**BOARD OF FORESTRY AND FIRE PROTECTION**

**15 - DAY NOTICE OF RULEMAKING**

**"ROAD RULES, 2013"**

[Notice Date – January 3, 2014]

**Title 14 of the California Code of Regulations (14 CCR),**
**Division 1.5, Chapter 4, Subchapters 1, 4, 5, 6, Articles 4, 5, 6, 8, and 12;**
**Subchapter 7, Articles 2, 6.5, 6.8, 6.9, and 7**

**MODIFICATIONS TO TEXT OF PROPOSED REGULATION AND PUBLIC HEARING DATE**

## PUBLIC HEARING DATE

Pursuant to the requirements of Government Code § 11346.8(c), and Title 1 of the California Code of Regulations § 44, the State Board of Forestry and Fire Protection (Board) is providing notice of modifications made to portions of the "Road Rules, 2013" rule proposal adopted by the Board following meetings conducted on October 9, 2013 and November 7, 2013, respectively. These modifications are substantially related to the 45-day Noticed rule text published August 23, 2013. **The Board will conduct a public hearing to consider adoption of the proposed rule text modifications at their regularly scheduled meeting on Wednesday, January 29, 2014. The meeting will begin at 8:00am in the first floor auditorium of the Resources Building located at 1416 9th Street, Sacramento, California.**

## MODIFICATIONS TO TEXT OF PROPOSED REGULATION

The Board is providing notice of proposed modifications to the 45-day Notice rule text published August 23, 2013. The majority of the proposed modifications were identified by the Board during their deliberations on the rule proposal following the public hearing held October 9, 2013. A small percentage of the proposed modifications were subsequently identified by staff in consultation with the Office of Administrative Law. The proposed modifications are discussed briefly below.

### Modifications to Section References on Page 1 of Rule Text:

The Board directed staff to correct two Rule Section references on Page 1 of the rule text as indicated in double underline and double strikethrough: "**§ 915.1 [~~934.8, 954.8~~ 935.1, 955.1] Use of Heavy Equipment for Site Preparation.**"

### Modifications to Descriptions of Proposed Actions on Rule Sections:

Staff proposes to modify the descriptions of the actions proposed ("Amend," "Repeal," "Renumber," "Adopt") and the sections or portions of the rule proposal affected beginning on page 1 and extending throughout the remainder of the rule text.

This modification is necessary for improved clarity and comprehension of the Board's overarching construct of the rule proposal. For example, the 45-day Notice rule text identified the deletion and replacement of an entire rule section as an action to "amend" a rule section. The rule text of this 15-day Notice now identifies this action as both "repeal" of the existing rule text and "adoption" of the new rule text.

**Modifications to Amended Definition of "Permanent Road," Section 895.1:**
The Board proposes to capitalize the existing word "road" in the term being defined for the purpose of consistency with the remainder of the definitions in the rule text. This proposed modification is indicated in double strikethrough and double underline as follows: "**Permanent ~~r~~Road**."

**Modifications to Amended Definition of "Permanent Road Network," Section 895.1:**
The Board proposes to modify the amended definition to clarify, for the sake of consistency with the remainder of the rule text, that abandoned roads are not considered part of the "Permanent Road Network." A new clarifying sentence was accordingly added to the end of the definition and indicated in double underline as follows:

"**Permanent Road Network** means the permanent, seasonal, ~~and~~ temporary, and deactivated roads, including appurtenant roads, that provide the infrastructure necessary for timber operations and forest management. Abandoned roads are not part of the permanent road network."

**Modification to Restore Existing Definition of "Public Road," Section 895.1:**
The Board proposes to modify the rule proposal by restoring the existing definition of "public road" without further revision. This existing definition appears to have been inadvertently struck from the proposed rule text and this was not the Board's intention. The existing definition has therefore been entirely removed from the text of the rule proposal and thereby restored to its present location in the Forest Practice Rules.

**Modifications to Amended Definition of "Reconstructed Roads," Section 895.1:**
The Board proposes to capitalize the existing word "roads" in the term being defined for the purpose of consistency with the remainder of the definitions in the rule text.

This proposed modification is indicated in double strikethrough and double underline as follows: "**Reconstructed ~~r~~Roads**."

**Modifications to Amended Definition of "Seasonal Road," Section 895.1:**
The Board proposes to capitalize the existing word "road" in the term being defined for the purpose of consistency with the remainder of the definitions in the rule text.

This proposed modification is indicated in double strikethrough and double underline as follows: "**Seasonal ~~r~~Road**."

The Board also proposes to modify the last sentence of the definition to remove the word "season" in favor of the word "period," as it more clearly articulates the temporal intention of the definition. This proposed modification is indicated by double strikethrough and double underline as follows:

"These roads have a surface that is suitable for maintaining a stable operating surface during the ~~season~~ period of use."

**Modifications to New Definition of "Significant Sediment Discharge," Section 895.1:**
The Board proposes to modify the definition to clarify the means by which an RPF would discern if soil erosion might occur at some future time. This proposed modification is indicated by double underline as follows:

"**Significant Sediment Discharge** means soil erosion that is currently, or, as determined based upon visible physical conditions, may be in the future, discharged to watercourses or lakes in quantities that violate Water Quality Requirements or result in significant individual or…"

**Modifications to New Definition of "Significant Existing or Potential Erosion Site," Section 895.1:**
The Board proposes to modify the definition to clarify the means by which an RPF would discern if soil erosion might occur at some future time. The proposed modification is a companion to the closely related modification of the definition of "Significant Sediment Discharge." This proposed modification is indicated by double underline as follows:

"**Significant Existing or Potential Erosion Site** means a location where soil erosion is currently, or there are visible physical conditions to indicate soil erosion may be in the future, discharged to…"

**Modifications to Amended Definition of "Temporary Road," Section 895.1:**
The Board proposes to capitalize the existing word "road" in the term being defined for the purpose of consistency with the remainder of the definitions in the rule text.

This proposed modification is indicated in double strikethrough and double underline as follows: "**Temporary ~~r~~Road**."

**Modifications to Amended Rule Section 914.8(d) [934.8(d), 954.8(d)] Tractor Road Watercourse Crossing:**
In addition to delineation of the break between amended rule Sections 914.7 [934.7, 954.7] and 914.8(d) [934.8(d), 954.8(d)], at staff's suggestion the Board proposes to further clarify the exception allowance process in amended

subsection 914.8(d). The proposed rule text modification specifies that the RPF may propose an exception and the Director may *approve* an exception. This proposed modification is indicated in double strikethrough and double underline as follows:

"The RPF may propose an exception if explained and justified in the plan~~,~~. The exception may be approved if ~~and~~ found by the Director to be in conformance with this article.*****"

**Modifications to Amended Rule Section 916.3(c)(3) [936.3(c)(3), 956.3(c)(3)]. General Limitations Near Watercourses, Lakes, Marshes, Meadows and Other Wet Areas:**

In addition to staff's new delineation of the break between amended rule Sections 915.1(b) [935.1(b), 955.1(b)] and 916.3(c)(3) [936.3(c)(3), 956.3(c)(3)], the Board proposes to modify subsection 916.3(c)(3) to clarify that the rule is intended to apply to both new *and existing* tractor road crossings. This proposed modification is indicated by double underline as follows:

"**~~(4)~~(3)** At new and existing tractor ~~and~~ road crossings approved as part of the Fish and Game Code process (F&GC 1600 et seq.).*****"

**Modifications to Amended Rule Section 916.9 [936.9, 956.9]. Protection and Restoration of the Beneficial Functions of the Riparian Zone in Watersheds with Listed Anadromous Salmonids:**

Unbeknownst to staff, the preamble of this rule Section as well as repealed Section 923.9 [943.9, 963.9] contains artifact language no longer relevant or necessary. This artifact language dates back to the Board's 2008 adoption of regulations to provide coho salmon "incidental take" authorization in cooperation with the former Department of Fish and Game (now Department of Fish and Wildlife). The adopted incidental take regulations were struck down in a court of law and later repealed through the Section 100 process. However, the artifact guidance language was inadvertently left behind and, though it does not appear in the Forest Practice Rulebook, it does appear in the Official California Code of Regulations. The Board therefore proposes to delete this language from the preamble of Section 916.9 [936.9, 956.9] as indicated in the italicized double strikethrough as follows:

"**Amend** § **916.9 [936.9, 956.9]. Protection and Restoration of the Beneficial Functions of the Riparian Zone in Watersheds with Listed Anadromous Salmonids.**

In addition to all other district Forest Practice Rules, the following requirements shall apply in any watershed with listed anadromous salmonids. Requirements of 14 CCR § 916.9 [936.9, 956.9] precede other sections of the FPRs.

~~*[Effective 1-1-2008 pursuant to Public Resources Code section 4554.5(a); operative the date Department of Fish and Game regulations 14 CCR sections 787.0-787.9 become effective] In addition to all other district Forest Practice Rules, the following requirements shall apply in any planning watershed with threatened or impaired values, except in*~~

~~*watersheds with coho salmon where the standards listed under 916.9.1 and 916.9.2 shall apply:*~~

**Geographic scope -** Requirements for watersheds with listed anadromous salmonids..."

**Modifications to Amended Rule Section 916.9(n)(1)(C) [936.9(n)(1)(C), 956.9(n)(1)(C)]. Protection and Restoration of the Beneficial Functions of the Riparian Zone in Watersheds with Listed Anadromous Salmonids:**
The Board proposes to modify this amended rule subsection to remove use of the previous water quality standard "deleterious to the quality and beneficial uses of water" in favor of the new standard, "that would result in a significant sediment discharge." This modification is proposed for the sake of consistency with the use of the newly adopted term "Significant Sediment Discharge" throughout the adopted rule text.

The proposed modified rule text is indicated in the double strikethrough and double underline as follows:
"**(~~D~~C)** Any other area of disturbed soil that threatens to discharge sediment into waters in amounts that would result in a significant sediment discharge ~~deleterious to the quality and beneficial uses of water~~."

**Modifications to Acronym and Name for "California Department of Fish and Wildlife":**
As of January 1, 2013, the California Department of Fish and Game "DFG" is now identified as the California Department of Fish and Wildlife or "CDFW." The Board proposes to incorporate the new moniker and acronym throughout the adopted rule text at the suggestion of the Department of Fish and Wildlife. The Board anticipates the comprehensive adoption of this new agency identifier throughout the Forest Practice Rules at a later date. An example of this modification excerpted from new Section 923(f)(1) [943(f)(1), 963(f)(1) is indicated in double strikethrough and double underline as follows:

"**(1)** A valid incidental take permit issued by ~~DFG~~ CDFW pursuant to Section 2081(b) of the Fish and Game Code that addresses anadromous salmonid protection; or…"

**Modifications to Adopted Rule Section 923.1(e)(4)[943.1(e)(4), 963.1(e)(4)]. Planning for Logging Roads and Landings.**
The Board proposes to modify this rule subsection to correct the inaccurate rule subsection reference from "(d)(1)" to "(e)(1)." The proposed modification is indicated in double strikethrough and double underline as follows:

"**(4)** The RPF shall disclose and map the significant existing and potential erosion sites identified per 14 CCR § 923.1 [943.1, 963.1], subsection (~~d~~e)(1), for which no feasible treatment measures exist."

**Modifications to Repealed Rule Section 923.1(i) [943.1(i), 963.1(i)] Planning for Roads and Landings:**
The Board proposes to modify these rule subsections (to be repealed) by correcting them to distinguish between the subsections intended for application in the Coast versus the Northern and Southern Forest Districts. The proposed modification would merely assign the correct subsection number to the appropriate District rules to be repealed.

**Modifications to Adopted Rule Section 923.2(a)(4) [943.2(a)(4), 963.2(a)(4)]. Design and Location of Logging Roads and Landings:**
The Board proposes to modify the amended rule subsection to clarify the Board's expectation that logging road segments may be, and are in common practice, drained by a combination of waterbreaks and rolling dips, rather than just one or the other. The proposed modification is indicated in double underline as follows:

"**(4)** Be outsloped where feasible and drained with waterbreaks and/or rolling dips in conformance with other applicable Forest Practice Rules."

**Modifications to Adopted Rule Section 923.5(g)&(h) [943.5(g)&(h), 963.5(g)&(h)]. Erosion Control for Logging Roads and Landings:**
The Board proposes to modify these subsections by including references to Technical Rule Addendum Number 5. These references are proposed to be added for the sake of consistency with other such references throughout the adopted rule text. An example of this proposed modification is excerpted from subsection 923.5(g) and indicated in double underline as follows:

"**(g)** Where outsloping and rolling dips are used to control surface runoff, the dip in the logging road grade shall be sufficient to capture runoff from the logging road surface. The steepness of cross-slope gradient in conjunction with the logging road or landing gradient and the estimated soil erosion hazard rating shall be used to determine the rolling dip spacing in order to minimize soil erosion and sediment transport and to prevent significant sediment discharge. Guidance on rolling dip spacing may be found in the Board's Technical Rule Addendum Number 5."

**Modifications to Adopted Rule Section 923.5(i) [943.5(i), 963.5(i)]. Erosion Control for Logging Roads and Landings:**
The Board proposes to modify this subsection by substituting the word "shall" for the word "will" for consistency with the Forest Practice Rules' reliance upon the term "shall" to indicate compulsory standards. The proposed modification is indicated in double strikethrough and double underline as follows:

"**(i)** Where logging road and landing surfaces, road approaches, inside ditches and drainage structures cannot be hydrologically disconnected, and where there is existing or the potential for significant sediment discharge, necessary and feasible treatments to prevent the discharge ~~will~~ shall be described in the plan."

**Modifications to Adopted Rule Section 923.5(o) [943.5(o), 963.5(o)]. Erosion Control for Logging Roads and Landings:**
At the suggestion of staff, the Board proposes to modify this subsection to clarify that *bare area(s)* are to be treated "prior to the start of rain that generates overland flow, or within ten days…" The proposed modification is indicated in double underline as follows:

"**(o)** Soil stabilization treatments shall be in place upon completion of operations for the year of use or prior to the extended wet weather period, whichever comes first. An exception is that bare areas created during the extended wet weather period shall be treated prior to the start of rain that generates overland flow, or within 10 days of the creation of the bare area(s), whichever is sooner, or as agreed to by the Director."

**Modifications to Adopted Rule Section 923.5(q)(3)(C) [943.5(q)(3)(C), 963.5(q)(3)(C)]. Erosion Control for Logging Roads and Landings:**
The Board proposes to rewrite the language of this amended rule subsection for improved clarity of the standard. The proposed modification is indicated in double strikethrough and double underline as follows:

"**(C)** Where slash mulch is applied, ~~slash coverage in contact with the ground surface shall be a minimum of 75 percent~~ a minimum of 75% of the area shall be covered by slash in contact with the ground."

**Modifications to Adopted Rule Section 923.6(g) & (h)(3) [943.6(g) & (h)(3), 963.6(g) & (h)(3)]. Use of Logging Roads and Landings:**
At the suggestion of staff, the Board proposes to modify these subsections consistent with the proposed modifications to amended subsections 914.8(d) [934.8(d), 954.8(d)]. This modification is intended to further clarify the exception allowance process. The proposed rule text modification specifies that the RPF may propose an exception, but the Director is the only one who can *approve* an exception. This proposed modification is as excerpted from subsection 923.6(g) and indicated in double strikethrough and double underline as follows:

"Exceptions may be proposed by the RPF, when locations are disclosed and justified in the THP, consistent with 14 CCR 923 (c)~~;~~, ~~and~~ Exceptions must be approved by the Director."

**Modifications to Adopted Rule Section 923.7(l)(3)(A)(iv) [943.7(l)(3)(A)(iv), 963.7(l)(3)(A)(iv)] Maintenance and Monitoring of Logging Roads and Landings:**
The Board proposes to modify this longstanding numerical velocity measurement standard to acknowledge measurement of velocity to two significant figures in the field during water drafting is not practically possible. The proposed modification is indicated in double strikethrough as follows:

"**(iv)** The approach velocity (water moving through the screen) shall not exceed 0.3~~3~~ feet/second."

**Modifications to Adopted Rule Section 923.9(m)(2)&(o) [943.9(m)(2)&(o), 963.9(m)(2)&(o)]. Watercourse Crossings:**
The Board proposes to modify these subsections by including references to Technical Rule Addendum Number 5. These references are proposed to be added for the sake of consistency with other such references throughout the adopted rule text. An example of this proposed modification was previously provided herein as an excerpt from subsection 923.5(g).

**Modifications to Adopted Rule Section 923.9(t)(3) [943.9(t)(3), 963.9(t)(3)]. Watercourse Crossings:**
At the suggestion of staff, the Board proposes to modify these subsections consistent with the proposed modifications to subsections 923.5(o) [943.5(o), 963.5(o)] in order to clarify that *bare area(s)* are to be treated "prior to the start of rain that generates overland flow, or within ten days…" The proposed modification is indicated in double underline as follows:

"**(3)** Soil stabilization treatments shall be in place upon completion of operations for the year of use or prior to the extended wet weather period, whichever comes first. An exception is that bare areas created during the extended wet weather period shall be treated prior to the start of rain that generates overland flow, or within 10 days of the creation of the bare area(s), whichever is sooner, or as agreed to by the Director."

