

RECORD OF DECISION
LAST CHANCE GRADE PERMANENT RESTORATION PROJECT
Del Norte County, California
District 1 – U.S. Highway 101 (PM 12.7 to 16.5)
EA 01-0F280/Project ID 0115000099

The environmental review, consultation, and any other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 USC 327 and the Memorandum of Understanding dated May 27, 2022, and executed by FHWA and Caltrans.

This Record of Decision (ROD) was developed pursuant to 40 Code of Federal Regulations (CFR) 1505.2 and 23 CFR 771.127 for the Last Chance Grade (LCG) Permanent Restoration Project on U.S. Highway 101 (U.S. 101) in Del Norte County, California. The California Department of Transportation (Caltrans) has identified this project to develop a long-term solution to the instability and potential roadway failure at LCG. The project description and purpose and need are described in Chapter 1 of the project's *Final Environmental Impact Report/Environmental Impact Statement and Final Section 4(f) Evaluation* that was signed on May 15, 2026. The Notice of Availability of the final environmental document was published in the *Federal Register* on June 5, 2026.

A. Decision

This ROD approves the preferred alternative identified in the Final Environmental Impact Report/Environmental Impact Statement (EIR/EIS). After circulation of the Draft EIR/EIS and consideration of various criteria, including environmental and construction considerations, and public and agency input received during circulation of the Draft EIR/EIS, Caltrans has selected Alternative F, Tunnel Bypass.

B. Alternatives Considered

During project development, a wide range of possible alternatives were identified over a three-decade period, based on past studies and input received from stakeholders, including regulatory agencies and the community. Several potential alternatives were considered but eliminated from further consideration prior to the preparation and circulation of the Draft EIR/EIS due to anticipated environmental impacts, cost, feasibility, and/or failure to meet most of the basic project objectives.

Two build alternatives, as well as a No-Build Alternative, were evaluated in the Draft EIR/EIS. The build alternatives included the following:

- **Alternative X** would involve reengineering a 1.6-mile-long portion of the existing roadway. This alternative would include a series of retaining walls, underground drainage features, and strategic eastward retreats (realignments) to minimize the risk of landslides.
- **Alternative F** would involve constructing an approximately 6,000-foot-long (1.1-mile) tunnel to the east of the existing highway to avoid the most intense area of known landslides and geologic instability, thereby avoiding the portion of U.S. 101 most prone to closure. The main components of this alternative include the construction of tunnel portals and the tunnel, a bridge, and an Operations and Maintenance Center (OMC).

Both Alternatives X and F would involve geotechnical investigations to confirm the location of basal failure planes and landslide depths. These geotechnical investigations would supplement previous investigations conducted in the area over the past several years.

Under the No-Build Alternative, the project would not occur; existing conditions would persist, including the anticipated continuation of emergency repairs and enhanced maintenance activities. This section of highway has been progressively sliding toward the Pacific Ocean since the roadway was first constructed in the 1930s. The roadway is now at the edge of bluffs that are subject to active coastal erosion, resulting in further loss of roadway resiliency. Due to the vast extents and depths of the landslides, engineering solutions such as retaining walls have not been able to provide long-term stability. Rather, they are short-term measures, and additional retaining structures would continue to be necessary to keep the highway facility open. Maintenance of the existing road alignment has become more difficult and costly, and costs are expected to escalate as repairs and retreats become even more difficult. In addition, there is the potential of a long-term closure of the highway, if a large-scale landslide movement occurred and resulted in a major roadway failure.

C. Preferred Alternative

Caltrans, as the lead agency under the National Environmental Policy Act (NEPA) as assigned by the Federal Highway Administration (FHWA), has selected Alternative F as the preferred alternative.

After circulation of the Draft EIR/EIS, the Caltrans Project Development Team began the process of identifying a preferred alternative. On May 16, 2024, Caltrans hosted a joint meeting of four Stakeholder Working Groups to present information on risks, impacts, and other considerations, including new information on the 2024 Geotechnical Risk Assessment (GRA), and collect stakeholder input on the alternatives and selection

process as informed by the presentation. In June 2024, the Project Development Team identified the preferred alternative based on a variety of factors including the 2024 GRA, the Draft EIR/EIS and public comments submitted, environmental impacts, delivery considerations, project purpose and need, and input from stakeholders including landowners, permitting agencies, tribes, government, industry, and the general public.

Alternative F was selected as the preferred alternative because it is expected to: (1) better meet the project's purpose, which is to develop a long-term solution to the instability and potential roadway failure at LCG, and (2) provide greater long-term economic and social benefits to the region than Alternative X. While both Alternative X and Alternative F would improve the reliability of the highway, the 2024 GRA concluded that good performance from Alternative F is approximately two times more likely than from Alternative X. More specifically, the probability of increased maintenance activities, emergency repair projects, and traffic impacts (lane closures and full closures) resulting from geotechnical threats related to deep landslides, nested landslides, rockslides, rockfall, and gully erosion is expected to be approximately two times lower for Alternative F than for Alternative X. Alternative F is also expected to be more resilient to extreme storm events and to perform better during a large magnitude earthquake than Alternative X.

D. Determinations and Findings Regarding Other Laws

Section 4(f) of the U.S. Department of Transportation Act of 1966

Under the preferred alternative (Alternative F), the project would result in use of three Section 4(f) resources: Redwood National and State Parks (RNSP), Crescent City to Trinidad Wagon Road, and the Traditional Cultural Landscape (TCL) contributing elements: redwoods and other conifers. There would be a permanent use of all three resources and a temporary use of RNSP and the Crescent City to Trinidad Wagon Road. Impacts on the Crescent City to Trinidad Wagon Road were determined to be *de minimis*.

Alternative F would involve both permanent and temporary use of RNSP. This includes the acquisition of approximately 18.70 acres of at-grade right of way (15.62 acres from National Park Service [NPS] and 3.08 acres from California Department of Parks and Recreation [CDPR]) for the construction and maintenance of the transportation facility. In addition, an approximately 2.06-acre at-grade temporary construction easement (TCE) would be needed for construction. Pending future project refinement, a maintenance easement may be needed for this location, which would require permanent access. Therefore, for the purposes of Section 4(f), it is assumed that the TCE would be considered permanent incorporation, bringing the total permanent use to approximately 20.76 acres. In addition to permanent uses, there would be temporary use of approximately 0.44 acre (approximately 0.33 from NPS and 0.11 from CDPR) for activities associated with geotechnical investigations. The project would permanently

transfer RNSP lands to transportation use within a UNESCO World Heritage Site designated as a site of outstanding universal value. The affected lands occur within a globally recognized protected conservation landscape and contribute to the ecological integrity, connectivity, and conservation values of RNSP. Once jurisdiction is transferred the land can no longer function as part of the managed conservation landscape.

