

1 **Board of Forestry and Fire Protection**

2  
3 **“Cumulative Impacts Assessment Checklist, Technical Rule Addendum No. 2**  
4 **and Appendix Amendments, 2017”**

5  
6 **Title 14 of the California Code of Regulations (14 CCR),**

7  
8 **Division 1.5, Chapter 4,**

9  
10 **Subchapter 4, 5, & 6, Article 2;**

11 **Amend:**

12  
13 **§ 912.9, 932.9, 952.9 Cumulative Impacts Assessment Checklist [All Districts]**

14  
15 **STATE OF CALIFORNIA BOARD OF FORESTRY AND FIRE PROTECTION**

16 **CUMULATIVE IMPACTS ASSESSMENT**

17 (4a) Do the assessment area(s) of resources that may be affected by the  
18 proposed project contain any Past Projects or Reasonably Foreseeable Probable  
19 Future Projects ~~past, present, or reasonably foreseeable probable future projects~~? Yes  
20 \_\_\_ No \_\_\_

21 If the answer is yes, identify the project(s) and affected resource subject(s).

22 (2b) Are there any continuing, significant adverse impacts from past land use  
23 activities that may add to the impacts of the proposed project? Yes \_\_\_ No \_\_\_

24 If the answer is yes, identify the activities, describing their location, impacts and  
25 affected resource subject(s).

(3c) Will the proposed project, as presented, in combination with ~~past~~ Past or Reasonably Foreseeable Probable Future Projects, ~~present, and reasonably foreseeable probable future projects~~ identified in items (1a) and (2b) above, have a reasonable potential to cause or add to significant cumulative impacts in any of the following resource subjects?

<u>Resource Subjects</u>	Yes after mitigation (a1)	No after mitigation (b2)	No reasonably potential significant effects impacts (c3)
<u>(A)1.</u> Watershed			
<u>(B)2.</u> Soil Productivity			
<u>(C)3.</u> Biological			
<u>(D)4.</u> Recreation			
<u>(E)5.</u> Visual			
<u>(F)6.</u> Traffic			
<u>(G)7.</u> Greenhouse Gases (GHG)			
<u>(H)</u> Wildfire Risk and Hazard			
<u>(I)</u> Other			

<u>Resource</u>  <u>Subjects</u>	Yes  after mitigation  (a1)	No  after mitigation  (b2)	No reasonably  potential  significant <del>effects</del>  <u>impacts</u> (e3)
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a) (1) “Yes after mitigation”; means that potential significant adverse cumulative impacts are left after application of the ~~forest practice rules~~ Board rules and mitigations or alternatives proposed by the plan submitter.

b) (2) “No after mitigation” means that any potential for the proposed timber operation to cause or add to significant adverse cumulative impacts by itself or in combination with other projects has been reduced to insignificance or avoided by mitigation measures or alternatives proposed in the ~~THP Plan~~ Plan and application of the ~~forest practice rules~~ Board rules.

e) (3) “No reasonably potential significant cumulative ~~effects~~ impacts” means that the operations proposed under the ~~THP Plan~~ Plan do not have a reasonable potential to join with the impacts of any other project to cause, add to, or constitute significant adverse cumulative impacts.

Note: Guidance on methods for evaluating impacts to resource subjects identified within this rule section is in the Appendix.

(4d) If column (a1) is checked in (3c) above, describe why the expected impacts cannot be feasibly mitigated or avoided and what mitigation measures or alternatives were considered to reach this determination. If column (b2) is checked in (3c) above, describe what mitigation measures have been selected which will substantially reduce or avoid reasonably potential significant cumulative impacts except for ~~these mitigation~~

1 ~~measures or alternatives developed pursuant to Board rules, mandated by application~~  
2 ~~of the rules of the Board of Forestry.~~

3 (5e) Provide a brief description of the assessment area used for each resource  
4 subject.

5 (6f) List and briefly describe the individuals, organizations, and records consulted  
6 in the assessment of cumulative impacts for each resource subject. Records of the  
7 information used in the assessment shall be provided to the Director upon request.

8  
9 **BOARD OF FORESTRY AND FIRE PROTECTION**

10 **TECHNICAL RULE ADDENDUM NO. 2**

11 **CUMULATIVE IMPACTS ASSESSMENT**

12  
13 **Introduction**

14 The purpose of this addendum is to ~~guide~~ provide a framework for the  
15 assessment of cumulative impacts as required in 14 CCR §§ 898 and 1034 that may  
16 occur as a result of proposed timber operations. This assessment shall include  
17 evaluation of both on-site and off-site interactions of proposed project activities with the  
18 impacts of Past Projects and Reasonably Foreseeable Probable Future Projects ~~past~~  
19 and reasonably foreseeable future projects.

20 In conducting an assessment of cumulative impacts, the RPF ~~must~~ shall  
21 distinguish between the potential on-site impacts of the Plan's proposed activities that  
22 are mitigated by application of the Forest Practice Rules and the interactions of  
23 proposed activities (which may not be significant when considered alone) with  
24 impacts of Past Projects and Reasonably Foreseeable Probable Future Projects ~~past~~  
25 and reasonably foreseeable future projects pursuant to 14 CCR § 15130(b)(1)(A).