**Modifications to Repealed Rule Section 923.9 [943.9, 963.9]. Roads and Landings in Watersheds with Listed Anadromous Salmonids:**
Unbeknownst to staff, the preamble of this rule Section as well as amended Section 916.9 [936.9, 956.9] contains artifact language no longer relevant or necessary. This artifact language dates back to the Board's 2008 adoption of regulations to provide coho salmon "incidental take" authorization in cooperation with the former Department of Fish and Game (now Department of Fish and Wildlife). The adopted incidental take regulations were struck down in a court of law and later repealed through the Section 100 process. However, the artifact guidance language was inadvertently left behind and, though it does not appear in the Forest Practice Rulebook, it does appear in the Official California Code of Regulations. The Board therefore proposes to delete this language from the preamble of repealed Section 923.9 [943.9, 963.9] as indicated in the italicized double strikethrough as follows:

"**Repeal § 923.9 [943.9, 963.9] Roads and Landings in Watersheds with Listed Anadromous Salmonids**
~~In addition to all other district Forest Practice Rules, the following requirements shall apply in any planning watershed with listed anadromous salmonids:~~

~~*[Effective 1-1-2008 pursuant to Public Resources Code section 4554.5(a); operative the date Department of Fish and Game regulations 14 CCR sections 787.0-787.9 become effective] In addition to all other district Forest Practice Rules, the following requirements shall apply in any planning watershed with threatened or impaired values, except in watersheds with coho salmon where the standards listed under 923.9.1 and 923.9.2 shall apply:*~~

~~**(a)** Where logging road or landing construction or reconstruction is proposed, the plan shall…~~"

**Modifications to Restore Existing Rule Text of Section 923.7 [943.7, 963.7] and Renumber it as Section 923.9.1 [943.9.1, 963.9.1]. Licensed Timber Operator Responsibility for Roads and Landings:**

The existing rule section previously identified as "923.7 [943.7, 963.7] Licensed Timber Operator Responsibility for Roads and Landings" is proposed for repeal and adoption as a new rule Section 923.7 entitled, "Maintenance and Monitoring of Logging Roads and Landings." In the course of proposing this change, the existing rule text of Section 923.7 relating to Licensed Timber Operator responsibilities was inadvertently proposed for deletion from the rule text of the 45-day Notice, rather than simply moved to another section number. Deletion of the rule text was not the Board's intention. The Board therefore proposes to restore this existing rule text and renumber it as Section 923.9.1 [943.9.1, 963.9.1], as the existing rule text of Section 923.9.1 is proposed for repeal. The proposed modification is indicated in double underline as follows:

"**Renumber §923.7 [943.7, 963.7] to 923.9.1 [943.9.1, 963.9.1]. Licensed Timber Operator Responsibility for Roads and Landings.**

The licensed timber operator who is responsible for the implementation or execution of the plan shall not be responsible for the construction and maintenance of roads and landings, unless the licensed timber operator is employed for that purpose."

**Modifications to Amended Rule Section 1034(x). Contents of Plan:**

The Board proposes to modify this subsection in order to correct inadvertent errors in the rule section referencing contained in the 45-day Notice rule text. The proposed corrections to the referencing related to mapping requirements are indicated in double underline and double strikethrough as follows:

*****(x) On titled USGS (if available) or equivalent topographic maps of a scale not less than 2" to the mile, the information in subsections (1-~~4~~3), (4)(A), (B) and (E) ((4)(B) and (E) for sites within the harvest area), (8), (9), and (11-13) shall be clearly shown. Additional maps, which may be topographic or planimetric, may be used to provide the information required in the other subsections, to ~~or~~ show specific details, and to improve map clarity. The appurtenant roads referenced in subsection (4)(B), (C), (D), and (E) ((4)(B) and (E) for ~~those~~ sites not within the harvest area) may be shown on a map which may be planimetric with a scale as small as one-half inch equals one mile.

**Modifications to Amended Rule Section 1034(x)(4)(A). Contents of Plan:**

The Board proposes to modify the mapping requirement in amended rule Section 1034(x)(4)(A) to include "deactivated" roads. "Deactivated" roads were inadvertently omitted from this amended rule section and the Board's proposed modification to include them restores consistency with the remainder of the rule proposal.

The proposed modification is indicated in double underline as follows:

"**(A)** The classification of all roads as permanent, seasonal, temporary, deactivated, or proposed for abandonment."

**Modifications to Amended Rule Section 1034(x)(4)(C). Contents of Plan:**
The Board proposes to modify the mapping requirement in amended rule Section 1034(x)(4)(C) to indicate "logging" roads providing access to rock pits and water drafting sites rather than "appurtenant" roads should be mapped. This modification is necessary because the proposed definition of "appurtenant road" does not appear to be inclusive of roads used to access rock pits or water drafting sites. The existing definition of "logging road," however does appear to be inclusive of such uses and is therefore more appropriately included in the amended mapping requirement.

The proposed modification is indicated in double underline and double strikethrough as follows:

"**(C)** ~~Appurtenant~~ Logging roads that provide access to rock pits and water drafting sites, and the location of water drafting sites."

**Modifications to Rule Section References in Amended Rule Section 1092.09(l). PTHP Contents:**
The Board proposes to modify this amended subsection to correct the inadvertent errors in the rule section referencing contained in the 45-day Notice rule text. The proposed corrections to the referencing related to mapping requirements for PTHPs are indicated in double underline and double strikethrough as follows:

"**(l)** On a titled USGS quadrangle or equivalent topographic map of a scale not less than 2" to the mile, the information in subsections ~~(1-5)~~ (1~~)-(5)~~(A)(1.-5.)), (6~~)~~(A~~)-(6)(K~~G)), if applicable, ~~(7)(A)-(B),~~ and (7-11) shall be clearly shown."

**Modifications to Technical Rule Addendum Number 5, Part I "Hydrologic Disconnection," Page 3, Paragraph 2, Last Sentence:**
The Board proposes to modify this portion of the proposed Technical Rule Addendum in order to reduce the potential for confusion amongst those utilizing the Addendum. Use of the word "volumes" could have been construed as implying a requirement for flow volume measurement and this was not the intention. The Board therefore proposes to revise the last sentence of Part I, the discussion of "Hydrologic Disconnection," paragraph 2 on page 3, to strike the last word "volumes" and end the sentence with the word "flow." The proposed modification is indicated in double strikethrough as follows:

"…or (5) indications of channel widening and/or incision below a drainage structure resulting from increases in flow ~~volumes~~."

**Modifications to Technical Rule Addendum Number 5, Part I "Hydrologic Disconnection," Page 7, Paragraph "B", Seventh Bullet, Parenthetical Examples:**

The Board proposes to modify one of the examples in this bullet for improved clarity and consistency with another of the proposed modifications to the Addendum. The modification to the example of "excessive pipe corrosion" would merely be substitution of the word "culvert" for "pipe." This substitution is appropriate as the word "pipe" is essentially a slang term for "culvert." The proposed modification is indicated in double strikethrough and double underline as follows:

> "Decreased structural integrity of ditch drain (relief) culverts, waterbreaks, or other road drainage structures (e.g., excessive ~~pipe~~ culvert corrosion, breached waterbreaks, or rutted road segments)."

**Modifications to Technical Rule Addendum Number 5, Part I "Hydrologic Disconnection," Page 8, Paragraph "C", Third Bullet, Second Sentence:**

The Board proposes to modify the parenthetical reference list of site-specific conditions to include "hydrology" in addition to "soil and and geologic material present." The Board recognizes "hydrology" as an important site-specific condition for consideration by the RPF. Inclusion of "hydrology" in the parenthetical list is likewise consistent with the remainder of the Technical Rule Addendum. The proposed modification is indicated in double underline as follows:

"Local experience, knowledge and site specific conditions (e.g., hydrology, soil and geologic material present) should be considered by the RPF in the location and spacing of ditch drains."

**Modifications to Technical Rule Addendum Number 5, Part II "Road Drainage, Energy Dissipation, Outsloping and Rolling Dips," Page 12, Paragraph "C", First Sentence:**

The Board proposes to modify this sentence to substitute the term "outside edge" for the term "fill slope" in order to improve the clarity of the description of outsloped roads in this paragraph. The proposed modification is indicated in double strikethrough and double underline as follows:

"**C. Logging Road Outsloping and Installation of Rolling Dips**
Outsloped roads are built with a slight angle of the road surface towards the ~~fill slope~~ outside edge (Refer to Figure 4)."

**Modifications to Technical Rule Addendum Number 5, Part IV "Crossings with Higher Risk of Failure and Higher Risk to the Environment," Page 15, Sentences 6-8:**

The Board proposes to modify sentences 6-8 in Part IV of the Technical Rule Addendum for improved clarity of the paragraph on high risk crossings.

The purely editorial changes include substitution of the word “culvert” for “pipe” consistent with the proposed modification of the parenthetical examples in the seventh bullet of paragraph “B” in “Part I Hydrologic Disconnection,” Page 7. The changes also include greater description of the purpose for utilization of “large rock” and substitution of the more appropriate word “becomes” for the word “is” in relation to culvert plugging. The proposed modifications are indicated in double strikethrough and double underline as follows:

“Where culverts are used, and fills are large, Cafferata et al. (2004) recommend that the diameter of the culvert be increased by 6 inches for every 5 feet of fill above the ~~pipe~~ culvert on the discharge side of the crossing. The additional culvert diameter reduces the risk of failure by allowing more room for transport of flow, sediment and debris, and is relatively inexpensive compared to the cost of replacement of a failed crossing. Crossings may also be reinforced by utilizing large rock designed to resist movement during high flows to line fill faces and by incorporating large critical dips to allow flow passage if the culvert ~~is~~ becomes plugged.”

**Modifications to Technical Rule Addendum Number 5, Part V “Tables and Figures,” Page 17, Captions below Figures 2 and 4:**

The Board proposes to modify the captions for Figures 2 and 4 to indicate permission for their use has been obtained. An example of this proposed modification is excerpted below from the caption of “Figure 2.” The modification is indicated in double strikethrough as follows:

“Figure 2. Diagram showing implementation of road drainage disconnection facilities/structures to limit sediment delivery into a watercourse. Note the absence of an apparent critical dip at the crossing. (modified from Oregon Forest Resources Institute 2011, 2nd Ed., used with permission ~~(to be obtained)~~).”

## PUBLIC COMMENTS

At the hearing, any person may present statements or arguments, orally or in writing, relevant to the proposed action described in the 15-Day Notice. The Board requests, but does not require, that persons who make oral comments at the hearing also submit a summary of their statements. Additionally, pursuant to Government Code § 11125.1, any information presented to the Board during the open hearing in connection with a matter subject to discussion or consideration becomes part of the public record. Such information shall be retained by the Board and shall be made available upon request.

## WRITTEN COMMENT PERIOD

Any person, or authorized representative, may submit written comments relevant to the proposed regulatory action to the Board. **The written comment period ends at 5:00 P.M., on Monday, January 20, 2014.** The Board will consider only written comments received at the Regulations Coordinator’s Office by that time (in addition to those comments received at the public hearing).

The Board requests, but does not require, that persons who submit written comments to the Board reference the title of the rulemaking proposal in their comments to facilitate review.

Written comments may be submitted by U.S. mail to the following address:

Board of Forestry and Fire Protection
Attn: Eric K. Huff
Regulations Coordinator
P.O. Box 944246
Sacramento, CA 94244-2460

Written comments can also be hand delivered or sent by courier to the contact person listed in this notice at the following address:

Board of Forestry and Fire Protection
Room 1506-14
1416 9th Street
Sacramento, CA

Written comments may also be sent to the Board via facsimile at the following phone number:

(916) 653-0989

Written comments may also be delivered via e-mail at the following address:

board.public.comments@fire.ca.gov

**UPDATED INFORMATIVE DIGEST/POLICY STATEMENT OVERVIEW**

On November 7, 2013, following consideration of the Final Statement of Reasons, including staff responses to written public comments, the California Board of Forestry and Fire Protection (Board) made its final adoption of the rulemaking proposal entitled, "Road Rules, 2013." This action followed the Board's tentative adoption of the Initial Statement of Reasons and rule text with a number of seemingly non-substantive rule text and Addendum modifications following a public hearing on October 9, 2013.

The adopted rule text, Final Statement of Reasons, and accompanying support documents were submitted to the Office of Administrative Law (OAL) for review and approval on November 18, 2013. In the course of its review of the rulemaking submission, OAL determined the modifications adopted by the Board following the October 2013 public hearing were not inconsequential, but were sufficiently related to the 45-day Noticed rule text. The Board was therefore required pursuant to Government Code Section 11346.8(c) to provide additional public noticing of the proposed modifications to the 45-day Noticed rule text.

The Board subsequently withdrew the rulemaking file from further OAL review in order to provide the necessary additional noticing. The Board anticipates resubmission of the rulemaking file to OAL in February 2014 pending the outcome of the public hearing on the rule text and addendum modifications described in this 15-day Notice.

## CONTACT PERSON

Requests for copies of the proposed text of the regulations, the *Final* and *Initial Statements of Reasons*, modified text of the regulations and any questions regarding the substance of the proposed action may be directed to:

Eric K. Huff
Regulations Coordinator
California Department of Forestry and Fire Protection
P.O. Box 944246
Sacramento, CA 94244-2460
(916) 653-9633

The designated backup person in the event Mr. Huff is not available is Mr. George Gentry, Executive Officer of the Board of Forestry and Fire Protection. Mr. Gentry may be contacted at the above address or by phone at (916) 653-8007.

## AVAILABILITY OF STATEMENT OF REASONS AND TEXT OF PROPOSED REGULATIONS

The Board has prepared an *Initial Statement of Reasons* and *Final Statement of Reasons* for the "Road Rules, 2013" rulemaking proposal. These documents provide an explanation of the purpose, background, and justification for the Board's adoption of the proposal. The statements are available from the contact person on request. If the rule text modifications discussed in this Notice are adopted by the Board as proposed on January 29, 2014, the *Final Statement of Reasons* will be amended to reflect the comments and responses received during the written comment period and public hearing on this 15-day Notice.

When the amendments to the *Final Statement of Reasons* have been prepared, these amendments to the statement will be available from the contact person on request.

A copy of the express terms and 45-day Notice rule text of the original proposed action using UNDERLINE to indicate an addition to the California Code of Regulations and ~~STRIKETHROUGH~~ to indicate a deletion is also available from the contact person named in this notice.

The Board will have the entire rulemaking file, including all information considered as a basis for this proposed regulation, available for public inspection and copying throughout the rulemaking process at the following address:

California Department of Forestry and Fire Protection
Resources Building
Room 1517
1416 9th St.
Sacramento, CA 95814
Attention: Eric K. Huff
Tel: (916) 653-9633

All of the above referenced information is also available on the Board website at:

http://www.bof.fire.ca.gov/regulations/proposed_rule_packages/

**15-DAY NOTICE RULE TEXT MODIFICATIONS**

Proposed modifications to the rule text previously adopted by the Board following a public hearing on October 9, 2013 are identified in the 15-Day Notice of Rulemaking rule text as follows:

Existing CCR Text ----- No underline or strikethrough

45-day Notice rule text changes ----- single underline or ~~single strikethrough~~

Deletions of rule text proposed in the 15-Day Notice ----- ~~double strikethrough~~

Additions to rule text proposed in the 15-Day Notice ----- double underline

**AVAILABILITY OF CHANGED OR MODIFIED TEXT**

After holding the hearing and considering all timely and relevant comments received, the Board may adopt the proposed regulations substantially as described in this notice. If the Board again makes modifications which are sufficiently related to the originally proposed text, it will again make the modified text—with the changes clearly indicated—available to the public for at least 15 days before the Board adopts the regulations as revised.

Notice of the comment period and the full text as modified, will be sent to any person who:

a) testified at the hearings,

b) submitted comments during the public comment period, including written and oral comments received at the public hearing, or

c) requested notification of the availability of such changes from the Board.

Requests for copies of the modified text of the regulations may be directed to the contact person listed in this notice.

The Board will accept written comments on the modified regulations for no less than 15 days from the date on which they are made publicly available.

Eric K. Huff, RPF No. 2544
Regulations Coordinator
California Department of Forestry and Fire Protection

# BOARD OF FORESTRY AND FIRE PROTECTION

## 15 - DAY NOTICE OF RULEMAKING

## "ROAD RULES, 2013"

[Notice Date – January 3, 2014]

**Title 14 of the California Code of Regulations (14 CCR),**
**Division 1.5, Chapter 4, Subchapters 1, 4, 5, 6, Articles 4, 5, 6, 8, and 12;**
**Subchapter 7, Articles 2, 6.5, 6.8, 6.9, and 7**

**Amend:**

| | |
|---|---|
| **§ 895.1** | **Definitions** |
| **§ 914.7 [934.7, 954.7]** | **Timber Operations, Winter Period** |
| **§ 914.8 [934.8, 954.8]** | **Tractor Road Watercourse Crossing** |
| **§ 915.1 [~~934.8, 954.8~~ 935.1, 955.1]** | **Use of Heavy Equipment for Site Preparation** |
| **§ 916.3 [936.3, 956.3]** | **General Limitations Near Watercourses, Lakes, Marshes, Meadows and Other Wet Areas** |
| **§ 916.4 [936.4, 956.4]** | **Watercourse and Lake Protection** |
| **§ 916.9 [936.9, 956.9]** | **Protection and Restoration of the Beneficial Functions of the Riparian Zone in Watersheds with Listed Anadromous Salmonids** |
| **§ 1034** | **Contents of Plan** |
| **§ 1051.1** | **Contents of Modified THP** |
| **§ 1090.5** | **Contents of NTMP** |
| **§ 1090.7** | **Notice of Timber Operations Content** |
| **§ 1092.09** | **PTHP Contents** |
| **§ 1093.2** | **Contents of Road Management Plan** |
| **§ 1104.1** | **Conversion Exemptions** |

**Repeal:**

| | |
|---|---|
| **§ 918.3 [938.3, 958.3].** | **Roads to be Kept Passable** |
| **§ 923 [943, 963]** | **Logging Roads and Landings** |
| **§ 923.1 [943.1, 963.1]** | **Planning for Roads and Landings** |
| **§ 923.2 [943.2, 963.2]** | **Road Construction** |
| **§ 923.3 [943.3, 963.3]** | **Watercourse Crossings** |
| **§ 923.4 [943.4, 963.4]** | **Road Maintenance** |
| **§ 923.5 [943.5, 963.5]** | **Landing Construction** |
| **§ 923.6 [943.6, 963.6]** | **Conduct of Operations on Roads and Landings** |
| **§ 923.8 [943.8, 963.8]** | **Planned Abandonment of Roads, Watercourse Crossings, and Landings** |
| **§ 923.9 [943.9, 963.9]** | **Roads and Landings in Watersheds with Listed Anadromous Salmonids** |
| **§ 923.9.1 [943.9.1]** | **Measures for Roads and Landings in Watersheds with Coho Salmon** |

**Renumber:**

**§923.7 [943.7, 963.7] to 923.9.1 [943.9.1, 963.9.1]. Licensed Timber Operator Responsibility for Roads and Landings.**

**Adopt:**

| | |
|---|---|
| **§ 923 [943, 963]** | **Intent for Logging Roads, Landings, and Logging Road Watercourse Crossings** |
| **§ 923.1 [943.1, 963.1]** | **Planning for Logging Roads and Landings** |
| **§ 923.2 [943.2, 963.2]** | **Design and Location of Logging Roads and Landings** |

**§ 923.3 [943.3, 963.3] Mapping and Identification of Logging Roads and Landings**

**§ 923.4 [943.4, 963.4] Construction and Reconstruction of Logging Roads and Landings**

**§ 923.5 [943.5, 963.5] Erosion Control for Logging Roads and Landings**

**§ 923.6 [943.6, 963.6] Use of Logging Roads and Landings**

**§ 923.7 [943.7, 963.7] Maintenance and Monitoring of Logging Roads and Landings**

**§ 923.8 [943.8, 963.8] Abandonment and Deactivation of Logging Roads and Landings**

**§ 923.9 [943.9, 963.9] Watercourse Crossings [All Districts]**

**§ 923.9.1 [943.9.1, 963.9.1] Licensed Timber Operator Responsibility for Roads and Landings**

**Technical Rule Addendum Number 5 – "Guidance on Hydrologic Disconnection, Road Drainage, Minimization of Diversion Potential, and High Risk Crossings."**

**Amend 14 CCR § 895.1. Definitions.**

**Abandoned Road** means a logging road on which proactive measures have been applied to effectively remove it from the permanent road network.

