State of California
Department of Fish and Wildlife

M e m o r a n d u m

Date: November 18, 2019

To: Dominik Schwab, Forest Practice Program Manager
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Robert Hall for

From: Timberland Conservation Program Manager
Northern Region
California Department of Fish and Wildlife
601 Locust Street
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Subject: California Department of Fish and Wildlife Pre-Harvest Inspection (PHI) Report for Timber Harvesting Plan (THP) 1-18-095 MEN, "Little"

PROJECT OVERVIEW

Timberland Owner/Plan Submitter:	Gualala Redwood Timber, LLC
CALWATER Planning Watershed: Version 2.2:	Doty Creek (1113.810003)
7.5-Minute Quadrangles:	Gualala 1960
Silviculture Treatments (acres):	Selection (199), No Harvest Area (46), Non-Timber Area (6)
Sensitive Species and Area Focus:	• Northern Spotted Owl (*Strix occidentalis caurina*) • Marbled Murrelet (*Brachyramphus marmoratus*) • Foothill yellow-legged frog (*Rana boylii*) • California red-legged frog (*Rana draytonii*) • Anadromous salmonids • Flood Prone Areas, channel migration zones, wetlands • Botanical resources • Watercourse classifications
PHI Dates and Attendees:	<u>December 12, 2018</u> • Art Haschak, Registered Professional Forester (RPF), Gualala Redwood Timber, LLC (GRT)

PHI Dates and Attendees (cont.):	<u>December 12, 2018 (cont.)</u> • John Bennett, RPF, GRT • Ken Margiott, Inspector, California Department of Forestry and Fire Protection, CAL FIRE • Kevin Dougherty, Certified Engineering Geologist, California Geological Survey (CGS) • Danielle Castle, Environmental Scientist, California Department of Fish and Wildlife, (CDFW) <u>January 3, 2019</u> • Art Haschak, GRT • John Bennett, GRT • Ken Margiott, CAL FIRE • Kevin Dougherty, Certified Engineering Geologist (CEG), (CGS) • Jim Burke, Professional Geologist, North Coast Regional Water Quality Control Board (NCRWQCB) • Danielle Castle, CDFW <u>May 14, 2019</u> • Art Haschak, GRT • Charll Stoneman, GRT • Gabriel Ghirann, Forestry Technician, GRT • Nick Kent, Resource Manager, Redwood Empire Sawmill (Redwood Empire) • Dr. Matthew O’Connor, Certified Engineering Geologist (CEG), O’Conner Environmental Inc. • Jeremy Kobor, Professional Geologist (PG), O’Conner Environmental Inc. • Dominik Schwab, Forest Practice Program Manager, CAL FIRE • Ken Margiott, CAL FIRE • Jim Burke, NCRWQCB • Jonathan Warmerdam, NCRWQCB • Justin Fitt, NCRWQCB • Gil Falcone, NCRWQCB • Nick Simpson, CDFW • Jon Hendrix, CDFW • Danielle Castle, CDFW <u>August 29, 2019</u> • John Bennett, GRT • Jesse Weaver, Redwood Empire

PHI Dates and Attendees (cont.):	• Gabriel Ghirann, GRT August 29, 2019 (cont.) • Dr. Matt O’Connor, CEG, O’Conner Environmental Inc. • Nick Kent, Redwood Empire • Will Creed, O’Conner Environmental Inc. • Kevin Doherty, CEG, CGS • Jim Burke, PG, NCRWQCB • Justin Fitt, NCRWQCB • Dan Wilson, National Marine Fisheries Service • Pete Cafferata, CAL FIRE • Stacy Stanish, CAL FIRE • Drew Coe, CAL FIRE • Ken Margiott, CAL FIRE • Jeff Longcrier CAL FIRE • George Gentry, RPF • Nick Simpson, CDFW • Jon Hendrix, CDFW • Danielle Castle, CDFW • Mark Smelser, CEG, CDFW

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INTRODUCTION

This report presents CDFW’s evaluation of potential impacts from proposed operations on fish, plants, wildlife, and their habitat. CDFW’s evaluation is based on review of the THP document and participation in the PHI. CDFW used the THP, field inspections, habitat modeling, and the California Natural Diversity Database (CNDDB, http://www.dfg.ca.gov/biogeodata/cnddb/) to identify and evaluate potential risks to biological resources resulting from timber operations.

This report should be applied to the review of all other documents related to this project prepared and reviewed pursuant to the California Environmental Quality Act (CEQA).

As the Trustee Agency for the State’s fish and wildlife resources, the California Department of Fish and Wildlife maintains jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of species (Fish and Game Code (Fish & G. Code) §1802). CDFW administers the California Endangered Species Act (CESA) and is the Trustee Agency pursuant to CEQA (Pub. Resources Code 21069, 21070). Based on information presented in THP 1-18-095 MEN, “Little” and associated reports, and referencing the best available science, this report includes recommendations for avoiding, minimizing, and mitigating potentially significant impacts to natural resources held in trust for the people of California.

THP DESCRIPTION AND SETTING

The proposed THP is in the Doty Creek Planning Watershed and adjacent to the Little North Fork Gualala River (Little North Fork). It lies in a northwest trending rift valley of the active San Andreas fault zone (Brown and Wolfe, 1972; and Slossen, 1974), and encompasses 251 acres that includes 199 acres of single tree selection silviculture and 52 acres of no harvest and non-timber. Ground based tractor yarding is the only proposed yarding method. The THP proposes to harvest trees from upslope and alluvial

bottomlands with second growth redwood (*Sequoia sempervirens*), Douglas fir (*Pseudotsuga menziesii*), and red alder (*Alnus rubra*). Numerous wetlands, and a complex network of channels occupy the alluvial bottomlands of the rift valley.

SENSITIVE RESOURCES OVERVIEW AND FOCUSED REVIEW AND RECOMMEDNATIONS

Northern Spotted Owl

The THP is within range of the Northern Spotted Owl (*Strix occidentalis caurina*). The United States Fish and Wildlife Service (USFWS) lists the Northern Spotted Owl as threatened pursuant to Title 16, United States Code (16 U.S.C.) §1531 et seq. under the federal Endangered Species Act (ESA). On June 27, 2017, the California Fish and Game Commission issued a Notice of Findings to list the Northern Spotted Owl as a threatened species pursuant to the CESA. The California Board of Forestry and Fire Protection also list Northern Spotted Owl as a sensitive species as defined by Title 14 California Code of Regulations (14 CCR) 895.1.

The THP discloses three known Northern Spotted Owl territories within 0.7 miles of the plan area: MEN0179, MEN0371, and MEN0212. CDFW First Review questions inquired about Northern Spotted Owl proposed protection measures, including Core Area delineations and road use restrictions. In first review responses, the described protection measures did not allay CDFW concerns about potentially significant, cumulative impacts to Northern Spotted Owls.

In the coastal redwood region, Northern Spotted Owls generally nest and roost in Core Areas that consist of older, structurally complex forests, including conifer and hardwood components. Northern Spotted Owls do not build their own nests. Rather, they rely on existing structures in the forest that frequently develop with time, such as trees with broken tops, cavities, burls, or sometimes use nests built by other species. When habitat is degraded and fragmented by timber harvesting, these habitat features cannot be easily replaced, or the losses mitigated. Northern Spotted Owls are highly territorial and exhibit high nest fidelity. Maintaining multi-story stands with diverse structural components in the Northern Spotted Owl Core Areas are essential for nesting behavior, breeding success, and sheltering (CDFW, 2016).

The USFWS’s, *Northern Spotted Owl Take Avoidance Analysis and Guidance for California Coast Forest District,* otherwise known as ‘Attachment A’ for the Coast redwood region outlines, “…*Northern Spotted Owl* [federal] *take avoidance measures for activities associated with California Timber Management*.” (AFWO, 2011). Activity Centers are areas of concentrated activity or locations that represent the best of detections. Activity Centers include known nest sites, stands used by roosting pairs or territorial single birds, and concentrated nighttime detections (USFWS, 2012; AFWO, 2011). The USFWS take avoidance guidance recommends protection for viable Northern

Spotted Owl Activity Centers, including biologically significant nest sites. The habitat retention guidelines are intended to assist the timberland owner in meeting the requirements outlined in the Forest Practice Rules, 14 CCR 919.10.

In response to first review questions, GRT disclosed that some nest site locations were mapped in error in the CDFW Biogeographic Information and Observation System (BIOS) database for MEN0212. GRT has since communicated with the CDFW Spotted Owl Database Coordinator and updated the nest site locations. There are several nest site Activity Centers for MEN0212 between Doty Creek and the Little North Fork Gualala River that are in the THP’s biological assessment area located in high quality habitat. Some of these nest sites are located within 500 feet of Unit 3. The THP does not include habitat protections for these Activity Centers that are consistent with Attachment A guidance (see Figure 1).

The USFWS 2011 take avoidance guidance for Activity Centers recommend designated Core Areas that retain and maintain the best available contiguous habitat. The guidance prescribes a minimum 500 acres of suitable habitat to be maintained within 0.7-mile of an Activity Center, with a minimum of 200 acres of contiguous nesting/roosting quality habitat. The guidance provides detailed steps on how to best delineate Core Areas. The Core Area habitat protection starts with accurately mapping an Activity Center location and delineating a 100-acre Core Area starting with a 1,000-foot radius (72 acres) and expands the additional acreage to include best available contiguous habitat. Habitat alteration should not occur within 500 feet of an Activity Center, and habitat typing should be maintained within 1,000 feet of an Activity Center. The THP appears to maintain habitat conditions within 1,000 feet of known Activity Centers, however habitat alteration is being proposed within 500 feet of Activity Centers in Unit 3 (see discussion below). CDFW recommends adhering to the habitat protections as outlined in Attachment A, to avoid potentially significant, and/or cumulative impacts to NSOs for all nest site Activity Centers (**Recommendation 1a**). The protections are also intended to meet 14 CCR 919.9 (e) and support minimal measures in 14CCR 919.10 (see example in Figure 2). In addition, CDFW recommends removing the segment of Unit 3 (approximately 3.7 acres) from the THP that is located within 500 feet of the nest site Activity Centers (**Recommendation 1b**).

The THP’s proposed Core Area for MEN0212 does not include several known nest sites (i.e., 1994, 1996, 1997, 2001, 2007) or a 2005 fledgling detection, all of which are indicators of best available habitat, and several sites had previously been addressed by CDFW when reviewing THP 1-06-186 MEN (see Figure 3). The proposed Core Area does, however, include several acres of habitat where there are no documented detections and lower quality habitat, which the LiDAR tree height calculator helps illustrate (figure 1). The Core Area should be re-delineated to exclude previous clearcut harvest units and focus on known Activity Centers that are supported with best available habitat.

Attachment A states, “…*if one Core Area does not encompass all known Activity Centers, multiple Core Areas for a Northern Spotted Owl pair, or territorial single Northern Spotted Owl may need to be mapped and protected to avoid the likelihood of incidental* [federal] *take*.” Core Areas should contain the highest quality habitat that is contiguous with an Activity Center. To address this issue in the THP and reduce potentially significant impacts to Northern Spotted Owls, CDFW recommends the THP re-delineate the Core Area for MEN0212 to be consistent with Attachment A guidance for the 1994, 1996, 1997, 2001, 2004, 2005, 2007 and 2008 Activity Centers (see figure 2) (**Recommendation 1c**). If an Activity Center is closer than 500 feet to the outside edge of nesting/roosting habitat, then the acres of non-habitat are included in the Core Area but should be augmented with additional nesting/roosting habitat elsewhere in the Core Area polygon. When the Activity Center is closer to 1,000 feet to, but not within 500 feet of the outside edge of nesting/roosting habitat, the Core Area should extend to the most distant edge of the nesting/roosting habitat but should not be less than a 500-foot radius. In other words, habitat within 1,000 feet of an Activity Center should not be downgraded, and habitat within 500 feet of an Activity Center should not be altered.

Section II, page 49 of the THP states the following: “Before July 10, road use and maintenance within 0.25-mile of a NSO Activity Center shall not occur until CAL FIRE provides a non-nesting status determination following submittal of nesting status surveys results consistent with USFWS reproductive survey protocols.” It is the role of the plan submitter to collect NSO survey data and then provide CAL FIRE with status determinations. CDFW recommends revising this statement to clarify that Northern Spotted Owl status determination information are provided by the plan submitter (**Recommendation 2**).

Section II, page 49 of the THP proposes an exception to the statement above, where use of permanent roads[1] would be permitted without seasonal restrictions. Hence, it is unclear how road use, without restrictions during the breeding period for occupied territories, will avoid potentially significant impacts to Northern Spotted Owls. The THP states “occupancy demonstrates a resilience to road use”. However, occupancy does not reflect information about reproductive success and the THP does not demonstrate how an occupied Northern Spotted Owl site is resilient to road use disturbance. Northern Spotted Owls are central place foragers, highly territorial, and have long lifespans (CDFW, 2016), so adults may occupy a site year-after-year. However, reproductive success of Northern Spotted Owls range-wide have been reportedly dropping for decades for a variety of reasons (Dugger et al., 2016). Hayward et al. (2011) examined the effects of vehicle use impacting Northern Spotted Owls and discovered higher stress hormones in birds near roads with lower fledgling success. Noise disturbance from road use during the Northern Spotted Owl breeding season may result in significant impacts

[1] It is unclear how a road qualifies as permanent when flooded during the winter period. Forest Practice Rules definition states that a permanent road “is designed for year-round use [and] …have a surface that is suitable for maintaining as table operating surface throughout the year” (14 CCR 895.1). Therefore, if the road is inaccessible during the winter period due to flooding, isn’t in fact a seasonal road?

or take by causing an adult or juvenile to flush from a nest during the breeding season. This can result in egg failure or reduced juvenile survival. An adult delaying feeding attempts of dependent birds over multiple occasions during the breeding season may reduce growth and the likelihood of survival of young (AFWO, 2006). Timber operations within a quarter mile of an Activity Center may also disrupt courtship and nest initiation, precluding a nesting attempt. CDFW recommends adhering to the road use restrictions described in Attachment A, or request CDFW consultation to assess permanent road use exceptions (**Recommendation 3**).

Section II, page 50, of the THP states, “…*during the breeding season, no timber operations should proceed unless protocol surveys do not detect nesting NSOs*.” The seasonal restrictions should to be clarified because restrictions depend upon a non-nesting or nesting failure status determination. Nesting status determinations are significantly different than “*not detecting nesting NSO*.” For example, if a pair is detected, but surveyors are unable to find the pair during daytime follow up visits to obtain a nesting status determination, the status of the pair detection is “UNKNOWN”. A pair location with an unknown status determination will still receive seasonal disturbance protections within a quarter mile until July 31, because non-nesting or nest failure could not be confirmed. Timber operations should not proceed if nesting status is unknown. CDFW recommends revising the sentence on page 50 to state: “*Activity Centers shall receive 0.25-mile seasonal protections until July 31 unless non-nesting or nesting failure has been determined consistent with USFWS survey protocol. If a non-nesting or nesting failure status cannot be confirmed, the seasonal restrictions shall stay in effect until after July 31*” (**Recommendation 4**).

Marbled Murrelet

California lists Marbled Murrelet (*Brachyramphus marmoratus*) as endangered pursuant to Fish & G. Code §2050 et seq. The USFWS lists the Marbled Murrelet as threatened pursuant to 16 U.S.C. §1531 et seq. under ESA, and the California Board of Forestry and Fire Protection lists Marbled Murrelet as a sensitive species as defined by 14 CCR 895.1.

The range of the Marbled Murrelet overlaps with the proposed THP. The proposed harvest unit adjacent to the appurtenant road is located within 1 mile of the previously identified Green Bridge Marbled Murrelet Habitat Area. The Green Bridge Marbled Murrelet Habitat Area was surveyed in 2017 and 2018 without detections, and CDFW determined “probable absence” of Marbled Murrelets for a period of 5 years. In response to first review questions, the RPF included CDFW consultation 16-R1-CTP-041-MAMU in Section V.

To reduce potentially significant impacts to Marbled Murrelet should the THP operate 5 years or longer, CDFW recommends disclosing the identified Green Bridge Marbled Murrelet Habitat Area on the THP Appurtenant Roads Map (**Recommendation 5a**). The

THP should then specify in Section II that GRT will re-consult with CDFW prior to commencing timber operations, should operations plan to proceed after the beginning of the 2024 Marbled Murrelet breeding season and within a quarter mile of the Green Bridge Marbled Murrelet Habitat Area (**Recommendation 5b**).

Foothill Yellow-Legged Frog

On June 21, 2017, the California Fish and Game Commission accepted the petition to consider the foothill yellow-legged frog (*Rana boylii*) as a candidate species as defined by Fish & G. Code §2068 and the Office of Administrative Law published the findings on July 7, 2017. As a candidate species for threatened status, activities which may result in take of foothill yellow-legged frog without authorization are unlawful pursuant to Fish & G. Code §2081.1.

Foothill yellow-legged frogs inhabit streams with a component of cobble substrate (Hayes and Jennings 1988) and terrestrial habitat in close proximity to streams (Bourque 2008). Partially shaded stream reaches are favored by foothill yellow-legged frogs, where frogs are rarely found in minimal canopy shade conditions (<20%) or densely shaded canopy conditions (>90%) (Van Wagner, 1996 – as cited in Haggarty, 2006). Juvenile and adult frogs have been observed moving upslope during the nonbreeding season away from the wetted channel amidst fall and winter rain events, presumably to avoid high flows and seek overwintering sites in the upper tributaries (Bourque, 2008). Egg masses are attached to instream rocks ranging in size from pebbles to small cobble, but may be laid on the surfaces of instream bedrock or boulders (Fuller and Lind 1992, Kupferberg 1996), and have been found in water temperatures ranging from 9 to 21.5 Celsius (Zweifel 1955 – as cited in Thomson et al. 2016). Breeding begins in the spring with tadpoles metamorphosing through the summer into early fall (Thomson et al. 2016). The THP is located in the range of *Rana boylii*.

