. These basins will remain in perpetuity, but will not be maintained. After creation of the sedimentation basins, all disturbed areas will be revegetated using native vegetation as recommended by a Licensed Landscape Architect. The decommissioning will take place during the dry season and construction BMPs (e.g., soil stabilization and sediment control) will be implemented to further minimize the likelihood of sediment entering the SFER.

8. Red Mountain Creek Fish Passage

CalTrans proposes to provide funding in the amount of \$100,000 to facilitate fish passage at Red Mountain Creek culvert to mitigate for impacts associated with the Highway 101 relocation at Confusion Hill. Highway 101 crosses Red Mountain Creek near the northern conform' of the proposed alignment and the existing alignment (Figure 1). This culvert was inventoried using the CDFG assessment protocol (Taylor and Love 2003). There is some adult and resident passage (obvious from salmonids upstream) but the culvert does create a velocity barrier over a great range of flows that would not normally impede salmonids. The fish passage project will incorporate NMFS and CDFG fish passage criteria and will be subject to approval by both NMFS and CDFG prior to construction. The Red Mountain Creek fish passage project will be undertaken as mitigation for the Highway 101 relocation at Confusion Hill.

B. Summary of Avoidance and Minimization Measures

CalTrans has proposed the following measures to avoid and minimize disturbance to ESA-listed salmonids and aquatic habitats associated with the proposed construction activities:

1. Riparian areas outside the designated work areas will be designated as Environmentally Sensitive Areas and clearly indicated as such on project construction plans. Project specifications will include a requirement that Environmentally Sensitive Areas are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction. Disturbance to riparian vegetation will be limited to cutting the *Salix* spp. at ground level rather than removing it.
2. Graded or otherwise bare areas resulting from construction activities will be revegetated using native species.
3. Contractors will comply with all BMPs to avoid stormwater and other habitat related impacts, and BMPs will be implemented as per the National Pollutant Discharge Elimination System permit, through a storm water pollution prevention plan, CDFG 1602 Streambed Alteration Agreement, 404 Nationwide Permit for temporary access construction, and a 401 Water Quality Certification. In addition, contractors will comply with current CalTrans Construction Site BMPs to minimize effects to anadromous fish habitat during construction. The CalTrans Construction Site BMPs manual is available at: http://www.dot.ca.gov/hq/construct/Construction_Site_BMPs.pdf.
4. To avoid entrapment of fish, any visible depressions created by the movement of gravels for temporary access construction will be contoured to facilitate even drainage as flows recede.
5. To maintain aquatic habitat and passage for juvenile salmonids, the SFER channel will not be dewatered.

² The location at which the proposed and existing alignments meet.

6. To avoid continuous wet crossings and their effects on fish and water quality, CalTrans will install and use temporary trestles.

C. Description of the Action Area

The action area is defined as all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area is located at Confusion Hill between the communities of Riverdale and Piercy in Mendocino County, California (Figure 1). The action area is within the SFER watershed and begins at the proposed southern crossing the SFER by Highway 101 and continues 3700 meters (m) downstream of the project site and is approximately 1000 m wide, centered on the SFER. This area is sufficiently large to contain all of the construction activities, including access roads and fish passage improvements on Red Mountain Creek, and a length of the SFER downstream were any temporary disruption to habitat (e.g. fine sediment plume) might be detectable.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

This biological opinion analyzes the effects of the proposed action on the following Evolutionarily Significant Units (ESU)³ of Pacific salmonids and critical habitat:

1. Threatened Southern Oregon/Northern California Coast coho salmon.
 - a. Final listing determination (70 FR 37160; June 28, 2005)
 - b. Critical habitat determination (64 FR 24049; May 5, 1999).
2. Threatened California Coastal Chinook salmon
 - a. Final listing determination (70 FR 37160; June 28, 2005)
 - b. Critical habitat determination (70 FR 52488; September 2, 2005 - the rule becomes effective on January 2, 2006).
3. Threatened Northern California steelhead
 - a. Final listing determination (65 FR 36074; June 7, 2000).
 - b. Critical habitat determination (70 FR 52488; September 2, 2005 - the rule becomes effective on January 2, 2006).

³ For purposes of conservation under the Endangered Species Act, an Evolutionarily Significant Unit (ESU) is a distinct population segment that is substantially reproductively isolated from other conspecific population units and represents an important component in the evolutionary legacy of the species (Waples 1991).

A. Species Description and Life History

Coho salmon, Chinook salmon, and 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 to adults. Juveniles migrating to the ocean are called smolts. Both smolts and adults go through physiological changes as they emigrate from fresh- to saltwater (smolts) and immigrate from salt- to freshwater (adults). The timing of migrations, freshwater habitat preferences for spawning and rearing, the duration of freshwater and ocean rearing, distribution in the ocean, age at maturity, and other traits vary by species. Coho salmon and Chinook salmon die after spawning, whereas steelhead can sometimes survive to spawn again (Shapovalov and Taft 1954, Sandercock 1991, Healy 1991, Busby *et al.* 1996).

1. Coho Salmon

The life history of the coho salmon in California has been well documented (Shapovalov and Taft 1954, Hassler 1987, Weikamp *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 timing of adult coho salmon migration to the Eel River watershed is October through February, peaking in November and December (Fukushima and Lesh 1998).

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, or smoltification, which prepares them for living in the marine environment. In the Eel River watershed, coho salmon smolts migrate to the ocean from May through July, peaking in April, May, and June (Fukushima and Lesh 1998). Emigration timing is correlated with precipitation events and peak upwelling currents along the coast. Entry into the ocean at this time facilitates more growth and, therefore, greater marine survival (Holby *et al.* 1990).

2. Chinook Salmon

Chinook salmon are the largest anadromous member of *Oncorhynchus*; adults weighing more than 120 pounds have been reported from North American waters (Scott and Crossman 1973, Page and Burr 1991). Chinook salmon exhibit two main life history strategies: ocean-type fish and river-type fish (Healy 1991). Ocean-type fish typically are fall- or winter-run fish that spawn shortly after entering freshwater and their offspring emigrate shortly after emergence from the redd. River-type fish are typically spring- or summer-run fish that have a protracted adult freshwater residency, sometimes spawning several months after entering freshwater. Progeny of river-type fish frequently spend one or more years in freshwater before emigrating. The Chinook salmon in the SFER are ocean-type fish.

Chinook salmon in the CC Chinook salmon ESU generally remain in the ocean for two to five years (reviewed in Myers *et al.* 1998 - Appendix B). In the ocean, Chinook salmon from California tend to stay along the California and Oregon coasts, but migration may continue to higher latitudes if oceanographic conditions are appropriate (Allen and Hassler 1986). Some Chinook salmon return from the ocean to spawn one or more years before full sized adults return, and are referred to as jacks (males) and jills (females). Fall-run Chinook salmon enter the Eel River from October through January (Fukushima and Lesh 1998). These fish typically enter freshwater at an advanced stage of maturity, move rapidly to their spawning areas on the mainstem or lower tributaries of rivers, and spawn within a few weeks of freshwater entry. Fall-run Chinook salmon typically spawn in the lower reaches of rivers and tributaries at elevations of 200 to 1,000 ft. Run timing is also, in part, a response to stream flow characteristics.