**Abandonment** means ~~leaving a logging road reasonably impassable to standard production four wheel-drive highway vehicles, and leaving a logging road and landings, in a condition which provides for long-term functioning of erosion controls with little or no continuing maintenance.~~ implementing measures to effectively remove an existing logging road, landing, or logging road watercourse crossing from the permanent road network.

**Appurtenant Road** means a logging road under the ownership or control of the timber owner, timberland owner, timber operator, or plan submitter that will be used for log hauling.

**Berm** means ~~a curb or dike constructed to control water and prevent roadway runoff waters from discharging onto roadside slopes and/or to provide material for subsequent road maintenance.~~a curb, dike, or linear mound of earth that is constructed to control water and direct roadway runoff waters or that has developed through road grading activities.

**Connected Headwall Swale** means a geomorphic feature consisting of a concave depression with convergent slopes, typically of 65 percent or greater steepness that is connected to a watercourse or lake by way of a continuous linear depression and that has been sculpted over geologic time by shallow landslide events. The slope profile is typically smooth and unbroken by benches, but may be interrupted by recent landslide deposits or scars. Emergent groundwater and wet areas may exist at the base of the swale. Soil and colluvium depth is typically greatest at the axis of the swale, thinning to either side.

**Critical Dip** means a constructed dip or low point across a logging road surface down grade from, or over, a logging road watercourse crossing that functions to prevent crossing overflow from draining down the road and minimizes fill erosion.

**Crowning** means creating a road surface with a convex cross sectional profile that drains runoff toward both sides of the road.

**Deactivated Road** means a logging road that is part of the permanent road network where measures have been implemented to prevent active use by logging trucks and standard production four-wheel drive highway vehicles.

**Deactivation** means implementing measures necessary to prevent the active use of an existing logging road, landing, or logging road watercourse crossing.

~~**End-Hauling** means the removal and transportation of excavated excavated material to prevent sidecast .~~

**Excess Material** means excavated material that is not used ~~or needed~~ as a functional part of the road or ~~a~~ landing. Excess material is synonymous with spoils.

**Extended Wet Weather Period** means the period from October 15 to May 1.

**Fill** means material that is mechanically placed ~~in low areas~~ and built up in compacted lifts to form a ~~the~~ roadbed or landing surface. Fill includes the material placed around culverts and related drainage structures at logging road watercourse crossings.

**Ford** means a logging road watercourse crossing where the road grade dips through the watercourse channel.

**Harvest Area** means the area where trees are felled and removed.

**Hydrologic Disconnection** means the removal of direct routes of drainage or overland flow of road runoff to a watercourse or lake ~~by directing drainage or overland flow onto stable portions of the forest floor to dissipate energy, facilitate percolation, and resist or prevent erosion or channelization~~.

**Insloping** means shaping the logging road or landing surface to drain toward a cutbank or inside ditch.

**Outsloping** means shaping the road surface to drain toward the outside edge of the logging road or landing.

**Permanent ~~r~~Road** means~~ a road which is planned and constructed to be part of a permanent all-season transportation facility. These roads have a surface which is suitable for the hauling of forest products throughout the entire winter period and have drainage structures, if any, at watercourse crossings which will accommodate the fifty-year flood flow. Normally they are maintained during the winter period.~~ a logging road that is part of the permanent road network and is designed for year-round use. These roads have a surface that is suitable for maintaining a stable operating surface throughout the year.

**Permanent Road Network** means the permanent, seasonal, ~~and~~ temporary, and deactivated roads, including appurtenant roads, that provide the infrastructure necessary for timber operations and forest management. Abandoned roads are not part of the permanent road network.

**Permanent Watercourse Crossing** means a watercourse crossing that ~~will be constructed to accommodate the estimated fifty-year flood flow and~~ will remain in place when timber operations have been completed.

**Prescribed Maintenance Period** means the time period, beginning with filing of the work completion report, provided that the report is subsequently approved, during which erosion controls ~~which~~ that are required and constructed as part of ~~a~~ timber operations must be

maintained in a functional condition. ~~The period shall not exceed three years from the filing of the work completion report provided that the report is subsequently approved by the director.~~

**Reconstructed ~~r~~Roads** means those existing roads that are to be restored or improved to make useable for hauling forest products; "reconstructed" does not include ~~routine or annual~~ road maintenance or rehabilitation that does not require substantial change in the original prism of the road.

**Road approach** means the portion of the logging road surface that drains overland water flow to the watercourse crossing.

**Road Maintenance** means activities that do not require substantial change to the logging road prism to maintain stable operating surfaces, functioning logging road drainage facilities and structures, and stable cutbanks and fill slopes. Examples of road maintenance may include rocking a road surface; localized shaping or outsloping; installation and maintenance of rolling and critical dips; restoring functional capacity of inboard ditches, cross drains, or culverts; and repairing water bars.

**Road Prism** means all parts of a road including cut banks, ditches, road surfaces, road shoulders, and road fills.

**Seasonal ~~r~~Road** means a ~~road which is planned and constructed as part of a permanent transportation facility where: 1) commercial hauling may be discontinued during the winter period, or 2) the landowner desires continuation of access for fire control, forest management activities, Christmas tree growing, or for occasional or incidental use for harvesting of minor forest products, or similar activities. These roads have a surface adequate for hauling of forest~~

~~products in the non-winter periods, and in the extended dry periods or hard frozen conditions occurring during the winter period; and have drainage structures, if any, at watercourse crossing which will accommodate the fifty-year flood flow. Some maintenance usually is required~~ logging road that is part of the permanent road network that is not designed for year-round use. These roads have a surface that is suitable for maintaining a stable operating surface during the ~~season~~ period of use.

**Sidecast** means excess earthen material pushed or dumped ~~to or~~ over the side of a road~~s~~ or landing~~s~~.

**Significant Sediment Discharge** means soil erosion that is currently, or, as determined based upon visible physical conditions, may be in the future, discharged to watercourses or lakes in quantities that violate Water Quality Requirements or result in significant individual or cumulative adverse impacts to the beneficial uses of water. One indicator of a Significant Sediment Discharge is a visible increase in turbidity to receiving Class I, II, III, or IV waters.

**Significant Existing or Potential Erosion Site** means a location where soil erosion is currently, or there are visible physical conditions to indicate soil erosion may be in the future, discharged to watercourses or lakes in quantities that violate Water Quality Requirements or result in significant individual or cumulative adverse impacts to the beneficial uses of water.

**Temporary ~~r~~Road** means a logging road that is to be used only during ~~the~~ timber operations and that will be deactivated or abandoned upon completion of use. ~~These roads have a surface adequate for seasonal logging use and have drainage structures, if any, adequate to carry the anticipated flow of water during the period of use.~~

**Through Cut** means a section of road that lies below the adjacent ground level on both sides of the road.

**Amend 14 CCR § 914.7 [934.7, 954.7]. Timber Operations, Winter Period.**

During the winter period:

**(a)** Mechanical site preparation and timber harvesting, shall not be conducted unless a winter period operating plan is incorporated in the timber harvesting plan and is followed, or unless the requirements of subsection (c) are met. Cable, helicopter and balloon yarding methods are exempted.

**(b)** The winter period operating plan shall include the specific measures to be taken in the winter operating period ~~timber operations~~ to ~~minimize damage due to~~ avoid or substantially lessen erosion, soil movement into watercourses and soil compaction from ~~felling, yarding, loading, mechanical site preparation, and erosion control activities~~ timber operations. A winter period operating plan shall address the following subjects:

**(1)** Erosion hazard rating.

**(2)** Mechanical site preparation methods.

**(3)** Yarding system (constructed skid trails and tractor road watercourse crossings).

**(4)** Operating Period.

**(5)** Erosion control facilities timing.

**(6)** Consideration of form of precipitation-rain or snow.

**(7)** Ground conditions (soil moisture condition, frozen).

**(8)** Silvicultural system-ground cover.

**(9)** Operations within the WLPZ.

**(10)** Equipment use limitations.

**(11)** Known unstable areas.

**(12)** Logging roads and landings.

**(c)** In lieu of a winter period operating plan, the RPF can specify the following measures in the THP:

**(1)** Tractor yarding or the use of tractors for constructing logging roads, landings, watercourse crossings, layouts, firebreaks or other tractor roads shall be done only during dry, rainless periods and shall not be conducted on saturated soil conditions that may produce significant sediment discharge. ~~sediment in quantities sufficient to cause a visible increase in turbidity of downstream waters in receiving Class I, II, III or IV waters or that violate Water Quality Requirements.~~ *****

**Amend** § **914.8 [934.8, 954.8] Tractor Road Watercourse Crossing**

********(d)** Tractor road ~~W~~watercourse crossing facilities ~~not constructed to permanent crossing standards on tractor roads~~ shall be removed and stabilized before the beginning of the winter period~~. If a watercourse crossing is to be removed, it shall be removed in accordance with~~ to the standards of 14 CCR § ~~923.3(d) [943.3(d), 963.3(d)]~~ 923.9 [943.9, 963.9], subsections (p)(1)-(4), or as specified in the winter period operating plan. The RPF may propose an exception if explained and justified in the plan~~,~~. The exception may be approved if ~~and~~ found by the Director to be in conformance with this article.*****

**Amend 14 CCR § 915.1 [935.1, 955.1]. Use of Heavy Equipment for Site Preparation.**

**(a)** Use of heavy equipment for site preparation shall comply with the provisions set forth in 14 CCR 914.2 [934.2, 954.2].

**(b)** Heavy equipment shall not be used for site preparation under saturated soil conditions that may produce significant sediment discharge ~~sediment in quantities sufficient to cause a visible increase in turbidity of downstream waters in receiving Class I, II, III or IV waters; that violate Water Quality Requirements~~; or when it cannot operate under its own power due to wet conditions.*****

**Amend** § **916.3 [936.3, 956.3]. General Limitations Near Watercourses, Lakes, Marshes, Meadows and Other Wet Areas**

***** **(c)** The timber operator shall not ~~construct or reconstruct roads,~~ construct or use tractor roads ~~or landings~~ in Class I, II, III or IV watercourses, in the WLPZ, marshes, wet meadows, and other wet areas unless when explained and justified in the ~~THP~~ plan by the RPF, and approved by the Director, except as follows:

**(1)** At prepared tractor road crossings as described in 14 CCR § 914.8(b) [934.8(b), 954.8(b)].

**(2)** Crossings of Class III watercourses ~~which~~ that are dry at the time of ~~timber operations~~ use.

~~**(3)** At existing road crossings.~~

~~**(4)**~~**(3)** At new and existing tractor ~~and~~ road crossings approved as part of the Fish and Game Code process (F&GC 1600 et seq.).*****

~~Use of existing roads is addressed in 916.4(a) [936.4(a), 956.4(a)].~~

**Amend 916.4 [936.4, 956.4]. Watercourse and Lake Protection.**

**(a)** The RPF or supervised designee shall conduct a field examination ~~of~~ and map all lakes and Class I, II, III, and IV watercourses ~~and shall map all lakes and watercourses which contain or conduct Class I, II, III or IV waters~~.

**(1)** As part of this field examination, the RPF or supervised designee shall evaluate areas near, and areas with the potential to directly impact, watercourses and lakes for sensitive conditions including, but not limited to, existing and proposed roads, skidtrails and landings, unstable and erodible watercourse banks, unstable upslope areas, debris, jam potential, inadequate flow capacity, ~~changeable~~ migrating channels, overflow channels, flood prone areas, and riparian zones wherein the values set forth in 14 CCR §§ 916.4~~(b)~~ [936.4~~(b)~~, 956.4~~(b)~~], subsection(b) are impaired.*****

**<u>Amend</u> § 916.9 [936.9, 956.9]. Protection and Restoration of the Beneficial Functions of the Riparian Zone in Watersheds with Listed Anadromous Salmonids.**

In addition to all other district Forest Practice Rules, the following requirements shall apply in any watershed with listed anadromous salmonids. Requirements of 14 CCR § 916.9 [936.9, 956.9] precede other sections of the FPRs.

~~*[Effective 1-1-2008 pursuant to Public Resources Code section 4554.5(a); operative the date Department of Fish and Game regulations 14 CCR sections 787.0-787.9 become effective] In addition to all other district Forest Practice Rules, the following requirements shall apply in any planning watershed with threatened or impaired values, except in watersheds with coho salmon where the standards listed under 916.9.1 and 916.9.2 shall apply:*~~

**Geographic scope -** Requirements for watersheds with listed anadromous salmonids differ depending on the geographic location of the watershed and geomorphic characteristics of the watercourse. Unique requirements for watersheds with listed anadromous salmonids are set forth for 1) watercourses in the coastal anadromy zone with confined channels, 2) watercourses with flood prone areas or channel migration zones, and 3) watercourses with confined channels located outside the coastal anadromy zone.

Watersheds which do not meet the definition of "watersheds with listed anadromous salmonids" are not subject to this section except as follows: The provisions of 14 CCR 916.9 [936.9, 956.9], subsections (k)-(q), ~~923.3 [943, 963] and 923.9 [943.9, 963.9]~~ also apply to planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids for purposes of reducing significant adverse impacts from transported fine sediment. Projects in other watersheds further upstream that flow into watersheds with listed anadromous salmonids, not otherwise designated above, may be subject to these provisions based on an assessment consistent with cumulative impacts assessment requirements in 14 CCR §§ 898 and 912.9 [932.9, 952.9] and Technical Rule Addendum No. 2, Cumulative Impacts Assessment. These requirements do not apply to upstream watersheds

where permanent dams attenuate the transport of fine sediment to downstream watercourses with listed anadromous salmonids.*****

*******(f) Class I watercourses -**

**(1)** For Class I watercourses, where fish are always or seasonally present or where fish habitat is restorable, any plan involving timber operations within the WLPZ shall contain the following information:

**(A)** Clear and enforceable specifications of timber operations within the Class I WLPZ, including a description of how any disturbance, or log or tree cutting and removal shall be carried out to conform with 14 CCR §§ 916.2 [936.2, 956.2], subsection (a) and 916.9 [936.9, 956.9], subsection (a).