Alternative F is also anticipated to have a permanent use of large redwood trees and other conifers—contributing elements of the TCL. Conifers within the existing right of way and those in the areas to be acquired are primarily located at the portals and would be affected by construction of the portals, bridge, and associated features and activities. A summary of conifer trees removed for Alternative F by species is available in Table 4 of the Final Section 4(f) Evaluation.

Overall, while there are impacts on Section 4(f) resources resulting from the construction of Alternative F, the extent of the impacts after mitigation would not negate the characteristics of the RNSP or the TCL that trigger protection of the resources under Section 4(f). Measures to address impacts include Bio-1, Bio-2, Park-2, Park-3, and Cultural-1 discussed below in Section E and documented in the EIR/EIS and Memorandum of Agreement (MOA) between Caltrans and the State Historic Preservation Officer (SHPO).

Based on the above considerations, there is no feasible and prudent alternative to the use of land from the RNSP and the identified TCL. The action includes all possible planning to minimize harm to RNSP and the TCL resulting from such use and causes the least overall long-term harm in light of the statute's preservation purpose.

Section 106 of the National Historic Preservation Act of 1966

Caltrans conducted consultation in accordance with Section 106 of the National Historic Preservation Act and its implementing regulations. There are four historic properties in or near the Area of Direct Impact for Alternative F. The Old Redwood Highway District and the DeMartin Barn Site would be avoided through designation and protection in place as environmentally sensitive areas. In November 2024, Caltrans proposed a Finding of Adverse Effect, and sought SHPO concurrence, after determining the project would cause adverse effects on the remaining two historic properties: the *ʻO Men hee-puer/Daa-ghestlh-tsʻaʻ* Historic District (a TCL), and the Crescent City to Trinidad Wagon Road. In December 2024 the SHPO responded, agreeing that the project would cause an adverse effect on the *ʻO Men hee-puer/Daa-ghestlh-tsʻaʻ* Historic District, but objected that the project would adversely affect the Crescent City to Trinidad Wagon Road because it would only impact 14% of contributing segments of the documented historic property. In January 2025, Caltrans consulted with appropriate parties and determined there would only be an adverse effect on one historic property: the *ʻO Men hee-puer/Daa-ghestlh-tsʻaʻ* Historic District. The SHPO concurred with the revised finding of effect in January 2025. As a result, per Section 106, the undertaking will have an adverse effect on historic properties.

An MOA between Caltrans and the SHPO was developed in coordination with the tribes and RNSP to address adverse effects on the TCL. A Post Review Discovery and Monitoring Plan (PRDMP) to address additional buried cultural resources or unanticipated discoveries that could be identified during construction is an attachment to the MOA. The MOA was developed in coordination with the tribes and the SHPO and was finalized on May 14, 2026.

Section 7 of the Endangered Species Act

Pursuant to the requirements of the Federal Endangered Species Act (FESA), record searches and habitat assessments were conducted to determine whether threatened and endangered species have the potential to occur within the project area. As described in Section 3.4.5 of the Final EIR/EIS, there is potential habitat for five federally threatened and endangered species and/or their critical habitat (CH), including marbled murrelet, northern spotted owl, Southern Oregon/Northern California Coast Evolutionarily Significant Unit of coho salmon, Humboldt marten, and western lily.

Formal FESA Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) was initiated on November 8, 2024, with the Biological Opinion being received on May 15, 2025. Per FESA, the project would have no effect on western lily. The project may affect, but is not likely to adversely affect, Humboldt marten. The project may affect, but is not likely to adversely affect, northern spotted owl, but would have no effect on its CH. Additionally, it is anticipated that the project may affect, and is likely to adversely affect, marbled murrelet and its CH.

Informal FESA Section 7 consultation with the National Marine Fisheries Service will be initiated during the design phase of the project. It is anticipated that the project may affect, but is not likely to adversely affect, coho salmon–Southern Oregon/Northern California Coast Evolutionarily Significant Unit and its CH.

E. Measures to Minimize Harm

Chapter 3 of the Final EIR/EIS provides a detailed discussion of potential impacts resulting from construction and operation of the project and identifies measures to avoid, minimize, and/or mitigate impacts. Measures to minimize harm are summarized below. Resource areas in which no avoidance, minimization, or mitigation measures are required are not included below.

Coastal Zone

Standard Measures and Best Management Practices (BMPs), listed in Section 2.6 of the Final EIR/EIS, would be implemented to minimize potential impacts on wetlands, non-wetland waters, riparian vegetation, and other Environmentally Sensitive Habitat Areas (ESHAs) in the coastal zone. Permanent impacts would be offset through a combination of on- and off-site restoration and replacement ratios would be developed in coordination with the Coastal Commission. Exact location, amount, and type of

permit-driven mitigation would be coordinated with the Coastal Commission and all applicable regulatory agencies.

Parks and Recreational Facilities

The project would affect RNSP through acquisition of park land, and through temporary and permanent impacts during construction. Measure Park-1 will reduce temporary visual effects from geotechnical drilling, and Park-2 will be implemented to inform park users of construction activities near recreational resources. Measure Park-3 will be implemented for impacts related to Section 4(f).

In addition to the measures below, measures to minimize effects on biological resources will also reduce impacts on park users. This includes measures for Sensitive Natural Communities (SNCs) and the associated trees (Bio-1 to Bio-3) and noise effects (Bio-5), which will reduce temporary effects on users of the California Coastal Trail (CCT) and the DeMartin Backcountry Camp. Bio-1 involves the implementation of long-term restoration and an adaptive management framework, with funding directed to Redwoods Rising, a program managed by RNSP. Biological resource measures are discussed below under Natural Communities.

- **Park-1:** Where feasible, boreholes near the CCT would be placed in areas that would be screened from view of trail users.
- **Park-2:** Signage would be posted at trailheads and on websites to notify park users of construction activities when there is work near the CCT.
- **Park-3:** Measures would be implemented to offset temporary and permanent impacts on Section 4(f) recreational resources. This may include CCT improvements or funding to support other park projects or trail management activities¹. Implementation of this measure would be determined in consultation with NPS and CDPR and would be finalized prior to Right of Way acquisition.

Visual/Aesthetics

Construction of the project is anticipated to last 6 to 8 years. Visual effects would be similar to existing conditions (i.e., ongoing emergency project construction) where construction equipment, materials staging, informational signage, temporary traffic control, grading and vegetation removal, etc. would be visible to highway users. After construction, the OMC, tunnel, tunnel portals, and tunnel approaches will introduce human-made elements into an otherwise natural environment. Context-sensitive design features include the architecture of the portals, using see-through railing on the bridge, the green “living” roof of the OMC, plantings between the OMC and the highway to screen the facility, and the use of context-sensitive colors, forms, and textures on the

¹ Improvements may be subject to additional environmental compliance requirements.

portals, bridge, and other infrastructure, which would help integrate them into the existing landscape.

The following measures will be used to minimize impacts by aiding revegetation efforts, which will help restore the natural setting, and by ensuring context-sensitive treatments are applied appropriately.