Egg deposition must be timed to ensure that fry emerge during the following spring at a time when the river or estuary productivity is sufficient for juvenile survival and growth. Adult female Chinook salmon prepare redds in stream areas with suitable gravel composition, water depth, and velocity. Spawning generally occurs in swift, relatively shallow riffles or along the edges of fast runs at depths greater than 24 centimeters (cm). Optimal spawning temperatures

range between 5.6 and 13.9°C. Redds vary widely in size and location within the river. Preferred spawning substrate is clean, loose gravel, mostly sized between 1.3 and 10.2 cm, with no more than 5 percent fines. Gravels are unsuitable when they have been cemented with clay or fines or when sediments settle out onto redds, reducing intergravel percolation. Minimum intergravel percolation rate depends on flow rate, water depth, and water quality. The percolation rate must be adequate to maintain oxygen delivery to the eggs and remove metabolic wastes. The Chinook salmon's need for a strong, constant level of subsurface flow may indicate that suitable spawning habitat is more limited in most rivers than superficial observation would suggest. After depositing eggs in redds, adult Chinook salmon guard the redd from 4 to 25 days before dying.

Chinook salmon eggs incubate for 90 to 150 days, depending on water temperature. Successful incubation depends on several factors including DO levels, temperature, substrate size, amount of fine sediment, and water velocity. Maximum survival of incubating eggs and pre emergent fry occurs at water temperatures between 5.6 and 13.3°C with a preferred temperature of 11.1°C. Fry emergence begins in December and continues into mid April (Leidy and Leidy 1984).

Emergence can be hindered if the interstitial spaces in the redd are not large enough to permit passage of the fry. In laboratory studies, Bjornn and Reiser (1991) observed that Chinook salmon and steelhead fry had difficulty emerging from gravel when fine sediments (6.4 mm or less) exceeded 30 to 40 percent by volume.

After emergence, Chinook salmon fry seek out areas behind fallen trees, back eddies, undercut banks, and other areas of bank cover (Everest and Chapman 1972). As they grow larger, their habitat preferences change. Juveniles move away from stream margins and begin to use deeper water areas with slightly faster water velocities, but continue to use available cover to minimize the risk of predation and reduce energy expenditure. Fish size appears to be positively correlated with water velocity and depth (Chapman and Bjornn 1969, Everest and Chapman 1972). Optimal temperatures for both Chinook salmon fry and fingerlings range from 12 to 14°C, with maximum growth rates at 12.8°C (Boles 1988). Chinook salmon feed on small terrestrial and aquatic insects and aquatic crustaceans. Cover, in the form of rocks, submerged aquatic vegetation, logs, riparian vegetation, and undercut banks provide food, shade, and protect juveniles from predation.

The low flows, high temperatures, and sand bars that develop in smaller coastal rivers during the summer months favor an ocean-type life history (Kostow 1995). With this life history, smolts typically emigrate as sub-yearlings during April through July (Myers *et al.* 1998). The ocean-type Chinook salmon in California tend to use estuaries and coastal areas for rearing more extensively than stream type Chinook salmon. The brackish water areas in estuaries moderate the physiological stress that occurs during pair smolt transitions.

3. Steelhead

General reviews for steelhead in California document much variation in life history (Shapovalov and Taft 1954, Barnhart 1986, Busby *et al.* 1996, McEwan 2001). Juvenile steelhead live 1 to 4 years in freshwater before smolting and emigrating, then spend 1 to 4 years maturing in the

ocean. Steelhead spawn at 2 to 8 years, and may spawn 1 to 4 times over their life. Although variation occurs, in coastal California, steelhead usually live in freshwater for 2 years, then spend 1 or 2 years in ocean before returning to their natal stream to spawn. Steelhead exhibit much variation in migration timing too. Steelhead can be divided into two reproductive ecotypes, based upon their state of sexual maturity at the time of river immigration and the duration of their spawning migration: stream maturing and ocean maturing. Stream maturing steelhead enter freshwater in a sexually immature condition and require several months to mature and spawn; whereas, ocean maturing steelhead enter freshwater with well developed gonads and spawn shortly after river entry. These two reproductive ecotypes are more commonly referred to by their season of freshwater entry (i.e., summer [stream maturing] and winter steelhead [ocean maturing]). Summer steelhead typically immigrate between May and October and spawn in January and February; winter steelhead typically immigrate between November and April spawning soon after reaching the spawning grounds. Both summer and winter steelhead are reported from the SFER, but only winter steelhead are likely found in the action area.

Survival to emergence of steelhead embryos is inversely related to the proportion of fine sediment in the spawning gravels. However, steelhead are slightly more tolerant than other salmonids, with significant reductions in survival when fines of less than 6.4 millimeters (mm) comprise 20-25 percent of the substrate. Fry typically emerge from the gravel two to three weeks after hatching (Barnhart 1986). Upon emerging from the gravel, fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Older fry establish territories which they defend. 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. In winter, juvenile steelhead become inactive and hide in available cover, including gravel or woody debris. 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). 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).

In Waddell Creek, in Santa Cruz County, Shapovalov and Taft (1954) found steelhead juveniles migrating downstream at all times of the year, with the most juvenile steelhead emigrating during spring and summer. Fukushima and Lest (1998) report the steelhead emigrate from the Eel River watershed from April through July.

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 populations in each ESU and factors responsible for the current status of each ESU.

1. SONCC Coho Salmon

A comprehensive review of estimates of historic abundance, decline, and present status of coho salmon in California is provided by Brown *et al.* (1994). They estimated that the coho salmon annual spawning population 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 California coho salmon population had declined more than 94 percent since the 1940s, with the greatest decline occurring since the 1960s. More recent population estimates vary from approximately 600 to 5,500 adults (Brown *et al.* 1994). Available information suggests that SONCC coho salmon abundance is very low, and the ESU is not able to produce enough offspring to maintain itself (population growth rates are negative) and has experienced many local extirpations (NMFS 2001, NMFS 2005). Also, SONCC coho salmon have experienced range constriction, fragmentation, and a loss genetic diversity. Many subpopulations that may have acted to support the species' overall numbers and geographic distribution, have likely been lost. While the amount of data supporting these conclusions is not extensive, NMFS is unaware of information that suggests a more positive assessment of the condition of the SONCC coho salmon ESU and its critical habitat. Recent status reviews for SONCC coho salmon conclude that this ESU is presently "likely to become endangered" (NMFS 2001, NMFS 2005). Recently NMFS evaluated the listing status of SONCC coho salmon and maintained the threatened status of SONCC coho salmon (70 FR 37160). Coho salmon are also in a precarious position having been extirpated from much of the Eel River system except for in the South Fork Eel River (CDFG 2002). Although coho salmon were confirmed in many of the SFER tributaries, there were nearly as many SFER tributaries in which coho salmon were not observed (CDFG 2002). CDFG (2004 - Figure 6-25) evaluated the risk of extinction for coho salmon throughout California and concluded that coho salmon from the SFER has a high risk of extinction.