GRT conducted extensive foothill yellow-legged frog surveys and has documented multiple breeding sites along the Gualala River. CDFW recommends disclosing this information and revising the THP to include existing foothill yellow-legged frog survey information in Section V. The survey information should, at a minimum, include a map of the surveyed areas, a map of foothill yellow-legged frog observations and known breeding sites, field survey forms, and a discussion of findings. (**Recommendation 6a – 6d**).

Water drafting is proposed from gravel bars in the North Fork, near known foothill yellow-legged frog breeding sites detected by GRT. Activities proposed for Class I watercourse drafting sites include excavating a drafting hole 10 feet from the wetted channel, driving a water truck onto the gravel bar, and drafting water that is hydrologically connected to the North Fork. Some potential impacts to foothill yellow-legged frogs from water drafting activities include potentially crushing dispersing foothill yellow-legged frogs on the gravel bar, impinging or crushing frogs occupying the drafting hole during drafting, and

dripping/spilling fuel and other petrochemicals from equipment. Water drafting activities are conditioned to not significantly impact the hydrograph of the Gualala River with recommended drafting rate restrictions in CDFW Lake and Streambed Alteration Agreements. However, based on potential for other significant impacts to foothill yellow-legged frogs, CDFW recommends installing alternative water drafting sites away from the Class I channels, such as gravity-fed, Class II watercourse water tanks outside of flood-prone areas or other existing water drafting sites that avoid excavation, drafting, and driving on gravel bars (**Recommendations 7a – 7c**). The project proponent may also apply for an incidental take permit associated with 2081(b) of the California Endangered Species Act (**Recommendation 7d**).

If alternative water drafting sites are infeasible, the THP should further demonstrate how to avoid significant impacts to foothill yellow-legged frogs during gravel bar operations such as during excavation, driving on the gravel bars, and pumping water from excavated water holes (**Recommendation 8**).

California Red-Legged Frog

The California red-legged frog (*Rana draytonii*) is a federally threatened species under the ESA and is recognized as a Priority I Species of Special Concern by the State of California. California red-legged frogs have been extirpated from 70% of their former range and are now primarily found in coastal drainages (USFWS, 2002). To adequately maintain a population of breeding *Rana draytonii*, there are three habitat components that should be protected: breeding habitat, nonbreeding habitat, and migration corridors. Identifying these habitat components and determining the adequate size of buffers require an expert opinion from a field biologist with extensive experience with *Rana draytonii*, or a field study to monitor radio-tagged frogs’ movement (Fellers, 2007). In the Fellers et al. study (2007), California red-legged frogs traveled up to 0.86 mile (1.4km) from suitable nonbreeding areas to breeding ponds.

The THP is located in the range of California red-legged frogs. Additional protection measures described below are designed to protect the hydrologic, geomorphic, and biological functions within the Little North Fork, and reduce potentially significant impacts to aquatic and terrestrial species, including California red-legged frogs, that are dependent on ponded and flood prone areas.

The THP contains optimal habitat for California red-legged frogs (*Rana draytonii*) such as dense riparian vegetation with pools, marshy areas, and slow-moving water (Thomson et al., 2016). The THP discloses an observation of a California red-legged frog in a shallow pool located in an inside ditch off a mainline road, adjacent to an extensive wetland. The THP provides a California red-legged frog habitat map in Section II, page 71. Site-specific protection measures are proposed for the observation. However, the THP does not address how timber operations will avoid frogs that frequently use logs, rocks, and other surface debris as shelter when not occupying ponded sites. CDFW

recommends revising the THP to include how it will reduce potentially significant impacts, including cumulative impacts, on California red-legged frogs dispersing from ponded and saturated areas (**Recommendation 9**). In addition, CDFW recommends the THP include a Technical Assistance Letter from the USFWS THP that acknowledges the proposed protections for California red-legged frogs (**Recommendation 10**).

The THP proposes to install exclusion fencing for the length of the ponded water along the mainline road where the California red-legged frog was observed. In addition, the THP will install a half-round culvert across the road with the intent of permitting frog passage while excluding access along the running surface of the road (see detailed description for Map Point 41 on page 64 of the THP). California red-legged frogs are known to climb over and cross below exclusion fencing. CDFW recommends the protection measures specify exclusion fencing be secured in a way that prevents frogs from slipping under the fence and include a barrier at the top (e.g. fold or ledge) to prevent frogs from climbing over. Exclusion fencing should be maintained whenever the road is in use and be removed prior to winter and upon the completion of operations (**Recommendations 11a – 11d**).

WATERCOURSE AND LAKE PROTECTION

Anadromous Salmonids and Biological Significance of Floodplains

The THP proposes harvesting operations in and adjacent to the Little North Fork Gualala River floodplain. Coho Salmon (*Oncorhynchus kisutch*) and Steelhead Trout (*Oncorhynchus mykiss*) are present in the Gualala River Watershed. The National Marine Fisheries Service list Coho Salmon as “Endangered”, Steelhead Trout as “Threatened”, and Chinook Salmon as “Threatened” pursuant to the ESA. Further, the California Fish and Game Commission list Coho Salmon as “Endangered” pursuant to CESA. As the THP is in a state-planning watershed with populations of anadromous salmonids listed as threatened or endangered under ESA or CESA, the THP is subject to the “Anadromous Salmonid Protection Rules” in 14 CCR 916.9.

Timber harvesting operations on the Little North Fork floodplain, Flood Prone Area and/or Channel Migration Zones (defined in 14 CCR 895.1) has potential to significantly impact anadromous salmonids. Steelhead Trout are known to be present in the Little North Fork Gualala River. The CDFW Coastal Steelhead Project, conducted in the mid-1970s, counted a minimum of 33 adult Coho Salmon in the Gualala River watershed between 1973 and 1976. This number represents a significant decline from the estimated 4,000 fish observed in 1963 (DFG, 2002). Between 1995 and 1997, a total of 45,000 juvenile Coho Salmon were released in the Little North Fork in an attempt to revive the Gualala River’s Coho Salmon population. The last documented observation of Coho Salmon in the Little North Fork was in 2003 (Christy, 2016), and are considered currently extirpated.

Environmental impacts in the Gualala watershed are attributed to three eras of intensive land use: old growth harvesting between 1868 to 1911, tractor harvesting of remaining old growth between 1942 to 1968, and cable/tractor harvesting of second growth redwood in lower watershed reaches between 1991 and 2001 (NCWAP, 2003). Legacy logging impacts are still prevalent today, from large-scale sideslope excavations, skid trail networks, sidecasting into streambanks that frequently buried stream channels, along with the mid-20th century logging era and in-channel wood debris removal efforts of the 1970’s and 1980’s (NCWAP, 2003). Storm events activated road debris slides and historically active landslides, have caused substantial channel aggradation. The previous landowner (Gualala Redwood Inc. – GRI) and GRT have taken significant steps to upgrade road systems and enhance habitat in the Little North Fork watershed in partnership with the Gualala River Watershed Council. CDFW acknowledges and appreciates these recovery and habitat restoration efforts so that listed anadromous salmonid populations may recover. Disclosing and protecting floodplains is consistent with efforts to recover Coho Salmon.

Floodplains provide habitat for juvenile salmonids in the form of seasonal wetlands, temporary tributaries, off-channel ponds, sloughs, flood-channels and seasonal estuarine drainages (Brown, 2002). When storm events activate bankfull discharge onto the floodplain surface, the inundated area provides juvenile fish access to invertebrates and food sources in the soil that are not otherwise available in the comparatively nutrient-poor main channel. Young fish are dependent upon a food web that is supported by complex riparian/floodplain habitat features. These features were observed during the PHI, including connected and disconnected side channels in red alder and redwood riparian forests, and dispersed perennial and seasonal wetlands throughout the harvest units. Floodplain side channels are highly productive for feeding anadromous salmonids, and an increased body mass is positively correlated to an increase in salmonid survival rates when salmonids migrate to sea (Bellmore et al., 2013).

The expression of perennial and seasonal wetlands on the floodplain surface of Little THP is indicative of the interconnected floodplain surface and groundwater, which is a key source of cool water in the summer and provides thermal refuge for salmonids (Levings et al., 1985). Riparian canopy cover reduces exposure of rearing fish and habitat to solar ultra-violet radiation and maintains groundwater/hyporheic zone temperatures, providing essential riparian functions for juvenile salmonids (Brown, 2002). Thermal tolerance of juvenile Coho Salmon was first quantified by Brett (1952) who estimated optimal temperature is around 12 and 14 degrees Celsius, which was later supported by Reiser and Bjornn (1979) that estimated 11.8 to 14.6 degrees Celsius. Removing tree canopy cover can warm floodplain surfaces and the hyporheic zone, which may adversely impact rearing juvenile salmonids by increasing water temperatures directly and/or indirectly in the main channel.

The Riparian Protection Committee (RPC) issued a guidance paper (CAL FIRE, 2005) for THPs and NTMPs involving flood prone areas. The guidance addresses increased

solar radiation, decreased supply of large wood, additional slash and debris in the watercourse, and unnatural erosion of streambanks as some of the impacts that floodplain timber harvesting may have on anadromous salmonids (see Table 1). The Forest Practice Rules took those potential impacts into consideration when determining canopy retention criteria in Class I watercourses with flood prone areas and a channel migration zone (14 CCR 916.9(a) and 916.9(f)(3)).

Table 1. Factors and consequences of timber harvest on salmonid survival (CAL FIRE, 2005).

Potential Change in Physical Stream Environment	**Potential Change in Quality of Salmonid Habitat**	**Potential Consequences for Salmonid Growth and Survival**
Increased solar radiation	Increased stream temperature; higher light levels; increased autotrophic production	Reduced growth efficiency; increased susceptibility to disease; increased food production; changes in growth rate and age at smolting
Decreased supply of large wood	Reduced cover; loss of pool habitat; reduced protection from peak flows; reduced storage of gravel and organic matter; loss of hydraulic complexity	Increased vulnerability to predation; lower winter survival; reduced carrying capacity; less spawning gravel; reduced food production; loss of species diversity
Addition of logging slash (needles, bark, branches)	Short-term increase in dissolved oxygen demand; increased amount of fine particulate organic matter; increased cover	Reduced spawning success; short-term increase in food production; increased survival of juveniles
Erosion of streambanks	Loss of cover along edge of channel; increased stream width; reduced depth; increased fine sediment in spawning gravels and food production areas	Increased vulnerability to predation; increased carrying capacity for age-0 fish, but reduced carrying capacity for age-1 and older fish; reduced spawning success; reduced food supply

The potential impacts to salmonids outlined by the RPC are also addressed by the basic Watercourse and Lake Protection measures outlined in 14 CCR §916.4(b), which would apply to the full extent of Class I watercourses with flood prone areas and channel migration zones (14 CCR §919.9(f)(3)) and include the following:

- Water temperature control

Tree retention standards on the flood prone area and channel migration zone minimize the floodplain surface exposure to solar radiation that can increase soil temperatures, and thereby warm the floodplain surface and subsurface water temperatures of the hyporheic zone. The hyporheic zone consists of subsurface water on the floodplain that is hydrologically connected to the main channel. When the subsurface water temperature increases, this can increase free water temperatures in the main channel. Salmonids will seek out cool upwellings from the hyporheic zone to build their redds, as Coho salmon egg incubation requires a cooler temperature range (4.4 to 12.8 degrees Celsius) than preferred temperatures for juvenile Coho (11.8 and 14.6 degrees Celsius) (DFG, 2002; Reiser and Bjornn, 1979). In one study, Coho salmon embryos suffered 50% mortality at temperatures exceeding 13.5 degrees Celsius (Beacham and Murray, 1990). As these tolerance studies are derived from controlled laboratory conditions, Ambrose and Hines (2000) looked at quantifying chronic exposures to given temperatures that have the greatest impact on deterring site selection by juvenile Coho salmon in select watersheds on timberlands in coastal Mendocino County. The Maximum Weekly Average Temperatures (MWAT) metric was used as a theoretical value to judge actual stream temperature conditions when compared with a seven-day moving average of daily maximum temperatures. Ambrose and Hines emphasized that there is no single temperature threshold that, if exceeded, would be considered detrimental to Coho, but rather there would be a limit to the number of days each temperature could be exceeded within a significant range of temperatures. Importantly, fish presence is only one metric of success, and the assumption that average conditions where fish are present will suffice as target can jeopardize the population if they are not actually thriving. With those critical caveats, the MWAT upper threshold for juvenile Coho salmon was found to be at 17.6 degrees Celsius, which corroborates Pacific Lumber Company (1997) findings. The MWAT for the North Fork Gualala stream temperature data between 1994 and 2011 ranged from 15.5 to 22 degrees Celsius (Gualala River Watershed Council, 2019). When an active channel migrates into areas on the floodplain that have not been afforded CMZ protections, this exposes the floodplain to solar radiation and warm water temperatures, which may be directly lethal or result in longer-term population declines and extirpation by stunting smolt development that can reduce survival rates of fish at sea.

The Little THP proposes single tree selection silviculture on the valley floor, which we assert is both a channel migration zone and flood prone, therefore dominant and codominant trees—that contribute to maintaining riparian microclimates—could be removed by not retaining canopy cover and large tree retention required in the Water Course or Lake Protection Zone’s (WLPZ) Inner Zones (14 CCR 919.9(f)(3)(D and C)). The floodplain area proposed for harvest is expected to be inundated with water, and may feasibly be occupied by the main channel at several locations, such as where avulsion hazard zones were observed in Unit 1 near OEI sites 5 and between sites 1 and 2 (see Attachment: 20191112_1-18-000095MEN_Revised Flood Prone Area

Assessment of the Little THP Mendocino Co. California-CDFW.pdf, (CDFW, 2019) figures 7A and 7B, which documents historical channel migration and flooding within the proposed THP area). If the channel migrates into these areas proposed for harvest, the channel could be exposed to an area of just 50% canopy retention standard rather than the 100% canopy retention (core zone) in the channel migration zone (CMZ) (see CMZ discussion below). The current and subsequent timber harvesting on the floodplain could expose sensitive floodplain surfaces and hyporheic zone to greater solar radiation. Greater exposure to solar radiation is more likely to increase water temperatures in the hyporheic zone, secondary channels, avulsion sites and potentially the main channel, which can significantly impact salmonids in the Little North Fork Gualala River.

Section IV page 139 and 143 of the THP states that temperature increases will be mitigated by applying Forest Practice Rules prescriptions, however, the methods GRT uses to apply FPRs prescriptions unclear. For example, the Watercourse Transition Line should be delineated at the outer edge of the channel migration zone. The THP map(s) do not fully delineate CMZs despite the THP acknowledging the “*Little North Fork itself migrates laterally and there are historic abandoned channels adjacent to this river*.” Thus, it is unclear how the THP mitigates for increased temperatures in the presence of channel migration when the Watercourse Transition Line is not accurately delineated.

- Streambed and flow modification by large woody debris

Retention of large trees near watercourses for large woody debris (LWD) recruitment is essential for developing high quality habitat for salmonids. Decreasing the number of large trees on the floodplain may result in the loss of potential complex habitat development, such as pool formation, protection from peak flow velocities, reduced storage of gravel and organic matter and loss of hydraulic complexity. It is particularly important to retain large trees in areas of channel migration so LWD will be available for recruitment in future channel zones across the floodplain. CDFW observed old growth stumps that were exhumed by stream flows from the present-day active channel, indicating the channel migrates across the valley floor. For reference, the California Salmonid Stream Habitat Restoration Manual (1998) recommends tree lengths that are 1.5 times longer than the mean bankfull width of the stream for effective LWD establishment. The Little North Fork ranges from approximately 60 feet wide to 150 feet wide in areas of active anabranching channels (CDFW, 2019), which suggests the tree height for bankside recruitment could range from at least 90 to 225 feet. The THP, which is currently LWD limited, proposes harvest in floodplain areas that may feasibly incur channel migration in the future and may not be able to meet such LWD recruitment.

- Filtration (filtering or storing) of organic and inorganic material

Timber harvesting operations such as skid trail construction/reconstruction/use and road building can add substantially large amounts of sediment to a watercourse and alter its ecological integrity. Physical features of a watershed help filter materials, like root-

stabilized banks, woody surface debris and vegetation that slow stream velocities and help drop-out suspended sediment and debris from the water column. The hyporheic zone plays a significant role filtering particles and nutrients through soil pores that deliver organic and inorganic nutrients to floodplain vegetation and the main channel. Timber harvesting activities on the floodplain surface can interfere with filtration of organic and inorganic material by disturbing or compacting soils and removing vegetation, which decreases vegetative roughness on the floodplain and can alter flow patterns. The Little THP does not fully assess the potential impacts resulting from proposed soil disturbing operations within the floodplain and therefore it is unclear how the THP will minimize or avoid substantial impacts.