- **Visual-1:** All replanting would use a variety of techniques, such as native seeding and container stock plantings, to provide a natural feel for the planting area(s).
- **Visual-2:** As feasible, construction topsoil would be salvaged and stockpiled for use within planting areas to increase vegetation success.
- **Visual-3:** As needed, a Caltrans-approved landscape architect or other appropriate specialist would be on-site during activities to oversee clearing and grubbing activities, tree and landscape preservation, structural aesthetic applications, and revegetation. The landscape architect would be on call as a resource for any aesthetic-related concerns that arise during construction.

Cultural Resources

An MOA between Caltrans and the SHPO was developed in coordination with affected tribes to address adverse effects on the TCL.

- **Cultural-1:** Implement treatments in the project MOA to address adverse effects on the contributing elements of the TCL. Treatments to address adverse effects on the contributing elements of the TCL have been developed in consultation with the Elk Valley Rancheria, Pulikla Tribe of Yurok People (formerly Resighini Rancheria), Tolowa Dee-ni' Nation, Tolowa Nation, Yurok Tribe, NPS, CDPR, and the SHPO. Treatments to address TCL effects include coordinating the delivery of old-growth redwood trees removed during construction to each tribe, plant gathering and salvage of natural resources prior to construction, including tribal designs or patterns on new construction, and funding tribal programs as described in the MOA.

Additional details are provided in the MOA (Appendix F of the EIR/EIS). A Post Review Discovery and Monitoring Plan (PRDMP) to address additional buried cultural resources or unanticipated discoveries that could be identified during construction is an attachment to the MOA.

Natural Communities

Sensitive Natural Communities

Under Alternative F, impacts on late successional SNCs are anticipated to be substantial; this includes late successional redwood forest and late successional Sitka spruce. To offset and mitigate impacts on these SNCs, Bio-1 (below) will be implemented.

ESHAs include late successional redwood forest and late successional Sitka spruce, which will be compensated for in the measures below. Bio-1 will also include late successional Douglas-fir forest which, while not considered an SNC, will potentially be considered an ESHA due to its use as habitat by special status species.

- **Bio-1:** Caltrans would undertake one or more mitigation projects to compensate for the loss of late successional (mature to old-growth) redwood, Douglas-fir, and Sitka spruce conifer forest and associated large trees. The mitigation project(s) would attempt to offset impacts based on acreage removed and temporal loss of function.

Typically, mitigation for Caltrans projects is established by applying ratios to compensate for the temporal loss of function of impacted habitat (e.g., 2:1, 3:1, etc.). However, these ratios are for resources where functional equivalency can be achieved within the foreseeable future. Mitigating for late successional forests is more complex, as the unique character and qualities of these forests cannot be replaced in the near-term. These forests, particularly those that support long-lived species such as coast redwood, can take hundreds of years to establish on their own.

Mitigation strategies for late successional forest communities would include forest restoration and preservation or forest restoration only. These mitigation strategies have been refined based on comments received on the draft environmental document (DED) and would continue to take into consideration input from project stakeholders. Mitigation would be initiated prior to the completion of project construction. Details pertaining to each mitigation strategy are outlined below:

- **Mitigation Strategy One:** Fund forest restoration projects that accelerate the development of late successional characteristics in younger-aged stands and preserve forested lands to further habitat continuity for late successional forests and/or publicly managed lands and special status species.

Funding thinning projects in dense, early successional stands would accelerate tree growth, increase tree vigor, increase biodiversity for botanical and wildlife species, buffer remaining late successional stands from high intensity stand-damaging fires, and increase carbon sequestration. Current available research supports that thinning young stands could accelerate the formation of late successional characteristics and functions in approximately 100 years for Sitka spruce, 150 years for Douglas-fir, and 200 years for redwood stands, though this is highly variable based on the treated stand's age, location, and position within the landscape.

In addition to funding thinning projects, this mitigation strategy would include:

- An endowment for the long-term management of treated stands, including additional actions to accelerate the development of late successional characteristics such as additional thinning, crown modification to improve structural complexity, etc.
- A research endowment to fund studies to guide forest management, monitor the efficacy of the thinning treatments, and identify appropriate adaptive management strategies.

Specific objectives related to forest thinning treatments for mitigation include, but are not limited to:

- Accelerate the recovery of previously logged young successional conifer stands to mature forest structure and function.
- Create connectivity between the remaining fragments of late successional forest communities.
- Improve stream habitat, reduce erosion, restore hydrology, and enhance landscape resiliency.

Impacts to sensitive natural communities and ESHA are typically mitigated at a 3:1 ratio; however, given the time it may take for treated stands to reach functional equivalency of the stands impacted by the project, the amount of mitigation required may be based on the length of time it would take to restore functional equivalency of late successional forest impacted by the proposed project, i.e., the number of years it would take for the treated stands to reach the functional equivalency of the impacted habitat. Therefore, mitigation would be 100:1 for late successional Sitka spruce forest, 150:1 for late successional Douglas-fir forest, and 200:1 for late successional coast redwood forest.

Based on the anticipated impact quantities and ratios discussed above, Caltrans would fund the restoration of a minimum of 335 acres of forest habitat at Redwoods Rising², a landscape-scale restoration project managed by RNSP. This mitigation strategy has been identified through coordination and consultation with RNSP. Although the total area was determined through species-specific ratios as shown below, it is anticipated that forest restoration would be completed based on the total acreage shown in Table 1. Funding such restoration would occur prior to the commencement of construction activities through a Cooperative Agreement or similar agreement with RNSP.

² <https://www.nps.gov/redw/redwoodsrisingmain.htm>

Table 1. Mitigation Strategy 1: Forest Restoration at Redwood Rising

Habitat Type	Impact (Acres)	Mitigation Ratio	Mitigation Total (Acres)
Redwood Late Successional	1.09	200:1	218
Douglas-Fir Late Successional	0.02	150:1	3
Sitka Spruce Late Successional	1.13	100:1	113
Total	2.24	N/A	335¹

¹ The sum of restoration acres (334) is rounded up to 335.

Preservation would be accomplished through the purchase of existing forest habitat, comprised of the aforementioned forest types, in Del Norte and/or Humboldt counties that is threatened by logging or development, with the intent of conveying the preserved habitat to an agency or organization that would manage it in perpetuity. Forest habitat within the coastal zone and located adjacent to late successional forests and/or publicly managed lands would be prioritized for preservation. Preservation of forest habitat adjacent to late successional forests and/or publicly managed lands would provide buffer habitat, reducing edge effects such as encroachment of invasive species, wildfire, and other external disturbances. Preservation would be implemented using the same ratios as forest restoration, presented in Table 1, resulting in preservation of a minimum of 335 acres. This preservation would be coordinated to provide the greatest benefit to existing late successional forests, and/or publicly managed lands, and special status species. Caltrans would develop a Long-term Management Plan identifying specific goals, objectives, and associated tasks based on the specific needs of the preserved forested habitat. Costs for implementation of the Long-term Management Plan would be developed in close coordination with project partners via a Property Analysis Record, to be held within an endowment and managed by an entity qualified to hold and manage endowments consistent with California Government Code Section 65968(e).