1 Resource subjects to be considered in the assessment of cumulative impacts are  
2 ~~described~~ listed in the 14 CCR § 912.9 [932.9, 952.9](c)–Appendix.

3 The RPF preparing a ~~THP~~ Plan shall conduct an assessment based on  
4 information that is reasonably available ~~before~~ prior to submission of the ~~THP~~ Plan.  
5 RPFs ~~are expected to~~ shall submit sufficient information to support their findings if  
6 significant issues are raised during the Department's review of the ~~THP~~ Plan.

7 Information used in the assessment of cumulative impacts may be supplemented  
8 during the ~~THP~~ Plan review period. Agencies participating in ~~plan~~ Plan review may  
9 provide input into the cumulative impacts assessment based upon their area of  
10 expertise. Agencies ~~should~~ shall justify and support their recommendations with  
11 documentation.

12 The Department, as lead agency, shall make the final determination regarding  
13 assessment sufficiency and the presence or absence of significant cumulative  
14 impacts. This determination shall be based on a review of all sources of information  
15 provided and developed during review of the ~~Timber Harvesting~~ Plan.  
16

### 17 **Identification of Resource Areas**

18 The RPF shall establish and briefly describe the geographic assessment area within  
19 or surrounding the ~~plan~~ Plan for each resource subject to be assessed and shall briefly  
20 explain the rationale for establishing the resource area. This shall be a narrative  
21 description and shall be shown on a map when a map adds clarity to the assessment.  
22

### 23 **Identification of Information Sources**

24 The RPF shall list and briefly describe the individuals, organizations, and records  
25 ~~used~~ relied upon as sources of information in the assessment of cumulative impacts,

1 including references for listed records and the names, affiliations, addresses, and  
2 phone numbers of specific individuals contacted. Records of information used in the  
3 assessment shall be provided to the Director upon request.

4 Common sources of information for cumulative effects impacts assessment are  
5 identified below. Sources to be used will depend upon the complexity of individual  
6 situations and the amount of information available from other pPlans. Sources not  
7 listed below may have to be consulted based on individual circumstances. Not all  
8 sources of information need to be consulted for every THP Plan.

9 **1. Consultation with Experts and Organizations:**

- 10 (a) County Planning Department; (b) Biologists;  
11 (c) Geologists; (d) Soil Scientists;  
12 (e) Hydrologists; (f) Federal Agencies;  
13 (g) State Agencies; (h) Public and private utilities.

14 **2. Records Examined:**

- 15 (a) Soil Maps; (b) Geology Maps;  
16 (c) Aerial Photographs; (d) Natural Diversity Data Base;  
17 (e) THP Plan Records; (f) Special Environmental  
18 Reports;  
19 (g) Topographic Maps; Basin Plans; (h) Basin Plans; Fire History  
20 Maps;  
21 (i) Fire History Maps; Relevant Federal Agency Documents or Plans;  
22 (j) Relevant Federal Agency Documents or Plans;  
23 (k) Relevant Watershed or Wildlife Studies (published or unpublished);  
24 (l) Available Modeling Approaches  
25

1 —As provided in Section 898 of the rules, the RPF or supervised designee and the plan  
2 submitter must consult information sources that are reasonably available.

3  
4 **Past Projects and Reasonably Foreseeable Probable and Future Activities**

5 **Projects**

6 Past Projects and Reasonably Foreseeable Probable Future Projects ~~future projects~~  
7 included in the cumulative impacts assessment shall be described as follows:

8 **A.** Identify and briefly describe the location of ~~past and reasonably foreseeable~~  
9 ~~probable future projects~~ Past Projects and Reasonably Foreseeable Probable Future  
10 Projects as defined in 14 CCR § 895.1 within described resource assessment areas.

11 Include a map or maps and associated legend(s) clearly depicting the following  
12 information:

13 1. Township and Range numbers and Section lines.

14 2. Boundary of the ~~planning~~ Planning watershed ~~Watershed(s)~~ ~~within~~ which the  
15 ~~Plan~~ area is located along with the CALWATER 2.2 identification number.

16 3. Location and boundaries of Past Projects and Reasonably Foreseeable  
17 Probable Future Projects ~~past, present and reasonably foreseeable probable future~~  
18 ~~timber harvesting projects~~ on land owned or controlled by the timberland owner of the  
19 proposed timber harvest within the ~~planning~~ Planning watershed Watershed (s)  
20 depicted in section (2.) above. For purposes of this section, Past Projects ~~past~~  
21 ~~projects~~ shall be limited to those projects submitted within ten years prior to  
22 submission of the ~~THP~~ Plan.

23 4. Silvicultural methods for each of the timber harvesting projects depicted in  
24 section (3.) above. Each specific silvicultural method must be clearly delineated on  
25 the map(s), and associated ~~THP~~ Plan number referenced in the legend or an

1 annotated list. In addition, shading, hatching, or labeling shall be used which clearly  
2 differentiates silvicultural methods into one of the four categories outlined in Table 1.

3 5. A north arrow and scale bar (or scale text).