- Bank and channel stabilization

Riparian vegetation plays a crucial role in streambank and channel stabilization by providing resistance to surface erosion and helping bind soil in place. The guidance document (CALFIRE, 2005) discusses the hydrologic, geomorphic, and biological roles of riparian vegetation, and affirms floodplain vegetation greatly aids in streambank stabilization by providing root structure that slows stream velocity. Slowing water velocities down helps reduce erosion potential and build up bank structure by dropping out suspended sediment. In floodplains subject to channel migration, vegetation must be maintained throughout the floodplain surface for long-term bank stability. The RPC guidance document emphasizes that riparian forest conditions throughout the floodplain surface must be maintained to guarantee that large wood will be available for bank stabilization and recruitment wherever the new channels form. The Little THP does not fully assess or propose tree retention standards for the channel migration zone or flood prone area (see Attachment: 20191112_1-18-000095MEN_Revised Flood Prone Area Assessment of the Little THP Mendocino Co. California-CDFW, (CDFW, 2019) figures 7A and 7B, which documents historical channel migration and flooding within the proposed THP area), and therefore it is unclear how banks will be stabilized in the event of an avulsion or lateral migration.

- Spawning and rearing habitat for salmonids

The Little North Fork Gualala River supports Steelhead trout, and until recently supported Coho salmon, that benefit from side channels, backwater areas and large standing conifers rooted on the floodplain, providing young and adult fish with shade, food and shelter from high velocity, debris and turbidity. The wetland areas observed on the PHIs that are dominated by slough sedge and other graminoids support beneficial uses of aquatic species including invertebrates that provide quality feeding and rearing habitat for fish when flooded. The ability for fish to have seasonal access to the floodplain surface beyond the active channel is essential for gaining body mass and directly increases survival rates when migrating out to sea. Side channels and backwater channels provide crucial foraging opportunities, and also provide winter refugia and rearing habitat that has been found to increase numbers of summer smolts (M.F.

Solazzi, et al., 2000). Harvesting activities that remove dominant and codominant trees in the channel migration zone and flood prone areas as described in the 20191112_1-18-000095MEN_Revised Flood Prone Area Assessment of the Little THP Mendocino Co. California-CDFW (CDFW, 2019), could cause significant negative and cumulative impacts which may harm the salmonid fishery that depend upon sensitive floodplain surfaces.

Salmonid spawning habitat was observed in the Little North Fork Gualala River, which is evidenced from young Steelhead sighted on the PHI near OEI (2019b) site #5 and the history of redds and fish observations documented in the Stream Monitoring Report (THP, pages 247-250). Salmonids require suitable spawning gravels to build their redds and prefer areas of groundwater seepage and upwellings to help eliminate wastes and prevent sediment from filling in interstitial gaps in the gravels (DFG, 2004a). Females typically select redd sites at pool outlets or riffle heads to maximize egg exposure to oxygenated water. Timber harvesting on the floodplain can directly and indirectly impact spawning habitat, for example, by increasing sediment delivery that clogs gravel pores that smother eggs and alveins or increase overland runoff from soil compaction resulting in flashier peak flows that may contribute to scour and redd failure.

The cumulative impacts discussion in Section IV acknowledges that “*salmon are not as common today as they have been in the past*,” and proposes to upgrade roads to decrease sediment delivery into watercourses to maintain fish habitat (THP, page 141-142). The Little THP does not offer significant, off-setting road upgrades for this plan and proposes to continue use of a seasonal WLPZ road subject to flooding. It is unclear how the Little THP mitigates for potential impacts by tractor roads and canopy reduction on the floodplain in potential CMZs where salmon may spawn and rear.

- Vegetation structure diversity for fish and wildlife habitat

Riparian vegetation along the Little North Fork ranges from red alder riparian to coastal redwood forest and wetland features that support an abundance of wildlife species, including several listed species and California Species of Special Concern. Riparian vegetation provides multi-story canopy structure that create microclimatic conditions that are used by a multitude of wildlife such as nesting resident and migratory birds, fawning deer, denning river otters, herpetofauna, insects and provides corridors for movement of terrestrial and aquatic species alike. Vegetation structure in mature riparian forest allows for the development of features associated with decadent trees (see Appendix B) and snags for recruitment.

The RPC explains that applying standard WLPZ protections identified in 14 CCR §916.5 Table 1 to a single active channel located in a flood prone area does not meet the purpose of conserving the ecological elements listed above. The RPC provided guidance to develop anadromous salmonid protection rules (14 CCR §919.9), that specify how timber harvesting plans can be designed and implemented to better protect Class I

watercourses with flood prone areas and channel migration zones (14 CCR §919.9 (f)(3). As stated in the RPC (CAL FIRE, 2005):

> *In some cases, flood prone areas that exist outside the WLPZ edges have been treated silviculturally similarly to areas on hillslopes located above the floodplain (i.e., the Class I WLPZ has not been extended to the edge of the flood prone area, or the WTL has not been established at the landward edge of the flood prone area – making the channel zone the entire flood prone area, instead of only a small part).*

The description above is consistent with what is being proposed for Little THP, where only a subset of the flood prone area is provided WLPZ protections, and the remaining area that extends to the landward edge (approximately 35-40 acres in Little THP) is subject to upland silviculture prescription. By under-classifying the flood prone area and channel migration zones, this THP and future THPs may continue to degrade anadromous fish habitat, cumulatively, when considering previous and the proposed timber operations in the Gualala. The THP’s discussion about cumulative environmental impacts from timber harvesting is a general overview of the Gualala River watershed as summarized in the North Coast Watershed Assessment Program (NCWAP) report from 2003. It does not provide an analysis of the THP’s potential impacts in the Little North Fork Gualala River. Some proposed mitigations, such as road upgrades, do not directly apply to this specific THP, since road upgrades are not proposed. It is therefore unclear how the THP avoids cumulative significant environmental impacts and/or restores habitat for anadromous salmonids, when recognizing a subset of the floodplain, referencing mitigations from an older report, while not addressing how they’d be applied in the Little North Fork for this THP.

The 20191112_1-18-000095MEN_Revised Flood Prone Area Assessment of the Little THP Mendocino Co. California-CDFW, (CDFW, 2019) supports that the extent of the flood prone area and channel migration zone within the proposed THP units extends to the boundaries as indicated in CDFW’s 2019 Memorandum Exhibits A/B, and the THP shall be revised to address the potential cumulative environmental impacts on the entire Little North Fork flood prone area. The address should include elements that may prevent the maintenance and restoration of habitat for anadromous salmonids and/or their habitat functions in the Little North Fork. The THP should also describe how adverse impacts of floodplain harvesting can be avoided. The THP should address how values and functions listed in 14 CCR §916.4(b) may be significantly or cumulatively impacted and describe measures to protect them (**Recommendations 12a – 12g**):

a. water temperature control
b. streambed flow modification by large woody debris
c. filtration of organic and inorganic material
d. upslope stability
e. bank and channel stabilization

f. spawning and rearing habitat for salmonids
g. vegetation structure diversity for fish and wildlife habitat

Additionally, 14 CCR 916.9 (f)(E) – Preferred Management Practices in the Inner Zone A and B of Flood Prone Areas - (6) recommends avoiding water drafting sites on flood prone areas, when feasible. Several proposed water drafting sites are located on Class I flood prone areas and propose to excavate drafting holes (sumps) on gravel bars. Page 31 of the THP states it is not feasible to avoid drafting from flood prone areas. The THP should evaluate alternative drafting options, for example, placing gravity-fed water tanks adjacent to Class II watercourses outside of flood prone areas. CDFW recommends the THP re-address the FPR’s preferred management practices and consider implementing alternative water drafting measures that might provide greater protection for aquatic species (**Recommendation 13**).

Flood Prone Area Delineation and THP Information and Analysis[2]

The THP delineates the flood prone area as the area inundated by a 20-year recurrence interval, whereas CDFW recognizes the flood prone area as the full extent of the alluvial valley floor. In support of that opinion, a more detailed analysis of the flood prone area was conducted by CDFW’s Senior Engineering Geologist (CDFW, 2019).,.

During the various PHI visits, CDFW observed the presence of a variety of side-channels and wetland areas across the alluvial valley bottom of the Little North Fork Gualala River. In addition, substantial evidence (e.g., fresh sediment deposits, silt lines on trees, and wracked debris) of recent (winter 2018/2019) overbank flooding was also documented (see figures 10 through 15 from CDFW Areas A, B and C, referenced in figure 9). These areas observed during PHIs also support the conclusion that the flood prone width of the Little North Fork extends throughout the width of the alluvial valley bottom. The Little North Fork floodplain for this THP was formally investigated by OEI in the early months of 2019 and that work attributes the recent overbank flooding to a February 26, 2019 storm event. Through a combination of hydrologic analyses, hydraulic modeling, and topographic surveying the investigators consider the late February flood event to be comparable to a 20-year recurrence interval flood (OEI, 2019a). Model results of a 20-year flood event through the valley do not show a uniform pattern of inundation across the Little North Fork valley bottom. Instead, some reaches are shown as not being subject to flooding in a 20-year return interval, and others are flooded across nearly the entire valley bottom width (OEI, 2019a, figures 7, 8a, and 8b). Near the confluence with the Little North Fork, a large linear feature backfloods the Little North Fork valley for a distance of about 1,000 feet upgradient. Cursory review of the model results suggests that those areas of the valley bottom most extensively flooded are those that occur downstream of major tributary confluences.

[2] Flood prone area discussion below prepared in consultation with CDFW Senior Engineering Geologist Mark Smelser (Attachment: 20191112_1-18-000095MEN_Revised Flood Prone Area Assessment of the Little THP Mendocino Co. California-CDFW.pdf).

The THP has adopted the sporadic distribution of flooding delineated by the 20-year flood model described above as the jurisdictional “*flood prone area*” for which harvest operations are proposed. More specifically, the applicant is invoking the latter part of the Flood Prone Area definition and in effect adopting the position that: 1) the Little North Fork is “*laterally stable”; and 2) the “. . . outer boundary of the flood prone area cannot be clearly determined using the field indicators . . .”.* This approach is confusing and/or contradictory because it: 1) implies that Little North Fork is incised and unable to migrate (i.e., laterally stable); 2) generally fails to embrace the ecological value of the Flood Prone Area described above; 3) provides no evidence that the Flood Prone Area does not extend to the valley walls; and 4) ignores or contradicts the published mapping by CGS that depicts the alluvial valley bottom width as extending from valley-wall to valley-wall. Collectively, these concerns demonstrate that additional information is necessary to evaluate the potential for the proposed THP to generate substantial adverse environmental impacts.

The Flood Prone Area defined in CCR 895.1 indicates the 20-year recurrence interval flood event shall be used if banks are laterally stable and indicators such as change in slope, presence of terraces, distinct change in soil/plant characteristics, and evidence of silt lines and floatable debris are <u>absent or unclear</u>.

During the PHI on May 14, 2019, CDFW staff observed distinct indicators of a flood prone area beyond the 20-year recurrence interval in the proposed harvest unit at the southern extent of the THP. The indicators such as side channels, wetland features and flat topography consisting of Bigriver loamy soils extend to the toe of the hillslope in most instances CDFW staff inspected (see figures 16-19). The Flood Prone Area is estimated to occur beyond the 20-year recurrence interval based on estimates of twice the depth of the main channel, measured at bankfull stage, or at the streamward beginning of the floodplain. On the August 29th PHI inspection date, Matt O’Connor conveyed that his measurements found the twice bankfull depth extending to the toe of the hillslope. The “twice bankfull depth” definition of the Flood Prone Area is further described in the Washington Forest Practices Board Manual (2004), a technical supplement to the Washington State Forest Practices Rules. Although the most frequently inundated portions of the floodplain (less than a 20-year recurrence interval) are biologically critical, less frequently inundated (20 to 100-year recurrence interval) floodplains offer multiple beneficial functions.

CDFW is in receipt of the OEI (2019a) characterization and extent of the February 26, 2019 storm, which OEI reports as an approximate 20-year recurrence interval discharge in the Little North Fork. Field observations of recently deposited silt lines, deep sediment deposits, and debris racking confirm this as at least the 20-year floodplain and was accurately mapped and delineated on the ground (Figure 4). However, based on field evidence of flat topography, abundant wetland vegetation communities, and a clear distinction between the existing and abandoned floodplain surfaces (for example, a

potential terrace exists near drafting site A, which appears elevated from the current floodplain and lacks wetland vegetation), CDFW determined the Flood Prone Area extends, laterally, beyond the 20-year recurrence interval to the toe of the slope (Figure 5). It is not clear if this portion of the floodplain is inundated moderately frequently (20 to 50-year recurrence interval), or infrequently (greater than a 50-year recurrence interval). The extension of the Flood Prone Area beyond the 20-year floodplain is further supported by soil maps that detail the composition of “Bigriver loamy sand” in this zone (Figure 6), and the Soils Map on page 70 of the THP. Bigriver loamy sand soils are very deep, well-drained soils that formed from alluvium on lower alluvial flats and floodplains where slopes are 0 to 5 percent (NRCS, 2019).

Bigriver loamy soils underly the majority of the THP area as demonstrated on page 70 of the THP and in figure 6, indicating the area has a low gradient and is flood prone. Based on CDFW’s analysis (See Figure 8), the observed field indicators, topography, soil type, along with the findings presented in the 20191112_1-18-000095MEN_ Revised Flood Prone Area Assessment of the Little THP Mendocino Co. California-CDFW.pdf, (CDFW, 2019) CDFW determined the Flood Prone Area encompasses the entire valley floor surface to the toe of the hillslope.

The Forest Practice Rules are designed to ensure timber operations protect, maintain, and contribute to the restoration of properly functioning salmonid habitat. The restoration goals include retention of large coniferous trees for the purpose of large wood recruitment, shade retention, and other habitat requirements for anadromous salmonids. CDFW estimates the THP, as submitted, allows an estimated 35 to 40 acres of Flood Prone Area outside of the Watercourse and Lake Protection Zone (WLPZ) to standard selection silviculture, without specific large tree retention or floodplain specific overstory canopy cover. The harvest mark on the Flood Prone Area includes large dominant and co-dominant conifers. CDFW determined the proposed timber harvest on the Flood Prone Area (outside of the WLPZ) is expected to diminish riparian habitat and beneficial uses for both aquatic and terrestrial species may be in conflict with restoration goals of 14 CCR 916.9(a).

CDFW recommends the entire valley in the THP be formally delineated as the Flood Prone Area (**Recommendation 14**).

Potential Impacts on Fish and Wildlife Due to Proposed Timber Harvest on Unmapped Flood Prone Areas

CDFW has determined impacts to fish and wildlife will likely occur if the standard selection silviculture harvest is implemented as proposed within 35 to 40 acres of the 20 to 100-year Flood Prone Area. The selection silviculture post-harvest stocking requires a minimum of 125-square foot basal area. The lack of large tree retention in this zone may not contribute to a properly functioning habitat condition for aquatic and terrestrial

resources over time. Fish and wildlife impacts from the proposed harvest in 35 to 40 acres of the 20 to 100-year Flood Prone Area include the following:

- *Loss of Coho salmon habitat over time*: The selection silviculture proposed may lower the recruitment rate of large diameter LWD and associated juvenile Coho Salmon rearing habitat. Recovery of Little North Fork Gualala Coho Salmon habitat and properly functioning conditions require management of riparian areas focused on growing large diameter trees to maximize LWD volume recruitment to the Flood Prone Area over time. Large riparian trees have fundamental roles in the physical and biological structuring of river valleys (Collins et al., 2012). Maximizing recruitment of properly functioning LWD volumes will lead to an accelerated development of zero velocity Coho habitat (alcoves, backwaters, etc.). These habitats provide critical high flow refugia for juvenile Coho that would otherwise be forced downstream into large reaches where survival rates are lower (Bell, 2001).

- *Potentially Increasing critical late summer stream temperatures*: Large riparian trees regulate stream temperature by reducing solar heating and ultra-violet light exposure across the extent of the floodplain. This process cools the hyporheic zone and maintains stream temperatures in preference ranges for anadromous fish, riparian vegetation, and aquatic invertebrates (CAL FIRE 2005; Bellmore et al., 2013; Boulton, A.J. et al., 1998; Noss, 2000; Beschta, 1997). Removing large riparian trees may therefore directly and/or indirectly increase stream temperatures.

- *Lowered capacity to filter organic and inorganic material*: Floodplain surfaces provide natural sediment filtration as upland erosion moves sediment downslope. Effective filtration is dependent upon recruitment of large diameter LWD, vegetation, organic litter, slope, soil type and soil drainage structure. Activities that disturb or compact soils, destroy organic litter, remove large downed wood or remove recruitment of future downed wood reduce the effectiveness of sediment filtration on floodplain surfaces.

- *Loss of late seral habitat development in riparian areas*: The proposed harvest in 30 to 40 acres of the 20 to 100-year Flood Prone Area may not lead to the development of late seral habitat conditions in this zone. This is contrary to goals set forth in 14 CCR §897(b)(1)(C), requiring recruitment of late seral habitat in the WLPZ.

Little North Fork Channel Migration Zone THP Information and Analysis

Channel Migration Zones are an important geomorphic process that creates a mosaic of habitat patches in a river corridor that provide high ecological value for aquatic and terrestrial species (Washington State Department of Ecology, 2014). Page 139 of the THP acknowledges channel migration occurs on the Little North Fork, and states:

> *… the Little North Fork itself migrates laterally and there are historic abandoned channels adjacent to this river…The existence of recently fallen trees across the river indicate that the channel continues to migrate and large woody debris is introduced as a result. This is one of the reasons that the 30-foot no-cut zone, the core zone, was made a part of the ASP rules.*

However, it appears that the CMZ has not been fully mapped in the Little THP. CDFW provided an assessment of definitions and analysis of OEI’s CMZ evaluation in the Little North Fork is provided in CDFW’s technical memorandum (Attachment: 20191112_1-18-000095MEN_Revised Flood Prone Area Assessment of the Little THP Mendocino Co. California-CDFW.pdf (CDFW, 2019). That memorandum concludes that the Little North Fork Gualala River is an alluvial stream subject to past, present, and anticipated future channel adjustments associated with both avulsions and lateral channel migration. It also summarizes much evidence in support of the interpretation that the outer boundary of the Little North Fork *flood prone area* extends from valley-wall to valley-wall. The memorandum closes with two recommendations: 1) that the entire valley floor, from valley-wall to valley-wall be formally delineated as the *flood prone area*; and 2) that a formal CMZ designed to accommodate the potential for both avulsions and lateral channel migration during the next 150 years be adopted for the “Little” THP. In support of those recommendations, both flood prone area and CMZ delineations are provided with the memorandum (CDFW, 2019).