~~**(B)** A description of all existing permanent logging road watercourse crossings.~~

~~**(C)** Clear and enforceable specifications describing how these crossings are to be modified, used, and treated to minimize risks, giving special attention to allowing fish to pass both upstream and downstream during all life stages.~~

~~**(D)** Clear and enforceable specifications for construction and operation of any new crossing(s) of a Class I watercourse to prevent direct harm, habitat degradation, water velocity increase, hindrance of fish passage, or other potential impairment of beneficial uses of water~~

**(~~E~~B)** Documentation of how proposed harvesting in the WLPZ contributes to the objectives of each zone stated in 14 CCR § 916.9 [936.9, 956.9], subsection (c) and other goals in 14 CCR § 916.9 [936.9, 956.9], subsection (a) (1)-(8). Documentation shall include the examinations, analysis, and other requirements listed in 14 CCR § 916.4 [936.4, 956.4], subsection (a).*****

******* (3) Class I watercourses with flood prone areas or channel migration zones:*******

***** **(E) Preferred Management Practices in the Inner Zone A and B of Flood Prone Areas*****

- ~~**4. Avoid Road and Landing Use:** All new roads and landings shall be located outside of zone. When feasible, minimize use of existing roads and landings in the flood prone area. No servicing of equipment within the flood prone area. Exceptions include the use of roads and landings to accomplish actions to improved salmonid habitat conditions stated 14 CCR § 916.9 [936.9, 956.9]. subsection (f)(3)(E(1.) above.~~

**~~5.~~4. Avoid Slash concentration and site preparation:*****

**~~6.~~5. Delineate Zone on the Ground:*****

**~~7.~~6. Avoid Use of Water Drafting Sites:*****

**~~8.~~7. Avoid Disturbance to Critical Flood Prone Area Habitat:*****

*****(k) Year-round ~~logging road, landing and~~ tractor road use limitations.**

**(1)** ~~Logging roads, landings or T~~tractor roads shall not be used when operations may result in significant sediment discharge. ~~visibly turbid water from the road, landing or tractor road (skid trail) or an inside ditch associated with the logging road, landing or tractor road may produce sediment in quantities sufficient to cause a visible increase in turbidity of downstream waters in receiving Class I, II, III or IV waters or violate Water Quality Requirements.~~

~~**(2)** Log hauling on logging roads and landings shall be limited to those which are hydrologically disconnected from watercourses to the extent feasible, and exhibit a stable operating surface in conformance with (1) above.~~

~~**(3)** Concurrent with use for log hauling, approaches to logging road watercourse crossings shall be treated for erosion control as needed to minimize soil erosion and sediment transport and to prevent the discharge of sediment into watercourses and lakes in quantities deleterious to the beneficial uses of water.~~

~~**(4)** Concurrent with use for log hauling, all traveled surfaces of logging roads in a WLPZ~~

~~or within any ELZ or EEZ designated for watercourse or lake protection shall be treated for erosion control as needed to minimize soil erosion and sediment transport and to prevent the discharge of sediment into watercourses and lakes in quantities deleterious to the beneficial uses of water.~~

~~**5)** Grading to obtain a drier running surface more than one time before reincorporation of any resulting berms back into the road surface is prohibited.~~

**(l) Extended Wet Weather Period -** ~~October 15 to May 1 shall be considered the extended wet weather period and the following shall apply :~~

~~**(1)**~~ No timber operations shall take place unless the approved plan incorporates a complete winter period operating plan pursuant to
14 CCR § 914.7 [934.7, 954.7]. subsection (~~a~~b). ~~that specifically addresses, where applicable, proposed logging road, landing or tractor road construction, reconstruction and useduring the extended wet weather period Where logging road watercourse crossing construction or reconstruction is proposed an implementation schedule shall be specified.~~

**(~~2~~1)** Unless the winter period operating plan proposes operations during an extended wet weather period with low antecedent soil wetness, no tractor roads shall be constructed, reconstructed, or used on slopes that are over 40 percent and within 200 feet of a Class I, II, or III watercourse, as measured from the watercourse or lake transition line ~~during the extended wet weather period~~.

~~**(3)** Logging roads, landings and tractor roads shall not be used when sediment from the logging road, landing or tractor road surface is transported to a watercourse or a drainage facility that discharges into a watercourse in amounts sufficient to cause a visible increase in turbidity in Class I, II, III, or IV waters.~~

~~**(4)** Logging roads and landings shall not be used for log hauling when saturated soil conditions result in the visible increase in turbidity specified in (3) above.~~*****

***** **(n) Treatments to stabilize soils -** Within the WLPZ, and within any ELZ or EEZ designated for watercourse or lake protection, treatments to stabilize soils, minimize soil erosion, and prevent significant sediment discharge ~~the discharge of sediment into watercourses or lakes in amounts deleterious to aquatic species or the quality and beneficial uses of water, or that threaten to violate applicable water quality requirements~~, shall be described in the plan as follows.

**(1)*****

~~**(C)** Disturbed road cut banks and fills, and~~

**(~~D~~C)** Any other area of disturbed soil that threatens to discharge sediment into waters in amounts that would result in a significant sediment discharge ~~deleterious to the quality and beneficial uses of water~~.

**(2)** Soil stabilization treatment measures may include, but need not be limited to, removal, armoring with rip-rap, replanting, mulching, ~~rip-rapping~~, ~~grass~~ seeding, installing commercial erosion control devices to manufacturer's specifications, or chemical soil stabilizers.

**(3)*****

*****(o) [Section reserved for future use.] ~~**Erosion site identification and remedies -*****~~

*****(p) [Section reserved for future use.]~~**Erosion control maintenance period** - The erosion control maintenance period on permanent and seasonal roads and associated landings that are not abandoned in accordance with 14 CCR § 923.8 [943.8, 963.8] shall be three years.~~

*****

*****(r) [Section reserved for future use.]~~**Water drafting** - Water drafting for timber operations shall:~~

~~**(1)** Comply with Fish and Game Code Section 1600, et seq.~~

~~**(A)** Timber operations conducted under a Fish and Game Code Section 1600 master or long-term agreement that includes water drafting may provide proof of such coverage for compliance with this paragraph.~~

~~**(2)** Describe the water drafting site conditions and proposed water drafting activity in the plan, including:~~

~~**(A)** a general description of the conditions and proposed water drafting;~~

~~**(B)** a map showing proposed water drafting locations;~~

~~**(C)** the watercourse classification;~~

~~**(D)** the drafting parameters including the months the site is proposed for use; estimated total volume needed per day; estimated maximum instantaneous drafting rate and filling time; and disclosure of other water drafting activities in the same watershed;~~

~~**(E)** the estimated drainage area (acres) above the point of diversion;~~

~~**(F)** the estimated unimpeded streamflow, pumping rate, and drafting duration,~~

~~**(G)** a discussion of the effects on aquatic habitat downstream from the drafting site(s) of single pumping operations, or multiple pumping operations at the same location, and at other locations in the same watershed;~~

~~**(H)** a discussion of proposed alternatives and measures to prevent adverse effects to fish and wildlife resources, such as reducing hose diameter; using gravity-fed tanks instead of truck pumping; reducing the instantaneous or daily intake at one location; describing allowances for recharge time; using other dust palliatives; and drafting water at alternative sites; and~~

~~**(I)** The methods that will be used to measure source streamflow prior to the water drafting operation and the conditions that will trigger streamflow to be measured during the operation.~~

~~**(3)** All water drafting for timber operations are subject to each requirement below unless the Department of Fish and Game modifies the requirement in the Lake or Streambed Alteration agreement that authorized the drafting operation, or unless otherwise specified below:~~

~~**(A)** All intakes shall be screened to prevent impingement of juvenile fish against the screen. The following requirements apply to screens and water drafting on Class I waters:~~

~~**1.** Openings in perforated plate or woven wire mesh screens shall not exceed 3/32 inches (2.38 millimeters). Slot openings in wedge wire screens shall not exceed 1/16 inches (1.75 millimeters).~~

~~**2.** The screen surface shall have at least 2.5 square feet of openings submerged in water.~~

~~**3**. The drafting operator shall regularly inspect, clean, and maintain screens to ensure proper operation whenever water is drafted.~~

~~**4**. The approach velocity (water moving through the screen) shall not exceed 0.33 feet/second.~~

~~**5.** The diversion rate shall not exceed 350 gallons per minute.~~

~~**(B)** Approaches and associated drainage features to drafting locations within a WLPZ or channel zone shall be surfaced with rock or other suitable material to minimize generation of sediment.~~

~~**(C)** Barriers to sediment transport, such as straw waddles, logs, straw bales or sediment fences, shall be installed outside the normal high water mark to prevent sediment delivery to the watercourse and limit truck encroachment.~~

~~**(D)** Water drafting trucks parked on streambeds and floodplains shall use drip pans or other devices such as absorbent blankets, sheet barriers or other materials as needed to prevent soil and water contamination from motor oil or hydraulic fluid leaks.~~

~~**(E)** Bypass flows for Class I watercourses shall be provided in volume sufficient to avoid dewatering the watercourse and maintain aquatic life downstream, and shall conform to the following standard:~~

~~**1**. Bypass flows in the source stream during drafting shall be at least 2 cubic feet per second.~~

~~**2.** Diversion rate shall not exceed 10 percent of the surface flow.~~

~~**3.** Pool volume reduction shall not exceed 10 percent.~~

~~**(F)** The drafting operator shall keep a log that records for each time water is drafted, the date, total pumping time, pump rate, starting time, ending time, and volume diverted. Logs shall be filed with the Department of Forestry and Fire Protection at the end of seasonal operations and maintained with the plan record. This requirement may be modified in the approved plan that covers the water drafting, but only with concurrence from the Department of Fish and Game.~~

~~**(G)** Before commencing any water drafting operation, the RPF and the drafting operator shall conduct a pre-operations field review to discuss the water drafting measures in the plan and/or Lake or Streambed Alteration Agreement.~~*****

**(v) Site-specific measures or nonstandard operational provisions*****

**Repeal** § **918.3 [938.3, 958.3].** ~~**Roads to be Kept Passable**~~

~~Timber operators shall keep all logging truck roads in a passable condition during the dry season for fire truck travel until snag and slash disposal has been completed.~~

**Amend Article 12. [Article 11. Northern] Logging Roads, Landings, and Logging Road Watercourse Crossings.** ~~**Logging Roads and Landings**~~

**Adopt § 923 [943,963]. Intent for Logging Roads, Landings, and Logging Road Watercourse Crossings.**

**(a)** All logging roads, landings, and logging road watercourse crossings in the logging area shall be planned, constructed, reconstructed, used, maintained, removed, abandoned, and deactivated in a manner that:

**(1)** Is consistent with long-term enhancement and maintenance of the forest resource.

**(2)** Accommodates appropriate yarding systems.

**(3)** Is economically feasible.

**(b)** Such planning, construction, reconstruction, use, maintenance, removal, abandonment, and deactivation shall occur in a manner that considers safety and avoids or substantially lessens significant adverse impacts to, among other things:

**(1)** Fish and wildlife habitat and listed species of fish and wildlife.

**(2)** Water quality and the beneficial uses of water.

**(3)** Soil resources.

**(4)** Significant archeological and historical sites.

**(5)** Air quality.

**(6)** Visual resources.

**(7)** Fire hazard.

**(c)** The RPF may propose exceptions to the rules of this Article if explained and justified in the plan and found by the Director not to result in a significant adverse impact on the environment.

**(d)** Exceptions may also be provided through application of Fish and Game Code Sections 1600 et seq. and shall be made an enforceable part of the plan in accordance with 14 CCR §§ 1039, 1040, 1090.14, 1092.26, or 1092.27, as appropriate.

**(e)** For watersheds with listed anadromous salmonids and for planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids all logging roads, landings, and logging road watercourse crossings shall be planned, designed, constructed and reconstructed, used, maintained, abandoned, deactivated, and removed in accordance with 14 CCR § 916.9 (a) and (c) [936.9 (a) and (c), 956.9 (a) and (c)].

**(f)** The provisions of Articles 12 [Article 11 for Northern District] that apply in watersheds with listed anadromous salmonids and in planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids shall not apply to a plan that is subject to:

**(1)** A valid incidental take permit issued by ~~DFG~~ CDFW pursuant to Section 2081(b) of the Fish and Game Code that addresses anadromous salmonid protection; or

**(2)** A federal incidental take statement or incidental take permit that addresses anadromous salmonid protection, for which a consistency determination has been made pursuant to Section 2080.1 of the Fish and Game Code; or

**(3)** A valid natural community conservation plan that addresses anadromous salmonid protection approved by ~~DFG~~ CDFW under section 2835 of the Fish and Game Code; or

**(4)** A valid Habitat Conservation Plan (HCP) that addresses anadromous salmonid protection, approved under Section 10 of the federal Endangered Species Act of 1973; or

**(5)** Project revisions, guidelines, or take avoidance measures pursuant to a memorandum of understanding or a planning agreement entered into between the plan submitter and ~~DFG~~ CDFW in preparation of obtaining a natural community conservation plan that addresses anadromous salmonid protection.

**Repeal § 923 [943, 963] Logging Roads and Landings**

~~All logging roads and landings in the logging area shall be planned, located, constructed, reconstructed, used, and maintained in a manner which: is consistent with long-term enhancement and maintenance of the forest resource; best accommodates appropriate yarding systems, and economic feasibility; minimizes damage to soil resources and fish and wildlife habitat; and prevents degradation of the quality and beneficial uses of water. The provisions of this article shall be applied in a manner which complies with this standard.~~

~~Factors that shall be considered when selecting feasible alternatives (see 14 CCR 897 and 898) shall include, but are not limited to, the following:~~

~~**(a)** Use of existing roads whenever feasible.~~

~~**(b)** Use of systematic road layout patterns to minimize total mileage.~~

~~**(c)** Planned to fit topography to minimize disturbance to the natural features of the site.~~

~~**(d)** Avoidance of routes near the bottoms of steep and narrow canyons, through marshes and wet meadows, on unstable areas, and near watercourses or near existing nesting sites of threatened or endangered bird species.~~

~~**(e)** Minimization of the number of watercourse crossings.~~

~~**(f)** Location of roads on natural benches, flatter slopes and areas of stable soils to minimize effects on watercourses.~~

~~**(g)** Use of logging systems which will reduce excavation or placement of fills on unstable areas.~~

**Adopt § 923.1 [943.1, 963.1]. Planning for Logging Roads and Landings.**

Logging roads and landings shall be planned and located within the context of a systematic layout pattern that considers 14 CCR § 923(b), uses existing logging roads and landings where feasible and appropriate, and provides access for fire and resource protection activities.

**(a)** Logging roads and landings shall be planned and located to minimize the following:

**(1)** Duplicative roads and total road mileage.

**(2)** The number of logging road watercourse crossings.

**(3)** Construction and reconstruction near watercourses, lakes, marshes, wet meadows, and other wet areas.

**(4)** Construction and reconstruction across steep areas that lead without flattening to Class I, II, III, or IV watercourses and lakes.

**(5)** Construction and reconstruction on unstable areas or in connected headwall swales.

**(6)** Construction and reconstruction near nesting sites of rare, threatened, or endangered bird species.

**(7)** Construction and reconstruction near populations of rare, threatened, or endangered plants.

**(8)** Ground disturbance and the size of cuts and fills.

**(9)** The potential for affecting surface hydrology, including but not limited to, concentrating or diverting runoff or draining the logging road or landing surface directly into a watercourse or lake.

**(10)** Maintenance needs while being compatible with the logging road classification and long-term road usage.

**(b)** No logging roads or landings shall be planned for construction (i) within 150 feet of the Class I watercourse transition line, (ii) within 100 feet of the Class II watercourse transition line on slopes greater than 30%, (iii) within Class I, II, III, or IV watercourses or lakes, (iv) within a WLPZ, or (v) in marshes, wet meadows, and other wet areas, except as follows:

**(1)** At existing logging road watercourse crossings.

**(2)** At logging road watercourse crossings to be constructed or reconstructed that are approved as part of the Fish and Game Code process (F&GC 1600 et seq.)

**(3)** At logging road watercourse crossings of Class III watercourses that are dry at the time of use.

**(c)** No logging roads or landings shall be planned for reconstruction (i) within Class I, II, III, or IV watercourses or lakes, (ii) within a WLPZ, or (iii) in marshes, wet meadows, and other wet areas, except as follows:

**(1)** At existing logging road watercourse crossings.

**(2)** At logging road watercourse crossings to be constructed or reconstructed that are approved as part of the Fish and Game Code process (F&GC 1600 et seq.)

**(3)** At logging road watercourse crossings of Class III watercourses that are dry at the time of use.

**(d)** Logging roads and landings shall be planned and located to avoid unstable areas and connected headwall swales. The Director may approve an exception if those areas are

unavoidable and site-specific measures to minimize slope instability due to logging road or landing construction or reconstruction are described and justified in the plan.

**(e)** As part of the planning and use of logging roads, landings, and watercourse crossings in the logging area, the RPF or supervised designee shall: (i) locate and map significant existing and potential erosion sites and (ii) specify feasible treatments to mitigate significant adverse impacts from the road or landing.

**(1)** The RPF shall evaluate all logging roads and landings in the logging area, including appurtenant roads, for evidence of significant existing and potential erosion sites.

**(2)** For significant existing and potential erosion sites identified per 14 CCR § 923.1 [943.1, 963.1] subsection (e)(1), the RPF shall consider the following key factors as part of developing necessary treatments:

**(A)** Type of road (permanent, seasonal, or temporary road), road location, expected log truck haul routes, and traffic use (e.g. volume and season) of each road segment during the life of the plan.

**(B)** Age of road and the history of sediment delivery from existing roads.

**(C)** Beneficial uses of the watercourse or lake and sensitive conditions potentially affected by the road including, but not limited to, watercourse classification and presence of listed anadromous salmonids.

**(D)** The hillslope grade, road grade of crossing approaches and the gradient of the stream channel.

**(E)** The erodibility of hillslope material exposed by the road.

**(F)** The length of hydrologic connectivity of a road segment, the physical properties of the connected segment and the presence or absence of an effective sediment filter strip.

**(G)** Site-specific information regarding the condition of and location of all existing or potential sediment sources including, but not limited to: watercourse crossings, road

approaches, ditch relief culverts, road surfaces, road cuts, road fills, inboard ditches, through-cuts, and landings.

**(3)** The RPF shall submit a list of the significant existing and potential erosion sites identified per 14 CCR § 923.1 [943.1, 963.1], subsection (e)(1) which have feasible treatments with the plan. This list shall include the following information:

**(A)** A map showing the location(s) of significant existing and potential erosion site(s) with a unique identifier for each site.

**(B)** Brief description of present condition of the mapped significant existing or potential erosion site.

**(C)** Brief description of proposed treatments for the mapped significant existing or potential erosion site.

**(D)** Items (B) and (C) above can be provided in tabular form as part of the plan.

**(4)** The RPF shall disclose and map the significant existing and potential erosion sites identified per 14 CCR § 923.1 [943.1, 963.1], subsection (~~d~~e)(1), for which no feasible treatment measures exist.

**(5)** Where feasible treatments for significant existing or potential erosion site are proposed, the RPF shall describe in the plan a logical order of treatment.

**(f)** When selecting feasible alternatives (see 14 CCR §§ 897 and 898) during the planning phase of logging roads and landings, the RPF shall consider the location and planned use of logging roads and landings and whether such logging roads and landings will be abandoned or deactivated.

**(g)** In watersheds with listed anadromous salmonids and in planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids, where logging road or landing construction or reconstruction is proposed, the plan shall identify:

**(1)** How the proposed operations will fit into the systematic layout pattern.

**(2)** What, if any, offsetting mitigation measures, including but not limited to, abandonment of logging roads and landings, are needed to minimize potential adverse impacts to watersheds from the road system.