4 6. Source(s) of geographical information.

5 The map scale shall be large enough to clearly represent one planning watershed per  
6 page or of a scale not less than 1:63,360. Planning watersheds with densely situated  
7 or overlapping harvest units, or those which are large or irregular in size, may require  
8 multiple maps to achieve clarity. Color coding on maps may be used if they are able  
9 to be reproduced in black and white and clearly show all details. A legend shall be  
10 included indicating the meaning of the symbols used. Additionally, maps shall be

11 ~~Map(s) shall be reproducible on black & white copiers, and submitted on an 8.5 by 1/2 x~~  
12 11 page(s).

13  
14 **Table 1**

<b>Silvicultural Category</b>	<b>Silvicultural Method</b>
Evenaged Management 14 CCR § 913.1 [933.1, 953.1]	Clearcutting, Seed Tree Seed Step, Seed Tree Removal Step, Shelterwood Preparatory Step, Shelterwood Seed Step, Shelterwood Removal Step
Unevenaged Management 14 CCR § 913.2 [933.2, 953.2]	Selection, Group Selection, Transition
Intermediate Treatments	Commercial Thinning, Sanitation-Salvage

14 CCR § 913.3 [933.3, 953.3]	
Special Prescriptions and Other Management 14 CCR § 913.4 [933.4, 953.4]	Special Treatment Area Prescriptions, Rehabilitation of Understocked Area Prescription, Fuelbreak/Defensible Space, Southern Subdistrict Special Harvesting Method (14 CCR § 913.8), Variable Retention, Conversion
Alternative Prescriptions shall be put into the category within which the most nearly appropriate or feasible silvicultural method in the <del>Forest Practice Rules Board rules</del> is found pursuant to 14 CCR § 913.6 (b)(3)[933.6(b)(3), 953.6(b)(3)].	

12 **B. The RPF shall identify** identify and give the location and description of any known,  
13 continuing significant environmental ~~problems~~ effects caused by ~~past~~ Past projects  
14 ~~Projects as defined in 14 CCR § 895.1.~~ The RPF who prepares the ~~plan~~ Plan, or the  
15 RPF's sSupervised dDesignee, shall obtain information from plan submitters  
16 (timberland or timber owner), and from appropriate agencies, landowners, and  
17 individuals about past, and future land management activities and shall consider past  
18 experience, if any, in the assessment area related to past impacts and the impacts of  
19 the proposed operations, rates of recovery, and land uses. A poll of adjacent land  
20 owners is encouraged and may be required by the Director to determine such activities  
21 and significant adverse environmental problems on adjacent ownerships.

22 **Appendix**

23 **Technical Rule Addendum # No. 2**

24 **Cumulative Impacts Assessment**

1 **Guidance Document**

2  
3 This Appendix to Technical Rule Addendum No. 2 provides guidance in the  
4 preparation and review for ~~In evaluating cumulative impacts to resource subjects in 14~~  
5 CCR § 912.9 [932.9, 952.9](c). ~~In evaluating cumulative impacts, the RPF shall~~  
6 ~~consider the factors set forth herein.~~

7 **A. Watershed Resources**

8 Cumulative Watershed Effects (CWEs) occur within and near bodies of water or  
9 ~~significant wet areas~~ wet meadows or other wet areas, where individual impacts are  
10 combined to produce an effect that is greater than any of the individual impacts acting  
11 alone. Factors to consider in the evaluation of cumulative watershed impacts are listed  
12 below.

13 **1.** Impacts to watershed resources, pursuant to 14 CCR § 912.9 [932.9, 952.9]  
14 (c), within the Watershed Assessment Area (WAA) ~~shall~~ may be evaluated based on  
15 significant on-site and off-site cumulative effects on beneficial uses of water, as defined  
16 and listed in applicable Water Quality Control Plans.

17 **2.** Watershed effects produced by timber harvest and other activities may include  
18 one or more of the following:

- 19
- 20 • Sediment
  - 21 • Water temperature
  - 22 • Organic debris
  - 23 • Chemical contamination
  - 24 • Peak flow

25 The following general guidelines ~~shall~~ may be used when evaluating watershed impacts. The factors described are general and may not be appropriate for all

1 situations. Actual measurements may be required if needed to evaluate significant  
2 environmental effects. The pPlan must comply with the quantitative or narrative  
3 water-quality objectives set forth in an applicable Water Quality Control Plan.

4 **a. Sediment Effects.** Sediment-induced CWEs occur when earth  
5 materials transported by surface or mass wasting erosion enter a stream or stream  
6 system at separate locations and are then combined at a downstream location to  
7 produce a change in water quality or channel condition. The eroded materials can  
8 originate from the same or different projects. Sediment is composed of both  
9 suspended and bedload material. Suspended sediment is usually the primary source  
10 of turbidity in forested watersheds, although suspended organic material also accounts  
11 for a proportion of the suspended load. Chronic turbidity can be an indicator of a  
12 cumulative watershed sediment effect when sources can be identified and linked to one  
13 or more projects. Both turbidity and suspended sediment concentrations are subject to  
14 extreme inherent variability from region to region, storm to storm, and from year to year,  
15 dependent upon underlying geology and precipitation.