During the May 14 and August 29th PHI visits, portions of the southern unit was evaluated for potential CMZs. Figure 9 illustrates CDFW evaluation areas and in all three locations (CDFW areas A, B and C, Figure 9), evidence of active secondary/distributary channel development through the Flood Prone Area was observed (See also Figures 10 through 15).

Based on CDFW’s analysis in Attachment: 20191112_1-18-000095MEN_Revised Flood Prone Area Assessment of the Little THP Mendocino Co. California-CDFW, (CDFW, 2019) the channel migration zone of alluvial valley floor has not been fully addressed, therefore the THP is currently not meeting or exceeding the goals of 14 CCR 916.9(a) - Goal - that timber operations, “…be planned and conducted to protect, maintain, and contribute to the restoration of properly functioning salmonid habitat and listed salmonid species.” The purpose of CMZ protections are to maintain habitat recruitment conditions for channels that may be occupied by anadromous salmonids and must be disclosed in order to apply protection measures specified in 14 CCR 916.9(f)(3). CDFW recommends the Channel Migration Zone presented in in Attachment: 20191112_1-18-000095MEN_Revised Flood Prone Area Assessment of the Little THP Mendocino Co. California-CDFW (CDFW, 2019) (see Figures 7A and 7B) shall be incorporated into the analysis of impacts and appropriate revisions amended into the THP (**Recommendation 15**).

Potential Impacts on Fish and Wildlife Due to Proposed Timber Harvest on Channel Migration Zones

- *Loss of Coho Salmon habitat over time*: Inner Zone A and Inner Zone B harvest in the CMZ may allow for harvest of trees where the primary channel may occupy over time. Exhumed whole trees with attached root wads are more effective at creating complex channel habitats compared to stumps and root wads (Fox, 1994). In addition, trees adjacent to the active channel have the highest likelihood to recruit to the stream. Maximizing recruitment of properly functioning LWD volumes will lead to an accelerated development of zero velocity Coho habitat (alcoves, backwaters, etc.) over time. These habitats provide critical high flow refugia for juvenile Coho that would otherwise be forced downstream into large reaches where survival rates are lower (Bell, 2001).

- *Increased critical late summer stream temperatures*: Active channel migration over time into areas harvested under Inner Zone A (minimum 80% overstory canopy retention) and Inner Zone B (minimum 50% canopy retention) may lead to increased late summer stream temperatures. North Fork Gualala stream temperature data indicate the MWAT between 1994 and 2011 ranged from 15.5 to 22 degrees Celsius (Gualala River Watershed Council 2019). The MWAT range, which incorporates the physiological optimum temperature and upper incipient lethal temperature for juvenile Coho salmon is between 16.8 and 17.4 degrees Celsius (Pacific Lumber Company, 1997). Increased water temperature in the Little North Fork Gualala due to significant reductions in canopy cover may impact juvenile Coho salmon survival in downstream North Fork reaches.

Little North Fork Watercourse and Lake Protection Zone Analysis

The THP proposes a 70-foot Inner Zone A for the majority of the Little North Fork Gualala River adjacency, except for the southern portion of the plan. The Forest Practice Rules specify:

> “…*minimum width of the Inner Zone A shall be the greater of the distance from the landward edge of the Core Zone to the landward edge of the Inner Zone A, or 70 feet. The maximum width is 120 feet*.”

In the ASP Rules Question and Answer document (CAL FIRE, 2010), the Inner Zone A encompasses the greater distance from the Core Zone to the landward edge (toe of the hillslope), up to 120 feet. If the landward edge is less than 120 feet from the Core Zone, then the Inner Zone A stops at the landward edge. If the hillslope is greater than 120 feet from the Core Zone, then the Inner Zone B begins from the outer edge of Inner Zone A and extends to the toe of the hillslope. The 70-foot minimum width would apply if the 70-foot minimum width encompasses the entire extent of the FPA.

As the valley floor to the toe of the hill slope is frequently greater than 120 feet for the Little THP, CDFW recommends the maximum width of Inner Zone A should be extended to 120 feet from the Core Zone (30 feet) where appropriate (**Recommendation 16a**). Where the Inner Zone A does not encompass the entire flood prone area, the THP shall extend the Inner Zone B to the landward edge (toe of the slope) to protect the full flood prone area (as discussed above) (**Recommendation 16b**). All revised Class I WLPZs in flood prone areas and channel migration zones should be delineated on the Operator’s Map and flagged in the field accordingly 14 CCR 916.9(f)(3)(E)(5) (**Recommendation 16c**).

Tractor Roads/Skid Trails in Flood Prone Areas

The THP proposes several tractor roads in flood-prone areas. Page 110.2 and 111 in Section III of the THP outlines the following proposed skid trail-use mitigations:

1. All skid trails will be flagged in the plan area, where heavy equipment will be restricted to the flagged areas;
2. In Flood Prone Areas, tractors may not drive with their blade lowered, except as needed to move debris;
3. In Flood Prone Areas, no excavation shall occur except at watercourse crossings described in Section II or as needed to improve drainage or resolve access problems resulting from previous logging operations; and
4. Under item 27(j) page 111, skid trails on flat ground are covered by thick leaf litter that is replenished annually by thick overstory canopy.

The THP discusses how mulching skid trails on flat ground would introduce non-native material into the area, and slash-packing skid trails would require more soil disturbance. The THP proposes to allow skid trails on flat ground to remain untreated and allow natural replenishment of the organic matter from tree canopy cover the skid trails.

Flagging skid trails—to guide equipment operators—is helpful to minimize excessive driving throughout the sensitive floodplain surface and keeping the tractor blade lifted in order to avoid unnecessary soil disturbance is a good disturbance minimization strategy. Yet, it is unclear how leaving skid trails untreated in Flood Prone Areas is an effective mitigation. Moore and Wondzell (2005) discuss how logging-related soil disturbance can influence subsurface stormflow by collapsing macropores that slows water infiltration into the soil to a soil depth of 30 cm or more. Tractor compacted soils can intercept and concentrate overland flows to rapidly deliver to watercourses, which is likely to lead to increased peak flows rather than slower infiltration from the hyporheic zone. The environmental impacts of skidding in a WLPZ on a flood prone area have not been fully addressed. Examples of potentially significant impacts to biological resources due to felling and skidding trees on skid trails on Flood Prone Areas include:

1. Soil compaction:

   a. Reducing water infiltration along skid trails that may alter drainage patterns on Flood Prone Areas (one example of this can be seen from impacts due to the previous railroad bed, which is still visible and directs flows down an unnatural pathway);
   b. Reducing water infiltration on the soil surface may increase peak flow events;
   c. Reducing the re-establishment of native vegetation and recovery of soil mycorrhiza;
   d. Impacting floodplain habitats that allow anadromous salmonids to feed during flood events;

2. Temporary or permanent alteration of seasonal wetlands on the Flood Prone Area;
3. Damage to the bed, bank or channel in overflow channels that provide winter refuge habitat for fish and other aquatic animals;
4. Potentially contributing to stranding fish in disconnected/isolated side channels;
5. Impacting wildlife that use the floodplain surfaces as year-round habitats (i.e., California red-legged frog).

CDFW recommends addressing potentially cumulative significant impacts of skid trail use in the THP, including soil compaction, temporary and permanent alteration of seasonal wetlands, alterations to overflow channels, and impacts to wildlife that utilize the flood prone area (**Recommendations 17a – 17d**).

Wetlands

The California Fish and Game commission adopted a Wetlands Resources Policy in 1987, which recognizes habitat values of wetlands and aims to minimize potentially significant impacts to these essential ecosystems. Pursuant to the Wetlands Resources Policy, the USFWS wetland definition is applied for purposes of wetland identification (Cowardin et al. 1979):

> *Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For the purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.*

A wetland includes, and is not limited to, portions of lakes, ponds, rivers and streams, and all areas that are periodically or permanently covered by shallow water or dominated

by hydrophytic vegetation, or in which soils are predominantly hydric in nature. Wetlands serve to trap sediment and nutrients, provide food sources and habitat for a multitude of aquatic and terrestrial species. According to the Wetlands Resources Policy, wetland indicators include hydrophytic vegetation, hydric soils, and/or wetland hydrology. Only one parameter need be present at any given time for an area to be considered a wetland.

Similarly, the State Water Resources Control Board developed the following definition for riparian areas:

> *Riparian Areas are areas through which surface and subsurface hydrology interconnect aquatic areas and connect them with their adjacent uplands… They are distinguished by gradients in biophysical conditions, ecological processes, and biota. They can include wetlands, aquatic support areas, and portions of uplands that significantly influence the conditions or processes of aquatic areas.*

CDFW observed both seasonal and perennial wetlands, which are widespread throughout the valley floor. A majority of the THP supports aquatic vegetation in the form of Obligate Wetland and Facultative Wetland species. The wetland features located throughout the THP provide key hydrologic, geomorphic, and biological functions and maintain numerous ecological benefits.

The California Fish and Game Commission considers wetlands crucial in providing significant and essential habitat for resident and migratory fish and wildlife species, and it is the policy of the Commission to protect, preserve, restore and enhance wetlands in California. CDFW considers the USFWS wetland definition and classification system to be the most biologically valid, which are defined as:

> "Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports hydrophytes, (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year" (Cowardin, 1979).

The California Department of Forestry and Fire Protection provide some protections for **Wet Meadows and Other Wet Areas**, which are defined by the Forest Practice Rules as:

> “…areas except cutover Timberland which are moist on the surface throughout most of the year and/or support aquatic vegetation, grasses and forbs as their principal vegetative cover.” (14 CCR 895.1).

The Forest Practice Rules “wet areas” definition may include seasonal wetlands, however the term “moist on the surface throughout most of the year” can be interpreted to include only perennial wetlands. Seasonal wetlands can undergo substantial changes in species composition and abundance throughout the year, and the U.S. Army Corps of Engineers (2008) wetland delineation manual states that seeps, springs and riparian habitats are examples of wetlands that are often exposed to seasonal variation and longer-term climatic fluctuation. Presence of seasonal wetlands may not be intuitive during the growing season and can appear dry on the surface for most of the year and support aquatic vegetation. The flood-prone nature of the Little North Fork indicates that the majority of the THP area undergoes frequent seasonal inundation, and during the growing season a shallow water table supports hydric vegetation year-round in several places throughout the THP area.

Wetland plants frequently observed in the proposed harvest units include *Carex obnupta* (slough sedge) and *Veratrum fimbriatum* (fringed corn lily), a California Rare Plant Rank (CRPR) 4.3 species, and are considered Obligate Wetland Plants (see the regional supplement guide *Western Mountains, Valleys and Coast 2016 Regional Wetland Plant List*). Wetland indicator status ratings are administered by the U.S. Army Corps of Engineers. Each plant species is assigned a rating that represents the estimated probability the plant will occur in wetlands across its range. Species identified as Obligate Wetland Plants (OBL) will almost always occur in wetlands. Species identified as Facultative Wetland Plants (FACW) will usually occur in wetlands and are often located in areas with saturated soils or the soil surface floods at least seasonally. Facultative Plants (FAC) occur in wetlands and non-wetlands, Facultative Upland Plants (FACU) usually occur in non-wetlands, and Upland Plants (UPL) rarely occur in wetlands. Additional wetland indicator species detected during the preliminary botanical inventory include: *Cyperus eragrostis* (tall flat sedge, FACW), *Equisetum hymenale* (tall scouring rush, FACW), *Equisetum telmateia* (giant horsetail, FACW), *Mentha pugellum* (pennyroyal, OBL), *Oenanthe sarmentosa* (water parsley, OBL), *Salix lucida* (shining willow, FACW), *Viola glabella* (stream violet, FACW) and *Woodwardia fimbriata* (giant chain fern, FACW).

Section II, page 34, the THP states all mapped and designated wet areas will be provided Class II-standard watercourse protections, except for the California red-legged frog habitat areas, which will receive greater protections as outlined on the frog habitat map, page 71. The Forest Practice Rules provide Core Zone and Inner Zone protections for standard Class II watercourses, where the Core Zone is 15 feet and the Inner Zone ranges from 35 feet (slopes less than 35%) to 85 feet, measured from the Watercourse Transition Line (WTL). No harvesting is permitted in the Class II Core Zone [14 CCR

916.9(g)(2)(A)]. Harvesting in the Inner Zone should include thinning from below and meet the goals outlined in 14 CCR 916.9(g)(2)(B).

The THP further addresses wet area protections by proposing a 25-foot Equipment Limitation Zone (ELZ) around all springs, wet areas, and wet meadows (Section II, page 35). ELZs limit operations for the protection of beneficial uses and water quality. Trees growing in “wet areas” are permitted to be felled and yarded through these features according to the FPRs. It is unclear which “wet areas” will receive full Class II standard protections, and which “wet areas” will receive 25-foot ELZs with 50% canopy retention.

During the PHI, CDFW staff observed what appeared to be trees marked for harvest in “wet area” Class II Core Zones. The THP specifies that all wet areas on maps will receive, at a minimum, Class II standard protections. Since the THP has undergone several revisions as a result of the OEI Reports (2019a) and agency review, CDFW recommends revisiting all Class II “wet area” polygons after updating the channel migration zone, and field-verifying flagging is consistent with Class II protections (**Recommendation 18**).

Several hydrologic features were observed during the PHI that were not delineated on the THP map or flagged in the field. For example, a linear 70-foot-long hydrologic feature that exhibited surface water, saturated soils, and aquatic vegetation was not mapped or protected (see Figure 18 and Figure 19 for approximate location). According to the OEI Report (2019), the side channel is inundated and hydrologically connected to the main channel during a frequent flood event. CDFW recommends mapping undisclosed perennial wetland features, and re-evaluating the feature described in Figures 18 and 19 to determine if it is part of the channel migration zone (**Recommendation 19**).

On January 3, 2019, the inspection team observed a low-gradient wet area associated with Map Point 8. The THP proposes a tractor crossing over a spring-fed Class II watercourse. The inspection team agreed the crossing can be avoided. CDFW recommends removing Map Point 8 from the THP (**Recommendation 20**). An extensive wet area or seasonal wetland was observed adjacent to Map Point 8, exhibiting saturated soils and *Carex obnupta* (slough sedge), a dominant Obligate Wetland Plant. The revised THP map updated the area from what was originally mapped as an Inner Zone B to a Class II wet area (see Figures 20 and 21).

Botanical Resources

The THP is located within range of several special-status botanical species. A botanical report has yet to be provided to the review team agencies and will likely be amended into the plan at a later date. Enforceable protection measures for botanical resources have not been provided in Section II of the THP by the time of this reporting.

The redwood forest region hosts sensitive[3] plants that are exposed to regular disturbances due to timber harvesting activities. Although sensitive species are persistent throughout managed forests, there is little information regarding the long-term cumulative impacts to sensitive forest plants. Forest management activities are more frequent and less variable in size and intensity than natural disturbance regimes, which may not provide the mosaic of undisturbed refugia for native plants (Scholars and Golec, 2007). Individual species respond differently to disturbances based upon the plant’s life history, habitat requirements, and the magnitude of the impact.

The most efficient and effective mitigation addressing sensitive plant species and botanical communities in Timber Harvesting Plans include the application of buffers around the footprint of sensitive botanical occurrences. The rationale is based on sound ecological principles. For one, individual occurrences are dependent upon the natural environment and can be significantly impacted or destroyed by the direct or indirect activities of timber operations (DFG, 2006). Examples of direct impacts to botanical resources include burying a seedbank under mounded soil or clearing a population for a landing site. Examples of foreseeable indirect impacts on a plant population include increased ultraviolet exposure due to the removal of tree canopy, alteration of hydrology, disruption of symbiotic, parasitic, or hemi-parasitic relationships with other plants and fungi, disturbance of root systems, and competition from invasive exotic species (DFG, 2006).

In addition to disclosing potentially significant effects, CEQA and the Forest Practice Rules require THPs include project alternatives and mitigation measures. As proposed, THP 1-18-095 MEN, “Little” does not all us to adequately assess the potentially significant impacts the THP may have on sensitive botanical resources. Section II, in the THP, does not provide enforceable protection measures for sensitive species. The botanical resource protections proposed on page 55 in the THP includes, “hanging special treatment flagging where rare plants are discovered.” The act of hanging flagging at an occurrence may not effectively avoid direct or indirect significant effects due to timber operations. The flagging must demarcate an establish a buffer that prevents timber operations from encroaching on a sensitive botanical occurrence or preventing unintended negative/consequential impacts from canopy openings’ edge effects. The purpose of providing buffers for botanical occurrences are for the THP to meet CEQA Section 15370 to achieve subsection (a): “Avoiding impact altogether by not taking a certain action or parts of an action,” and (b): “minimizing impacts by limiting the degree or magnitude of the action and its implementation.” The Department recommends that an interim 50-foot buffer for sensitive plant occurrences as a default protection measure until site-specific protection measures are developed, typically through consultation. The

[3] Sensitive plants include those plants listed as endangered, threatened or rare (Section 670.2, Title 14, California Code of Regulations; Section 1900, Fish and Game Code; ESA Section 17.11, Title 50, Code of Federal Regulations) or plant species that meet the definition of rare or endangered, provided in Section 15380 of the CEQA Guidelines.