**(h)** In watersheds with listed anadromous salmonids no logging roads or landings shall be planned for construction or reconstruction in the CMZ or Core Zone of a Class I watercourse except those listed in 14 CCR § 916.9(e)(1)(A)-(E) [936.9(e)(1)(A)-(E), 956.9(e)(1)(A)-(E)] or pursuant to 14 CCR § 916.9(v) [936.9(v), 956.9(v)], or within 150 feet of a Class I watercourse transition line.

**(i)** In watersheds with listed anadromous salmonids within the Inner Zone A and B of flood prone areas of Class I watercourses the following Preferred Management Practices should be considered for inclusion in the plan by the RPF and by the Director:

**(1)** Constructed and reconstructed logging roads and landings should not be planned for location within these zones.

**(2)** When feasible, planned use of existing logging roads and landings should be minimized in the flood prone area.

**(3)** Exceptions include the use of roads and landings to accomplish actions to improve salmonid habitat conditions stated in 14 CCR § 916.9(f)(3)(E)(1) [936.9(f)(3)(E)(1), 956.9(f)(3)(E)(1)].

**Repeal § 923.1 [943.1, 963.1] Planning for Roads and Landings**

~~The following standards for logging roads and landings shall be adhered to:~~

~~**(a)** All logging roads shall be located and classified on the THP map as permanent, seasonal, or temporary. Road failures on existing roads which will be reconstructed shall also be located on the THP map. In addition to the requirements of 14 CCR 1034(x), the probable location of those landings which require substantial excavation or which exceed one quarter acre in size, shall be shown on the THP map.~~

~~**(b)** New logging roads shall be planned in accordance with their classification and maintenance requirements.~~

~~**(c)** Logging roads and landings shall be planned and located, when feasible, to avoid unstable areas. The Director shall approve an exception if those areas are unavoidable, and site-specific measures to minimize slope instability due to construction are described and justified in the THP.~~

~~**(d)** Where roads and landings will be located across 100 feet or more of lineal distance on any slopes over 65% or on slopes over 50% which are within 100 ft. of the boundary of a WLPZ, measures to minimize movement of soil and the discharge of concentrated surface runoff shall be incorporated in the THP. The Director may waive inclusion of such measures where the RPF can show that slope depressions, drainage ways, and other natural retention and detention features are sufficient to control overland transport of eroded material. The Director may require end-hauling of material from areas within 100 ft. of the boundary of a WLPZ to a stable location if end hauling is feasible and is necessary to protect water quality. The Director shall require maintenance provisions in the THP for drainage structures and facilities provided that such maintenance is feasible and necessary to keep roadbeds and fills stable.~~

~~**(e)** New logging roads shall not exceed a grade of 15% except that pitches of up to 20% shall be allowed not to exceed 500 continuous feet (152.4 m). These percentages and distances may be exceeded only where it can be explained and justified in the THP that there is no other feasible access for harvesting of timber or where in the Northern or Southern Districts use of a gradient in excess of 20% will serve to reduce soil disturbance.~~

~~**(f)** Roads and landings shall be planned so that an adequate number of drainage facilities and structures are installed to minimize erosion on roadbeds, landing surfaces, sidecast and fills.~~

~~**(g)** Unless exceptions are explained and justified in the THP, general planning requirements for roads shall include:~~

~~**(1)** Logging roads shall be planned to a single-lane width compatible with the largest type of equipment used in the harvesting operation with turnouts at reasonable intervals.~~

~~**(2)** Roads shall be planned to achieve as close a balance between cut volume and fill volume as is feasible.~~

~~**(3)** When roads must be planned so that they are insloped and ditched on the uphill side, drainage shall be provided by use of an adequate number of ditch drains.~~

~~**(h)** Road construction shall be planned to stay out of Watercourse and Lake Protection Zones. When it is a better alternative for protection of water quality or other forest resources, or when such roads are the only feasible access to timber, exceptions may be explained and justified in the THP and shall be agreed to by the Director if they meet the requirements of this subsection.~~

~~**(i) [923.1]** The location of all logging roads to be constructed shall be flagged or otherwise identified on the ground before submission of a THP or major amendment. Exceptions may be explained and justified in the THP and agreed to by the Director if flagging is unnecessary as a substantial aid to examining: (1) compatibility between road location and yarding and silvicultural systems, or (2) possible significant adverse effects of road location on water quality, soil productivity, wildlife habitat, or other special features of the area.~~

~~**(i) [943.1, 963.1]** All logging roads to be constructed shall be flagged or otherwise identified on the ground before submission of a THP or, substantial deviation, except for temporary roads less than 600 ft. in length that would meet the requirements for a minor deviation (see 14 CCR 1036, 1039, 1040) if they were submitted as such. Exceptions may be explained and justified in the THP and agreed to by the Director if flagging or other identification is unnecessary as a substantial aid to examining: (1) compatibility between road location and yarding and silvicultural systems or (2) possible significant adverse effects of road location on water quality, soil productivity, wildlife habitat, or other special features of the area.~~

~~**(j)** If logging roads will be used from the period of October 15 to May 1, hauling shall not occur when saturated soil conditions exist on the road that may produce sediment in quantities~~

~~sufficient to cause a visible increase in turbidity of downstream waters in receiving Class I, II, III or IV waters or that violate Water Quality Requirements.~~

**Adopt § 923.2 [943.2, 963.2]. Design and Location of Logging Roads and Landings.** Constructed and reconstructed logging roads and landings shall be designed and located in accordance with their proposed use, maintenance requirements, and the approved plan:

**(a)** All logging roads and landings shall:

**(1)** Avoid or mitigate potential impacts to public safety.

**(2)** Avoid unstable areas and connected headwall swales to the extent feasible and minimize activities that adversely affect them.

**(3)** Minimize the size of cuts and fills to the extent feasible.

**(4)** Be outsloped where feasible and drained with waterbreaks and/or rolling dips in conformance with other applicable Forest Practice Rules.

**(5)** Be hydrologically disconnected from watercourses and lakes to the extent feasible to minimize sediment delivery from road runoff to a watercourse, and reduce the potential for hydrologic changes that alter the magnitude and frequency of runoff delivery to a watercourse. Guidance on methods for hydrologic disconnection may be found in the Board's Technical Rule Addendum Number 5.

**(6)** Include adequate drainage structures and facilities necessary to avoid concentrating and diverting runoff, to minimize erosion of roadbeds, landing surfaces, drainage ditches, sidecast and fills, to minimize the potential for soil erosion and sediment transport, and to prevent significant sediment discharge. Guidance on methods for conformance with this rule section may be found in the Board's Technical Rule Addendum Number 5.

**(7)** Avoid crossing, or locations on, 100 feet or more of lineal distance over any slopes greater than 65 percent or within 100 feet of the boundary of a WLPZ on slopes greater than 50 percent that drain toward the zoned watercourse or lake. Where logging road or

landing construction or reconstruction is proposed in these areas, specific measures to minimize movement of soil and the discharge of concentrated surface runoff shall be incorporated in the plan. The Director may waive inclusion of such measures where the RPF can show that slope depressions, drainage ways, and other natural retention and detention features are sufficient to control overland transport of eroded material.

**(b)** The Director may require removal of deposits of excess material if the deposits are in a position to adversely affect the beneficial uses of water.

**(c)** Excess material excavated during logging road and landing construction shall not be transported to locations where it may result in significant sediment discharge.

**(d)** In addition to the requirements of subsection (a) above, all logging roads to be constructed or to be reconstructed shall:

**(1)** Be no wider than a single-lane compatible with the largest type of equipment specified for use on the logging road, with adequate turnouts provided as required for safety, except where wider road dimensions are required by existing contracts with a federal agency.

**(2)** Avoid grades greater than 20% or grades greater than 15% that extend greater than 500 continuous feet. Exceptions may be approved where there is no other feasible access for harvesting of timber or where use of a gradient greater than 20% will serve to reduce soil disturbance.

**(e)** In addition to the requirements of subsection (a) above, all landings to be constructed or to be reconstructed shall:

**(1)** Be consistent with the yarding and loading system to be used.

**(2)** Be no larger than one-half acre.

**(3)** Avoid construction on slopes greater than 40 percent where the landing will exceed one-quarter acre in size.

**Repeal § 923.2 [943.2, 963.2] Road Construction**

~~Logging roads shall be constructed or reconstructed in accordance with the following requirements or as proposed by the RPF, justified in the THP, and found by the Director to be in conformance with the requirements of this Article.~~

~~**(a)** Logging roads shall be constructed in accordance with the approved THP. If a change in designation of road classification is subsequently made, the change shall be reported in accordance with 14 CCR 1039 or 1040, as appropriate.~~

~~**(b)** Where a road section which is greater than 100 feet in length crosses slopes greater than 65%, placement of fill is prohibited and placement of sidecast shall be minimized to the degree feasible. The Director may approve an exception where site specific measures to minimize slope instability, soil erosion, and discharge of concentrated surface runoff are described and justified in the THP.~~

~~**(c)** On slopes greater than 50%, where the length of road section is greater than 100 ft., and the road is more than 15 ft. wide (as measured from the base of the cut slope to the outside of the berm or shoulder of the road) and the fill is more than 4 ft. in vertical height at the road shoulder for the entire 100 feet the road shall be constructed on a bench that is excavated at the proposed toe of the compacted fill and the fill shall be compacted. The Director may approve exception to this requirement where on a site-specific basis if the RPF has described and justified an alternative practice that will provide equal protection to water quality and prevention of soil erosion.~~

~~**(d) [Coast]** Fills, including through fills across watercourses shall be constructed in a manner to minimize erosion of fill slopes using techniques such as insloping through-fill approaches, waterbars, berms, rock armoring of fill slopes, or other suitable methods.~~

~~**(d) [Northern, Southern]** Roads shall be constructed so no break in grade, other than that needed to drain the fill, shall occur on through fill; breaks in grade shall be above or below the~~

~~through fill, as appropriate. Where conditions do not allow the grade to break as required, through fills must be adequately protected by additional drainage structures or facilities.~~

~~**(e)** Through fills shall be constructed in approximately one foot lifts.~~

~~**(f)** On slopes greater than 35 percent, the organic layer of the soil shall be substantially disturbed or removed prior to fill placement. The RPF may propose an exception in the THP and the Director may approve the exception where it is justified that the fill will be stabilized.~~

~~**(g)** Excess material from road construction and reconstruction shall be deposited and stabilized in a manner or in areas where downstream beneficial uses of water will not be adversely affected.~~

~~**(h)** Drainage structures and facilities shall be of sufficient size, number and location to carry runoff water off of roadbeds, landings and fill slopes. Drainage structures or facilities shall be installed so as to minimize erosion, to ensure proper functioning, and to maintain or restore the natural drainage pattern. Permanent watercourse crossings and associated fills and approaches shall be constructed where feasible to prevent diversion of stream overflow down the road and to minimize fill erosion should the drainage structure become plugged.~~

~~**(i)** Where there is evidence that soil and other debris is likely to significantly reduce culvert capacity below design flow, oversize culverts, trash racks, or similar devices shall be installed in a manner that minimizes culvert blockage.~~

~~**(j)** Waste organic material, such as uprooted stumps, cull logs, accumulations of limbs and branches, and unmerchantable trees, shall not be buried in road fills. Wood debris or cull logs and chunks may be placed and stabilized at the toe of fills to restrain excavated soil from moving downslope.~~

~~**(k)** Logging roads shall be constructed without overhanging banks.~~

~~**(l)** Any tree over 12 inches (30.5 cm) d.b.h. with more than 25% of the root surface exposed by road construction, shall be felled concurrently with the timber operations.~~

~~**(m)** Sidecast or fill material extending more than 20 ft. (6.1 m) in slope distance from the outside edge of the roadbed which has access to a watercourse or lake which is protected by a WLPZ shall be seeded, planted, mulched, removed, or treated as specified in the THP, to adequately reduce soil erosion.~~

~~**(n)** All culverts at watercourse crossings in which water is flowing at the time of installation shall be installed with their necessary protective structures concurrently with the fill, construction and reconstruction of logging roads. Other permanent drainage structures shall be installed no later than October 15. For construction and reconstruction of roads after October 15, drainage structures shall be installed concurrently with the activity.~~

~~**(o)** Drainage structures and drainage facilities on logging roads shall not discharge on erodible fill or other erodible material unless suitable energy dissipators are used. Energy dissipators suitable for use with waterbreaks are described in 14 CCR 914.6(f) [934.6(f), 954.6(f)].~~

~~**(p)** Where roads do not have permanent and adequate drainage, the specifications of Section 914.6 [934.6, 954.6] shall be followed.~~

~~**(q)** Drainage facilities shall be in place and functional by October 15. An exception is that waterbreaks do not need to be constructed on roads in use after October 15 provided that all such waterbreaks are installed prior to the start of rain that generates overland flow.~~

~~**(r)** No road construction shall occur under saturated soil conditions that may produce sediment in quantities sufficient to cause a visible increase in turbidity of downstream waters in receiving Class I, II, III or IV waters or that violate Water Quality Requirements, except that construction may occur on isolated wet spots arising from localized ground water such as springs, provided measures are taken to prevent material from significantly damaging water quality.~~

~~**(s)** Completed road construction shall be drained by outsloping, waterbreaks and/or cross-draining before October 15. If road construction takes place from October 15 to May 1, roads shall be adequately drained concurrent with construction operations.~~

~~**(t)** Roads to be used for log hauling during the winter period shall be, where necessary, surfaced with rock in depth and quantity sufficient to maintain a stable road surface that does not produce sediment in quantities that may cause a visible increase in turbidity of downstream waters in receiving Class I, II, III or IV waters or would violate Water Quality Requirements throughout the period of use. Exceptions may be proposed by the RPF, justified in the THP, and found by the Director to be in conformance with the requirements of this subsection.~~

~~**(u)** Slash and other debris from road construction shall not be bunched against residual trees which are required for silvicultural or wildlife purposes, nor shall it be placed in locations where it could be discharged into Class I or II watercourses.~~

~~**(v)** Road construction activities in the WLPZ, except for stream crossings or as specified in the THP, shall be prohibited.~~

**Adopt § 923.3 [943.3, 963.3]. Mapping and Identification of Logging Roads and Landings.**

The following mapping and identification standards shall apply to logging roads and landings:

**(a)** For logging road- and landing-related mapping requirements refer to 14 CCR §§ 1034(x)(4)(A)-(E) and (5)(A)-(G), 1090.5(w)(4)(A)-(E) and (5)-(6), 1090.5(gg), 1090.7(n)(4)-(6), and 1092.09(l)(5)(A)(1.-5.) and (6)(A)-(G).

**(b)** The RPF shall identify in the field, for use by the LTO, all logging roads and landings to be constructed or to be reconstructed:

**(1)** Across slopes greater than 65 percent for 100 lineal feet or more.

**(2)** Across slopes greater than 50 percent for 100 lineal feet or more within 100 feet of the boundary of a WLPZ that drains toward the zoned watercourse or lake.

**(c)** The location of all logging roads to be constructed or to be reconstructed shall be flagged or otherwise identified on the ground prior to the pre-harvest inspection. Exceptions may be explained and justified in the plan and agreed to by the Director if flagging is unnecessary as a substantial aid to examining: (1) compatibility between logging road location and yarding and

silvicultural systems, or (2) possible significant adverse effects of logging road location on the factors listed under 14 CCR § 923(b) [943(b), 963(b)].

**Repeal § 923.3 [943.3, 963.3] Watercourse Crossings**

~~Watercourse crossing drainage structures on logging roads shall be planned, constructed, reconstructed, and maintained or removed, according to the following standards. Exceptions may be provided through application of Fish and Game Code Sections 1600 et seq. and shall be included in the THP.~~

~~**(a)** The location of all new permanent watercourse crossing drainage structures and temporary crossings located within the WLPZ shall be shown on the THP map. If the structure is a culvert intended for permanent use, the minimum diameter of the culvert shall be specified in the plan. Extra culverts beyond those shown in the THP map may be installed as necessary.~~

~~**(b)** The number of crossings shall be kept to a feasible minimum.~~

~~**(c)** Drainage structures on watercourses that support fish shall allow for unrestricted passage of all life stages of fish that may be present, and shall be fully described in the plan in sufficient clarity and detail to allow evaluation by the review team and the public, provide direction to the LTO for implementation, and provide enforceable standards for the inspector.~~

~~**(d)** When watercourse crossings, other drainage structures, and associated fills are removed, the following standards shall apply:~~

~~**(1)** Fills shall be excavated to form a channel that is as close as feasible to the natural watercourse grade and orientation, and that is wider than the natural channel.~~

~~**(2)** The excavated material and any resulting cut bank shall be sloped back from the channel and stabilized to prevent slumping and to minimize soil erosion. Where needed, this material shall be stabilized by seeding, mulching, rock armoring, or other suitable treatment.~~

~~**(e)** All permanent watercourse crossings that are constructed or reconstructed shall accommodate the estimated 100-year flood flow, including debris and sediment loads.~~

~~**(f)** Watercourse crossings and associated fills and approaches shall be constructed or maintained to prevent diversion of stream overflow down the road and to minimize fill erosion should the drainage structure become obstructed. The RPF may propose an exception where explained in the THP and shown on the THP map and justified how the protection provided by the proposed practice is at least equal to the protection provided by the standard rule.~~

~~(g) All new permanent culverts on Class I watercourses, where fish are always or seasonally present or where fish habitat is restorable, shall be planned, designed and constructed to allow upstream and downstream passage of fish or listed aquatic species during any life stage and for the natural movement of bedload to form a continuous bed through the culvert and shall require an analysis and specifications demonstrating conformance with the intent of this section and subsection.~~

**Adopt § 923.4 [943.4, 963.4]. Construction and Reconstruction of Logging Roads and Landings.**

Logging roads and landings shall be constructed or reconstructed in accordance with the approved plan and the following requirements. If a change in designation of logging road classification is made after the plan is approved, the change shall be reported in accordance with 14 CCR §§ 1039, 1040, 1090.14, 1092.26 or 1092.27, as appropriate.