16  
17 Potentially adverse sediment changes are most likely to occur in the following locations  
18 and situations:

19 - Downstream areas of ~~reduced~~ low stream gradient where  
20 sediment from a new source may be deposited in addition to sediment derived from  
21 existing or other new sources.

22 - Immediately downstream from where sediment from a new  
23 source is combined with sediment from other new or existing sources and the  
24 combined amount of sediment exceeds the transport capacity of the stream.

1 - Any location where sediment from new sources in  
2 combination with suspended sediment from existing or other new sources significantly  
3 increases turbidity, reduces the survival of fish or other aquatic organisms, or otherwise  
4 reduces the quality of waters used for domestic, agricultural, or other beneficial uses.

5 - Channels with relatively steep gradients which contain  
6 accumulated sediment and debris that can be mobilized by sudden new sediment  
7 inputs, such as debris flows, resulting in debris torrents and severe channel scouring.

8 Potentially significant adverse impacts of cumulative sediment  
9 inputs may include:

10 - Increased treatment needs or reduced suitability for  
11 domestic, municipal, industrial, or agricultural water use.

12 - Direct mortality of fish and other aquatic species.

13 - Impaired spawning and rearing habitat for salmonids or  
14 otherwise. - Reduced viability of aquatic organisms or disruption of aquatic habitats  
15 and loss of stream productivity caused by filling of pools and plugging or burying  
16 streambed gravel.

17 - Accelerated channel filling (aggradation) resulting in loss of  
18 streamside vegetation and stream migration that can cause accelerated bank erosion.

19 - Accelerated channel filling (aggradation) resulting in  
20 increased frequency and magnitude of overbank flooding.

21 - Accelerated filling of downstream reservoirs, navigable  
22 channels, water diversion and transport facilities, estuaries, and harbors.

23 - Channel scouring by debris flows and torrents.

24 - Nuisance to or reduction in water related recreational  
25 activities.

1 Situations where sediment production potential is greatest include:

- 2 - Sites with high or extreme erosion hazard ratings.
- 3 - Sites which are tractor logged on steep slopes.
- 4 - Unstable areas.

5 **b. Water Temperature Effects.** Water temperature-related CWEs  
6 are changes in water chemistry or biological properties caused by the combination of  
7 solar-warmed water from two or more locations (in contrast to an individual effect that  
8 results from impacts along a single stream segment) where natural cover has been  
9 removed. Cumulative changes in water temperature are most likely to occur in the  
10 following situations:

- 11 - Where stream bottom materials are dark in color.
- 12 - Where water is shallow and has little underflow.
- 13 - Where removal of streamside canopy results in substantial,  
14 additional solar exposure or increased contact with warm air at two or more locations  
15 along a stream.
- 16 - Where removal of streamside canopy results in substantial,  
17 additional solar exposure or increased contact with warm air at two or more streams  
18 that are tributary to a larger stream.
- 19 - Where water temperature is near a biological threshold for  
20 specific species.

21 Significant adverse impacts of cumulative temperature increases  
22 include:

- 23 - Increases in the metabolic rate of aquatic species.

1 - Direct increases in metabolic rate and/or reduction of  
2 dissolved oxygen levels, either of which can cause reduced vigor and death of sensitive  
3 fish and other sensitive aquatic organisms.

4 - Increased growth rates of microorganisms that deplete  
5 dissolved oxygen levels or increased disease potential for organisms.

6 - Stream biology shifts toward warmer water ecosystems.

7 **c. Organic Debris Effects.** CWEs produced by organic debris can  
8 occur when logs, limbs, and other organic material are introduced into a stream or lake  
9 at two or more locations. Decomposition of this debris, particularly the smaller sized  
10 and less woody material, removes dissolved oxygen from the water and can cause  
11 impacts similar to those resulting from increased water temperatures. Introduction of  
12 excessive small organic debris can also increase water acidity.

13 Large organic debris is an important stabilizing agent ~~that should be maintained~~ in  
14 small to medium size, steep gradient channels, ~~but~~ The sudden introduction of large,  
15 unstable volumes of bigger debris (such as logs, chunks, and larger limbs produced  
16 during a logging operation) can obstruct and divert streamflow against erodible banks,  
17 block fish migration, and may cause debris torrents during periods of high flow.

18 Removing streamside vegetation can reduce the natural, annual inputs of litter to  
19 the stream (after decomposition of logging-related litter). This can cause both a drop in  
20 food supply, and resultant productivity, and a change in types of food available for  
21 organisms that normally dominate the lower food chain of streams with an overhanging  
22 or adjacent forest canopy.

23 **d. Chemical Contamination Effects.** Potential sources of  
24 chemical CWEs include run-off from roads treated with oil or other dust-retarding  
25 materials, direct application or run-off from pesticide treatments, contamination by

1 equipment fuels and oils, and the introduction of nutrients released during slash burning  
2 or wildfire from two or more locations.