Preservation of existing forest habitat for mitigation would also include:

- An endowment for the long-term management/maintenance of preserved habitats.
- A deed restriction or conservation easement that restricts future land use practices that could adversely affect the protected habitat, thereby ensuring protection of the habitat in perpetuity.

As stated above, this mitigation strategy proposes forest restoration in combination with preservation of forested habitats. However, acquiring land with forest habitat suitable for preservation presents several challenges including, but not limited to, availability of land for purchase, willingness of property owners to sell at fair market value, issues arising during the due

diligence process, and identification of an entity qualified and willing to hold the property and/or conservation easement(s) and conduct long-term management. If progress becomes stalled and Mitigation Strategy One is determined to be infeasible, Mitigation Strategy Two would then be pursued.

- **Mitigation Strategy Two:** Fund forest restoration projects that accelerate the development of late successional characteristics in younger-aged stands.

Mitigation Strategy Two would fund additional restoration beyond what is proposed under Mitigation Strategy One to account for the inability to effectively implement preservation.

Based on the anticipated impact quantities and ratios discussed above, Caltrans would fund the additional restoration of 335 acres of forest habitat in addition to the 335 acres discussed in Mitigation Strategy One for a total of 670 acres of forest restoration. Funding such restoration would occur prior to the commencement of construction activities through a Cooperative Agreement or similar agreement with RNSP.

Similar to Mitigation Strategy One, in addition to funding thinning projects, this mitigation strategy would include:

- An endowment for the long-term management of treated stands, including additional actions to accelerate the development of late successional characteristics such as additional thinning, crown modification to improve structural complexity, etc.
- A research endowment to fund studies to guide forest management, monitor the efficacy of the thinning treatments, and identify appropriate adaptive management strategies.

Trees

In addition to the Standard Measures and BMPs to avoid and minimize damage to large trees and Bio-1 above, which will minimize impacts on late successional conifer forests and the associated large trees, the following avoidance and minimization measures will be implemented.

- **Bio-2:** During construction, when the roots of large diameter trees are being severed, an arborist shall be on-site to assess the extent of damage to the structural root zone and root health zone to ensure that any roots damaged during grading or construction shall be exposed to sound tissue and cut cleanly with a saw, and to make a decision on tree removal.
- **Bio-3:** In temporary impacts areas, permeable fill materials would be used where feasible.

A tree root study would be implemented on large, late-seral trees identified for removal and adjacent to construction areas. This study would take advantage of the proposed removal to examine the response of these trees using what would otherwise be destructive sampling techniques.

Wetlands and Other Waters

The project will have temporary and permanent impacts on aquatic resources, including wetlands and other waters and riparian habitat. While the Standard Measures and BMPs that will be implemented as part of the project will help avoid and minimize effects on aquatic resources, Caltrans anticipates permit-driven compensation for impacts to these resources, including wetlands, streams, and riparian habitat, as described below.

- **Bio-4:** In compliance with state and federal wetlands policies, which establish guidelines for wetland conservation (e.g., no net loss), Caltrans anticipates pursuing permit-driven compensation for impacts on wetlands, as well as on riparian and other waters. Compensation may include a combination of on- and off-site restoration efforts. Compensation efforts, and appropriate ratios, would be determined in coordination with appropriate agencies during the permitting process. Ratios are typically a minimum of 1:1 and are often dependent on the quality of the wetlands and whether an impact is temporary or permanent.

Animal Species

Various special status animal species may be affected by the project. Impacts on purple martin, Vaux's swift, fisher, ringtail, Sonoma tree vole, white-footed vole, and migratory birds have been found to be minimal. However, Bio-5 (detailed below), which will reduce construction noise, will be implemented to further minimize impacts on these special status species.

For special status bats, tree removal has the potential to adversely impact roosting bats. Measures Bio-6, Bio-7, Bio-8, and Bio-9, detailed below, will be implemented to avoid and reduce impacts. Bio-6 requires tree removal be conducted outside of both the maternity and torpor seasons, Bio-7 requires a qualified bat biologist identify all suitable bat roosting trees prior to tree removal, Bio-8 requires all trees identified as bat roosting trees use site-specific means to modify and disturb the habitat to allow bats to wake and leave the roost prior to tree felling, and Bio-9 requires a qualified construction monitor on site during removal of identified bat roosting trees. With these measures incorporated, tree removal has been determined to have minimal impacts on special status bats.

- **Bio-5:** Noise control practices would be followed to minimize construction noise and disturbance to sensitive habitat areas:
 - Require that all construction equipment powered by gasoline or diesel engines has sound control devices such as exhaust mufflers that are at least

as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation.

- Use equipment powered by electric motors instead of gasoline- or diesel-powered engines where feasible.
- Prevent excessive noise by shutting down idling vehicles or equipment, when feasible.
- **Bio-6:** Tree removal would be conducted outside of the maternity season (typically March 1 through September 1) and the winter torpor period (December 1 through February 28), to the extent possible. The limited operating periods may be modified at the recommendation of a biologist based on regional bat roosting data, site-specific roost status, and/or annual climate variation.
- **Bio-7:** Prior to tree removal, a qualified bat biologist would examine trees to be removed or trimmed for suitable bat roosting habitat. Trees greater than 24 inches diameter-at-breast-height or any size with habitat features (e.g., tree cavities, basal hollows, loose or peeling bark, larger snags) would be further evaluated for the potential to support roosting habitat, and the area within accessible cavities (and on the outside of the tree, as feasible) for bat sign (e.g., guano, culled insect parts, staining), as feasible. The qualified bat biologist would be approved by Caltrans and be knowledgeable on bat life history, species identification, and identification of potential roosting habitat.

Where suitable cavity bat roosting habitat is identified, the qualified bat biologist would further evaluate the potential use of the tree by bats by conducting an evening emergence survey and/or using a directional night-vision camera to view into the cavity to identify presence of bats at cavities accessible from the ground. Emergence surveys would be conducted no more than 2 weeks prior to start of tree removal activities. Surveys would be conducted 30 minutes before sunset to 1 hour after sunset (or until there is no visibility) and during favorable weather conditions (calm nights with temperatures conducive to bat activity and no precipitation predicted). Acoustic detectors may be used to detect emerging bats and identify species.

If bats are documented and the site is conducive, the roost is safely accessible from the ground, and it is feasibly appropriate (limited access points), an exclusion device may be installed prior to tree removal. Any exclusion device would be installed under the guidance of a qualified bat biologist and when weather is fair. No exclusion would occur during the maternity season.