2. CC Chinook Salmon

Rigorous population estimates for the CC Chinook salmon are lacking. Myers *et al.* (1998) reviewed early estimates and reported estimated historic (prior to 1965) Chinook salmon escapement for the Eel River as 55,500. Recent estimates of abundance within the Eel River exceeds 4,000 Chinook salmon and show a -29.7 percent trend in abundance from 1987-1997 (Myers *et al.* 1998). Evidence suggests that CC Chinook salmon populations have been extirpated or nearly extirpated in the southern part of the ESU, or are extremely low in abundance - Chinook salmon in the Russian River are an exception. Also, an apparent loss of the spring-run Chinook life history in the Eel River Basin and elsewhere in the ESU indicates risks to the diversity of the ESU. Although there are few data available, recent status reviews for CC Chinook salmon conclude that population abundance levels remain depressed relative to historical levels and that this ESU is presently "likely to become endangered" (NMFS 2001, NMFS 2005). Recently NMFS evaluated the listing status of CC Chinook salmon and maintained the threatened status of SONCC coho salmon (70 FR 37160). Chinook salmon runs

observed in the South Fork Eel River and the Van Duzen River in 1992/93 through 1994/95 indicated a slight increase in numbers (CDFG 1997).

3. NC Steelhead

Based on the limited data available (dam counts of portions of stocks in several rivers), NMFS' initial status review of NC steelhead (Busby *et al.* 1996) determined that population abundance was very low relative to historical estimates (1930s and 1960s dam counts), and recent trends were downward in most stocks. Overall, population numbers are severely reduced from pre-1960s levels, when approximately 198,000 adult steelhead migrated upstream to spawn in the major rivers of this ESU (Busby *et al.* 1996, 65 FR 36074). Updated status reviews reach the same conclusion, and noted the poor amount of data available, especially for winter run steelhead (NMFS 1997, Adams 2000, NMFS 2005). The information available suggests that the population growth rate is negative. Comprehensive geographic distribution information is not available for this ESU, but steelhead are considered to remain widely distributed (NMFS 1997). It is known that dams on the Mad River and Eel River block large amounts of habitat historically used by NC steelhead (Busby *et al.* 1996). Hatchery practices in this ESU have exposed the wild population to genetic introgression and the potential for deleterious interactions between native stock and introduced steelhead. Historical hatchery practices at the Mad River hatchery are of particular concern, and included out-planting of non-native Mad River hatchery fish to other streams in the ESU and the production of non-native summer steelhead (65 FR 36074). The conclusion of the most recent status review (NMFS 2005) echoes that of previous reviews. Abundance and productivity in this ESU are of most concern, relative to NC steelhead spatial structure (distribution on the landscape) and diversity (level of genetic introgression). The lack of data available also remains a risk because of uncertainty regarding the condition of some stream populations. Recently, NMFS evaluated the listing status of NC steelhead and proposed maintaining the threatened listing determination (69 FR 33102). NMFS is unaware of recent population status information specific to steelhead in the SFER.

4. Critical Habitat

Critical habitat is defined in section 3(5)(A) of the Endangered Species Act (ESA) as "(I) the specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species . . . upon a determination by the Secretary of Commerce (Secretary) that such areas are essential for the conservation of the species" (see 16 U.S.C. 1532(5)(A)). The term "conservation", as defined in section 3(3) of the ESA, means " . . . to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary" (see 16 U.S.C. 1532(3)). Therefore, critical habitat is the geographic area and habitat functions necessary for the recovery of the species.

The condition of critical habitat, for all three ESUs, has been degraded from conditions known to support viable salmonid populations. These conditions are, in part, the result of the following

human-induced factors affecting critical habitat*: logging, agricultural and mining activities, urbanization, stream channelization, dams, wetland loss, and water withdrawals, including unscreent diversions for irrigation (reviewed in NMFS 2005). Impacts of concern include alteration of stream bank and channel morphology, reduced surface flow, alteration of water temperatures, loss of spawning and rearing habitat, fragmentation of habitat, loss of downstream recruitment of spawning gravels and large woody debris, degradation of water quality, removal of riparian vegetation resulting in increased stream bank erosion, increases in erosion entry to streams from upland areas, loss of shade (higher water temperatures), and loss of nutrient inputs. Depletion and storage of natural river and stream flows have drastically altered natural hydrologic cycles in many of the streams in the ESU. The SFER is included on the 2002 Clean Water Act section 303(d) list of water quality limited segments. The pollution factors for the SFER are sedimentation and temperature. Forestry, agriculture, and nonpoint sources are listed as the potential sources for these factors.

IV. ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the status of the species, its habitat, and the 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 impact of State or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The project is located in the west portion of the Northern Coast Ranges Geomorphic province. This province is characterized by northwest-trending mountain ranges and valleys bounded by right-lateral strike-slip faults that are part of the San Andreas fault system. The northern Coast Ranges are dominated by irregular, knobby, landslide-topography of the Franciscan Complex. Seismic episodes in the region cause uplift followed by widespread down cutting of stream bottoms and causes the slopes to become steeper. The project site is characterized by steep topography. The matrix of the sheared bedrock layers has an affinity to absorb and retain water that greatly adds to the instability of these local slopes. Overall, the SFER basin is underlain by Franciscan mélange and is unstable and highly erosive. Coupled with high precipitation, steep slopes, and a great deal of anthropogenic soil disturbance, the Eel River has one of the highest rates of sedimentation rates in the world (US Environmental Protection Agency 1999).

A. Status of Listed Species within the Action Area

NMFS is not aware of any recent fisheries survey information for the action area. However, staff from CDFG and NMFS have observed coho salmon, Chinook salmon, and steelhead in the

*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.

action area. From late October through June, one or more of these species migrate through the action area to reach upstream spawning areas (as adults) or when emigrating to the Pacific Ocean (as smolts). In the SFER portion of the action area during summers, only steelhead juveniles are expected. Although coho salmon spend about 18 months in freshwater, higher than optimal summertime water temperatures likely preclude rearing of coho salmon within that area. Chinook salmon likely spawn within the SFER portion of the action area, but their juveniles spend little time rearing in freshwater. Soon after emerging in the spring they emigrate to the Eel River estuary or ocean to rear. Because of higher than optimal summertime water temperatures, most juvenile steelhead likely use the colder tributaries away from the SFER portion of the action area; few juvenile steelhead are likely to be present in the action area during the summer months. Staff from CDFG have observed coho salmon, Chinook salmon, and steelhead in Red Mountain Creek (Scott Harris, CDFG, personal communication, November 3, 2005). Water temperature probably does not limit salmonid use of Red Mountain Creek (Humboldt County Resource Conservation District 2003), so NMFS will assume that coho salmon and steelhead are present in Red Mountain Creek year-round. Given the life history of Chinook salmon, they will not be present in Red Mountain Creek in the summer and early fall.

B. Status of Critical Habitat within the Action Area

NMFS staff have observed the stream channel in the action area during the construction window, May 15 - October 31. The SFER at the project site is shallow with few pools, has reduced surface flow, and provides limited habitat for juvenile salmonids in this time period. Large cobbles and boulders likely provide some instream cover. Instream large woody debris appears mostly lacking. Based on current channel conditions, NMFS concludes that critical habitat within the action area is degraded from properly functioning condition due to lack of riparian and instream cover, excessive loading of fine sediment, reduced summer and fall surface flow, and potential for coho salmon populations throughout California and has determined that although the SFER aquatic habitat is degraded, it has a high potential for restoration and management (CDFG 2004 - Figure 6-27). Aquatic habitat conditions in Red Mountain Creek are somewhat degraded (Scott Harris, CDFG, personal communication, November 3, 2005), though water temperatures appear satisfactory for use by salmonids (Humboldt County Resource Conservation District 2003). The Red Mountain Creek culvert under Highway 101 was identified as a velocity barrier to salmonid migration under some flow conditions (Susan Leroy, CalTrans, personal communication, October 25, 2005).