**(a)** Logging roads and landings shall be hydrologically disconnected from watercourses and lakes to the extent feasible to minimize sediment delivery from road runoff to a watercourse, and reduce the potential for hydrologic changes that alter the magnitude and frequency of runoff delivery to a watercourse. Guidance on methods for hydrologic disconnection may be found in the Board's Technical Rule Addendum Number 5.

**(b)** No logging roads or landings shall be constructed (i) within 150 feet of the Class I watercourse transition line, (ii) within 100 feet of the Class II watercourse transition line on

slopes greater than 30%, (iii) within Class I, II, III, or IV watercourses or lakes, (iv) within a WLPZ, or (v) in marshes, wet meadows, and other wet areas, except as follows:

**(1)** At existing logging road watercourse crossings.

**(2)** At logging road watercourse crossings to be constructed or reconstructed that are approved as part of the Fish and Game Code process (F&GC 1600 et seq.)

**(3)** At logging road watercourse crossings of Class III watercourses that are dry at the time of use.

**(c)** No logging roads or landings shall be reconstructed (i) within Class I, II, III, or IV watercourses or lakes, (ii) within a WLPZ, or (iii) in marshes, wet meadows, and other wet areas, except as follows:

**(1)** At existing logging road watercourse crossings.

**(2)** At logging road watercourse crossings to be constructed or reconstructed that are approved as part of the Fish and Game Code process (F&GC 1600 et seq.)

**(3)** At logging road watercourse crossings of Class III watercourses that are dry at the time of use.

**(d)** Logging roads and landings shall not be constructed or reconstructed across unstable areas or connected headwall swales except as specified in the Plan.

**(e)** Logging roads and landings shall not be constructed with overhanging banks.

**(f)** Any tree over 12 inches dbh with more than 25 percent of the root surface exposed by logging road or landing construction shall be felled concurrently with the timber operations.

**(g)** On slopes greater than 40 percent, the organic layer of the soil shall be removed prior to fill placement.

**(h)** Waste organic material, such as uprooted stumps, cull logs, accumulations of limbs and branches, and unmerchantable trees, shall not be buried in logging road or landing fills. Wood debris or cull logs and chunks may be placed and stabilized at the toe of fill to restrain excavated soil from moving downslope.

**(i)** Slash and other debris from road construction shall not be bunched against residual trees, which are required for silvicultural or wildlife purposes, nor shall it be placed in locations where it could be discharged into Class I or II watercourses or lakes.

**(j)** Where constructed fills will exceed three feet in vertical thickness, fill slopes shall be inclined no greater than 65 percent.

**(k)** Logging roads or landings shall not be constructed or reconstructed under saturated soil conditions that may produce significant sediment discharge, except that construction may occur on isolated wet spots arising from localized ground water such as springs, provided measures are taken to prevent significant sediment discharge.

**(l)** Construction or reconstruction of logging roads or landings shall not take place during the winter period unless the approved plan incorporates a complete winter period operating plan pursuant to 14 § CCR 914.7 [934.7, 954.7] that specifically addresses such logging road or landing construction or reconstruction.

**(m)** On slopes greater than 50 percent for greater than 100 lineal feet, fills greater than four feet in vertical height at the outside shoulder of the logging road or landing shall be:

**(1)** Constructed on a bench that is excavated at the proposed toe of the fill and is wide enough to compact the first lift.

**(2)** Compacted in approximately one-foot lifts from the toe to the finished grade or retained by an engineered structure.

**(n)** Logging roads and landings approved for construction or reconstruction across 100 feet or more of lineal distance on any slope greater than 65 percent or within 100 feet of the boundary of a WLPZ on slopes greater than 50 percent that drain toward the zoned watercourse or lake shall be constructed to the specific construction techniques or measures as described in the plan.

**(o)** Fills shall not be constructed on slopes greater than 65 percent.

**(p)** On slopes greater than 65 percent, sidecast from logging road and landing construction shall be minimized to the degree feasible.

**(q)** Excess material transported from logging road or landing construction or reconstruction shall be deposited and stabilized in a manner and in areas that avoid potential adverse impacts to locations that could deliver significant sediment discharge.

**(r)** In watersheds with listed anadromous salmonids, no logging roads or landings shall be constructed or reconstructed within the CMZ or Core Zone of a Class I watercourse except for those listed in 14 CCR § 916.9 [936.9, 956.9], subsections (e)(1)(A)-(F) or pursuant to 14 CCR § 916.9 [936.9, 956.9], subsection (v).

**(s)** In watersheds with listed anadromous salmonids and in planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids, the following shall apply:

**(1)** On slopes greater than 50 percent that have access to a watercourse or lake:

**(A)** Specific provisions for the protection of salmonid habitat shall be identified and described for all logging road construction.

**(B)** Where cutbank stability is not an issue, logging roads may be constructed as a full-benched cut (no fill). Spoils not utilized in logging road construction shall be disposed of in stable areas with less than 30 percent slope outside of any WLPZ, EEZ, or ELZ designated for watercourse or lake protection. The Director, with concurrence from other responsible agencies, may waive inclusion of these measures where the RPF can show that slope depressions and other natural retention and detention features are sufficient to control overland transport of eroded material.

**(C)** Logging roads may be constructed with balanced cuts and fills:

**(i)** If properly engineered, or,

**(ii)** If fills are removed and the slopes recontoured prior to the winter period.

**(2)** During the extended wet weather period, no timber operations shall take place unless the approved plan incorporates a complete winter period operating plan pursuant to 14 CCR § 914.7(b) [934.7(b), 954.7(b)]. The winter period operating plan shall specifically address, where applicable, proposed logging road and landing construction, and reconstruction.

**Repeal § 923.4 [943.4, 963.4] Road Maintenance**

~~Logging roads, landings, and associated drainage structures used in a timber operation shall be maintained in a manner which minimizes concentration of runoff, soil erosion, and slope instability and which prevents degradation of the quality and beneficial uses of water during timber operations and throughout the prescribed maintenance period. In addition those roads which are used in connection with stocking activities shall be maintained throughout their use even if this is beyond the prescribed maintenance period.~~

~~**(a)** The prescribed maintenance period for erosion controls on permanent and seasonal roads and associated landings and drainage structures which are not abandoned in accordance with 14 CCR 923.8 [943.8, 963.8] shall be at least one year. The Director may prescribe a maintenance period extending up to three years in accordance with 14 CCR 1050.~~

~~**(b)** Upon completion of timber operations, temporary roads and associated landings shall be abandoned in accordance with 14 CCR 923.8 [943.8, 963.8].~~

~~**(c)** Waterbreaks shall be maintained as specified in 14 CCR 914.6 [934.6, 954.6].~~

~~**(d)** Unless partially blocked to create a temporary water source, watercourse crossing facilities and drainage structures, where feasible, shall be kept open to the unrestricted passage of water. Where needed, trash racks or similar devices shall be installed at culvert inlets in a manner which minimizes culvert blockage. Temporary blockages shall be removed by November 15.~~

~~**(e)** Before the beginning of the winter period, all roadside berms shall be removed from logging roads or breached, except where needed to facilitate erosion control.~~

~~**(f)** Drainage structures, if not adequate to carry water from the fifty-year flood level, shall be removed in accordance with 14 CCR 923.3(d) [943.3(d), 963.3(d)] by the first day of the winter period, before the flow of water exceeds their capacity if operations are conducted during the winter period, or by the end of timber operations whichever occurs first. Properly functioning drainage structures on roads that existed before timber operations need not be removed. An RPF may utilize an alternative practice, such as breaching of fill, if the practice is approved by the Director as providing greater or equal protection to water quality as removal of the drainage structure.~~

~~**(g)** Temporary roads shall be blocked or otherwise closed to normal vehicular traffic before the winter period.~~

~~**(h)** During timber operations, road running surfaces in the logging area shall be treated as necessary to prevent excessive loss of road surface materials by, but not limited to, rocking, watering, chemically treating, asphalting or oiling.~~

~~**(i)** Soil stabilization treatments on road or landing cuts, fills, or sidecast shall be installed or renewed, when such treatment could minimize surface erosion which threatens the beneficial uses of water.~~

~~**(j)** Drainage ditches shall be maintained to allow free flow of water and minimize soil erosion.~~

~~**(k)** Action shall be taken to prevent failures of cut, fill, or sidecast slopes from discharging materials into watercourses or lakes in quantities deleterious to the quality or beneficial uses of water.~~

~~**(l)** Each drainage structure and any appurtenant trash rack shall be maintained and repaired as needed to prevent blockage and to provide adequate carrying capacity. Where not present, new trash racks shall be installed if there is evidence that woody debris is likely to significantly reduce flow through a drainage structure.~~

~~**(m)** Inlet and outlet structures, additional drainage structures (including ditch drains), and other features to provide adequate capacity and to minimize erosion of road and landing fill and sidecast to minimize soil erosion and to minimize slope instability shall be repaired, replaced, or installed wherever such maintenance is needed to protect the quality and beneficial uses of water.~~

~~**(n)** Permanent watercourse crossings and associated approaches shall be maintained to prevent diversion of stream overflow down the road should the drainage structure become plugged. Corrective action shall be taken before the completion of timber operations or the drainage structure shall be removed in accordance with 14 CCR Section 923.3(d) [943.3(d), 963.3(d)].~~

~~**(o)** Except for emergencies and maintenance needed to protect water quality, use of heavy equipment for maintenance is prohibited during wet weather where roads or landings are within a WLPZ.~~

~~**(p)** The Director may approve an exception to a requirement set forth in subsections (b) through (o) above when such exceptions are explained and justified in the THP and the exception would provide for the protection of the beneficial uses of water or control erosion to a standard at least equal to that which would result from the application of the standard rule.~~

**Adopt § 923.5 [943.5,963.5]. Erosion Control for Logging Roads and Landings.**

The following erosion control standards shall apply to logging roads and landings:

**(a)** All logging road and landing surfaces shall be adequately drained through the use of logging road and landing surface shaping in combination with the installation of drainage structures or facilities and shall be hydrologically disconnected from watercourses and lakes to the extent feasible. Guidance on methods for hydrologic disconnection may be found in the Board's Technical Rule Addendum Number 5.

**(b)** Drainage facilities and structures shall be installed along all logging roads and all landings that are used for timber operations in sufficient number to minimize soil erosion and sediment transport and to prevent significant sediment discharge.

**(c)** Ditch drains, associated necessary protective structures, and other features associated with the ditch drain shall:

**(1)** Be adequately sized to convey runoff.

**(2)** Minimize erosion of logging road and landing surfaces.

**(3)** Avoid discharge onto unprotected fill.

**(4)** Discharge to erosion resistant material.

**(5)** Minimize potential adverse impacts to slope stability.

**(d)** Waterbreaks and rolling dips installed across logging roads and landings shall be of sufficient size and number and be located to avoid collecting and discharging concentrated runoff onto fills, erodible soils, unstable areas, and connected headwall swales.

**(e)** Where logging roads or landings do not have permanent and adequate drainage, and where waterbreaks are to be used to control surface runoff, the waterbreaks shall be cut diagonally a minimum of six inches into the firm roadbed and shall have a continuous firm embankment of at least six inches in height immediately adjacent to the lower edge of the waterbreak cut. On logging roads that have firmly compacted surfaces, waterbreaks may be installed by hand methods and need not provide the additional six-inch embankment provided the waterbreak ditch is constructed so that it is at least six inches deep and six inches wide on the bottom and provided there is ample evidence based on slope, material, amount of rainfall, and period of use that the waterbreaks so constructed will be effective in diverting water flow from the logging road surface without the embankment.

**(f)** Distances between waterbreaks shall not exceed the following standards and consider erosion hazard rating and road gradient:

**MAXIMUM DISTANCE BETWEEN WATERBREAKS**

| **Estimated Hazard Rating** | **Logging Road Gradient in Percent** | | |
|---|---|---|---|
| | **10 or less** | **11-25** | **>25** |
| | Feet | Feet | Feet |
| Extreme | 100 | 75 | 50 |
| High | 150 | 100 | 75 |
| Moderate | 200 | 150 | 100 |
| Low | 300 | 200 | 150 ) |

**(g)** Where outsloping and rolling dips are used to control surface runoff, the dip in the logging road grade shall be sufficient to capture runoff from the logging road surface. The steepness of cross-slope gradient in conjunction with the logging road or landing gradient and the estimated soil erosion hazard rating shall be used to determine the rolling dip spacing in order to minimize soil erosion and sediment transport and to prevent significant sediment discharge. Guidance on rolling dip spacing may be found in the Board's Technical Rule Addendum Number 5.

**(h)** Drainage facilities and structures shall discharge into vegetation, woody debris, or rock wherever possible. Where erosion-resistant material is not present, slash, rock, or other energy dissipating material shall be installed below the drainage facility or drainage structure outlet as necessary to minimize soil erosion and sediment transport and to prevent significant sediment discharge. Guidance on energy dissipaters for drainage structures may be found in the Board's Technical Rule Addendum Number 5.

**(i)** Where logging road and landing surfaces, road approaches, inside ditches and drainage structures cannot be hydrologically disconnected, and where there is existing or the potential for significant sediment discharge, necessary and feasible treatments to prevent the discharge ~~will~~ shall be described in the plan.

**(j)** All logging roads and landings used for timber operations shall have adequate drainage upon completion of use for the year or by October 15, whichever is earlier. An exception is that drainage facilities and drainage structures do not need to be constructed on logging roads and landings in use during the extended wet weather period provided that all such drainage facilities and drainage structures are installed prior to the start of rain that generates overland flow.

**(k)** Where logging road or landing construction or reconstruction takes place during the extended wet weather period, drainage facilities and drainage structures shall be installed concurrent with construction or reconstruction operations.

**(l)** Bare soil on logging road or landing cuts, fills, transported spoils, or sidecast that is created or exposed by timber operations shall be stabilized to the extent necessary to minimize soil erosion and sediment transport and to prevent significant sediment discharge. Sites to be stabilized include, but are not limited to:

**(1)** Sidecast or fill exceeding 20 feet in slope distance from the outside edge of a logging road or a landing that has access to a watercourse or lake.

**(2)** Cut and fills associated with approaches to logging road watercourse crossings of Class I or II waters or Class III waters where an ELZ, EEZ, or a WLPZ is required.

**(3)** Bare areas exceeding 800 continuous square feet within a WLPZ.

**(m)** Soil stabilization measures shall be described in the plan pursuant to 14 CCR 923.5(l) [943.5(l),963.5(l)], and may include, but are not limited to, removal, armoring with rip-rap, replanting, mulching, seeding, installing commercial erosion control devices to manufacturer's specifications, or chemical stabilizers.

**(n)** Where the natural ability of ground cover within a WLPZ is inadequate to protect the beneficial uses of water by minimizing soil erosion or by filtering sediments, the plan shall specify protection measures to retain and improve the natural ability of the ground cover to filter sediment and minimize soil erosion.

**(o)** Soil stabilization treatments shall be in place upon completion of operations for the year of use or prior to the extended wet weather period, whichever comes first. An exception is that bare areas created during the extended wet weather period shall be treated prior to the start of rain that generates overland flow, or within 10 days of the creation of the bare area(s), whichever is sooner, or as agreed to by the Director.

**(p)** Overhanging or unstable concentrations of slash, woody debris or soil along the downslope edge or face of landings shall be removed or stabilized when it is located on slopes greater than 65 percent, within 100 feet of the boundary of a WLPZ on slopes greater than 50 percent that drain toward the zoned watercourse or lake, or when it may result in significant sediment discharge. Removed materials shall not be placed at disposal sites that could result in a significant sediment discharge.

**(q)** In watersheds with listed anadromous salmonids and in planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids, the following shall apply:

**(1)** Constructed and reconstructed logging roads shall be outsloped where feasible and drained with waterbreaks or rolling dips.

**(2)** In addition to the provisions listed under 14 CCR § 923.2(d)(2) [943.2(d)(2), 963.2(d)(2)], all permanent and seasonal logging roads with a grade of 15 percent or greater that extend 500 continuous feet or more shall have specific erosion control measures stated in the plan.

**(3)** Within the WLPZ, and within any ELZ or EEZ designated for watercourse or lake protection, treatments to stabilize soils, minimize soil erosion, and prevent significant sediment discharge shall be described in the plan as follows:

**(A)** In addition to the requirements of subsections (l)-(o), soil stabilization is required for the following areas:

**(i)** Areas exceeding 100 continuous square feet where timber operations have exposed bare soil, and

**(ii)** Disturbed logging road and landing cut banks and fills, and

**(iii)** Any other area of disturbed soil that threatens to cause significant sediment discharge.

**(B)** Where straw mulch is used, the minimum straw coverage shall be 90 percent, and any treated area that has been reused or has less than 90 percent surface cover shall be treated again by the end of timber operations.

**(C)** Where slash mulch is applied, ~~slash coverage in contact with the ground surface shall be~~ a minimum of 75% of the area shall be covered by slash in contact with the ground.

**(D)** For areas disturbed outside of the extended wet weather period, treatment shall be completed prior to the start of any rain that causes overland flow across or along the disturbed surface that could result in significant sediment discharge.

**(E)** For areas disturbed during the extended wet weather period, treatment shall be completed prior to any day for which a chance of rain of 30 percent or greater is forecast by the National Weather Service or within 10 days of disturbance, whichever is earlier.

**(F)** Where the natural ability of ground cover is inadequate to protect the beneficial uses of water by minimizing soil erosion or by filtering sediments within any ELZ or EEZ designated for watercourse or lake protection, the plan shall specify protection measures to retain and improve the natural ability of the ground cover to filter sediment and minimize soil erosion.