- **Bio-8:** If the bat biologist determines during the preconstruction tree surveys (Bio-7) that the tree is suitable for bat roosting, the biologist would use feasible site-specific means to modify and disturb the habitat to allow bats to wake and leave the roost prior to tree felling. These disturbances may include

(1) modifying habitat conditions such as removing smaller non-habitat trees at least a day prior to removing habitat trees; (2) creating a vibrational disturbance over the course of a few minutes with a chainsaw, knocking the tree with a sledgehammer, using equipment to shake the tree, or removing the tree in pieces (sections or limbs) over the course of a few days; (3) changing the structure of the potential roost by lifting bark to modify temperature, wind, light, and precipitation; and/or (4) using ultrasound deterrents. The tree disturbance would be monitored by the construction monitor (Bio-9).

- **Bio-9:** A qualified construction monitor would be present on site to conduct monitoring during removal of the trees identified during preconstruction surveys (Bio-7) as having the potential to support bat roosting in tree cavities. Following tree removal, the construction monitor would search downed vegetation for dead and injured bats. Injured bats would be transported to the nearest wildlife rehabilitation facility (Humboldt Wildlife Care Center near Arcata). The qualified construction monitor would be approved by Caltrans and be knowledgeable on bat life history, species identification, and roosting habitat.

Threatened and Endangered Species

Threatened and endangered species may be in the project area and affected by construction, including state endangered bald eagle, federally threatened and state endangered California condor, federally threatened and state endangered marbled murrelet, federally and state threatened northern spotted owl, federally and state threatened Southern Oregon/Northern California Coast Evolutionarily Significant Unit of coho salmon, state endangered and California Department of Fish and Wildlife Species of Special Concern Humboldt marten, and federally and state endangered, and seriously threatened in California, western lily.

For western lily, California condor, and coho salmon, the project would have no impact or, with the Standard Measures incorporated, impacts would be minimal. No additional species-specific avoidance and minimization measures are needed. For bald eagle, northern spotted owl, and Humboldt marten, impacts have also been determined to be minimal. Bio-5, which will reduce construction noise, will be implemented to further minimize impacts on these special status species.

Implementation of Bio-1 will benefit marbled murrelet and its CH. However, impacts on marbled murrelet will remain adverse, as proposed mitigation measures may take multiple centuries to result in replacement of lost habitat.

The following measures, developed through Section 7 formal consultation with USFWS and provided through the Biological Opinion received on May 15, 2025, will be implemented by Caltrans to avoid or minimize potential adverse effects on spotted owl and coastal marten. The measures were developed for murrelet but will also avoid or minimize potential adverse effects on spotted owl and coastal marten in the unlikely

event that either species occurs within the action area but were not detected during surveys.

1. Helicopter use will be restricted to between September 16 and the following January 31 to avoid auditory or visual disturbance to nesting spotted owls or denning coastal martens.
2. During the majority of the spotted owl nesting season and coastal marten denning season (i.e., during the murrelet nesting season of March 24 through September 15), no suitable spotted owl nest trees or suitable coastal marten den or rest trees will be removed, and no suitable spotted owl nesting/roosting or foraging habitat or suitable coastal marten resting or denning habitat will be altered or removed (Standard Measures BR-2 K and BR-2 M).
3. No human activities (including use of drones) will occur within visual line of sight of 328 feet or less from a known spotted owl nest or coastal marten natal or maternal den site.

The following conservation measures will be implemented by Caltrans to avoid or minimize potential adverse effects on murrelet and designated murrelet CH:

1. During the murrelet nesting season (i.e., from March 24 through September 15), no suitable murrelet nest trees will be removed, and no suitable or potential murrelet nesting habitat (defined in *Murrelet Nesting Habitat Availability* section below) will be altered or removed (Standard Measure BR-2 I).
2. At the north portal construction area, where the majority of suitable murrelet nesting habitat occurs and murrelet occupancy is presumed, no pile driving will occur from March 24 through August 5 (i.e., during most of the murrelet nesting season). Furthermore, from August 6 through September 15 (i.e., the end of the murrelet nesting season) at the north portal, pile driving will be restricted to a daily work window beginning 2 hours post-sunrise and ending 2 hours pre-sunset. This restriction will minimize auditory disturbance to dependent chicks in nests, and to adult murrelets during morning and evening prey deliveries to the nest. Additionally, at the north portal, blasting at the portal and in the tunnel interior (to the point where it would raise sound levels to greater than 90 decibels (dB) at the edge of habitat) will be prohibited from March 24 through September 15 (i.e., throughout the entire murrelet nesting season) (Standard Measure BR-2 J).
3. Preconstruction surveys, following the Pacific Seabird Group's revised protocol (Pacific Seabird Group 2024), will be conducted for murrelets at the south portal and OMC construction areas. If murrelets are detected at either construction area, pile driving would not take place between March 24 and August 5, and between August 6 and September 15 pile driving would be

- restricted to a daily work window beginning 2 hours post-sunrise and ending 2 hours pre-sunset. In addition, if murrelets are detected within the south portal construction area, blasting at that portal and in the tunnel interior (to the point where it would raise sound levels to greater than 90 dB at the edge of habitat) would be limited to the period from September 16 through the following March 23. If murrelets are not detected there will be no seasonal restrictions on elevated sound levels.
4. Helicopter use will be limited to outside the murrelet nesting season (i.e., from September 16 through the following March 23). Furthermore, helicopters will fly at a high enough altitude between staging areas and geotechnical boreholes to reduce rotor wash on tree canopies and the surrounding habitat.
 5. Artificial night lighting may be required during construction. To reduce potential disturbance to nesting murrelets, work area lighting will be temporary and directed specifically on the portion of the work area actively under construction. Lighting for security will be directed specifically on the area needed for this purpose (Standard Measure BR-2 F).
 6. To prevent attracting corvids (e.g., common ravens and jays) and other known or potential murrelet nest predators, no trash or foodstuffs will be left or stored at construction sites. All trash will be deposited in a secure container daily and disposed of at an approved waste facility at least once a week. Also, on-site workers will not attempt to attract or feed any wildlife (Standard Measure BR-2 C).
 7. To compensate for the impacts based on acreage of habitat removed and temporal loss of function to habitats caused by the proposed action, Caltrans will undertake a mitigation project to restore early successional conifer forest habitat to late successional forest habitat and/or preserve conifer habitat to act as buffer habitat to late successional forest. Acreages of restoration and/or preservation will be based on the following ratios: 100:1 for late successional Sitka spruce forest, 150:1 for late successional Douglas-fir forest, and 200:1 for late successional coast redwood forest. Caltrans will coordinate with USFWS to choose a forest location within the range of the murrelet that is likely to be used for nesting once restored or preserved. Caltrans will implement treatments to create natural nesting platforms and assess the success of these platforms in this habitat. Caltrans will develop a restoration or preservation plan with assurances for implementation and a research proposal for developing nesting platforms and solicit input from USFWS prior to construction of the proposed project. Upon implementation, for 10 years or until murrelets successfully occupy habitat by fledging young, whichever comes first, Caltrans will report progress of restored habitat and utilization by murrelets on an annual basis.