3 **e. Peak Flow Effects.** CWEs can be caused by management-  
4 induced peak flow increases in streams during storm events, ~~are difficult to anticipate.~~  
5 Peak flow increases may result from management activities that reduce rainfall  
6 interception (i.e., evaporation) and vegetative water use (i.e., transpiration), or produce  
7 openings where snow can accumulate, ~~(such as clear-cutting in clearcuts and site~~  
8 ~~preparation on roads and landings), or that change the timing of flows by producing~~  
9 ~~more efficient runoff runoff (such as insloped roads). These~~ While increases, if any  
10 however, are likely to be small relative to pre-harvest natural peak flows, extensive  
11 canopy removal over a short period of time on a watershed scale can increase peak  
12 flow effects on streambank erosion, channel incision, and headward channel extension  
13 in erodible landscapes, from medium and large storms. Research to date on the effects  
14 of management activities on channel conditions indicates that channel changes during  
15 storm events are primarily the result of large sediment inputs. The timing and  
16 concentration of flows affecting lower order stream channel morphology can also be  
17 affected by the routing of runoff from roads, landings, and skid trails. Peak flow effects  
18 diminish with decreasing intensity of canopy removal, increasing time since harvest,  
19 and during larger flow recurrence intervals.

20 **3. Watercourse Condition.** The watershed impacts of past upstream  
21 and on-site projects are often reflected in the condition of stream channels on the  
22 project area. Following is a list of channel characteristics and factors that may be used  
23 to describe current watershed conditions and to assist in the evaluation of potential  
24 project impacts:  
25

1                   ◇ Gravel Embedded - Spaces between stream gravel filled with  
2 sand or finer sediments. Gravel are often in a tightly packed arrangement.

3                   ◇ Pools Filled - Former pools or apparent pool areas filled with  
4 sediments leaving few areas of deep or "quiet" water relative to stream flow or size.

5                   ◇ Aggrading - Stream channels filled or filling with sediment that  
6 raises the channel bottom elevation. Pools will be absent or greatly diminished and  
7 gravel may be embedded or covered by finer sediments. Streamside vegetation may  
8 be partially or completely buried, and the stream may be meandering or cutting into its  
9 banks above the level of the former streambed. Depositional areas in aggrading  
10 channels are often increasing in size and number.

11                  ◇ Bank Cutting - Can either be minor or severe and is indicated by  
12 areas of fresh, unvegetated soil or alluvium exposed along the stream banks, usually  
13 above the low-flow channel and often with a vertical or undercut face. Severe bank  
14 cutting is often associated with channels that are downcutting, which can lead to over-  
15 steepened banks, or aggrading, which can cause the channel to migrate against slopes  
16 that were previously above the high flow level of the stream.

17                  ◇ Bank Mass Wasting - Channels with landslides directly entering  
18 the stream system. Slide movement may be infrequent (single events) or frequent  
19 (continuing creep or periodic events).

20                  ◇ Downcutting - Incised stream channels with relatively clean,  
21 uncluttered beds cut below the level of former streamside vegetation and with eroded,  
22 often undercut or vertical, banks.

23                  ◇ Scoured - Stream channels that have been stripped of gravel and  
24 finer bed materials by large flow events or debris torrents. Streamside vegetation has  
25 often been swept away, and the channel has a raw, eroded appearance.

1                   ◇ Organic Debris - Debris in the watercourse can have either a  
2 positive or negative impact depending on the amount and stability of the material.  
3 Some stable organic debris present in the watercourse helps to form pools and retard  
4 sediment transport and downcutting in small to medium sized streams with relatively  
5 steep gradients. Large accumulations of organic debris can block fish passage, block  
6 or divert streamflow, or could be released as a debris flow.

7                   ◇ Stream-Side Vegetation - Stream-side vegetation and near-  
8 stream vegetation provide shade or cover to the stream, which may have an impact on  
9 water temperature, and provides root systems that stabilize streambanks and  
10 floodplains and filter sediment from flood flows.

11                   ◇ Recent Floods - A recent high flow event that would be considered  
12 unusual in the project area may have an impact on the current watercourse condition.

### 13                   **B. Soil Productivity**

14                   Cumulative soil productivity impacts occur when the effects of two or more  
15 activities, from the same or different projects, combine to produce a significant  
16 decrease in soil biomass production potential. These impacts most often occur on-site  
17 within the project boundary, and the relative severity of productivity losses for a given  
18 level of impact generally increases as site quality declines. The primary factors  
19 influencing soil productivity that can be affected by timber operations include:

- 20                   ◇ Organic matter loss.                   ◇ Soil compaction.
- 21                   ◇ Surface soil loss.                   ◇ Growing space loss.

22                   The following general guidelines may be used when evaluating soil productivity  
23 impacts.

24                   **1. Organic Matter Loss.** Displacement or loss of organic matter can  
25 result in a long term loss of soil productivity. Soil surface litter and downed woody

1 debris are the store-house of long term soil fertility, provide for soil moisture  
2 conservation, and support soil microorganisms that are critical in the nutrient cycling  
3 and uptake process. Much of the chemical and microbial activity of the forest nutrient  
4 cycle is concentrated in the narrow zone at the soil and litter interface.