C. Factors Affecting Species Environment within the Action Area

Poor forest practices and poor land use practices, combined with catastrophic flooding in 1964, have led to increased rates of sediment loading and a reduction in large woody debris recruitment; these factors have caused significant declines in habitat quality that persist currently in the Eel River watershed (Busby *et al.* 1996, Myers *et al.* 1998, NMFS 2005) and the SFER (US Environmental Protection Agency 1999). An additional risk factor for SFER salmonids is predation resulting from the illegal introduction of nonnative Sacramento pikeminnow (*Pygocentrus grandis*) to the Eel River basin (NMFS 2005). Sacramento pikeminnow were

introduced to the Eel River watershed in the early 1980s and have subsequently spread to most areas within the basin, including the SFER. The rapid expansion of pikeminnow populations is believed to have been facilitated by alterations in habitat conditions (particularly increased water temperatures) that favor pikeminnow over salmonids. NMFS assumes that these factors are affecting salmonids within the action area.

In its biological assessment and subsequent documentation, CalTrans reported that landslides in the action area occur with greater frequency and magnitude in recent years, particularly during rainfall and seismic events, and deliver large amounts of sediment to the SFER. Rural homeowners near the action area continue to use an extensive network of primitive roads that were not designed for long-term use leading to increased delivery of fine sediments. In addition, water withdrawals occur in some tributaries to supply these developments. The total volume of water removal during the summer months for domestic and agricultural uses is unknown, but is likely a large amount during periods of low water flow.

V. EFFECTS OF THE PROPOSED ACTION

The purpose of this section is to identify the direct and indirect effects of the proposed action on threatened SONCC coho salmon, CC Chinook salmon, NC steelhead, and on designated critical habitat for those species. Data to quantitatively determine the precise effects of the proposed action on coho salmon, Chinook salmon, steelhead, and critical habitat, are limited or not available; the assessment of effects therefore focuses mostly on qualitative identification. This approach was based on a review of ecological literature concerning the effects of loss and alteration of habitat elements important to salmonids, including water, substrate, food, and adjacent riparian areas; the primary constituent elements of critical habitat that will be affected. This information was then compared to the likely effects associated with the proposed project.

The project is anticipated to take three consecutive construction seasons to complete, beginning in 2006. Construction activities within the stream channel will be limited annually to May 15 through October 31. From May 15 through June 30, coho salmon, Chinook salmon, and steelhead smolts may be in the action area as all three species emigrate from the Eel River watershed through June (Fukushima and Lesh 1998). Construction activities in the SFER or Red Mountain Creek undertaken from May 15 through June 30 may affect smolting coho salmon, Chinook salmon, and steelhead. From July 1 through October 31 only juvenile steelhead are likely found in the SFER, but both juvenile coho salmon and steelhead may be in Red Mountain Creek. The number of juvenile salmonids present in both the SFER and Red Mountain Creek is likely less than would be found in streams and rivers with better rearing habitat conditions. Construction activities undertaken in the SFER from July 1 through October 31 may affect juvenile steelhead. Construction activities undertaken in Red Mountain Creek during that same time period may affect juvenile coho salmon and juvenile steelhead. The work window end date of October 31 will avoid the immigration period for adult salmonids throughout the action area. NMFS anticipates no take of adult coho salmon, adult Chinook salmon, and adult steelhead.

A. Fish Relocation Activities

Since the SFER is a perennial stream and instream piles are necessary for the trestles, cofferdams may be used to isolate the small area surrounding temporary trestle piles from the stream. The area within the cofferdams will be dewatered before pile placement. Before the project site is dewatered, qualified biologists will capture and relocate fish away from the project work site to minimize mortality from dewatering within the cofferdams. Fish within the cofferdams will be captured by seine, dip net and/or electrofisher, and then transported and released to a suitable instream location. Data to precisely quantify the amount of fish that will be relocated prior to implementation of each individual construction project are not available. However, NMFS can narrow the life stage to which effects are anticipated. Fish relocation activities will occur outside the adult migration period. Since the cofferdams will be put in slowly and will be constructed of sheet pile, smolting salmonids, with their effective escape behavior, will likely avoid the cofferdams during construction. Therefore, only juvenile salmonids will be enclosed by the cofferdams and will need to be captured during relocation activities. Most, if not all, juvenile salmonids will be rescued from the cofferdams; all salmonids remaining in the cofferdams will be exposed to harm from dewatering or crushing.

Fish relocation activities pose a risk of injury or mortality to rearing juvenile salmonids. Any fish collecting gear, whether passive (Hubert 1983, Hubert 1996) or active (Hayes 1983, 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. The effects of seining and dipnetting on juvenile salmonids include stress, scale loss, physical damage, suffocation, and desiccation. Electrofishing can kill juvenile salmonids, and researchers have found serious sublethal effects including spinal injuries (Reynolds 1996, Nielsen 1998). The long-term effects of electrofishing on salmonids are not well understood. Although chronic effects may occur, it is assumed that most impacts from electrofishing occur at the time of sampling. Since fish relocation activities will be conducted by qualified fisheries biologists following both CDFG and NMFS electrofishing guidelines, direct effects to and mortality of juvenile salmonids during capture will be minimized. Data from two years of similar salmonid relocation activities in Humboldt County indicate that average mortality rate is below one percent (Collins 2004).

Although sites selected for relocating fish should have similar water temperature as the capture site and should have ample habitat, in some instances relocated fish may endure short-term stress from crowding at the relocation sites. Relocated fish may also have to compete with other fish causing 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. As each fish moves, competition remains either localized to a small area or quickly diminishes as fish disperse. NMFS cannot accurately estimate the number of fish affected by competition, but does not believe this impact will cascade through the watershed populations of these species based on the small area that will likely be affected and the small number of salmonids likely relocated.

B. 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. At the trestle construction sites, the cofferdams, if used, will not interrupt the entire channel, as they will surround a span of four or five pilings placed longitudinally in the stream. Effects to fish should be minimal as they can flee the work area during placement of the cofferdams and can avoid the area when the cofferdams are completed. However, some fish may be enclosed within the cofferdams; however, most if not all of these fish will be rescued, thereby reducing the number of fish exposed to construction activities. Stream flow in the vicinity of the project site should be the same as free-flowing conditions. Any temporary loss, alteration, and reduction of aquatic habitat within the cofferdams will be minimal.

At the Red Mountain Creek site cofferdams will interrupt the entire stream flow; project work area dewatering is expected to cause temporary loss, alteration, and reduction of aquatic habitat. NMFS anticipates that only a small reach of stream will be dewatered for in-channel construction activities. Stream flow diversions could harm individual rearing juvenile coho salmon and steelhead by concentrating or stranding them in residual wetted areas before they are relocated (Cushman 1985).