8. Caltrans, in conjunction with RNSP and applicable utility companies, will develop and implement a plan to bury existing power lines in elk prairie, which present a known threat to murrelets. This action will offset direct or indirect impacts on murrelets that result from the removal of nest trees, by providing relief from murrelet strikes with utility infrastructure. Compliance with this measure will be achieved by Caltrans funding up to \$1 million dollars toward the completion of such effort and will be conditioned upon State Parks entering into a financial agreement with Caltrans. Pending the completion of the financial agreement between Caltrans and RNSP, Caltrans will ensure funding of this action will occur prior to the completion of the proposed project.

All practicable measures to minimize environmental harm from the selected alternative (Alternative F) have been incorporated into the decision.

F. Monitoring or Enforcement Program

An Environmental Commitments Record (ECR) has been prepared for the project and is provided in Appendix D of the Final EIR/EIS. The ECR provides the language of each measure, identifies responsible parties for implementing the measure, and indicates the timing of the implementation of each measure. The ECR provides a process for tracking and documenting the implementation of avoidance, minimization, and mitigation measures for the project.

Caltrans will be responsible for implementing and reporting the status of measures in the ECR. Caltrans will also be responsible for construction management and oversight and ensuring mitigation measures are fully implemented by designated and qualified personnel.

G. Responses to Comments on the Final EIR/EIS

Following the Notice of Availability of the Final EIR/EIS and during the 30-day waiting period, Caltrans received comments on the project. Substantive comments on the Final EIR/EIS and other questions on the environmental document are addressed in the table below. Copies of the formal comment letters are included in Attachment A.

Commenter	Summarized Comment	Response
U.S. Environmental Protection Agency (EPA)	See Attachment A for the letter from the U.S. EPA.	No substantive comments were received.

Commenter	Summarized Comment	Response
Michelle Novoa	I am writing in the hope that you listen to the people and the experts. To please mitigate the impact on these very important trees. I visit California just to go see these trees. I've visited the Sequoias National Park & the Redwoods National Park. Both which are simply breathtaking and beautiful. These trees aren't found anywhere else in the world. They are in California and only 5% is left. This is truly sad and what makes it worse is that now you are all considering removing more trees, those left in that 5%. These Old-growth redwoods are simply irreplaceable. The trees likely to be removed are centuries-old, older than all of us currently alive. Removing of any individual tree is itself a great loss. But removal also impacts the wider forest ecosystem by, among other things, creating new edge effects on more interior forest and impacting the vigor and health of remaining trees, thereby affecting the habitat value of the larger forest. Please consider the plan that EPIC has presented. We pled to you, to not continue to destroy these beautiful trees that are simply irreplaceable.	Caltrans has considered all project-related impacts on late successional redwood forest and developed a robust mitigation package to address these impacts that invests in hundreds of acres of forest restoration through Redwoods Rising, a landscape-scale restoration project focused on improving redwood ecosystems, and preservation through the purchase of existing forest habitat in Del Norte and/or Humboldt counties that is threatened by logging or development in various stages of succession. Mitigation includes an endowment to be established with a substantial annual return for the long-term management/maintenance of forest habitats.

Commenter	Summarized Comment	Response
Save the Redwoods League (SRL)	See Attachment A for the letter from SRL.	Caltrans appreciates Save the Redwoods League's (SRL) continued participation throughout project development and support for Alternative F and the timely implementation of the Last Chance Grade Permanent Restoration project. SRL asserts that the estimated cost of the proposed mitigation is insufficient relative to the overall project cost. However, the cost of mitigation does not affect the adequacy of the selected mitigation measure or warrant any changes to the Final EIR/EIS. Additionally, SRL recommends that Caltrans adopt an alternative methodology for evaluating mitigation and use the Net Present Value framework. Caltrans considered the recommendation and has determined that pursuant to NEPA and FHWA regulations (23 CFR 771), a change in methodology for evaluation of mitigation is not necessary and does not require changing the selected mitigation measure. As outlined in the EIR/EIS, Mitigation Measure Bio-1, developed to mitigate for late successional forest impacts, is grounded in established mitigation practices, current research on late successional coniferous forest restoration, and consultation with experienced forestry professionals and land managers. This measure provides a comprehensive framework for long-term restoration and preservation actions that incorporate adaptive management to ensure success. Caltrans mitigation addresses the inherent complexities of long-term forest recovery. The establishment of an endowment would ensure sustained funding for continual management and adaptive strategies within restoration areas. This includes resources for reoccurring maintenance activities, such as additional thinning, snag creation, crown manipulation, understory restoration, invasive species control, and other interventions designed to advance late successional forest characteristics. The endowment may also support additional treatment areas, as necessary, to achieve restoration success on a landscape scale. Furthermore, Caltrans mitigation encompasses forest restoration research and monitoring to assess the effectiveness of restoration techniques and inform the development of adaptive management approaches. In coordination with project stakeholders and partners, these endowments would be fully developed during the next project phase, providing annual funding until restored areas reach late successional ecosystem and habitat recovery. Bio-1 is not a one-time acreage replacement, but rather a long-term commitment to sustained management, adaptive practices, and ongoing research in forest restoration.

Commenter	Summarized Comment	Response
Environmental Protection Information Center (EPIC)	See Attachment A for the letter from EPIC.	Caltrans appreciates EPIC's continued participation throughout project development and support for Alternative F and the timely implementation of the Last Chance Grade Permanent Restoration project. Caltrans intends to implement Strategy One unless progress becomes stalled and Mitigation Strategy One is determined to be infeasible. There is evidence that restoration methods used by Redwoods Rising, which include crown manipulation, can accelerate the development of large branches such as those required for marbled murrelet nesting platforms. The 2018 research paper "Manipulating tree crown structure to promote old-growth characteristics in second-growth redwood forest canopies"³ found that redwoods maintain simple, model-conforming crowns for centuries unless damaged (e.g., by wind or fire). This research found that strategic injury of trees can result in the formation of limbs and these crown manipulations may have long-term conservation value in second-growth redwood forests if limbs can be initiated high enough in the crown to persist as trees approach maximum height. EPIC comments that the mitigation ratio is inadequate and recommends that Caltrans adopt an alternative methodology for evaluating mitigation and use the Net Present Biodiversity Value. Caltrans considered the recommendation and has determined that a change in methodology for evaluation of mitigation is not necessary and does not require changing the selected mitigation measure. As outlined in the EIR/EIS, Mitigation Measure Bio-1, developed to mitigate for late successional forest impacts, is grounded in established mitigation practices, current research on late successional coniferous forest restoration, and consultation with experienced forestry professionals and land managers. This measure provides a comprehensive framework for long-term restoration and preservation actions that incorporate adaptive management to ensure success. Additionally, the project would reroute the highway into a tunnel, lowering traffic noise levels along U.S. 101 from existing conditions, improving habitat connectivity, and reducing risk to wildlife of vehicle strikes. This is anticipated to benefit several species residing in the area, including northern spotted owl, Humboldt marten, fisher, ringtail, and others. Over a mile of the U.S. 101 roadway would be decommissioned, eliminating the edge effects of the existing alignment.