5 Displacement of surface organic matter occurs as a result of skidding, mechanical  
6 site preparation, and other land disturbing timber operations. Actual loss of organic  
7 matter occurs as a result of burning or erosion. The effects of organic matter loss on  
8 soil productivity may be expressed in terms of the percentage displacement or loss as a  
9 result of all project activities.

10 **2. Surface Soil Loss.** The soil is the storehouse of current and future site  
11 fertility, and the majority of nutrients are held in the upper few inches of the soil profile.  
12 Topsoil displacement or loss can have an immediate effect on site productivity,  
13 although effects may not be obvious because of reduced brush competition and lack of  
14 side-by-side comparisons or until the new stand begins to fully occupy the available  
15 growing space.

16 Surface soil is primarily lost by erosion or by displacement into windrows, piles, or  
17 fills. Mass wasting is a special case of erosion with obvious extreme effects on site  
18 productivity. The impacts of surface soil loss may be evaluated by estimating the  
19 proportion of the project area affected and the depth of loss or displacement.

20 **3. Soil Compaction.** Compaction affects site productivity through loss of  
21 large soil pores that transmit air and water in the soil and by restricting root penetration.  
22 The risk of compaction is associated with:

- 23 - Depth of surface litter. - Soil structure.
- 24 - Soil organic matter content. - Presence and amount of coarse
- 25 fragments in the soil.

1 - Soil texture.

- Soil moisture status.

2  
3 Compaction effects may be evaluated by considering the soil conditions, as listed  
4 above, at the time of harvesting activities and the proportion of the project area  
5 subjected to compacting forces.

6 **4. Growing Space Loss.** Forest growing space is lost to roads, landings,  
7 permanent skid trails, and other permanent or non-restored areas subjected to severe  
8 disturbance and compaction.

9 The effects of growing space loss may be evaluated by considering the overall  
10 pattern of roads, etc., relative to feasible silvicultural systems and yarding methods.

### 11 **C. Biological Resources**

12 Biological assessment areas will vary with the species being evaluated and its  
13 habitat. Factors to consider in the evaluation of cumulative biological impacts include:

14 **1.** Any known rare, threatened, or endangered species or sensitive  
15 species (as described in the Board rules Forest Practice Rules) that may be directly or  
16 indirectly affected by project activities. Significant cumulative effects on listed species  
17 may be expected from the results of activities over time which combine to have a  
18 substantial effect on the species or on the habitat of the species.

19 **2.** Any significant, known wildlife or fisheries resource concerns within the  
20 immediate project area and the biological assessment area (e.g. loss of oaks creating  
21 forage problems for a local deer herd, species requiring special elements, sensitive  
22 species, and significant natural areas). Significant cumulative effects may be expected  
23 where there is a substantial reduction in required habitat or the project will result in  
24 substantial interference with the movement of resident or migratory species.

1 The significance of cumulative impacts on non-listed species viability ~~should~~may be  
2 determined relative to the benefits to other non-listed species. For example, the  
3 manipulation of habitat results in conditions which discourage the presence of some  
4 species while encouraging the presence of others.

5 **3.** The aquatic and near-water habitat conditions on the ~~THP~~ Plan and immediate  
6 surrounding area. Habitat conditions of major concern are: Pools and riffles, ~~L~~large  
7 woody material in the stream, ~~N~~near-water vegetation. Much of the information needed  
8 to evaluate these factors is described in the preceding Watershed Resources  
9 provision~~section~~. A general discussion of their importance is given below:

10 **a. Pools and Riffles.** Pools and riffles affect overall habitat quality  
11 and fish community structure. Streams with little structural complexity offer poor habitat  
12 for fish communities as a whole, even though the channel may be stable. Structural  
13 complexity is often lower in streams with low gradients, and filling of pools can reduce  
14 stream productivity.

15 **b. Large Woody Material.** Large woody debris in the stream plays  
16 an important role in creating and maintaining habitat through the formation of pools.  
17 These pools comprise important feeding locations that provide maximum exposure to  
18 drifting food organisms in relatively quiet water. Removal of woody debris can reduce  
19 frequency and quality of pools.

20 **c. Near-Water Vegetation.** Near-water vegetation provides many  
21 habitat benefits, including: shade, nutrients, vertical diversity, migration corridors,  
22 nesting, roosting, and escape. Recruitment of large woody material is also an  
23 important element in maintaining habitat quality.

24 **4.** The biological habitat condition of the ~~THP~~ Plan and immediate surrounding  
25 area. Significant factors to consider are:

- ◇ Snags/den trees
- ◇ Hardwood cover
- ◇ Downed, large woody debris
- ◇ Late seral (mature) forest

characteristics.

- ◇ Multistory canopy
- ◇ Late seral habitat continuity
- ◇ Road density

The following general guidelines may be used when evaluating biological habitat. The factors described are general and may not be appropriate for all situations. The ~~THP~~ Plan preparer must also be alert to the need to consider factors which are not listed below. Each set of ground conditions are unique and the analysis conducted must reflect those conditions.