Rearing juvenile salmonids could be killed or injured if crushed during construction and diversion activities, though direct mortality is expected to be minimal due to relocation efforts prior to installation of the diversion. Juvenile salmonids that avoid capture in the project work area will die during dewatering activities.

In both the SFER sites and Red Mountain Creek site, benthic (i.e., bottom dwelling) aquatic macroinvertebrates may be killed or their abundance reduced when aquatic habitat is dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from stream flow diversions and dewatering will be temporary because 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 macroinvertebrate loss on juvenile salmonids is likely to be negligible because food from upstream sources (via drift) would be available downstream of the dewatered areas since stream flows will be maintained around the project work site and food sources derived from the riparian zone will not be affected by the project. Based on the foregoing, the loss of aquatic macroinvertebrates as a result of dewatering activities is not expected to adversely affect ESA-listed salmonids.

C. Increased Mobilization of Sediment within the Stream Channel

Roadway, bridge, and related construction activities may cause temporary increases in turbidity (reviewed in Furniss *et al.* 1991, Reeves *et al.* 1991, and Spence *et al.* 1996). NMFS anticipates that short-term increases in turbidity will occur during proposed dewatering activities, construction and removal of cofferdams, construction and removal of temporary trestles, and construction and decommissioning of temporary roads. Sediment may affect salmonids by a

variety of mechanisms. Excessive fine sediment can interfere with development and emergence of salmonids (reviewed by Reiser and Bjorn 1979 and Chapman 1988). High concentrations of suspended sediment can disrupt normal feeding behavior and efficiency (Cordone and Kelly 1961; Bjorn *et al.* 1977; Berg and Northcote 1985), reduce growth rates (Couscous *et al.* 1981), and increase plasma cortisol levels (Serviz and Martens 1992). High turbidity concentrations can reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases, and can also cause fish mortality (Sigler *et al.* 1984; Berg and Northcote 1985; Gregory and Northcote 1993; 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 chances of survival. Increased sediment deposition can fill pools and reduce the amount of cover available to fish, decreasing the survival of juveniles (Alexander and Hansen 1986).

Much of the research discussed in the previous paragraph focused on turbidity levels higher than those likely to result from the proposed construction activities. Recent monitoring of newly replaced culverts within Humboldt County indicated temporary increases in turbidity following winter storm events. The measured turbidity at these sites was generally less than the turbidity threshold commonly cited as beginning to cause minor behavioral changes (Bentley *et al.* 2000), and always less than turbidity levels necessary to injure or kill salmonids. CalTrans proposes to minimize the effects of construction activities by following CalTrans soil stabilization and sediment control BMPs, using no imported material, decommissioning the temporary roads and trestles after completion of the construction project, minimizing the loss of native riparian vegetation, and replanting any disturbed soils with native vegetation. NMFS expects small temporary increases in turbidity that is likely to result in some limited behavioral effects, such as temporarily vacating preferred habitat or temporarily reduced feeding efficiency. These behavioral changes are not expected to reduce the survival chances of individual salmonids.

D. Toxic Chemicals

Equipment refueling, fluid leakage, and maintenance activities within and near the stream channel pose some risk of contamination of aquatic habitat and subsequent injury or death to listed salmonids. NMFS anticipates that CalTrans and its contractors will maintain any and all fuel storage and refueling sites in upland locations well away from the stream channel, that vehicles and construction equipment be in good working condition, showing no signs of fuel or oil leaks, and that any and all servicing of equipment be conducted in an upland location. CalTrans may use bentonite as a lubricant for pile placement and an accidental release of bentonite may occur. Bentonite is potentially lethal to fish. Sigler *et al.* (1984) reported that steelhead and coho salmon show reduced growth rates or increased emigration rates when exposed to 125 to 175 mg/l bentonite. In addition to toxic chemicals associated with construction equipment, water that comes into contact with wet cement during construction can adversely affect water quality by raising the pH of water, which may result in injury or death to listed salmonids. NMFS does not anticipate any localized or appreciable water quality degradation from toxic chemicals or adverse effects to ESA-listed salmonids associated with the proposed projects, as the stream will be dewatered around the instream construction sites, giving

CalTrans and its contractors ample opportunity to attend to any spill prior to toxic chemicals reaching the waters of the SFEK or Red Mountain Creek.

E. Sound

There are two significant sources of above ambient sound levels on this project: placement of piles for the temporary trestles and blasting associated with bridge and through-cut construction. Underwater pressure waves generated by pile placement and blasting activities may adversely impact fish (Wright and Hopky 1998; NMFS 2003). Rapid increases in hydrostatic pressure and subsequent decreases to below ambient pressures can lead to a range of effects on fish from death to sublethal behavioral changes. The degree to which an individual fish exposed to sound will be affected is dependent on a number of variables, including, but not limited to: species and size of the fish, distance from the source, peak sound pressure and frequency, depth of the water around the pile, bottom substrate composition and texture, and effectiveness of any sound attenuation technology (reviewed in NMFS 2003). Also, sound patterns are affected by the size and type of placement machine and size and material of the pile (for pile placement) and the amount and type of explosive (for blasting). CalTrans has not determined which method of pile placement will be used on this project. CalTrans will use either a vibrating hammer or a drill to place casings in the stream to bedrock; the casings will be filled with cement after they are set in place. Depending on local geology, blasting may be used when creating the through-cut between the new bridges, the foundation elements of piers 2 and 3 for the permanent northern bridge, and the northern conform of the project.

NMFS (2003) reviewed pile driving effects for fish and concluded that underwater sound levels between 165 peak decibels (dB_{peak}) and 190 dB_{peak} in Carquinez Strait are expected to cause stress, agitation, and behavioral changes, and sound pressure levels greater than 190 dB_{peak} are expected to cause direct permanent injury or mortality of salmonids. Placing piles with an impact hammer regularly result in sound levels in excess of 190 dB_{peak}. Vibrating piles and drilling piles, as proposed by CalTrans on this project, are thought to create lower, acceptable sound levels than those associated with pile driving. NMFS does not anticipate harmful sound levels from vibrating or drilling piles. Salmonids exposed to above-ambient, though nonlethal, sound levels at the Confusion Hill site during the pile placement, are likely to flee the area.

The effects of blasting on fish are similar to the effects of pile driving. However, sometimes higher sound levels are accepted in blasting when compared with pile driving, because pile driving is a serial event (*i.e.*, there are multiple events in a very short timeframe) and is associated with underpressure as well as overpressure causing additional physical stressors on fish. Blasting outside of the stream channel reduces, but does not avoid, impacts to fish. Seismic energy from blasts outside of the stream is transferred through the substrate to water (Wright and Hopky 1998). CalTrans has proposed no in-stream blasting; the nearest site is at pier 2 of the northern bridge. The distance between pier 2 of the northern bridge and the ordinary high-water mark (OHW) (which would be higher than actual stream conditions at the time of blasting) would be approximately 75 ft (22.9 m). The distance between pier 3 and the OHW would be approximately 120 ft (36.6 m), between the northern conform and the OHW would be

The construction window is designed such that adult ESA-listed salmonids will not be present during wet channel crossings. Given that the wet channel crossings are limited in temporal and spatial scope and the degraded condition of habitat, NMFS estimates that no more than 50 juvenile, nonsmolted salmonids will be killed during instream construction activities.