³ Stephen C. Sillett, Marie E. Antoine, Jim Campbell-Spickler, Allyson L. Carroll, Ethan J. Coonen, Russell D. Kramer, and Kalia H. Scarla. 2018. Manipulating tree crown structure to promote old-growth characteristics in second-growth redwood forest canopies. *Forest Ecology and Management* 417:77–89. ISSN 0378-1127. <https://doi.org/10.1016/j.foreco.2018.02.036>.

Commenter	Summarized Comment	Response
		Caltrans' mitigation strategy includes an endowment component to ensure long-term forest habitat restoration. This endowment component would be held by a qualified party with experience in managing restoration funds in an effort to maximize restoration return. Additionally, the endowment would be of sufficient scale to ensure the development of late successional characteristics and would be designed to finance long-term restoration activities, including ongoing maintenance, adaptive management, and research.

H. Record of Decision Approval

Based on careful consideration of the technical studies, evaluations, and other data contained in the environmental document and input received from agencies, organizations, and the public, Caltrans, as the federal lead agency for this project, has selected Alternative F, as described in the Final EIR/EIS, for the Last Chance Grade Permanent Restoration Project. All practicable measures to minimize environmental impacts and harm have been adopted and will be incorporated into this decision.



 Matthew Brady
 District 1 Director
 California Department of Transportation

7/15/2026
 Date

Attachment A: Comments Received on the Final EIR/EIS



REGION 9

SAN FRANCISCO, CA 94105

July 6, 2026

Steve Croteau
Senior Environmental Scientist
Caltrans North Region Environmental – District 1
P.O. Box 3700
Eureka, California 95502-3700

Subject: EPA Comments on the Last Chance Grade Permanent Restoration Project Final
Environmental Impact Report/Environmental Impact Statement and Final Section 4(f)
Evaluation, Del Norte, County, CA (CEQ No. 20260067)

Dear Steve Croteau:

The U.S. Environmental Protection Agency has reviewed the above-referenced document pursuant to Section 309 of the Clean Air Act and the National Environmental Policy Act. The CAA Section 309 role is unique to the EPA. It requires the EPA to review and comment on the environmental impact of any proposed federal action subject to NEPA's Environmental Impact Statement requirements and to make its comments public.

The EPA previously participated in early coordination meetings held in 2020 and 2021, and provided scoping comments (December 6, 2021), as well as comments on the Draft Environmental Impact Statement/Draft Environmental Impact Report (February 13, 2024). We appreciate Caltrans consideration of EPA input provided and we have no further comments. Please continue to coordinate with the EPA should Caltrans choose to analyze additional project alternatives.

We appreciate the opportunity to review the FEIS/FEIR. If you have any questions, please contact me at (415) 947-4167 or prijatel.jean@epa.gov or Connell Dunning, Transportation Lead at (415) 947-4161 or dunning.connell@epa.gov.

Sincerely,

Jean Prijatel
Branch Manager
Office of the Regional Administrator



Save the Redwoods League

July 6, 2026

RE: Last Chance Grade Final EIR/EIS - Mitigation Framework and Ratios

Dear Stephen Umbertis and CalTrans Staff-

Save the Redwoods League (SRL) laments the loss of any ancient coast redwoods, while acknowledging the difficult reality that there is no way to safely address Last Chance Grade without removing some old growth trees. We appreciate the opportunity to provide input on the proposed mitigation framework for impacts associated with the Last Chance Grade (LCG) project. We recognize the importance of advancing the Alternative F, Tunnel (Bypass Slide) solution which appropriately limits impacts to late-successional coastal forest ecosystems while ensuring public safety on a critical stretch of US Highway 101, "Redwood Highway."

Since 2015, Save the Redwoods has worked closely with Caltrans and Congressman Huffman's Stakeholder Working Group to assess Last Chance Grade, limit the project's environmental impact to the least harmful option and explore mitigation opportunities that reflect the substantial nature of that impact. Completing this project will improve safety for travelers, support the regional economy and preserve vital Tribal and community connectivity.

However, based on our review, SRL has significant concerns with the proposed mitigation approach reflected in the Environmental Impact Report (EIR). The proposed approach does not reflect the unprecedented nature of permanent loss of exceedingly rare and irreplaceable old-growth forests that are part of a UNESCO world heritage site. The proposed framework would result in a mitigation outcome that is less than 1% of the total project cost. This is unacceptable given the impacts envisioned for this project. In addition to the inadequate scale of the proposed mitigation outcome, we have identified several flaws with the methodology used.

Firstly, the proposed framework equates mitigation acreage directly with the number of years required to restore late successional conditions, effectively treating time and acreage as interchangeable units. This is not a standard practice and is not scientifically defensible.

Secondly, this approach does not adequately account for the ecological realities or



complexities of long-term forest recovery. While modeling tools can be used to estimate the length of time to recover specific old-growth forest characteristics such as average tree diameter and stored above-ground carbon, this approach is inherently speculative when applied to more complex considerations related to ecosystem functions and processes. Full ecosystem and habitat recovery is likely to take significantly longer than the 100-200 years utilized in the mitigation approach, even with multiple thinning entries and habitat manipulations.

Thirdly, late successional forest systems function as an integrated ecosystem. A more appropriate approach would evaluate impacts and recovery trajectories at a holistic forest level, which would better capture structural complexity, and habitat function.

One alternative approach would be to apply a net present value (NPV) framework that accounts for the time value of ecosystem recovery. Applying a standard 5% discount rate over a 200 year horizon set forth by CalTrans results in orders of magnitude differences relative to the current approach, highlighting the extent to which long-term ecological losses are undervalued under the existing methodology. This approach better reflects a fundamental issue: impacts to existing old growth or late successional habitat represent the immediate loss of ecological functions—carbon storage, habitat complexity, and biodiversity support—that will not be replaced for centuries.

Fourthly, mitigation should not be framed as a one time acreage replacement. Restoration to late successional conditions requires a sustained management trajectory, including multiple treatment periods over decades to centuries. As such, SRL requests that CalTrans provide more detail and work with stakeholders, including SRL, to further define the proposed dedicated endowment to fund long-term restoration, stewardship, and adaptive management actions. Any endowment must have the corpus to support multiple treatment entries over time in order to achieve the late successional characteristics set forth in the Bio-1 mitigation framework. This approach aligns mitigation financing with the temporal scale of ecosystem recovery and ensures continuity of outcomes rather than reliance on a single intervention.