50-foot buffer is a reasonable and feasible distance to maintain microclimatic conditions until further consultation with the Department (CDFG, 2006).

To avoid potentially significant impacts to special status botanical species due to timber operations, CDFW recommends revising the botanical resource protections in Section II to specify that a minimum 50-foot buffer shall be marked in the field around the each population core for all sensitive plant occurrences in the THP (**Recommendation 21a**). If alternative protections are proposed, CDFW recommends Section II specify that the RPF will consult with CDFW to address the botanical resource protection measures on a site-specific basis (**Recommendation 21b**).

During agency THP review, a botanist surveyed the THP area to protocol, though a complete botanical report was not available for review upon plan submittal. A preliminary botanical inventory list was requested and provided to CDFW by the RPF. It is the intent of CEQA, Public Resources Code 21003, to ensure relevant information such as occurrences of sensitive plant species are not only disclosed but also available for subsequent environmental reports, review, and impact determinations. The California Natural Diversity Database (CNDDB) is the State database established for this purpose. Additional information on the CNDDB program and database is available through https://www.wildlife.ca.gov/Data/CNDDB/About. CDFW recommends submitting special status botanical occurrences to the CNDDB (**Recommendation 21c**).

CDFW may not receive botanical documentation, surveys, etc. in amendments for review directly because such information is typically submitted after THP approval. Therefore, CDFW recommends sending botanical amendment reports directly to CDFW Fort Bragg staff a minimum of 10 business days prior to operations (**Recommendation 21d**).

Watercourse Classifications

The Little North Fork has several low-gradient tributaries located in the THP area. As discussed during the PHI, the tributaries lack total permanent natural barriers to anadromous fish. The first major tributary is approximately three-quarters of a mile upstream from the confluence with the North Fork and drains approximately 385 acres. The watercourse is mapped as a Class II-Large (see Figure 20). Due to the size, gradient, potential habitat features, and lack of apparent barriers to anadromy, CDFW recommends reclassifying the tributary as a Class I watercourse within at least the boundary of the THP (**Recommendation 22**).

On January 3, the inspection team visited an area exhibiting complex watercourse channels and observed several side channels containing red alder riparian habitat (Figure 21). CDFW observed several side channels without any permanent natural barriers to anadromous fish and considers these side channels Class I watercourses. The inspected area appears to be part of a potential Channel Migration Zone. In addition, the channels are inconsistent with the THP map. CDFW is recommending a re-

evaluation of the features described in Figures 20 and Figure 21. During the PHI, the RPF explained the area is not proposed for timber harvesting, and GRT’s revised map from 8/23/2019 labels areas as “non-timber – no cut.” Although harvest is not proposed in the non-timbered riparian zone, this designation would not prevent equipment entering the sensitive habitat area. To avoid confusion, CDFW recommends delineating all alder riparian dominated “non-timber” areas as no harvest Equipment Exclusion Zones, unless determined to be part of a CMZ (**Recommendation 23**).

Wildlife Tree Retention Mitigation

Wildlife trees provide invaluable structure and habitat features in the tree bole and canopy that develop with age and are used by common and special-status wildlife species alike. These trees are typically residual old growth and mature trees that exhibit broken tops, large branch reiterations, large-diameter limbs, thick bark with furrows and fissures, cavities and basal hollows, limbs that support a duff layer, soil deposits and/or bryophyte accumulations, and other unique features that require time to develop, and are generally scarce on the landscape as a result of historic harvesting practices. Wildlife trees provide habitat as living trees, snags and ultimately large woody debris where all stages serve ecological functions. The THP does not provide guidance or default protection measures for wildlife trees, and thus it is unclear how wildlife trees will be identified or retained in the THP. Consistent with 14CCR 916.4(b) and general wildlife protection practices (14 CCR 919), CDFW recommends including a definition of wildlife trees in Section II of the THP and referencing a wildlife tree retention scorecard such as in Appendix B (**Recommendation 24**).

RECOMMENDATIONS

As Trustee Agency for California’s fish, wildlife, and native plant resources (Public Resources Code 21000, et seq.), a Responsible Agency pursuant to California Environmental Quality Act §15381 and Trustee Agency pursuant to §15386, and a review team agency under 14 CCR 1037.5(a), CDFW provides the following feasible and project specific recommendations in order to avoid or reduce potentially significant direct, indirect, and cumulative impacts in accordance with the Forest Practice Rules, 14 CCR 1037.5(f).

Prior to the THP’s Final Review Team meeting, revise Section II and/or other appropriate sections in the THP by incorporating the following recommendations:

1. To address potentially significant impacts to Northern Spotted Owls, the THP shall be revised to:

    a. Provide minimum habitat protections for all Activity Centers, including 500 feet (18 acres) of no habitat alteration and 1,000 feet (72 acres) of habitat that will not be downgraded in quality;

b. Remove harvest areas located within 500 feet of all known nest sites;

c. Re-delineate the Core Area for MEN0212 such that it includes the best available contiguous habitat, consistent with Attachment A guidance (AFWO, 2011), including 1994, 1996, 1997, 2001, 2004, 2005, 2007 and 2008 Activity Centers.

2. Page 49 of the THP shall be revised to clarify that Northern Spotted Owl status determinations are made by the plan submitter.

3. To address potentially significant impacts to nesting Northern Spotted Owls, the THP shall be revised to include the road use restrictions outlined in the USFWS Attachment A, or alternative protection measures in consultation with CDFW.

4. On page 50, the THP statement, “no timber operations should proceed unless protocol surveys do not detect nesting NSOs”, shall be revised for clarification and state all Activity Centers shall receive 0.25 mile seasonal protections until July 31, unless a non-nesting or nesting failure status has been determined according to USFWS protocol. If a non-nesting or nesting failure status cannot be confirmed, the seasonal restrictions shall remain in effect until after July 31.

5. To reduce potentially significant impacts to Marbled Murrelet, the THP shall be revised to:

    a. Disclose the Green Bridge Marbled Murrelet Habitat Area on the THP Appurtenant Roads Map in Section II;

    b. Specify in Section II that the RPF will re-consult with CDFW prior to commencing operations, including timber hauling, should operations plan to proceed after the beginning of the 2024 Marbled Murrelet breeding season and if within 0.25 mile of the Green Bridge Marbled Murrelet Habitat Area.

6. To reduce potentially significant impacts to foothill yellow-legged frogs, the THP shall be revised to disclose previously known foothill yellow-legged frog occurrences in the THP area. The survey information shall, at a minimum, include the following:

    a. Map of the surveyed areas;
    b. Map of foothill yellow-legged observations and known breeding sites;
    c. Field survey forms; and
    d. A discussion of findings.

7. To avoid unauthorized incidental take and reduce potentially significant impacts to foothill yellow-legged frogs due to proposed Class I water drafting, the THP shall be revised to evaluate the following alternatives to Class I watercourse drafting sites:

    a. Alternative water sources;
    b. Indirect and gravity-fed Class II watercourse drafting into water storage tanks; or
    c. Existing drafting sites that avoid excavation, drafting, and driving on gravel bars.
    d. Applying for an Incidental Take Permit.

8. If alternative water drafting sites are infeasible, revise the THP to address how the THP will avoid potentially significant impacts to foothill yellow-legged frog at all life stages during gravel bar excavation, ingress/egressing on the gravel bars, and pumping water from excavated water holes.

9. To reduce potentially significant impacts to California red-legged frogs in wetland features on the North Fork Gualala River floodplain, revise the THP to include a discussion of how operations propose to reduce potentially significant impacts, including cumulative impacts, to California red-legged frogs dispersing from ponded habitats and wetland areas.

10. Prior to operations, revise the THP to include Technical Assistance from the USFWS that supports the proposed protections for California red-legged frogs.

11. To reduce potentially significant impacts to California red-legged frogs dispersing from the ponded water along the mainline road, revise the THP to specify the following:

    a. The exclusion fencing shall be secured so that it prevents frogs from slipping under the fence;
    b. Include a barrier at the top of the exclusion fencing (e.g. fold or ledge) to prevent frogs from climbing over;
    c. Exclusion fencing shall be checked and maintained whenever the road is in use; and
    d. All material shall be removed prior to the winter period and upon the completion of operations.

12. To evaluate potentially significant impacts to anadromous fish and other aquatic species in the Little North Fork Gualala River, the THP shall disclose the potential cumulative environmental impacts of timber harvesting in the channel migration zone and flood prone areas for each of the following:

a. water temperature control
b. streambed flow modification by large woody debris
c. filtration of organic and inorganic material
d. upslope stability
e. bank and channel stabilization
f. spawning and rearing habitat for salmonids
g. vegetation structure diversity for fish and wildlife habitat

13. The THP shall be revised to address 14 CCR 916.9 (f)(E)(6), regarding why the THP does not incorporate preferred management practices that avoid the use of water drafting sites in the Inner Zone A and Inner Zone B Flood Prone Areas.

14. Consistent with 14 CCR 919.9(f)(3), and in reference to our report in Attachment: 20191112_1-18-000095MEN_Revised the THP shall delineate the entire Little North Fork valley as the Flood Prone Area and apply appropriate (WLPZ) protection measures.

15. Consistent with 14 CCR 919.9(f)(3), and in reference to our Attachment: 20191112_1-18-000095MEN_Revised Flood Prone Area Assessment of the Little THP Mendocino Co. California-CDFW.pdf, the Channel Migration Zone presented in see Figures 7A and 7B shall be adopted as part of the THP, and appropriate protection measures shall be applied.

16. To ensure WLPZ protections in the Flood Prone Area are appropriately applied according to 14 CCR 916.9(f)(3), the THP shall be revised to:

    a. Apply the maximum Inner Zone A designation to the revised CMZ Core Zone (see recommendation 15);
    b. Apply the Inner Zone B WLPZ designation as appropriate from the outer edge of Inner Zone A to the toe of the slope;
    c. Delineate all revised WLPZs and CMZs on the Operator’s Map and flag in the field according to 916.9(f)(3)(E)(5).

17. To further evaluate potentially significant impacts to anadromous fish and other aquatic species in the Little North Fork Gualala River due to skid trail use on the Little North Fork floodplain, the THP shall address the potential cumulative environmental impacts from skid trails via:

    a. soil compaction;
    b. temporary and permanent alteration of seasonal wetlands;
    c. alterations to overflow, secondary and side channels; and
    d. impacts to wildlife that utilize the Flood Prone Area.

18. CDFW recommends revisiting all Class II “wet area” polygons, and field verifying flagging is consistent with Class II protections (applies to wet areas that are outside of revised channel migration zones).

19. Prior to second review, THP maps shall be re-evaluated and revised appropriately to include protections for all “wet area” features, including the side channel feature described in CDFW Figures 18 and 19. This linear side-channel feature, and all similar features, shall be re-evaluated for potential channel migration zones (see Recommendation 15).

20. Revise the THP to remove watercourse crossing Map Point 8.

21. To avoid potentially significant impacts to special status botanical species due to timber operations, and to remain consistent with current *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (March 2018), Section II of the THP shall be revised to include:

    a. A 50-foot buffer that shall be marked in the field from the outer edge all sensitive plant occurrences impacted by the THP;

    b. If alternative botanical protection measures are proposed, Section II of the THP shall specify that the RPF will consult with CDFW to address the botanical resource protection measures on a site-specific basis;

    c. CNDDB form(s) will be submitted upon discovery of all sensitive botanical species;

    d. Botanical reports shall be sent directly to CDFW Fort Bragg staff and CAL FIRE for review a minimum of 10 business days prior to operations.

22. Due to watercourse sizes, gradients, potential habitat features, and lack of apparent barriers to anadromy, the THP shall be revised to expand Class I watercourse WLPZ protection measures to the watercourses identified in CDFW Figures 18 and 19.

23. For clarification of operations, the THP shall treat all areas mapped as “non-timber” areas as no-harvest Equipment Exclusion Zones, unless revised to be a CMZ.

24. It is unclear how wildlife trees will be identified and retained in the THP. To better address 14 CCR 916.4(b) and improve wildlife protection practices (14 CCR 919), CDFW recommends Section II of the THP shall be revised to define how wildlife

trees will be identified and how they shall be retained, consistent with the Wildlife Tree Retention Scorecard provided in Appendix B.

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Appendix A: Figures

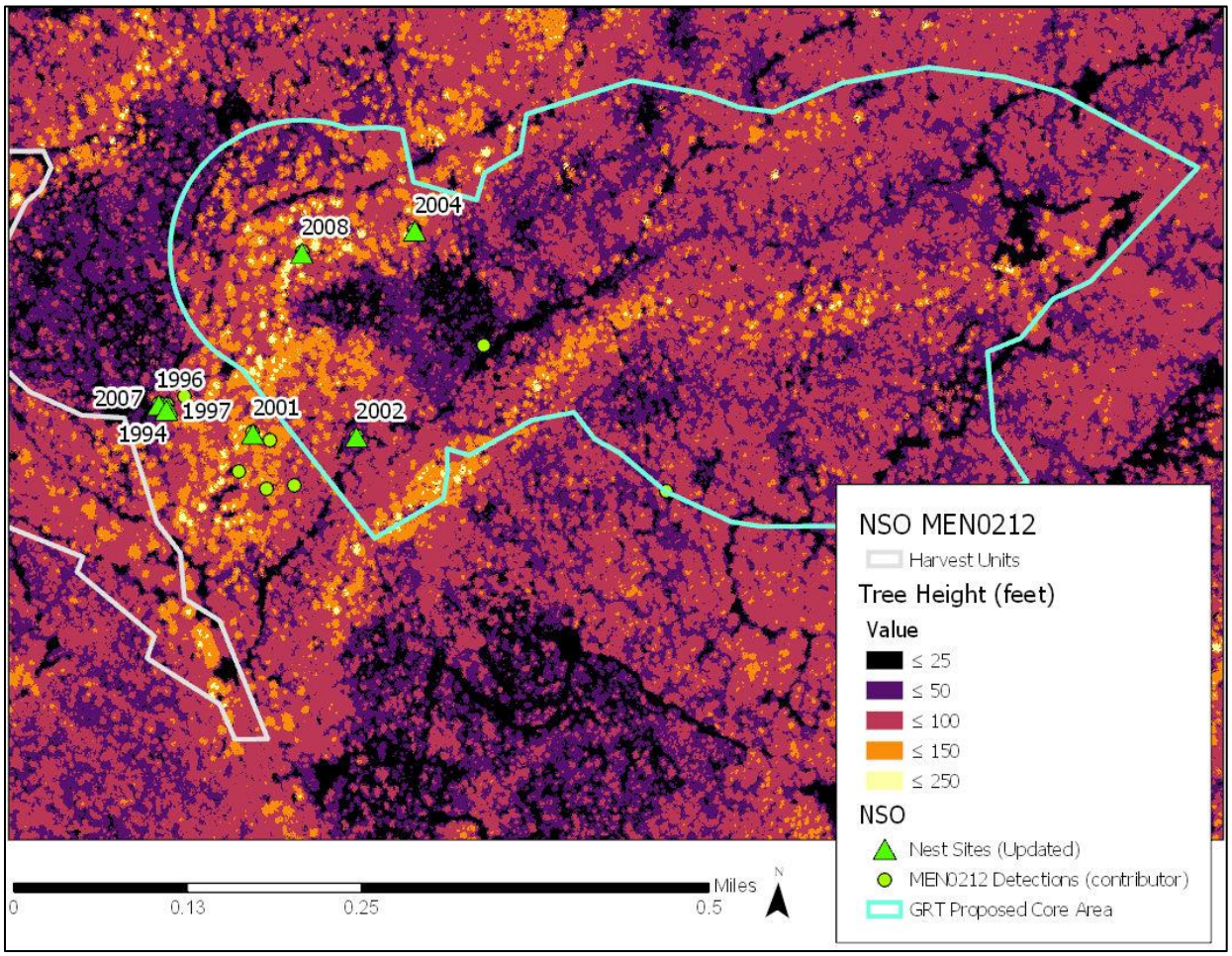

Figure 1. GRT proposed Core Area (polygon) with LiDAR-derived tree height imagery. Known nest trees are labeled by year. Note several clustered detections and nest trees in higher quality stand is not included in GRT’s proposed NSO Core Area.