G. Interdependent and Interrelated Actions

NMFS does not anticipate any interdependent or interrelated actions associated with the proposed action.

H. Beneficial Effects

The current culvert at the Highway 101 crossing of Red Mountain Creek is undersized and is not adequately designed for fish passage. An undersized culvert will tend to increase downstream erosion. During a wide range of typical stream flows, the existing culvert at Red Mountain Creek prevents ESA-listed salmonids from accessing historic spawning and rearing habitat located upstream of the structure. Replacing the culvert with a correctly sized culvert will reduce road-related erosion - an integral part of a sediment reduction plan. Reducing fine sediment loading downstream of the culvert can improve the quality of critical habitat. Installing a culvert designed to pass fish will allow access to under utilized habitat upstream of the culvert. Reintroducing listed salmonids into frequently unavailable upstream habitat will likely increase reproductive success, increasing the populations of salmonids that inhabit this stream.

VI. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. NMFS is not aware of any additional actions that would cause cumulative effects beyond those that are ongoing, including rural development and forestry, and have been analyzed in the Environmental Baseline section of this biological opinion.

VII. INTEGRATION AND SYNTHESIS OF EFFECTS

Given the timing and location of the proposed project, the project will not effect the migration of adult salmonids or salmonid spawning, and NMFS anticipates no take of adult salmonids. The proposed project may affect the migration of juvenile salmonids as the construction window begins May 15 and smolting salmonids emigrate from the SFER through June. Rearing habitat within the action area is marginal, primarily due to higher than optimal water temperatures and so few rearing juvenile salmonids are likely in the action area. CalTrans has proposed few instream construction elements for this project and they occur infrequently, though those elements directly affect ESA-listed salmonids and their habitat. Most of the impacts to listed species associated with the proposed activities will be nonlethal, though a small number of

approximately 300 ft (91.4 m), and between the west side alignment and the OHW would be greater than 400 ft (121.9 m).

Wright and Hopky (1998) use a maximum pressure threshold of 100 kilopascals (kPa) to avoid physical impacts to fish and provide guidelines to determine setbacks for use of explosives near fish bearing streams. Their guidelines use the following equation to determine a setback distance for blasting in rock: $R = \sqrt{W \cdot K}$, where, R = the minimum setback distance (m), W = the weight of the charge (kilogram [kg]), and K = 5.03 (a coefficient for blasting in rock). CalTrans cannot anticipate the maximum charge used at any of the Confusion Hill sites, but they do know the nearness of the sites to the SFER. Using the distances of the sites relative to the SFER and the equation and guidelines of Wright and Hopky (1998), we can determine that the maximum weight of explosive per shot⁵ of 20.7 kg, 52.9 kg, 330.4, and 587.5 kg would result in a maximum pressure threshold of 100 kPa - the limit to avoid physical impacts to fish - at 22.9 m, 36.6 m, 91.4 m, and 121.9 m respectively from the SFER. To minimize the amount of explosive used, CalTrans or their contractors will use pre-splitting - a technique of drilling a number of holes in the rock and using small, shotted charges to break the bedrock into large pieces to be removed rather than pulverized. This technique requires much less energy and equates to smaller charges. CalTrans has determined that the maximum weight derived from the Wright and Hopky (1998) equation exceeds the amounts likely used for this project (Susan Leroy, CalTrans, personal communication, October 31, 2005). Therefore, NMFS concludes that the proposed blasting at Confusion Hill will not exceed the 100 kPa - the threshold to avoid physical impacts to fish - and that only minor behavioral effects to salmonids will occur.

F. Instream Construction Activities

Wet channel crossings and the placement of piles in the stream can directly affect ESA-listed salmonids by crushing or startling the fish and being a source of turbidity. Crossing will occur only once during construction of the temporary trestles and once during the demolition of the temporary trestles. After the trestles are constructed, the equipment will cross the SFER using the constructed trestles. Trestle construction will occur at the beginning of this three year project and demolition will occur near the end of the project time period. Only three pieces of heavy equipment (drilling rig, vibrating hammer, and excavator) will cross at each trestle. The equipment shall cross at the same location during construction and demolition to minimize damage to channel substrate. The construction window begins May 15, which overlaps with anticipated smolt emigration in the action area, so there is a potential for adverse effects to ESA-listed salmonids. The equipment will be driven slowly across the channel. NMFS anticipates that all smolting salmonids will be able to swim away from the equipment without being harmed, but that some young-of-the-year steelhead may retreat to interstitial spaces in the sediment and be injured or killed during the wet channel crossings. Similarly, a few juvenile steelhead may also be injured or killed during construction of the temporary trestles if cofferdams are not used. Given the limited amount of juvenile steelhead likely present, the number of juvenile steelhead injured or killed by construction activities during wet crossings and trestle construction, with or without cofferdams, is likely to be minimal.

5 A shot may contain several charges placed in separate holes detonated synchronously.

rearing juvenile salmonids may die. Rearing juvenile salmonids present in the immediate project work areas will be subject to disturbance, capture, relocation, and related short-term effects. NMFS expects no injuries to salmonids from sound levels produced from pile placement or blasting, though. Placement of cofferdams will not span the entire stream in the SFER, but will be at the Red Mountain Creek site. Placement of cofferdams and other instream construction activities will be done slowly enough to allow slow smolting salmonids to avoid the sites. Any fish enclosed by cofferdams will be rescued and relocated to a suitable location. NMFS anticipates that up to 50 juvenile, nonsmolting salmonids may be killed during instream construction activities in the SFER and Red Mountain Creek.

The effects of the project are expected to result in minimal adverse effects to SONCC coho salmon, CC Chinook salmon, and NC steelhead. The project will not have any permanent deleterious effects on habitat, because the piers of the proposed permanent bridges will be above the elevation of 100-yr flow events and the culvert work on Red Mountain Creek culvert will improve habitat allowing fish passage during more flow regimes. The loss of a small number of salmonids from the action area is not expected to appreciably reduce the number, distribution, or reproduction of SONCC coho salmon, CC Chinook salmon, and NC steelhead in the SFER watershed in future years. Few salmonids are expected within the action area and they likely make up a small proportion of salmonids from the SFER watershed. Due to the relatively large number of juveniles produced by each spawning pair, salmonids spawning in these streams and in the SFER watershed in future years are likely to produce enough juveniles to replace the few that may be lost at the project site. In consideration of the above, the proposed project is not anticipated to appreciably reduce the likelihood of the survival and recovery of the salmonid populations in the SFER watershed or the survival and recovery of the NC steelhead, CCC steelhead, and CCC coho salmon ESUs.

The action area is designated critical habitat for SONCC coho salmon, CC Chinook salmon, and NC steelhead. Impacts to critical habitat include a short term loss of habitat from sedimentation or dewatering that is not expected to cause a long term loss in the essential features of critical habitat. Because the effects are short-term, and flow will resume at the completion of construction, adverse effects will not rise to a level which will appreciably diminish the value of critical habitat for conservation of the SONCC coho salmon, CC Chinook salmon, and NC steelhead ESUs.

VIII. 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 realignment of Highway 101 at Confusion Hill is not likely to jeopardize the continued existence of or result in the destruction or adverse modification of critical habitat for SONCC coho salmon, CC Chinook salmon, or NC steelhead.