**Repeal § 923.5 [943.5, 963.5] Landing Construction**

~~Landings shall be constructed according to the following standards:~~

~~**(a)** On slopes greater than 65%, no fill shall be placed and sidecast shall be minimized to the degree feasible. The Director may approve an exception if, site specific measures to minimize slope instability, soil erosion, and discharge of concentrated surface runoff are described and justified in the THP.~~

~~**(b)** On slopes greater than 50%, fills greater than 4 ft. in vertical height at the outside shoulder of the landing shall be: 1) constructed on a bench that is excavated at the proposed toe of the fill and is wide enough to compact the first lift, and 2) compacted in approximately 1 ft. lift from the toe to the finished grade. The RPF or supervised designee shall flag the location of this bench or the RPF shall provide a description of the bench location (narrative or drawing) in the THP for fills meeting the above criteria, where the length of landing section is greater than 100 feet. The RPF may propose an exception in the THP and the Director may approve the exception where it is justified that the landing will be stabilized.~~

~~**(c)** Waste organic material, such as uprooted stumps cull logs, accumulations of limbs and branches, or unmerchantable trees, shall not be buried in landing fills. Wood debris or cull logs and chunks may be placed and stabilized at the toe of landing fills to restrain excavated soil from moving downslope.~~

~~**(d)** Constructed landings shall be the minimum in width, size, and number consistent with the yarding and loading system to be used. Landings shall be no larger than one-half acre (.202 ha) unless explained and justified in the THP.~~

~~**(e)** No landing construction shall occur under saturated soil conditions that may produce sediment in quantities sufficient to cause a visible increase in turbidity of downstream waters in receiving Class I, II, III or IV waters or that violate Water Quality Requirements.~~

~~**(f)** The following specifications shall be met upon completion of timber operations for the year or prior to October 15, whichever occurs first:~~

~~**(1)** Overhanging or unstable concentrations of slash, woody debris and soil along the downslope edge or face of the landings shall be removed or stabilized when they are located on slopes over 65% or on slopes over 50% within 100 ft. of a WLPZ.~~

~~**(2)** Any obstructed ditches and culverts shall be cleaned.~~

~~**(3)** Landings shall be sloped or ditched to prevent water from accumulating on the landings. Discharge points shall be located and designed to reduce erosion.~~

~~**(4)** Sidecast or fill material extending more than 20 feet in slope distance from the outside edge of the landing and which has access to a watercourse or lake shall be seeded, planted, mulched, removed or treated as specified in the THP to adequately reduce soil erosion.~~

~~**(5)** Sidecast or fill material extending across a watercourse shall be removed in accordance with standards for watercourse crossing removal set forth in 14 CCR 923.3 (d).~~

~~**(g)** On slopes greater than 35%, the organic layer of the soil shall substantially removed prior to fill placement.~~

~~**(h)** When landings are constructed after October 15 they shall be adequately drained concurrent with construction operations and shall meet the requirements of (f)(1) through (f)(4) of this subsection upon completion of operations at that landing.~~

~~**(i)** The RPF may propose and the Director may approve waiver of requirements in (f)(1) through (f)(4) of this subsection if the Director finds they are not necessary to minimize erosion or prevent damage to downstream beneficial uses. The Director may also approve an exception to the October 15th date for treatment of slash and debris, including the practice of burning.~~

**Adopt § 923.6 [943.6, 963.6]. Use of Logging Roads and Landings.**

The following use standards shall apply to logging roads and landings:

**(a)** Logging roads and landings shall be used in a manner that is consistent with their design and construction specifications.

**(b)** Logging roads and landings shall not be used during any time of the year when operations may result in significant sediment discharge to watercourse or lakes, except in emergencies to protect the road, to reduce erosion, to protect water quality, or in response to public safety needs.

**(c)** During the extended wet weather period, log hauling or other heavy equipment uses shall be limited to logging roads and landings that exhibit a stable operating surface in conformance with (b) above. Routine use of logging roads and landings shall not occur when equipment cannot operate under its own power.

**(d)** When burning permits are required pursuant to PRC § 4423, logging roads and landings that are in use shall be kept in passable condition for fire trucks.

**(e)** Roadside berms that impede logging road drainage, concentrate logging road surface flow, or lead to hydrologic connection shall be removed or breached before the beginning of the winter period, with the exception of berms needed for erosion control.

**(f)** Temporary roads shall be blocked or otherwise closed to standard production four-wheel drive highway vehicles prior to the winter period, or upon completion of use as specified in an approved winter period operating plan pursuant to 14 CCR § 914.7(b) [934.7(b), 954.7(b)].

**(g)** Logging roads and landings used for log hauling or other heavy equipment uses during the winter period shall occur on a stable operating surface and, where necessary, be surfaced with rock to a depth and quantity sufficient to maintain such a surface. Use is prohibited on roads that are not hydrologically disconnected and exhibit saturated soil conditions. Exceptions may be proposed by the RPF, when locations are disclosed and justified in the THP, consistent with 14 CCR 923 (c)~~,~~ ~~and~~ Exceptions must be approved by the Director.

**(h)** In watersheds with listed anadromous salmonids and in planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids, the following shall apply:

**(1)** Existing logging roads or landings shall not be used within the CMZ of a Class I watercourse except as listed in 14 CCR § 916.9 [936.9, 956.9] subsection (e)(1)(A)-(F) or pursuant to 14 CCR § 916.9(v) [936.9(v), 956.9(v)].

**(2)** When feasible, minimize use of existing logging roads and landings located within Inner Zones A and B of flood prone areas. Exceptions include the use of roads and landings to accomplish actions to improve salmonid habitat conditions stated in 14 CCR § 916.9(f)(3)(E)(1.) [936.9(f)(3)(E)(1.), 956.9(f)(3)(E)(1.)]

**(3)** Log hauling on logging roads and landings shall be limited to those which are hydrologically disconnected from watercourses to the extent feasible, and exhibit a stable operating surface in conformance with (b) above. Exceptions may be proposed by the RPF, when locations are disclosed and justified in the THP, consistent with 14 CCR 923 (c)~~,~~. ~~and~~ Exceptions must be approved by the Director.

**(4)** Concurrent with use for log hauling, all road approaches to logging road watercourse crossings shall be treated for erosion control as needed to minimize soil erosion and sediment transport and to prevent significant sediment discharge to watercourses or lakes.

**(5)** Concurrent with use for log hauling, all traveled surfaces of logging roads in a WLPZ, and ELZ or EEZ designated for watercourse or lake protection, shall be treated for erosion control as needed to minimize soil erosion and sediment transport and to prevent significant sediment discharge to watercourses or lakes.

**(6)** No timber operations shall take place during the extended wet weather period unless the approved plan incorporates a complete winter period operating plan pursuant to 14 CCR § 914.7(b) [934.7(b), 954.7(b)] that specifically addresses, where applicable, proposed logging road or landing use.

**Repeal § 923.6 [943.6, 963.6] Conduct of Operations on Roads and Landings**

~~Routine use and maintenance of roads and landings shall not take place when, due to general wet conditions, equipment cannot operate under its own power. Operations may take place when roads and landings are generally firm and easily passable or during hard frozen conditions. Isolated wet spots on these roads or landings shall be rocked or otherwise treated to permit passage. However, operations and maintenance shall not occur when sediment discharged from landings or roads will reach watercourses or lakes in amounts deleterious to the quality and beneficial uses of water. This section shall not be construed to prohibit activities undertaken to protect the road or to reduce erosion.~~

**Adopt § 923.7 [943.7, 963.7]. Maintenance and Monitoring of Logging Roads and Landings.**

The following maintenance and monitoring standards shall apply to logging roads and landings:

**(a)** Logging road and landing surfaces shall be monitored and maintained during timber operations and throughout the prescribed maintenance period to ensure hydrologic disconnection from watercourses and lakes to the extent feasible, minimize soil erosion and sediment transport, and to prevent significant sediment discharge.

**(b)** Logging roads that are used in connection with stocking activities shall be maintained throughout such use, even if this extends beyond the prescribed maintenance period.

**(c)** During timber operations, road running surfaces in the logging area shall be treated as necessary to prevent excessive loss of road surface materials by methods including, but not limited to, rocking, watering, paving, chemically treating, or installing commercial erosion control devices to manufacturer's specifications.

**(d)** Grading of logging roads or landings to obtain a drier running surface more than one time before reincorporation of any resulting berms back into the road surface is prohibited.

**(e)** Drainage facilities and drainage structures, including associated necessary protective structures, shall be maintained to allow free flow of water, and minimize soil erosion and slope instability. Drainage facilities and structures shall be repaired, replaced, or installed as needed to protect the quality and beneficial uses of water.

**(f)** Soil stabilization treatments on logging road or landing cuts, fills, and sidecast shall be maintained as needed to reduce the potential for slope instability, minimize soil erosion and sediment transport, and to prevent significant sediment discharge.

**(g)** Heavy equipment shall not be used in a WLPZ for maintenance during wet weather, except in emergencies to protect the road, to reduce erosion, to protect water quality, or in response to public safety needs.

**(h)** Where there is evidence of significant sediment discharge along a logging road or landing used for timber operations, additional measures shall be implemented to minimize soil erosion and sediment transport, and to prevent significant sediment discharge.

**(i)** The prescribed maintenance period for erosion controls on logging roads and associated landings and drainage structures, including appurtenant, abandoned, and deactivated logging roads and landings, shall be at least one year. The Director may prescribe a maintenance period extending up to three years in accordance with 14 CCR § 1050.

**(j)** In watersheds with listed anadromous salmonids and in planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids, the prescribed maintenance period for deactivated or abandoned roads shall be one year unless otherwise prescribed by the Director pursuant to 14 CCR § 1050. The prescribed maintenance period for logging roads and associated landings, including appurtenant roads, shall be three years.

**(k)** All logging roads, including abandoned, deactivated, and appurtenant roads**,** landings, and associated drainage structures used for timber operations shall be monitored as needed to comply with 14 CCR § 1050. Monitoring inspections shall be conducted, when access is

feasible during the prescribed maintenance period, a sufficient number of times during the extended wet weather period, particularly after large winter storm events and at least once annually, to evaluate the function of drainage facilities and structures. The Department shall also conduct monitoring inspections at least once during the prescribed maintenance period to assess logging road and landing conditions.

**(1)** Inspections shall include checking drainage facilities and structures for evidence of downcutting, plugging, overtopping, loss of function, and sediment delivery to Class I, II, or III watercourses and lakes. If evidence of sediment delivery or potential sediment delivery is present, and the implementation of feasible corrective measures could reduce the potential for significant sediment discharge, such additional measures shall be implemented when feasible.

**(2)** Inspections conducted pursuant to California Regional Water Quality Control Board requirements may be used to satisfy the inspection requirements of this section.

**(l)** In watersheds with listed anadromous salmonids, water drafting for timber operations shall:

**(1)** Comply with Fish and Game Code Section 1600, et seq. Timber operations conducted under a Fish and Game Code Section 1600 Master Agreement for Timber Operations that includes water drafting may provide proof of such coverage for compliance with 14 CCR 923.7(l).

**(2)** Describe the water drafting site conditions and proposed water drafting activity in the plan, including:

**(A)** A general description of the conditions and proposed water drafting;

**(B)** The watercourse classification;

**(C)** The drafting parameters including the months the site is proposed for use; estimated total volume needed per day; estimated maximum instantaneous drafting rate and filling time; and disclosure of other water drafting activities in the same watershed;

**(D)** The estimated drainage area (acres) above the point of diversion;

**(E)** The estimated unimpeded streamflow, pumping rate, and drafting

duration,

**(F)** A discussion of the effects on aquatic habitat downstream from the drafting site(s) of single pumping operations, or multiple pumping operations at the same location, and at other locations in the same watershed;

**(G)** A discussion of proposed alternatives and measures to prevent adverse effects to fish and wildlife resources, such as reducing hose diameter; using gravity-fed tanks instead of truck pumping; reducing the instantaneous or daily intake at one location; describing allowances for recharge time; using other dust palliatives; and drafting water at alternative sites;

**(H)** The methods that will be used to measure source streamflow prior to the water drafting operation and the conditions that will trigger streamflow to be measured during the operation.

**(3)** All water drafting for timber operations are subject to each requirement below unless the Department of Fish and ~~Game~~ Wildlife modifies the requirement in the Lake or Streambed Alteration agreement that authorized the drafting operation, or unless otherwise specified below:

**(A)** All intakes shall be screened to prevent impingement of juvenile fish against the screen. The following requirements apply to screens and water drafting on Class I waters:

**(i)** Openings in perforated plate or woven wire mesh screens shall not exceed 3/32 inches (2.38 millimeters). Slot openings in wedge wire screens shall not exceed 1/16 inches (1.75 millimeters).

**(ii)** The screen surface shall have at least 2.5 square feet of openings submerged in water.

**(iii)** The drafting operator shall regularly inspect, clean, and maintain screens to ensure proper operation whenever water is drafted.

**(iv)** The approach velocity (water moving through the screen) shall not

exceed 0.3~~3~~ feet/second.

**(v)** The diversion rate shall not exceed 350 gallons per minute.

**(B)** Approaches and associated drainage features to drafting locations within a WLPZ or channel zone shall be surfaced with rock or other suitable material to minimize generation of sediment.

**(C)** Barriers to sediment transport, such as straw wattles, logs, straw bales or sediment fences, shall be installed outside the normal high water mark to prevent sediment delivery to the watercourse and limit truck encroachment.

**(D)** Water drafting trucks parked on streambeds, floodplains, or within a WLPZ shall use drip pans or other devices such as adsorbent or absorbent blankets, sheet barriers or other materials as needed to prevent soil and water contamination from motor oil or hydraulic fluid leaks.

**(E)** Bypass flows for Class I watercourses shall be provided in volume sufficient to avoid dewatering the watercourse and maintain aquatic life downstream, and shall conform to the following standard:

**(i)** Bypass flows in the source stream during drafting shall be at least 2 cubic feet per second.

**(ii)** Diversion rate shall not exceed 10 percent of the surface flow.

**(iii)** Pool volume reduction shall not exceed 10 percent.

**(F)** The drafting operator shall keep a log that records for each time water is drafted, the date, total pumping time, pump rate, starting time, ending time, and volume diverted. Logs shall be filed with the Department of Forestry and Fire Protection at the end of seasonal operations and maintained with the plan record. This requirement may be modified in the approved plan that covers the water drafting, but only with concurrence from the Department of Fish and ~~Game~~ Wildlife.

**(G)** Before commencing any water drafting operation, the RPF and the

drafting operator shall conduct a pre-operations field review to discuss the water drafting measures in the plan and/or Lake or Streambed Alteration Agreement.

**Repeal § 923.7 [943.7, 963.7] Licensed Timber Operator Responsibility for Roads and Landings**

~~The licensed timber operator who is responsible for the implementation or execution of the plan shall not be responsible for the construction and maintenance of roads and landings, unless the licensed timber operator is employed for that purpose.~~

**Adopt § 923.8 [943.8, 963.8]. Abandonment and Deactivation of Logging Roads and Landings.**

All logging roads and landings that are proposed to be removed from the permanent road network shall be abandoned. All temporary logging roads and landings that are to remain a part of the permanent road network shall be deactivated annually prior to the winter period or upon completion of timber operations as specified in an approved winter period operating plan pursuant to 14 CCR § 914.7(b) [934.7(b), 954.7(b)]. Other logging roads and landings proposed to be deactivated shall comply with the standards specified in this section. Where abandonment or deactivation is required or proposed, specific measures to prevent significant sediment discharge that apply the following general requirements shall be described in the plan:

**(a)** All abandoned and deactivated logging roads and landings shall be left in a condition that provides for long-term, maintenance-free function of drainage and erosion controls.

**(b)** Soil exposed by abandonment or deactivation operations shall be removed or stabilized as needed to minimize soil erosion and sediment transport.

**(c)** Logging road watercourse crossings, other drainage structures, and associated fills shall be removed and stabilized in accordance with 14 CCR § 923.9 [943.9, 963.9], subsections (p)(1)-(4).

**(d)** Logging roads to be abandoned or deactivated shall be blocked prior to the winter period, or upon completion of timber operations as specified in an approved winter period operating plan pursuant to 14 CCR § 914.7(b) [934.7(b), 954.7(b)], so that standard production four wheel-drive highway vehicles cannot pass the point of closure at the time of abandonment or deactivation. If the logging road is to be abandoned, then the blockage design shall be described in the plan.

**Repeal § 923.8 [943.8, 963.8] Planned Abandonment of Roads, Watercourse Crossings, and Landings**

~~Abandonment of roads, watercourse crossings and landings shall be planned and conducted in a manner which provides for permanent maintenance-free drainage, minimizes concentration of runoff, soil erosion and slope instability, prevents unnecessary damage to soil resources, promotes regeneration, and protects the quality and beneficial uses of water. General abandonment procedures shall be applied in a manner which satisfies this standard and include the following:~~

~~**(a)** Blockage of roads so that standard production four wheel-drive highway vehicles cannot pass the point of closure at the time of abandonment.~~

~~**(b)** Stabilization of exposed soil on cuts, fills, or sidecast where deleterious quantities of eroded surface soils may be transported in a watercourse.~~

~~**(c)** Grading or shaping of road and landing surfaces to provide dispersal of water flow.~~

~~**(d)** Pulling or shaping of fills or sidecast where necessary to prevent discharge of materials into watercourses due to failure of cuts, fills, or sidecast.~~

~~**(e)** Removal of watercourse crossings, other drainage structures, and associated fills in accordance with 14 CCR 923.3(d). Where it is not feasible to remove drainage structures and associated fills, the fill shall be excavated to provide an overflow channel which will minimize~~

~~erosion of fill and prevent diversion of overflow along the road should the drainage structure become plugged.~~

~~The Director may approve an exception to a requirement set forth in (b) through (e) above when such exceptions are explained and justified in the THP and the exception would provide for the protection of the beneficial uses of water or control erosion to a standard at least equal to that which would result from the application of the standard rule.~~

**Adopt § 923.9 [943.9, 963.9]. Watercourse Crossings.**

Watercourse crossing drainage structures on logging roads shall be planned, constructed, reconstructed, and maintained or removed according to the standards provided in this rule section.