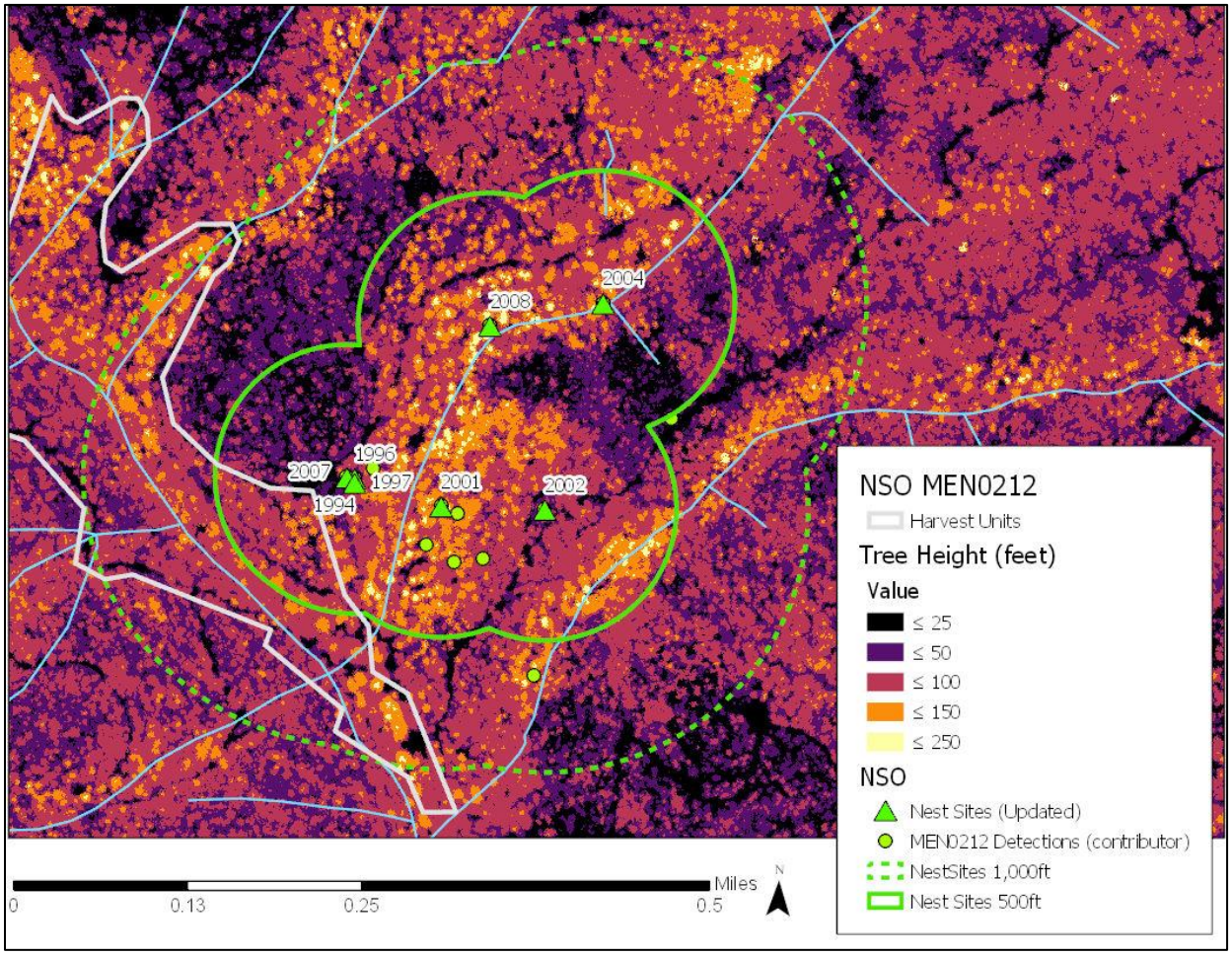

Figure 2. MEN0212 with 500-foot and 1,000-foot buffers based on nest site Activity Centers. Core Area should be delineated around best available habitat and focus on areas within 1,000 feet of the AC.

Mr. Ken McLean 13 January 17, 2007

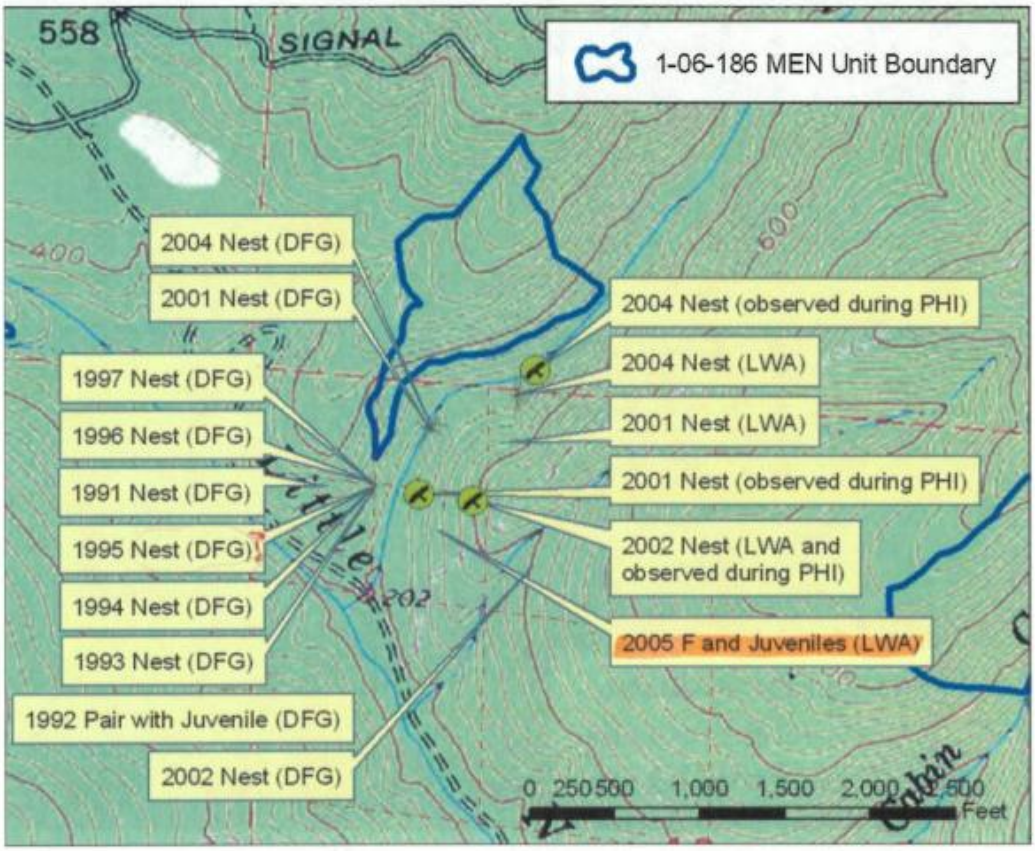

Figure 5. Recorded locations of nest sites for NSO activity center MEN0212. Field verified locations shown with bird icon.

Figure 3. Documentation of recorded nest sites from 1991, 1992, 1993, 1994, 1995, 1996, 1997, for MEN0212 in Doty Creek Planning Watershed, from CDFW PHI report for THP 1-06-186 MEN in Doty Creek.

Figure 4. The estimated 20-year floodplain in the southern unit of 1-18-095 MEN “Little” THP.

Figure 5. The estimated 20 to 100-year floodplain in the southern unit of 1-18-095 MEN “Little” THP.

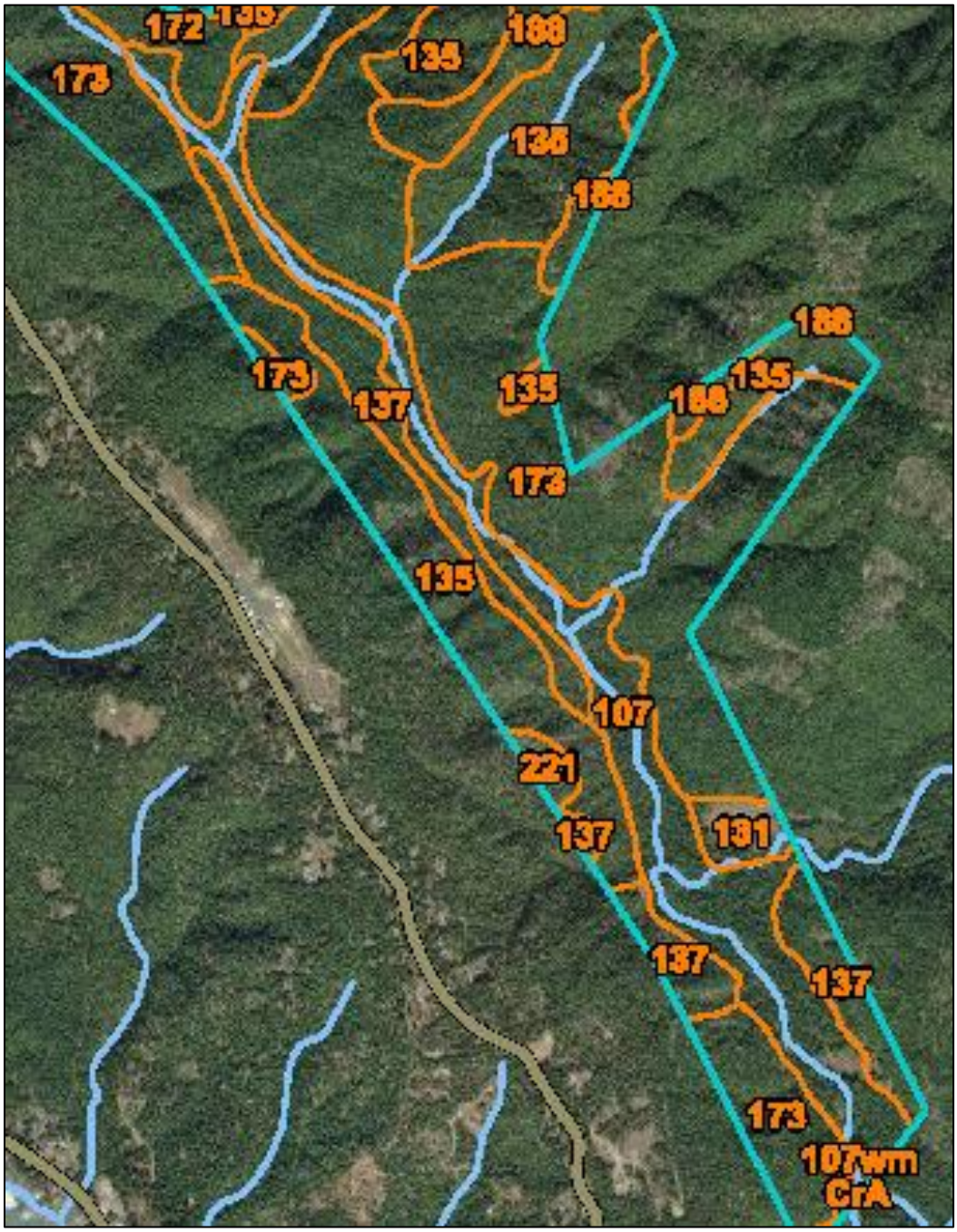

Figure 6. Bigriver Loamy Soils, defined as deep well-drained soils on lower alluvial flats and floodplains, represented by code **107** (NRCS, 2019). Consistent with Soils Map on page 70 of THP.

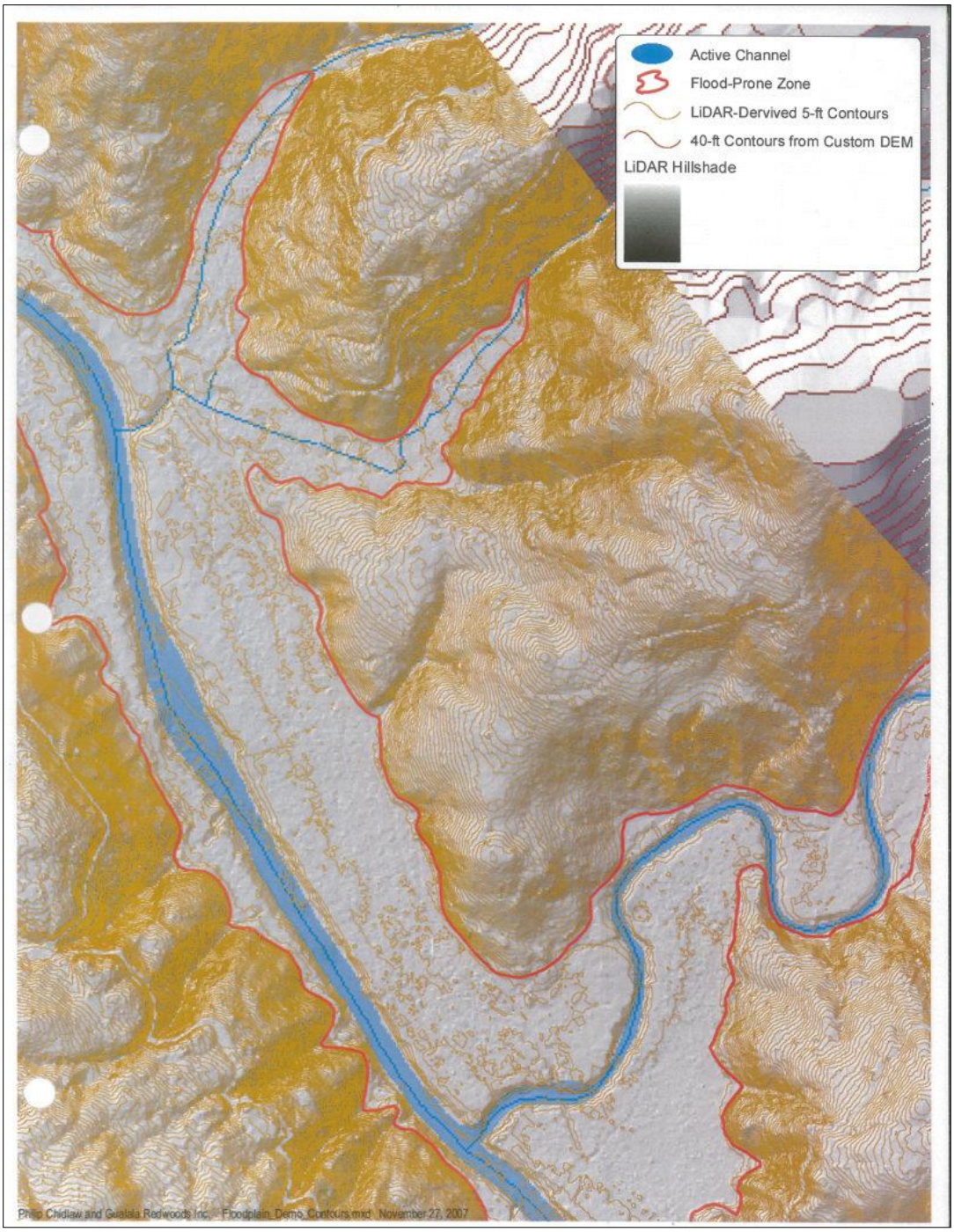

Figure 7. Example of GRI’s delineation of the estimated “Flood-Prone Zone” in 2007 (in red outlines) using LiDAR hillshade and 5-foot contour lines.

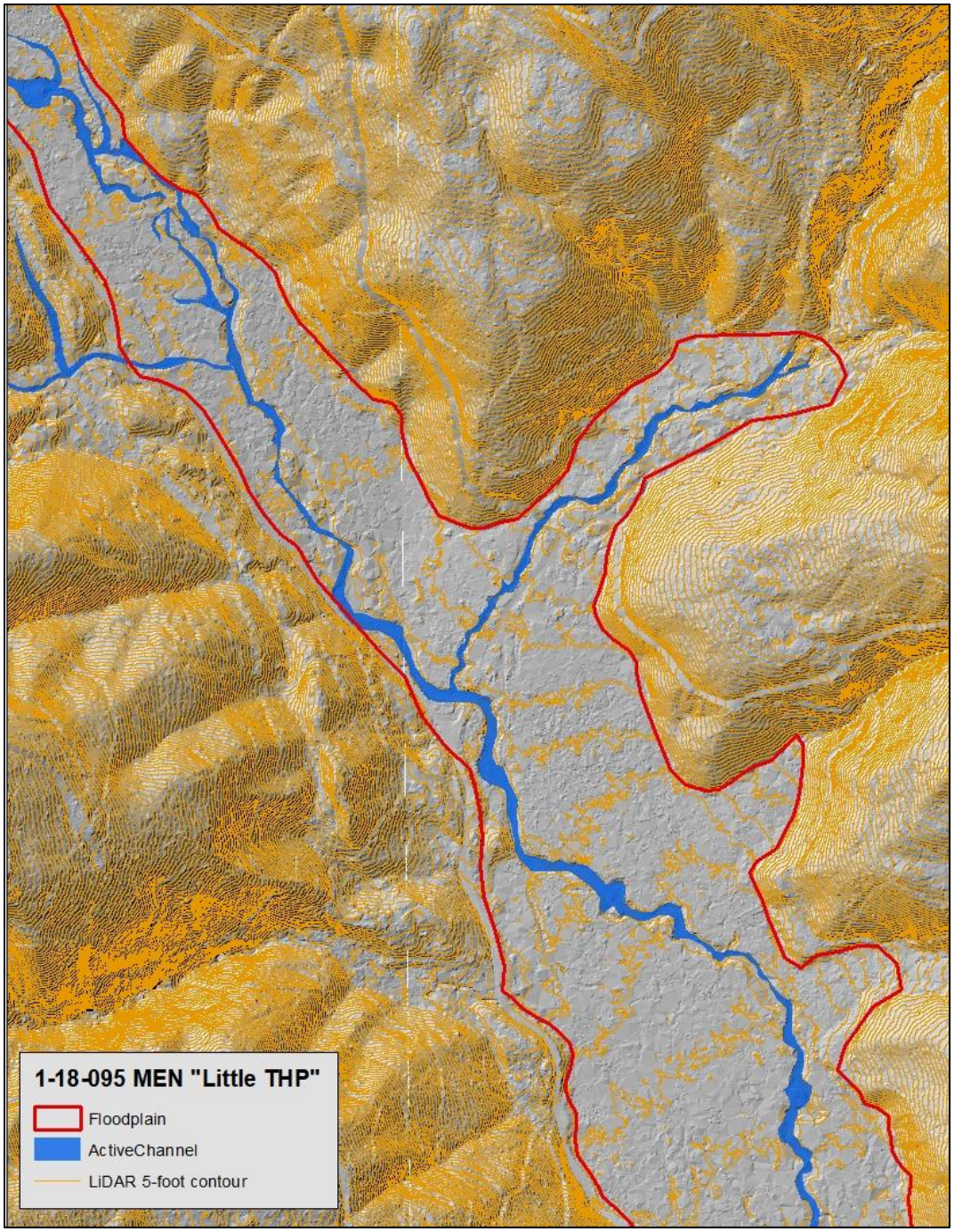

Figure 8. Example of CDFW delineation of the “Flood Prone Area” (in red outlines) for Little North Fork Gualala River using LiDAR hillshade and 5-foot contour lines.