IX. 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(e)(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 FHWA, CalTrans, and their designees for the exemption in section 7(e)(2) to apply. The FHWA and CalTrans have a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA and CalTrans: (1) fail to assume and implement the terms and conditions, or (2) fail to require any designee 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(e)(2) may lapse. In order to monitor the impact of incidental take, the FHWA and CalTrans 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(f)(3)).

A. Amount or Extent of Take

The realignment of Highway 101 at Confusion Hill is expected to result in minimal incidental take of threatened SONCC coho salmon, CC Chinook salmon, and NC steelhead. Fish in the vicinity of the project could be adversely affected by the project construction activities. Juvenile salmonids that are relocated or that have fled the area to avoid disturbances may suffer an increase risk of competition.

The number of ESA-listed salmonids that may be incidentally taken during project activities cannot be accurately quantified due to: (1) the precise number of fish that may be present is unknown; (2) the precise number of fish that may be stranded is unknown; and (3) the level of harm that might occur when juvenile fish are relocate or displaced to other habitat areas of the stream. In instances where NMFS cannot quantify the amount of incidental take, surrogates such as the extent of habitat affected or modified by the proposed action are used.

Therefore, take is quantified as: All fish present in the areas to be dewatered between May 15 and October 31 during the years that the project occurs may be captured by relocation activities. Based on the low mortality rates for relocation efforts and the small number of salmonids present in the action area, NMFS anticipates no more than one percent of juvenile salmonids handled

will be harmed or killed during relocation efforts. NMFS expects that the number of juvenile salmonids that will be killed as a result of stranding during dewatering activities will be less than those killed during relocation. This is due to the small area affected, the relocation efforts, and the low numbers of juvenile salmonids expected to be present within the action area. NMFS anticipates that no salmonids will be harmed by sound levels generated by pile placement or blasting. NMFS anticipates that all of the juvenile steelhead at the area of the wet crossings and pile placement will be exposed to crushing and may perish. However, the amount of area exposed to instream construction activities is small, the instream activities are infrequent and of short duration, the activities are done slowly giving juvenile steelhead an opportunity to escape, and the habitat is not heavily used by juvenile steelhead during the anticipated instream activities. Therefore, NMFS anticipates that no more than 50 juvenile, nonsmolting steelhead will be killed during instream construction activities.

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 the species.

C. Reasonable and Prudent Measures

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of SONCC coho salmon, CC Chinook salmon, and NC 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 construction activities.
3. Undertake measures to assure that adverse effects to water quality are minimized.
4. Prepare and submit an annual report to document effects of construction and relocation activities and performance.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the FHWA, CalTrans, and their designers 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 to ensure that harm and mortality to listed salmonids resulting from fish relocation and dewatering activities is low:

a. The FHWA and CalTrans 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 FHWA and CalTrans 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 *NOAA Fisheries Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act*, June 2000.

b. The biologist shall monitor the construction site during placement and removal of 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 Daniel Logan at (707) 575-6053 or dan.logan@nrmfs.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 rescue 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 Daniel Logan by phone immediately at (707) 575-6053 or the NMFS Santa Rosa 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, and be 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 NMFS Santa Rosa Area Office without obtaining prior written approval from the Santa Rosa Area 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 to minimize harm to listed salmonids resulting from bridge and roadway construction:
 - a. The FHWA or CalTrans shall notify the NMFS Santa Rosa Area Office, by letter stating the project commencement date, at least fourteen days prior to implementation. The letter shall be sent to the NMFS Santa Rosa Area Office, Attention: Supervisor of Protected Resources Division, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528.
 - b. The FHWA or CalTrans shall allow any NMFS employee(s) or any other person(s) designated by NMFS, to accompany field personnel to visit the construction sites during activities provided for in this opinion.
 - c. The FHWA or CalTrans shall conduct a worker education program prior to construction activities on the importance of protecting salmonids and their habitat and the project measures to do so.
 - d. 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 FHWA or CalTrans and their contractors, upon notification from the biologist, shall halt the work activity causing the condition affecting salmonids and recommend measures for avoiding the condition. Work can resume when NMFS agrees that the proposed measures are appropriate for avoiding the condition.
 - e. Prior to commencement of work on the Red Mountain Creek fish passage improvement component, FHWA or CalTrans shall submit the final engineering design for the structures related to fish passage to NMFS for evaluation and approval prior to implementation. The designs should be sent to the NMFS Santa Rosa Area Office, Attention: Supervisor of Protected Resources Division, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528.
 - f. The standard for success for revegetation activities shall be 80 percent survival of plantings or 80 percent ground cover for broadcast planting of seed after a period of three years. If either success criteria is not met, FHWA and CalTrans shall collaborate with NMFS to develop and undertake a satisfactory plan for revegetation.
 - g. Prior to any work within the 100-year flood plain of the South Fork Eel River or any blasting related to the Confusion Hill project, FHWA or CalTrans shall ensure that a hydroacoustic monitoring program is implemented at the project site. FHWA and CalTrans shall work collaboratively with NMFS and CDFG to create a satisfactory hydroacoustic monitoring program. The hydroacoustic monitoring plan shall include, at a minimum, measurements of underwater sound levels, both peak decibels and root mean square decibels, at several locations in the wetted

- channel. The hydroacoustic monitoring plan shall include an emergency response protocol and include annual reporting requirements.
 - h. Prior to any work within the 100-year flood plain of the South Fork Eel River, FHWA or CalTrans shall ensure and provide funding for implementation of minimization and mitigation measures and for monitoring compliance and effectiveness of those measures in a form and amount acceptable to and approved in writing by NMFS and CDFG.
 - i. Prior to any work within the 100-year flood plain of the South Fork Eel River, FHWA or CalTrans shall develop a biological monitoring plan which shall be approved in writing by NMFS and CDFG. The biological monitoring plan shall include annual reporting requirements.
 - j. Once construction is finished for each construction season, all project introduced material (pipe, gravel, filler fabric, demolition debris, etc.) must be removed, leaving the creek as it was before construction. Excess materials will be disposed of at an approved disposal site.
3. The following terms and conditions implement Reasonable and Prudent Measure 3 to assure that adverse effects to water quality are minimized.
 - a. Contractors must have a supply of erosion control materials onsite to facilitate a quick response to unanticipated storm events or emergencies.
 - b. Bentonite shall be prevented from entering the stream channel. Any bentonite that does enter the stream during construction shall be immediately removed in a manner that has minimal impact to the streambed and water quality.
 - c. Water that comes in contact with wet concrete and has a pH greater than 9.0 must not be allowed to enter the ground or stream but shall be either: (1) pumped to a separate, lined basin, and then pumped to a truck or upland for disposal or treatment (not within the bank to bank of any waterway); or (2) pumped directly to a truck for disposal at a site that is not within the top of bank to top of bank of any waterway.
 - d. 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), FHWA, CalTrans, or their contractor will contain the spill and remove the affected soils.
 - e. Water for dust abatement, if necessary, must be acquired from an off-site source. Water drafting from the action area is not permitted.

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.