**a. Snags/Den/Nest Trees:** Snags, den trees, nest trees and their recruitment are required elements in the overall habitat needs of more than 160 wildlife species. Many of these species play a vital role in maintaining the overall health of timberlands. Snags of greatest value are >16" DBH and 20 ft. in height. The degree of snag recruitment over time ~~should~~ may be considered. Den trees are partially live trees with elements of decay which provide wildlife habitat. Nest trees have importance to birds classified as a sensitive species.

**b. Downed large, woody debris:** Large downed logs (particularly conifers) in the upland and near-water environment in all stages of decomposition provide an important habitat for many wildlife species. Large woody debris of greatest value consists of downed logs >16" diameter at the large end and >20 feet in length.

**c. Multistory canopy:** Upland multistoried canopies have a marked influence on the diversity and density of wildlife species utilizing the area. More productive timberland is generally of greater value and timber site capability ~~should~~ may be considered as a factor in an assessment. The amount of upland multistoried

1 canopy may be evaluated by estimating the percent of the stand composed of two or  
2 more tree layers on an average per acre basis.

3 Near-water multistoried canopies in riparian zones that include conifer and hardwood  
4 tree species provide an important element of structural diversity to the habitat  
5 requirements of wildlife. Near-water multistoried canopy may be evaluated by  
6 estimating the percentage of ground covered by one or more vegetative canopy strata,  
7 with more emphasis placed on shrub species along Class III and IV streams (14 CCR  
8 §§ 916.5, 936.5, or 956.5).

9 **d. Road Density:** Frequently traveled permanent and secondary roads  
10 have a significant influence on wildlife use of otherwise suitable habitat. Large declines  
11 in deer and bear use of areas adjacent to open roads are frequently noted. Road  
12 density influence on large mammal habitat may be evaluated by estimating the miles of  
13 open permanent and temporary roads, on a per-section basis, that receive some level  
14 of maintenance and are open to the public. This assessment ~~should~~ can also account  
15 for the effects of vegetation screening and the relative importance of an area to wildlife  
16 on a seasonal basis (e.g. winter range).

17 **e. Hardwood Cover:** Hardwoods provide an important element of  
18 habitat diversity in the coniferous forest and are utilized as a source of food and/or  
19 cover by a large proportion of the state's bird and mammal species. Productivity of  
20 deer and other species has been directly related to mast crops. Hardwood cover can  
21 be estimated using the basal area per acre provided by hardwoods of all species.

22 **[Northern and Southern only]:** ~~Post-harvest deciduous oak retention~~  
23 ~~for the maintenance of habitats for mule deer and other hardwood-associated wildlife~~  
24 ~~shall be guided by the Joint Policy on Hardwoods between the California Board of~~  
25 ~~Forestry and California Fish and Game Commission (5/9/94).~~ To sustain wildlife, a

1 diversity of stand structural and seral conditions, and tree size and age classes of  
2 deciduous oaks ~~should~~ may be retained in proportions that are ecologically  
3 sustainable. Regeneration and recruitment of young deciduous oaks ~~should~~ can be  
4 sufficient over time to replace mortality of older trees. Deciduous oaks ~~should~~ can be  
5 present in sufficient quality and quantity, and in appropriate locations to provide  
6 functional habitat elements for hardwood-associated wildlife.

7 **f. Late Seral (Mature) Forest Characteristics:**

8 Determination of the presence or absence of mature and over-mature forest stands  
9 and their structural characteristics provides a basis from which to begin an assessment  
10 of the influence of management on associated wildlife. These characteristics include  
11 large trees as part of a multilayered canopy, large decadent trees, and the presence of  
12 large numbers of snags and downed logs, all of which ~~that~~ contribute to an increased  
13 level of stand decadence and complexity. Late seral stage forest amount may be  
14 evaluated by estimating the percentage of the land base within the project and the  
15 biological assessment area occupied by areas conforming to the following definitions:

16 Forests not previously harvested should be at least 80 acres in size to maintain the  
17 effects of edge. This acreage is variable based on the degree of similarity in  
18 surrounding areas. The area ~~should~~ can include a multi-layered canopy, two or more  
19 tree species with several large coniferous trees per acre (smaller subdominant trees  
20 may be either conifers or hardwoods), large conifer snags, and an abundance of large  
21 woody debris.

22 Previously harvested forests are in many possible stages of succession and may  
23 include remnant patches of late seral stage which generally conform to the definition of  
24 unharvested forests but do not meet the acreage criteria.

25 **g. Late Seral Habitat Continuity:** Projects containing areas meeting

1 the definitions for late seral stage characteristics ~~may~~ **must** be evaluated for late seral  
2 habitat continuity. The fragmentation and resultant isolation of late seral habitat types  
3 is one of the most significant factors influencing the sustainability of wildlife populations  
4 not adapted to edge environments.

5 This fragmentation may be evaluated by estimating the ~~amount of the on-site~~ number  
6 of acres within both the project area, and as well as the biological assessment area  
7 occupied by portions of or entire late seral stands ~~greater than~~ at least 80 acres in size  
8 (considering the mitigating influence of adjacent and similar habitat, if applicable) and  
9 less than one mile apart or connected by a corridor of similar habitat.