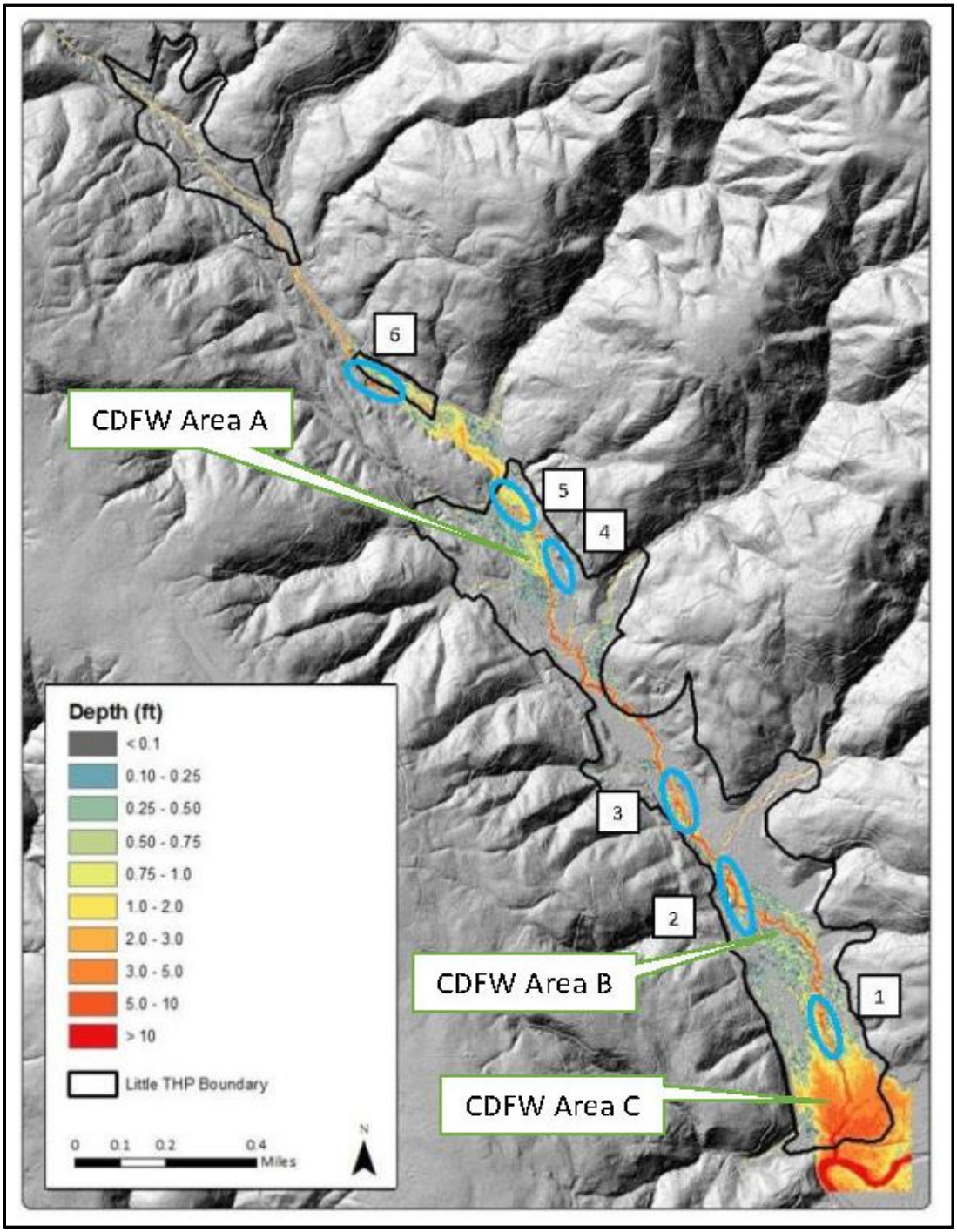

Figure 9. OEI Report (2019b) CMZ evaluation sites (Points 1 through 6) and CDFW evaluation Areas (A, B and C) in the southern portion of the 1-18-095 MEN “Little” THP downstream unit. The base map is from Figure 4 the OEI CMZ Report (2019b).

Figure 10. Floodplain area with evidence of secondary channel in floodplain. Photo taken from secondary channel facing upstream (CDFW Area A in Figure 9).

Figure 11. Floodplain area where secondary channel migration occurred. Photo taken from secondary channel facing upstream (CDFW Area B in Figure 9).

Figure 12. Approximately 100 feet downstream of secondary channel migration point. Note surface gravel in channel (CDFW Area B in Figure 9).

Figure 13. Approximately 50 feet downstream of the secondary channel migration point (CDFW Area C in Figure 9).

Figure 14. Approximately 500 feet downstream of the secondary channel migration point (CDFW Area C in Figure 9).

Figure 15. Approximately 600 feet downstream of the secondary channel migration point, and 50 feet from mainstem channel. Note deposition of silt indicating backflow from the larger downstream reach of the North Fork Gualala River (CDFW Area C in Figure 9).

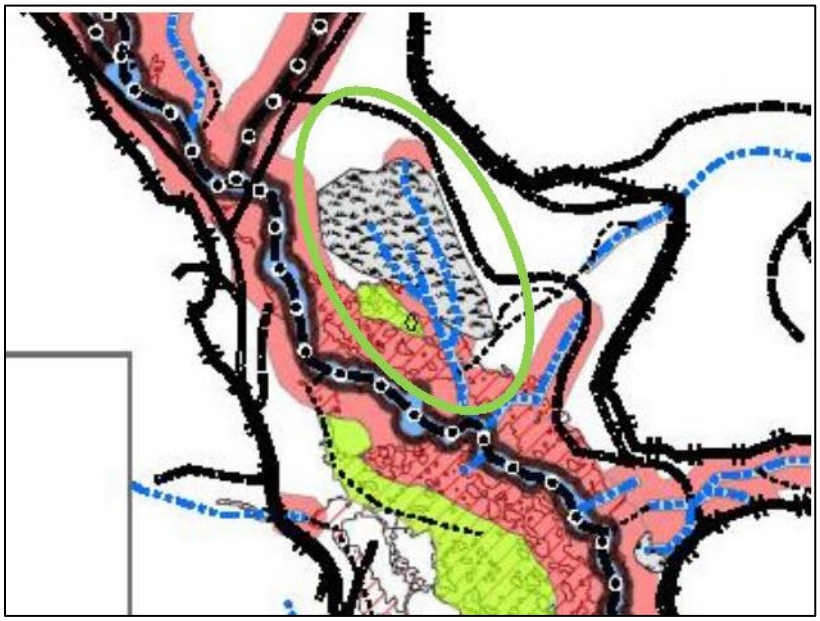

Figure 16. “Wet areas” that were updated in the revised THP map and provide minimum Class II wet area protections. This area will require updates to reflect the Core Zone tree retention in the field.

Figure 17. Low gradient seasonal wetland area dominated by slough sedge in recently revised wet area polygon circled in Figure 16 (photo taken January 3, 2019).

Figure 38. Ponded side channel observed on January 3, 2019 (prior to February storm events) that meanders for at least 70 feet on the floodplain. The unflagged wetland feature exhibits surface water, aquatic vegetation, and saturated soils that provides beneficial uses for several terrestrial and aquatic species.

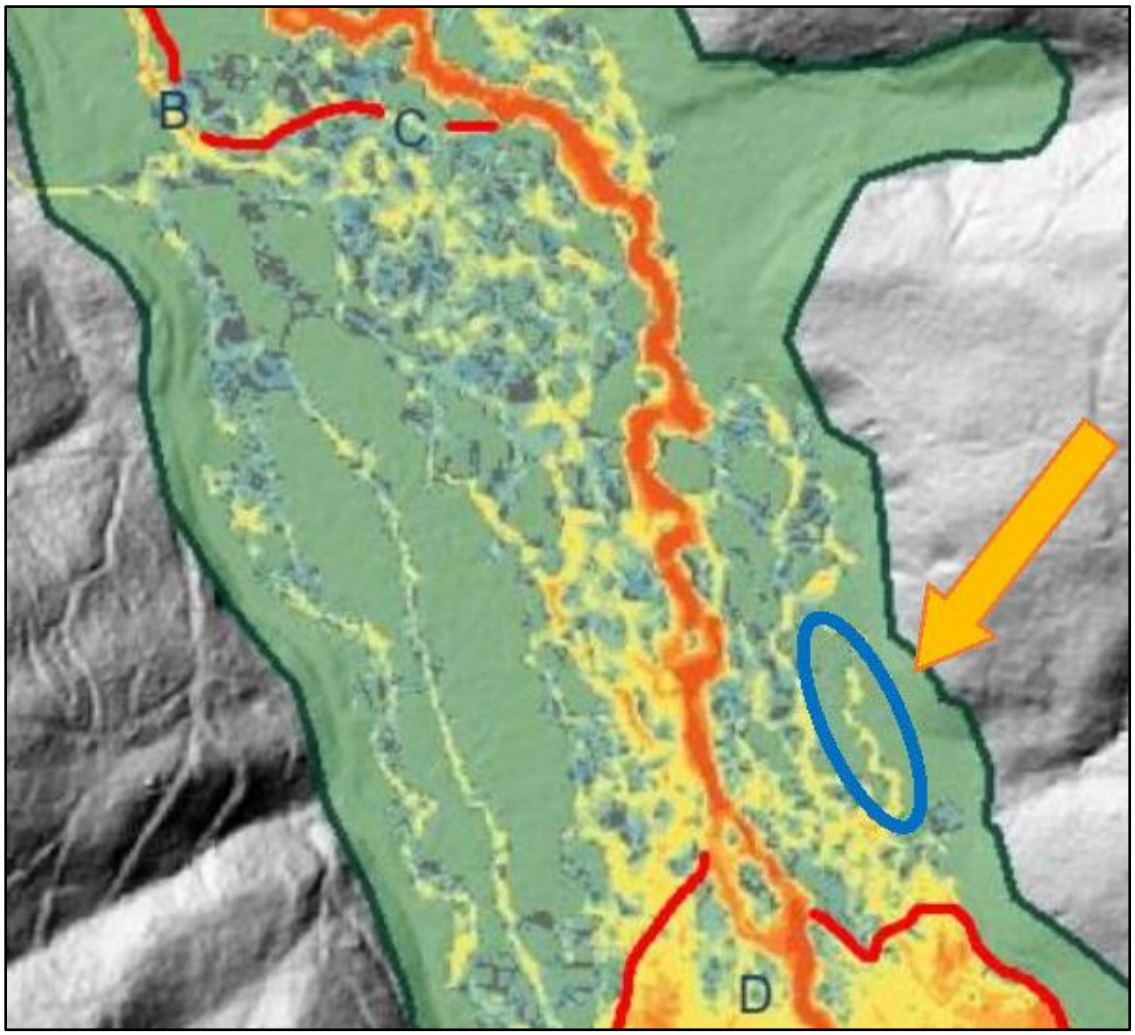

Figure 49. Approximate location of a side channel feature (see Figure 18) observed during the January 3, 2019 PHI that should be mapped and flagged in the field. Several side channels are located throughout the THP. All channels should be re-evaluated for potential Channel Migration Zones. Base map from the OEI Report (2019).

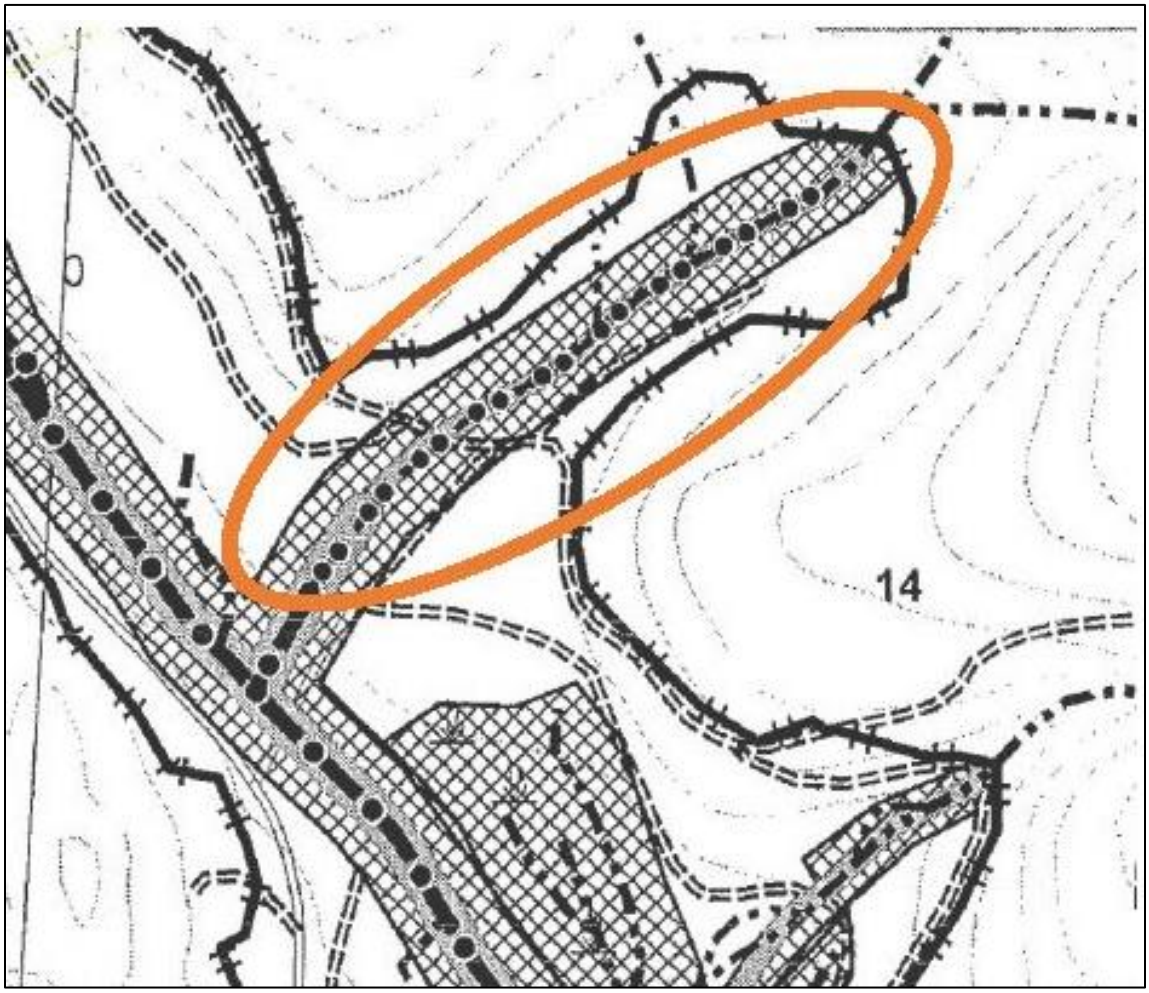

Figure 20. Tributary that drains approximately 385 acres without a natural barrier to anadromy. CDFW recommends upgrading the watercourse to a Class I watercourse within at least the plan boundary.

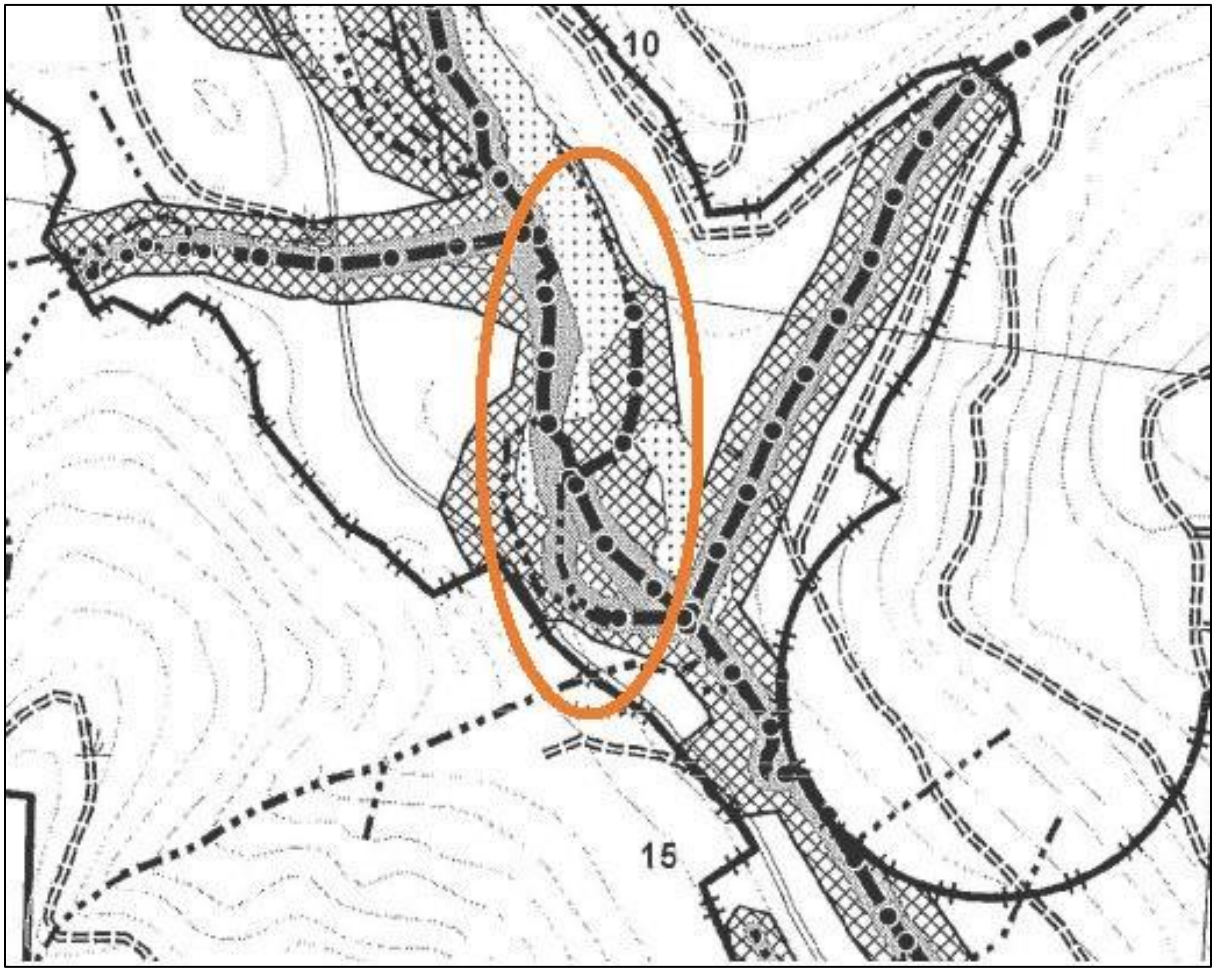

Figure 21. Sample area visited January 3, 2019 that exhibits multiple Class I watercourse channels (potentially CMZ) with red alder riparian features. CDFW recommends upgrading the channels to Class I watercourses where natural fish barriers are not present and delineate riparian alder stands (“non-timber”) as “Out Areas.” These areas should be re-evaluated for CMZ.