XI. 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 Recommendations:

1. The FHWA and CalTrans should consult with NMFS to develop a monitoring and research plan which seeks to better understand the sound levels associated with pile driving, blasting, or other road construction and maintenance actions. Having that information will allow FHWA, CalTrans, NMFS, and others, to minimize and avoid the potential impacts of project-related sound levels on ESA-listed salmonids.
2. The FHWA and CalTrans should consult with NMFS to develop a long range planning approach, perhaps a programmatic approach, which seeks to minimize and avoid the impacts of road construction and maintenance projects on ESA-listed salmonids.
3. The FHWA and CalTrans should identify culverts under their jurisdiction that currently do not meet the NMFS guidelines for salmonid passage, and to prioritize nonconforming culverts for replacement or retrofitting to meet or exceed the NMFS guidelines for salmonid passage.
4. The FHWA and CalTrans should consult with NMFS to identify funding sources and collaborative partners to assist with replacing or retrofitting culverts, under the jurisdiction of the FHWA and CalTrans, which do not conform to the NMFS guidelines for salmonid passage.
5. Any new stream crossing, under the jurisdiction of the FHWA and CalTrans, should meet or exceed design criteria of the NMFS guidelines for salmonid passage.
6. The FHWA and CalTrans should identify and prioritize any maintenance and construction projects which, if implemented, can improve salmonid migration or in-stream environmental conditions.

4. The following term and condition implements Reasonable and Prudent Measure 4 to document status of construction and relocation activities and performance.

a. FHWA and CalTrans shall provide a written report to NMFS by January 15 following completion of each construction season. The report shall be submitted to the NMFS Santa Rosa Area Office Attention: Supervisor of Protected Resources Division, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528. The report shall contain, at a minimum, the following information:

Construction related activities - The report shall 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.

Revegetation - The report shall include a description of the locations planted or seeded, the area (m²) revegetated, a plant palette, planting or seeding methods, the efforts taken to ensure success of new plantings, performance or success criteria, and pre- and post-planting color photographs of the revegetated area.

Fish Relocation - The report shall 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 electroshocker 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.

Sound - The report shall include elements related to the hydroacoustic monitoring discussed in section IX, D, 2, g of this opinion.

X. REINITIATION NOTICE

This concludes formal consultation on the proposed relocation of Highway 101 at Confusion Hill in Mendocino 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

XII. LITERATURE CITED

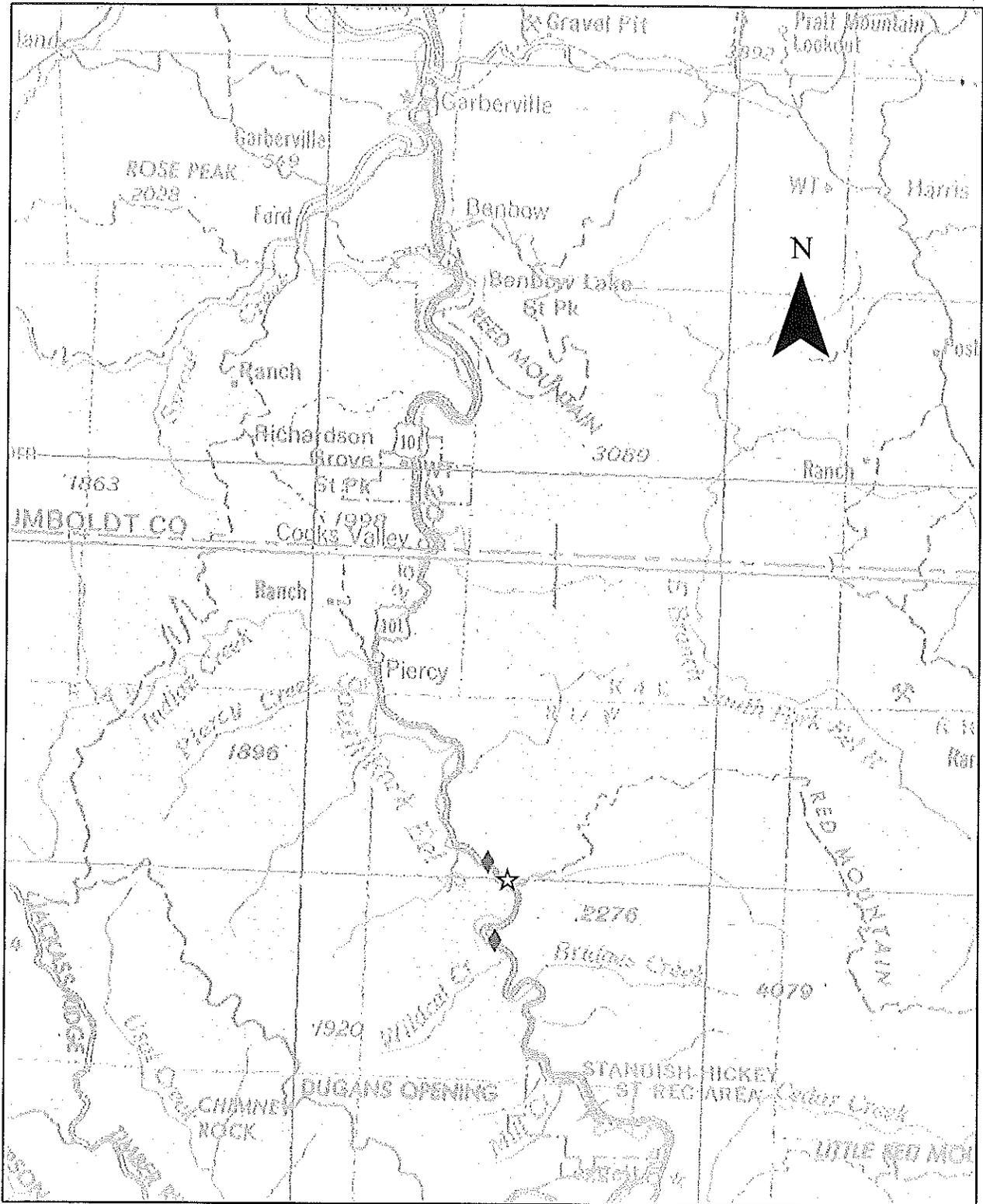
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- A. Federal Register Notices Cited
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- 65 FR 36074. National Marine Fisheries Service. Final Rule: Threatened Status for One Steelhead Evolutionarily Significant Unit (ESU) in California. Federal Register 65:36074-36094. June 7, 2000.
- 69 FR 33102. National Marine Fisheries Service. Proposed rule: Proposed Listing Determinations for 27 ESUs of West Coast Salmonids. Federal Register 69:33102-33179. June 14, 2004.
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- 70 FR 52488. National Marine Fisheries Service. Final rule: Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California. Federal Register 70: 52488-52586. September 2, 2005.
- B. Personal Communications
- Scott Harris, CDFG, e-mail message to Daniel Logan, NMFS, November 3, 2005.
- Susan Leroy, CalTrans, e-mail message to Daniel Logan, NMFS, October 25, 2005.
- Susan Leroy, CalTrans, telephone conversation with Daniel Logan, NMFS, October 31, 2005.

Location of Red Mountain Creek Fish Passage Project



Post Mile 100.46, Mendocino Highway 101

18.5 miles south of Garberville, 8 miles north of Leggett
Mendocino County, California

	Confusion Hill Bridge
	Fish Passage Project