10 **h. Special Habitat Elements:** The loss of a key habitat element may  
11 have a profound effect on a species even though the habitat is otherwise suitable.  
12 Each species may have several key limiting factors to consider. For example, a  
13 special need for some large raptors is large decadent trees/snags with broken tops or  
14 other features. Deer may have habitat with adequate food and cover to support a  
15 healthy population size and composition but dependent on a few critical meadows  
16 suitable for fawning success. These and other key elements may need special  
17 protection.

#### 18 **D. Recreational Resources**

19 The recreational assessment area is generally the area that includes the logging area  
20 plus 300 feet.

21 To assess recreational cumulative impacts:

22 **1.** Identify the recreational activities involving significant numbers of  
23 people in and within 300 ft. of logging area (e.g., fishing, hunting, hiking, picnicking,  
24 camping).

25 **2.** Identify any recreational Special Treatment Areas described in the

1 Board rules on the pPlan area or contiguous to the area.

## 2 **E. Visual Resources**

3 The visual assessment area is generally the logging area that is readily visible to  
4 significant numbers of people who are no further than three miles from the timber  
5 operation. To assess visual cumulative effects:

6 **1.** Identify any Special Treatment Areas designated as such by the  
7 Board because of their visual values.

8 **2.** Determine how far the proposed timber operation is from the nearest  
9 point that significant numbers of people can view the timber operation. At distances of  
10 greater than 3 miles from viewing points activities are not easily discernible and will be  
11 less significant.

12 **3.** Identify the manner in which the public identified in 1 and 2 above will  
13 view the proposed timber operation (from a vehicle on a public road, from a stationary  
14 public viewing point or from a pedestrian pathway).

## 16 **F. Vehicular Traffic Impacts**

17 The traffic assessment area involves the first roads not part of the logging area on  
18 which logging traffic must travel. To assess traffic cumulative effects:

19 **1.** Identify whether any publicly owned roads will be used for the  
20 transport of wood products.

21 **2.** Identify any public roads that have not been used recently for the  
22 transport of wood products and will be used to transport wood products from the  
23 proposed timber harvest.

24 **3.** Identify any public roads that have existing traffic or maintenance  
25 problems.

1                   4. Identify how the logging vehicles used in the timber operation will  
2 change the amount of traffic on public roads, especially during heavy traffic conditions.  
3

4                   **G. Greenhouse Gas (GHG) Impacts**

5                   Forest management affects GHG sequestration and emission rates of forests to the  
6 extent management activities affect forest inventory, growth, yield, and mortality.

7 Timber operations and subsequent production of wood products, and in some  
8 instances energy, can result in the emission, storage, and offset of GHGs. Any one or  
9 a combination of the following options can be used to assess the potential for  
10 significant cumulative GHG effects:

11                   1.Incorporation by reference, or tiering from, a programmatic assessment  
12 that was certified by the Board, CAL FIRE, or other State Agency, which  
13 analyzes the net effects of GHG associated with forest management  
14 activities.

15  
16                   2.Application of a model or methodology quantifying an estimate of  
17 greenhouse gas emissions resulting from the project. The model or  
18 methodology should at minimum consider the following:

19                   a.Inventory, growth, and harvest over a specified planning horizon

20                   b.Projected forest carbon sequestration over the planning horizon

21                   c.Timber operation related emissions originating from logging  
22 equipment and transportation of logs to manufacturing facility

23                   d.GHG emissions and storage associated with the production and  
24 life cycle of manufactured wood products.  
25

1 3.A qualitative analysis describing the extent to which the project in  
2 combination with Past Projects and Reasonably Foreseeable Probable  
3 Future Projects may increase or reduce GHG emissions compared to the  
4 existing environmental setting. Such analysis should disclose if a known  
5 'threshold of significance' (14 CCR § 15064.7) for the project type has  
6 been identified by the Board, CAL FIRE or State Agency, and if so, if the  
7 project's emissions in combination with other forestry projects are  
8 anticipated to exceed this threshold.

#### 9 10 **H. Wildfire Risk and Hazard**

11 Cumulative increase in wildfire risk and hazard can occur when the effects of two or  
12 more activities from the same or different projects combine to produce a significant  
13 increase in forest fuel loading in the vicinity of residential dwellings and communities.

14 Risk to life and property increases with increasing proximity to dwellings and  
15 communities while hazard increases as a result of elevated forest fuel loads.

16  
17 The following elements may be considered in the assessment of potential  
18 cumulative effects:

19 1. Fire hazard severity zoning

20 2.Existing and future fuel conditions including vertical and horizontal  
21 continuity

22 3.Location of existing fuel breaks and fuel hazard reduction activities

23 4.Road access for fire suppression  
24  
25

1 Note: Authority cited: Sections 4551, 4551.5, 4553, 4562, 4562.5, 4562.7, and  
2 21080.5, Public Resources Code. Reference: Sections 4512, 4513, 4526, 4551.5,  
3 4562, 4562.5, 4582.5, 5093.50, 21000(g), 21001(f), 21002, 21080.4, 21080.5 Public  
4 Resources Code. Sections 100 Water Code; Section 5650c fish and game code.

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