Appendix B: Wildlife Tree Retention Scorecard EXAMPLE

Key to Wildlife Tree Retention/Late Seral Element Scorecard

Trees and Snags with obvious wildlife value that may not need to be evaluated with the Scorecard

Residual tree (Legacy tree): A tree that existed in a stand prior to the most recent harvest entry. This is clearly most distinct and applicable if the stands were managed under even-aged silviculture methods – however, the concept still applies in selection systems.

Description: Structure and appearance varies substantially depending on residual tree age, species, and harvest history of the stand. For conifers, the residual tree will almost always exhibit a greater age and diameter (i.e. predominant tree) than the trees regenerated by the prior harvests. If the residual has a live top it will likely project well above the surrounding canopy.

Two types of residual trees may be recognized:

Old-growth residual (Legacy tree): A tree that was dominant or co-dominant at the time of the original harvest. Minimum age varies by species. For practical purposes, these trees are irreplaceable features in most forests under current management programs.

Description: Usually has a greater diameter than the second-growth trees in the stand and often relatively tall (at "true" site potential height for site class). In addition to large size, old-growth residual trees usually exhibit one to several readily observable features of "old-growth" including: broken top; large reiterations and large-diameter limbs; thick bark that may have deep furrows; fire scars; a basal cavity; other cavities; and possibly well-developed duff layers, moss, or lichen accumulations on horizontal limbs or platforms. Crown architecture visible from the air may include emergent crown (where the surrounding stand is relatively young), irregular or flat-topped shape (as opposed to conical top), obvious dead or spike top (note these may also occur in large second-growth trees), and/or multiple leaders due to large reiterations (which may give the crown the appearance of a cluster of tall young trees).

"Mature" residual ("Bastard-growth"; Legacy tree): A tree that was sub-canopy at the time of the initial harvest. These trees are variably replaceable under current management timber management programs.

Description: Usually at or above the maximum dbh of the second-growth trees in the stand. Other characteristics (height and defect) vary depending on age, age relative to other trees in the stand, fire history, and whether the tree was damaged to the residual during the initial entry. Typically, "mature" residuals show a much smaller dbh than an old-growth residual for the site class and exhibit fewer of the structural features listed above for old-growth residuals. From the air, the crown of a "mature" residual tree may emerge above the surrounding canopy (where the surrounding stand is relatively young) or may not be particularly evident if the surrounding stand is mature second-growth. A "mature" residual that grew for an extended period above a regenerating stand may exhibit a relatively broad crown and high degree of taper, but otherwise be relatively free of physically induced defect.

Snag: A standing dead tree.

Description: Snags vary tremendously in appearance and function for wildlife depending on species, size, and decay class.

Wildlife Tree Scorecard Definitions and Values

For all trees larger than 36 inches in diameter at breast height, assess the base, bole and canopy for the elements, features, and structures described below. Calculate a wildlife tree score by entering the associated value for each applicable feature; then add all the associated tree values to determine a score for the assessed tree. A structural element may score under several categories, include all applicable values for the feature (i.e. a reiterative limb may have epiphytic growth and epicormic branching, or a tree with minor conk may have a cavity and sloughing bark).

BOLE FEATURES

Cavities and Hollows

Cavity: Cavity (or void within a tree bole or large limb) with a relatively small entrance suitable for use by a variety of wildlife species, such as small to large woodpeckers, secondary cavity-nesting birds, wood ducks, Vaux's swift, Purple Martin, bats, Douglas squirrel, owls, wood rats, Pacific fisher, or American marten. The small entrance precludes the entry of larger predators into the cavity. Cavities with larger entrances may also be used by these species. A cavity may be as large as several feet deep with an entrance size ranging from about 1.5 to 6 inches diameter. Entrance height is often at least 10 feet above the ground, but lower entrances may also be used. In practice, interior dimensions will usually just be a guess based on entrance size and appearance, as well as the characteristics of the tree, plus any observations of wildlife use of the cavity. More than a single entrance hole suggests more extensive internal cavity development.

- CAVITY SMALL (**1** per opening) Opening 1.5 inches to 3 inches in diameter
- CAVITY LARGE (**3** per opening) Opening >3 inches in diameter

Hollow: A large cavity with an entrance or opening greater than 6 inches diameter.
Description: Hollows have similar interior dimensions as large cavities and may be used by the same suite of species for cover; however, the larger entrance size of a hollow may not prevent larger predators from entering the hollow.

- HOLLOW MINOR (**3**) – A bole hollow with an opening > than 6 inches diameter and less than 2 feet[2]
- HOLLOW MAJOR (**5**) – A bole hollow with an opening > than 2 feet[2]

Basal hollow (Goose pen/cat faces): A hollow at or near ground level typically created by fire that destroys the cambium on a portion of the bole's circumference. Repeated fires play an important role in maintaining and enlarging basal hollows[1].

Description: A basal hollow is a hollow that extends into the bole near the buttress. A cavity may have formed above the opening. Basal hollows are used by a large assortment of wildlife.

- BASAL HOLLOW MINOR (**1**)– cat face or basal burn scar , 2 feet[2] with no opening or cavity (RCI 1 or potentially 2)

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[1] Fire Cavities: Indicators of Past Fire Regimes in Coast Redwood provides a discussion of the role of fire and basal hollow formation, as well as a Redwood Cavity Index (RCI) classification system..

- BASAL HOLLOW MEDIUM (**3**)– basal hollow with an opening > 2 feet^2 and/or with a cavity extending > 6 inches above the top of the hollow opening (RCI 2 and potentially 3)

- BASAL HOLLOW MAJOR (**5**)– basal hollow with an opening >**4** feet^2 and/or with a cavity extending >2 feet above the top of the basal hollow opening (RCI 3, **4**, and 5)

Crack (Fissure): A longitudinal gap in the bole of a tree caused either by physical damage (including wind, lighting, or fire) or by growth of two trees or leaders into each other where the gap provides cover for wildlife.
Description: Cracks must be sufficiently deep relative to their width to provide partial cover for foraging birds or complete cover for nesting birds, roosting bats, or small- to medium sized mammals. Longitudinal indentations in which the deepest portions are visible from outside the tree are not considered cracks unless they are capable of providing cover for foraging or roosting small vertebrates.

- CRACK SMALL (**0.5** per crack) Crack >2 feet in length, >1 inch deep and >0.5 inch wide

- CRACK MEDIUM (**1** per crack) Crack >5 feet in length, >1 inch deep and >0.5 inch wide

- CRACK LARGE (**2** per crack) Crack >10 feet in length, >1 inch deep and >0.5 inch wide

- CRACK EXTRA-LARGE (**3**) Crack >20 feet in length, >**4** inch deep and >0.5 inch wide

Internal decay (Heart rot): Widespread or localized heart rot fungus infection within the bole of a tree. Decayed, softened wood encompasses at least enough volume to allow excavation of a small cavity.
Description: Decayed wood in old scars may be visible at ground level or with binoculars well above the ground. Good indicators of internal decay include fungal fruiting bodies, such as conk, cavity entrances, and sloughing wood and bark. In practice, it may be difficult to discern the extent of internal decay in some cases.

- DECAY MINOR (**1**) Trees with obvious decay over less than 25% of the bole. May show minimal conk in only a small portion of the bole.

- DECAY MEDIUM (**3**) Trees with 25% to 75% effected boles. They may show evidence of conk over a portion of the boles length. Increased likelihood to be a cull tree.

- DECAY MAJOR (**5**) Trees with more than 75% effected boles. They may show evidence of extensive conk and have sloughing bark or wood. Most likely to be a cull tree.

Epicormic branching and structures: Re-sprouting limbs from dormant, damaged or scarred branch nodes. Often associated with decadent tree
Description: Epicormic branching may be develop ledges and/or platforms at the branching node/s. These structures may support epiphytic growth and/or provide resting and nesting habitat for various wildlife species.

- EPICORMIC BRANCH – MINOR (**1**) Early epicormic branching – 3 branches (or more) < 1 inch in diameter at a single node.

- EPICORMIC BRANCH – MEDIUM (2) Developing epicormic branching – 3 branches (or more) >1 inch and < 3 inches in diameter at a single node.

- EPICORMIC BRANCH – MAJOR (4) Developed epicormic branching with a high potential for ledges and/or platforms – 3 branches (or more) >3 inches in diameter at a single node.

Furrowed bark: A relatively deep linear indentation in the bark of a tree capable of providing cover for roosting bats or foraging bole-gleaners.
Description: Furrowed bark occurs where an underlying defect (crack, old lightning or fire scar, narrow strip of removed cambium) or the line of contact between two trees growing into each other has been covered by bark. The furrow is sufficiently deep and narrow to be capable of providing cover for small vertebrates or colonies of invertebrates.

- FURROWED BARK (3)

Loose bark: A discrete, large piece of bark that has separated from the underlying tree bole but remains attached to the tree.
Description: "Loose bark" refers to a portion of a tree's bark that provides cover for roosting bats, nesting birds, or possibly foraging bole gleaners. Typically, such bark pieces provide relatively tight, stable cover for small animals. The distance of separation from the underlying tree should be 2 inches or less and should not be so loose that the bark piece flaps in the wind. As a general rule, loose bark is attached along at least one edge at least 1 foot long. Although some bear-stripped trees may meet the definition of "loose bark", most recently bear-stripped trees have bark that has been pulled away from the bole along most of the strip's edges, flaps against the underlying wood in the wind, and only provides a small amount of cover at one end of the strip. Such recent bear-stripped bark should not be scored as "loose bark".

- LOOSE BARK – MINOR (1) Bark segment <3 feet in length

- LOOSE BARK – MAJOR (3) Bark segment >3 feet in length

Deformities/Scarring: Basal fire scars and burls resulting from damage to the bole. These deformities may provide ledges, cracks/crevices or cavities.

- SCAR – SMALL (1 each) Scarring or burls up to 2 feet^2 extending out from the >4 inches

- SCAR – MEDIUM (2 each) Scarring or burl up to 4 feet^2 extending out from the bole >6 inches

- SCAR – LARGE (4 each) Scarring or burl > 4 feet^2 extending out of the bole > 6 inches

CROWN FEATURES

Epiphytic growth: Fern, Mistletoe (Witch's broom), moss, lichen, other growth supported within on limbs, forks and nodes within the canopy. A compact spray of branches infected with mistletoe.
Description: A tree should be scored for mistletoe broom if the structure is large and solid enough to provide an opportunity for resting or nesting of vertebrate wildlife, or if smaller brooms occur in multiple locations within the tree.

- EPIPHYTE MINOR (**0.5** each patch) Epiphytes/Ferns/Mistletoe present in lesser amounts (patch size is < 16 inches^2 (**4** inch by **4** inch area) on larger limbs, deformities, broken top/s, branch nodes or within the canopy structure.

- EPIPHYTE MAJOR (**2** each patch) Epiphytes/Ferns/Mistletoe or other growth present in patch size of > 16 inches^2 (**4** inch by **4** inch area) on larger limbs, deformities, broken top/s, branch nodes or within the canopy structure.

Complex Crown

Dead top (Spike): A dead tree leader.
Description: "Dead top" refers to dead leaders that are evidenced by leaf die-back along at least the top one-fifth of the tree height or with a **minimum** diameter at the lowest extent of leaf die-back of about 12 inches.

- DEADTOP (**5**)

Broken top: A tree with the original leader broken off.
Description: "Broken top" refers to broken-topped trees with a **minimum** diameter at the original break of about 12 inches.

- BROKEN TOP (**5**)

Reiteration (Reiterated top, Bayonet, "Schoolmarm", Candelabra): A sprouted leader or limb that exhibits apical dominance.
Description: Reiterations vary greatly depending on relative age and position on tree. All reiterations include some vertical growth that gives them the appearance of a "tree-on-a-tree". Reiteration can provide opportunities for resting, denning, or nesting, and **may** support epiphytes.

- REITERATION SMALL (**2** each) Reiterative limbs < 6 inches in diameter

- REITERATION MEDIUM (**3** each) Reiterative limbs >6 inches and <12 inches in diameter

- REITERATION LARGE (**5** each) Reiterative limbs > 12 inches in diameter

Forked top: A split in a tree's leader.
Description: A tree should be scored for a forked top if the structure provides an opportunity for resting or nesting for vertebrate wildlife, or if defect associated with the fork suggests that other structures **may** be present (such as internal rot or cavity).

- FORKED TOP (**3**)

Large limb (Platform limb): A relatively horizontal limb of sufficient girth for vertebrate wildlife to use the structure for resting or nesting (but not including bird perches).

- LARGE LIMB – MINOR (**0.5** each) Limb/s with a diameter >6 inches

- LARGE LIMB – MEDIUM (**2** each) Limbs with a diameter >8 inches

- LARGE LIMB – MAJOR (**5** each) Limbs with a diameter >12 inches

Intermingled limbs with HIGH VALUE WILDLIFE TREE: Trees with limbs intermingles with HIGH VALUE WILDLIFE trees and/or residuals provide cover (screening) and can maintain microclimates favorable to wildlife such as daytime shading and/or wind shielding or cover from precipitation.

- INTERMINGLED LIMBS – MINOR (**1**) Tree that intermingles less than 1/3 of the HIGH WILDLIFE TREE canopy radius.
- INTERMINGLED LIMBS – MAJOR (**5**) Tree that intermingles greater than 1/3 of the HIGH WILDLIFE TREE canopy radius.

ACTIVELY USED WILDLIFE TREES

Trees associated to raptor nesting and/or Sonoma red tree vole: A tree used by nesting raptors or that has Sonoma red tree vole, including perch and/or screen trees.

- NEST TREE (**5**) Tree containing the nest of raptor or Sonoma red tree vole, or tree providing screening or associated raptor perch tree.

Granaries

- GRANARY SMALL (**3**) Tree with less than 100 holes that are either filled with acorns or capable of containing acorns.
- GRANARY LARGE (**5**) Tree with 100 or more holes that are either filled with acorns or capable of containing acorns.

Feature/ Structure		Category	Score/Value						Tree Tally						
			0.5	1	2	3	4	5	Tree 1	Tree 2	Tree 3	Tree 4	Tree 5	Tree 6	Tree 7
Bole opening	Cavity	Small		1											
		Large				3									
	Hollow	Minor				3									
		Major						5							
	Basal Hollow	Minor		1											
		Medium				3									
		Major						5							
	Crack	Small	0.5												
		Medium		1											
		Large			2										
		Extra-large				3									
Evidence of Decay		Minor		1											
		Medium				3									
		Major						5							
Epicormic Branching		Minor		1											
		Medium			2										
		Major					4								
Deep furrowed bark						3									
Loose Bark		Minor		1											
		Major				3									
Scarring/deformities		Minor		1											
		Medium			2										
		Major					4								
Epiphytic Growth		Minor	0.5												
		Major			2										
Dead Top								5							
Broken Top								5							
Side A (bole feature) total[A]															

[A] To be added to Side B for total wildlife tree score.

Feature/ Structure	Category	Score/Value						Tree Talley						
		0.5	1	2	3	4	5							
Limb Reiteration	Small			2										
	Medium				3									
	Major						5							
Split bole/forked top					3									
Large Limb	Minor	0.5												
	Medium			2										
	Major						5							
Intermingling limbs with HIGH VALUE WILDLIFE TREE	< 1/3 canopy radius		1											
	>1/3 canopy radius						5							
Raptor/tree vole nest trees							5							
Granary	small				3									
	large						5							
Side B (Canopy feature) total														
TOTAL WILDLIFE TREE SCORE/S (Side A + Side B)														

Trees with a score equal to 5 (= HIGH VALUE WILDLIFE TREE) or greater shall be retained

If less than 6 trees per acre score as a 5 or greater in the area under the planned NTO, retain the 6 highest scoring trees per acre.

Note: Trees not meeting the minimum retention score but exhibiting high potential defect (standing slash) or high harvesting costs so as to negate their value should also be considered as prime candidates for meeting green tree retention guidelines if high-scoring trees are not available