Finally, given the complexity and long time horizons involved, SRL recommends that Caltrans engage an independent third party scientific and economic expert to refine the mitigation

¹ If 1 acre of late successional redwood forest is lost today, and replacement habitat only becomes equivalent 200 years from now, then at a standard 5% annual discount rate, you'd need 17,292 acres of future habitat to equal the present value of 1 acre today. ($1 \text{ acre} \times 1.05^{200} = 17,292.58$)



methodology. Such a process would strengthen the technical defensibility of the final mitigation package and provide a transparent basis for decision making.

In summary, SRL urges Caltrans to:

- Replace time-based acreage ratios with a net present value framework;
- Evaluate mitigation at the ecosystem level rather than by individual species categories; and
- Incorporate long-term funding through a well-explicated endowment model that supports ongoing restoration and management;
- Consider engaging independent third-party expertise to validate methodology and assumptions, as needed.

We believe these adjustments will result in a mitigation program that more accurately reflects the true scale of ecological loss and aligns with best available science.

We appreciate your consideration and look forward to continued partnership. Thank you for your ongoing commitment to the Huffman Stakeholder Group, and public and private assurances of collaboration regarding the scale and framework of the mitigation package. We are grateful, too, for your work with our partners at Redwood National and State Parks and for your effort to reflect their considerable expertise regarding mitigation needs. Redwoods Rising is a profoundly worthy recipient of mitigation funding, and we are glad to see the project centered in the mitigation framework. We look forward to your responses and ongoing discussions about the scale of the mitigation package -- within the context of ensuring a successful and timely Last Chance Grade project.

Sincerely,

Paul Ringgold

Chief Program Officer

Save the Redwoods League



Delivered via email on July 6, 2026

Re: Comments on the Last Chance Grade FEIR

Dear Director Brady,

On behalf of the Environmental Protection Information Center (EPIC) and our 18,000 members and supporters, please accept these comments on the Final Environmental Impact Statement for the Last Chance Grade Project. As you are aware, EPIC is deeply invested in the success of this project, having served on the Congressman Huffman Stakeholder Group since its inception. EPIC commends Caltrans for the transparent and participatory nature by which this project was developed. We believe that this process has accelerated the development of the project and we trust that should Caltrans continue to follow this approach, the project will be a success. These comments are offered in this spirit.

EPIC Supports Mitigation Strategy One

EPIC supports mitigation strategy one, combining both restoration and conservation, as the best way to mitigate impacts to the project. We question whether restoration alone can adequately mitigate the impacts of this project. While EPIC supports Redwoods Rising and believes that the available science supports the conclusion that restoration forestry can hasten the development of certain old-growth characteristics in forests, we also caution that we only have early data and that it appears that only age can fully create the full suite of characteristics of an old-growth redwood forest.

The first restoration forestry projects in the redwoods date to 1979, and while these projects have produced useful data and suggest that forest thinning activities can better rebalance species composition, promote understory development and otherwise increase stand heterogeneity, and accelerate biomass production through competitive release, it likewise appears that only age can create certain characteristics. For example, marbled murrelets require heavy branches with an accumulation of duff or moss sufficient to provide a nesting platform. It does not appear that



forest thinning projects, like Redwoods Rising, can hasten the development of large, heavy branches for murrelets. This is important, of course, as the project will remove suitable habitat for murrelets. It appears that the best way to mitigate impacts to murrelets here is to better conserve existing habitat. (See USFWS, *Recovery Plan for the Marbled Murrelet* (1997)).

Mitigation Ratio Inadequate

EPIC recognizes that mitigating biodiversity loss is difficult, and here, determining appropriate mitigation the loss of old-growth redwoods is particularly challenging. However, the ratio employed by Caltrans is inadequate for multiple reasons. Caltrans proposes a 200-1 ratio, based on the idea that it will take roughly 200 years for a redwood forest to begin to function like an old-growth forests. But age and acreage are not interchangeable. For example, one acre of old-growth lost would have, but for the project, served as habitat for 200 years. While there may be more forest in the future that could serve as functional old-growth, the missing 200 years are important and the value of these forests are hard to quantify.

A more appropriate mitigation strategy would employ a “Net Present Biodiversity Value” (see Overton, J. M., Stephens, R. T., & Ferrier, S. (2013). Net present biodiversity value and the design of biodiversity offsets. *Ambio*, 42(1), 100-110.) The idea treats a biodiversity offset like a loan: development causes an immediate "debt" of lost biodiversity, and the offset must "repay" that debt over time. Two components make this work:

1. **Biodiversity value functions:** nonlinear functions that assign value to a given amount of a species, habitat, or ecosystem type, allowing comparison across different biodiversity types (needed for out-of-kind offsets).
2. **Time discounting:** future gains and losses are discounted based on risk of non-repayment, lost opportunity cost, biodiversity's own "rate of return" (e.g., regrowth), changing marginal value (increasing rarity), and pure time preference.

EPIC urges Caltrans to engage a specialist in no net loss biodiversity compensatory mitigation to help develop a more robust mitigation ration that adequately considers the

EPIC also takes issue with the determination of areas “impacted” by the project. Caltrans claims that only 1.09 acres of late-successional redwood forest will be impacted, however, impacts from the project will decidedly go beyond this skimpy acreage. EPIC reiterates our previous comments issued on the draft documents concerning how project impacts will be felt deeper into the forest than considered in the analysis. In particular, we wish to emphasize that the edge effects of the project will be felt deeply into old-growth forests and the habitat value of these forests are likely to be diminished. (See Russell, William H., Joe R. McBride, and Ky Carnell. “Edge effects and the effective size old-growth coast redwood preserves.” *Proceedings of wilderness science in a time of change*, RMRS-P-000 (2000): 128-136.) EPIC urges Caltrans to take a broader consideration of what is “impacted” by the project.

Mitigation Endowment

EPIC appreciates and supports the inclusion of an endowment to support continued restoration of California’s iconic redwoods. In developing this endowment, we urge Caltrans to consider the following:

1. **Neutral Administration:** We urge Caltrans to house the endowment at a neutral third party with a history of administering conservation endowments. We further urge Caltrans



to ensure that the most money possible will go to work on the ground by negotiating as small of an administrative cost as possible.

2. **Adequate Size:** The endowment should be of sufficient size to ensure that the funds are adequate to accomplish meaningful work in perpetuity.

In closing, EPIC believes that the success of this project is intrinsically tied to the full mitigation of impacts. Critical to this is a more scientific and objective approach to mitigating the impacts to old-growth redwood forests. We are confident that Caltrans will, by working with diverse stakeholders, craft a package that will draw consensus support.

Should you have any questions concerning these comments, please do not hesitate to call or write.

Sincerely,

Tom Wheeler
Executive Director
tom@wildcalifornia.org
(206) 356-8689