**(a)** The planning for and use of logging road watercourse crossings shall include the evaluation and documentation of significant existing and potential erosion sites consistent with 14 CCR § 923.1(e) [943.1(e), 963.1(e)].

**(b)** The number of crossings shall be kept to a feasible minimum. Existing logging road watercourse crossing locations shall be utilized where feasible and appropriate.

**(c)** All new drainage structures and facilities on watercourses that support fish or listed aquatic species shall allow for unrestricted passage of all life stages that may be present, and allow for the natural movement of bedload to form a continuous bed through the crossing.Such structures and facilities shall be fully described in the plan in sufficient clarity and detail to allow evaluation by the review team and the public, provide direction to the LTO for implementation, and provide enforceable standards for the inspector.

**(d)** In watersheds with listed anadromous salmonids, a description of all existing permanent Class I watercourse crossings shall be provided, where fish are always or seasonally present or where fish passage is restorable. Where it is determined that current crossing conditions may be adversely affecting fish passage at any life stage, the RPF shall disclose such conditions in

the plan and propose measures, if feasible, to address these conditions subject to the Director's review and determination.

**(e)** The location of all new permanent constructed and reconstructed, and temporary logging road watercourse crossings, including those crossings to be abandoned or deactivated, shall be shown on a map. If the structure is a culvert intended for permanent use, the minimum diameter of the culvert and the method(s) used to determine the culvert diameter shall be specified in the plan.

**(1)** The location of all logging road watercourse crossings to be constructed or reconstructed shall be flagged or otherwise identified on the ground prior to the pre-harvest inspection, if necessary, or prior to logging road watercourse crossing construction or reconstruction. Exceptions may be explained and justified in the plan and agreed to by the Director if flagging is unnecessary as a substantial aid to examining possible significant adverse effects of the crossing location on the factors listed under 14 CCR § 923(b) [943(b), 963(b)].

**(f)** All permanent watercourse crossings that are constructed or reconstructed shall accommodate the estimated 100-year flood flow, including debris and sediment loads.

**(g)** All culverts used for new and replacement logging road watercourse crossings shall be installed at or as close as practical and feasible to the natural watercourse grade. Culverts shall be installed in alignment with the watercourse channel to the extent feasible, and of the appropriate length to prevent fill erosion.

**(h)** Logging road watercourse crossings shall not discharge water onto erodible fill or other erodible material without the installation of energy dissipaters and other necessary protective structures.

**(i)** Fills for constructed and reconstructed logging road watercourse crossings shall be thoroughly compacted in approximately one-foot lifts during installation. The face of crossing fills shall be no greater than 65 percent (1.5:1, horizontal to vertical). Excavated material and cut banks resulting from construction or reconstruction which has access to a watercourse shall be

sloped back from the channel to prevent slumping, to minimize soil erosion, and to prevent significant sediment discharge.

**(j)** Critical dips shall be incorporated into the construction or reconstruction of logging road watercourse crossings utilizing culverts, except where diversion of overflow is addressed by other methods stated in the plan.

**(k)** Watercourse crossings and associated fills and approaches shall be constructed and maintained to prevent diversion of stream overflow down the road, and to minimize fill erosion should the drainage structure become obstructed. Methods to mitigate or address diversion of stream overflow at logging road watercourse crossings shall be stated in the plan.

**(l)** Any necessary protective structures associated with logging road watercourse crossings such as wing walls, rock armored headwalls, and downspouts shall be adequately sized to transmit runoff, minimize erosion of crossing fills, and prevent significant sediment discharge. Rock used to stabilize the outlets of crossings shall be adequately sized to resist mobilization, with the range of required rock dimensions described in the plan.

**(m)** The following drainage standards shall apply to logging road watercourse crossings:

**(1)** Adequate surface drainage at logging road watercourse crossings shall be provided through the use of logging road surface shaping in combination with the installation of drainage facilities, ditch drains, or other necessary protective structures to hydrologically disconnect the road from the crossing to the extent feasible.

**(2)** Consistent with 14 CCR § 923.5(a)-(i) [943.5(a)-(i), 963.5(a)-(i)], drainage facilities and ditch drains shall be installed adjacent to logging road watercourse crossings, as needed, to hydrologically disconnect to the extent feasible the logging road approach from the crossing, to minimize soil erosion and sediment transport, and to prevent significant sediment discharge during and upon completion of timber operations. Guidance on hydrologic disconnection may be found in the Board's Technical Rule Addendum Number 5.

**(3)** Drainage structures and facilities installed adjacent to logging road watercourse crossings shall be located to avoid discharging concentrated runoff onto fills, erodible soils, unstable areas, and connected headwall swales to the extent feasible.

**(n)** Where a significant volume of sediment is stored upstream from a logging road watercourse crossing that is proposed to be reconstructed or removed, the stored sediment shall be removed or stabilized, to the extent feasible, as described in the plan and in conformance with the conditions of required ~~DFG~~ CDFW 1600 agreements, where applicable.

**(o)** Where crossing fills over culverts are large, or where logging road watercourse crossing drainage structures and erosion control features historically have a high failure rate, such drainage structures and erosion control features shall be oversized, designed for low maintenance, reinforced, or removed before the completion of timber operations or as specified in the plan. Guidance on reducing the potential for failure at high risk watercourse crossings may be found in the Board's Technical Rule Addendum Number 5.

**(p)** All logging road watercourse crossings that are proposed by the plan submitter to be removed, including temporary crossings and those along abandoned or deactivated roads, shall be removed as described in the plan and shall apply the following standards:

**(1)** Fills shall be excavated to form a channel that is as close as feasible to the natural watercourse grade and orientation, and that is wider than the natural channel as observed upstream and downstream of the logging road watercourse crossing to be removed.

**(2)** The excavated material and any resulting cut bank shall be no greater than 65 percent (1.5:1, horizontal to vertical) from the outside edge of the constructed channel to prevent slumping, ~~and~~ to minimize soil erosion and sediment transport, and to prevent significant sediment discharge. Exposed soil located between the watercourse crossing and the nearest adjacent drainage facility or hydrologic divide, whichever is closer, including cut banks and excavated material, shall be stabilized by seeding, mulching, rock armoring, replanting, or other suitable treatment to prevent soil erosion and significant sediment discharge.

**(3)** Where it is not feasible to remove a logging road watercourse crossing or its associated fill to the above standards, the plan shall identify how soil erosion and significant sediment discharge will be prevented.

**(4)** All logging road watercourse crossings proposed for removal shall be removed upon completion of use, prior to the winter period or as specified in the applicable ~~DFG~~ CDFW 1600 agreement, whichever is earlier, or as otherwise specified in the plan.

**(q)** Logging road watercourse crossings shall not be constructed or reconstructed under saturated soil conditions or when such activities could result in significant sediment discharge.

**(r)** Temporary logging road watercourse crossings shall be removed and stabilized prior to the winter period or as specified in the plan.

**(s)** In watersheds with listed anadromous salmonids and in planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids, where construction or reconstruction is proposed during the extended wet weather period, no timber operations shall take place unless the approved plan incorporates a complete winter period operating plan pursuant to 14 CCR § 914.7(b) [934.7(b), 954.7(b)] that specifically addresses such construction or reconstruction.

**(t)** The following stabilization standards shall apply to logging road watercourse crossings:

**(1)** Soil stabilization measures shall be described in the plan and may include, but are not limited to, removal, armoring with rip-rap, replanting, mulching, seeding, installing commercial erosion control devices to manufacturer's specifications, or chemical stabilizers.

**(2)** Bare soil on fills or sidecast associated with logging road watercourse crossings that are created or exposed by timber operations shall be stabilized to the extent necessary to minimize soil erosion and sediment transport and to prevent significant sediment discharge. Erosion control measures for the traveled surface of roads and landing surfaces are specified in 14 CCR §§ 923.5 [943.5, 963.5] and 923.7 [943.7, 963.7]. Sites to be stabilized include, but are

not limited to, sidecast or fill exceeding 20 feet in slope distance from the outside edge of the road surface at the logging road watercourse crossing.

**(3)** Soil stabilization treatments shall be in place upon completion of operations for the year of use or prior to the extended wet weather period, whichever comes first. An exception is that bare areas created during the extended wet weather period shall be treated prior to the start of rain that generates overland flow, or within 10 days of the creation of the bare area(s), whichever is sooner, or as agreed to by the Director.

**(4)** In watersheds with listed anadromous salmonids and in planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids, treatments to stabilize soils, minimize soil erosion, and prevent significant sediment discharge within the WLPZ and within any ELZ or EEZ designated for watercourse or lake protection, shall be described in the plan as follows:

**(A)** In addition to the requirements of 14 CCR § 923.9(p)(1)-(3) [943.9(p)(1)-(3), 963.9(p)(1)-(3)] , soil stabilization is required for the following:

**(i)** Areas exceeding 100 continuous square feet where timber operations have exposed bare soil.

**(ii)** Disturbed logging road watercourse crossing cut banks and fills, and

**(iii)** Any other area of disturbed soil that threatens to cause significant sediment discharge.

**(B)** Where straw mulch is used, the minimum straw coverage shall be 90 percent, and any treated area that has been reused or has less than 90 percent surface cover shall be treated again by the end of timber operations.

**(C)** Where slash mulch is applied, slash coverage in contact with the ground surface shall be a minimum of 75 percent.

**(D)** For areas disturbed outside the extended wet weather period, treatment shall be completed prior to the start of any rain that causes overland flow across or along the disturbed surface that could result in significant sediment discharge.

**(E)** For areas disturbed during the extended wet weather period, treatment shall be completed prior to any day for which a chance of rain of 30 percent or greater is forecast by the National Weather Service or within 10 days of disturbance, whichever is earlier.

**(u)** Logging road watercourse crossings shall be monitored and maintained during timber operations and throughout the prescribed maintenance period as needed, to comply with 14 CCR § 1050. The prescribed maintenance period is specified in 14 CCR § 923.7(i)-(j) [943.7(i)-(j), 963.7(i)-(j)]. Monitoring inspections shall be conducted, when access is feasible during the prescribed maintenance period, a sufficient number of times during the extended wet weather period, particularly after large winter storm events and at least once annually, to evaluate watercourse crossing function. The Department shall also conduct monitoring inspections at least once during the prescribed maintenance period to assess watercourse crossing conditions.

**(1)** Inspections shall include checking watercourse crossings for evidence of downcutting, plugging, overtopping, loss of function, and sediment delivery to Class I, II, or III watercourses and lakes. If evidence of sediment delivery or potential sediment delivery is present, and the implementation of feasible corrective measures could reduce the potential for significant sediment discharge, such additional measures shall be implemented when feasible.

**(2)** Inspections conducted pursuant to California Regional Water Quality Control Board requirements may be used to satisfy the inspection requirements of this section.

**(v)** Logging road watercourse crossings shall be maintained as designed, constructed, and reconstructed during timber operations and throughout the prescribed maintenance period.

Crossings used in connection with stocking activities shall be maintained throughout such use, even if this extends beyond the prescribed maintenance period.

**Repeal § 923.9 [943.9, 963.9] Roads and Landings in Watersheds with Listed Anadromous Salmonids**

~~In addition to all other district Forest Practice Rules, the following requirements shall apply in any planning watershed with listed anadromous salmonids:~~

~~*[Effective 1-1-2008 pursuant to Public Resources Code section 4554.5(a); operative the date Department of Fish and Game regulations 14 CCR sections 787.0-787.9 become effective] In addition to all other district Forest Practice Rules, the following requirements shall apply in any planning watershed with threatened or impaired values, except in watersheds with coho salmon where the standards listed under 923.9.1 and 923.9.2 shall apply:*~~

~~**(a)** Where logging road or landing construction or reconstruction is proposed, the plan shall state the locations of, and specifications for, logging road or landing abandonment or other mitigation measures to minimize the adverse effects of long-term site occupancy of the transportation system within the watershed.~~

~~**(b)** Unless prohibited by existing contracts with the U.S.D.A. Forest Service or other federal agency, new and reconstructed logging roads shall be no wider than a single-lane compatible with the largest type of equipment specified for use on the road, with adequate turnouts provided as required for safety. The maximum width of these roads shall be specified in the plan. These roads shall be outsloped where feasible and drained with water breaks or rolling dips (where the road grade is inclined at 7 percent or less), in conformance with other applicable Forest Practice Rules.~~

~~**(c)** The following shall apply on slopes greater than 50% that have access to a watercourse or lake:~~

~~**(1)** Specific provisions of construction shall be identified and described for all new roads.~~

~~**(2)** Where cutbank stability is not an issue, roads may be constructed as a full-benched cut (no fill). Spoils not utilized in road construction shall be disposed of in stable areas with less than 30 percent slope and outside of any WLPZ, EEZ, or ELZ designated for watercourse or lake protection. The Director, with concurrence from other responsible agencies, may waive inclusion of these measures where the RPF can show that slope depressions and other natural retention and detentions feature are sufficient to control overland transport of eroded material.~~

~~**(3)** Logging roads may be constructed with balanced cuts and fills: if~~

~~**(A)** Properly engineered, or~~

~~**(B)** Fills are removed and the slopes recontoured prior to the winter period.~~

~~**(d)** In addition to the provisions listed under 14 CCR § 923.1 [943.1, 963.1], subsection (e), all permanent or seasonal logging roads with a grade of 15% or greater that extend 500 continuous feet or more shall have specific erosion control measures stated in the plan.~~

~~**(e)** Where logging road networks are remote or are located where the landscape is unstable, where crossing fills over culverts are large, or where logging road watercourse crossing drainage structures and erosion control features historically have a high failure rate, drainage structures and erosion control features shall be oversized, designed for low maintenance, reinforced, or removed before the completion of the timber operation. The method of analysis and the design for crossing protection shall be included in the plan.~~

~~**(f)** Except when expressly required by 14 CCR § 923.9 [943.9, 963.9], subsections (f)(1)-(5) below, the provisions of 14 CCR § 923.9 [943.9, 963.9] shall not apply to a plan that is subject to:~~

~~**(1)** a valid incidental take permit issued by DFG pursuant to Section 2081(b) of the Fish and Game Code that addresses anadromous salmonid protection; or~~

~~**(2)** a federal incidental take statement or incidental take permit that addresses anadromous salmonid protection, for which a consistency determination has been made pursuant to Section 2080.1 of the Fish and Game Code; or~~

~~**(3)** a valid natural community conservation plan that addresses anadromous salmonid protection approved by DFG under section 2835 of the Fish and Game Code; or~~

~~**(4)** a valid Habitat Conservation Plan that addresses anadromous salmonid protection, approved under Section 10 of the federal Endangered Species Act of 1973; or~~

~~**(5)** project revisions, guidelines, or take avoidance measures pursuant to a memorandum of understanding or a planning agreement entered into between the plan submitter and DFG in preparation of obtaining a natural community conservation plan that addresses anadromous salmonid protection.~~

**Renumber §923.7 [943.7, 963.7] to 923.9.1 [943.9.1, 963.9.1]. Licensed Timber Operator Responsibility for Roads and Landings.**

The licensed timber operator who is responsible for the implementation or execution of the plan shall not be responsible for the construction and maintenance of roads and landings, unless the licensed timber operator is employed for that purpose.

**Repeal § 923.9.1 [943.9.1] Measures for Roads and Landings in Watersheds with Coho Salmon**

~~In addition to all other district Forest Practice Rules, the regulations in 14 CCR §§ 923.3 [949.3] and 923.9 [943.9] as amended and effective on January 1, 2010 shall apply in any planning watershed with coho salmon.~~

**Amend § 1034. Contents of Plan.**

*******(o)** The classification and approximate length of each of the following logging road segment categories: constructed, reconstructed, and abandoned ~~Explanation and location of new roads wider than single lane with turnouts~~.

*******(x)** On titled USGS (if available) or equivalent topographic maps of a scale not less than 2" to the mile, the information in subsections (1-~~4~~3), (4)(A), (B) and (E) ((4)(B) and (E) for sites within the harvest area), (8), (9), and (11-13) shall be clearly shown. Additional maps, which may be topographic or planimetric, may be used to provide the information required in the other subsections, to ~~or~~ show specific details, and to improve map clarity. The appurtenant roads referenced in subsection (4)(B), (C), (D), and (E) ((4)(B) and (E) for ~~these~~ sites not within the harvest area) may be shown on a map which may be planimetric with a scale as small as one-half inch equals one mile. Color coding shall not be used. A legend shall be included indicating the meaning of the symbols used. See the district rules for the appropriate minimum mapping acreages.

**(1)-(3) [No change]**

**(4)** Location of all roads to be used for, or potentially impacted by, timber operations. This shall include:~~Location of public roads and those private roads to be used for timber operations within the plan area, and private roads appurtenant to the timber operations where such roads are under the ownership or control of the timber owner, timberland owner, timber operator, or submitter of the plan, and classification of all proposed and existing logging roads as permanent, seasonal, or temporary roads.~~

**(A)** The classification of all roads as permanent, seasonal, temporary, deactivated, or proposed for abandonment.

**(B)** Roads and landings located in watercourses, lakes, WLPZs, marshes, wet meadows, or other wet areas, other than at road watercourse crossings.

**(C)** ~~Appurtenant~~ Logging roads that provide access to rock pits and water drafting sites, and the location of water drafting sites.

(**D**) Public roads within one-quarter (¼) mile of the harvest area.

(**E**) The location of significant existing or potential erosion sites on all roads and landings pursuant to 14 CCR 923.1(e).

**(5)** ~~Probable location of proposed and existing landings in the watercourse and lake protection zone, and landings outside the zone that are greater than 1/4 acre in size or whose construction involves substantial excavation.~~ The following shall be mapped at the scale required under subsection (x) for all constructed and reconstructed logging roads and landings, unless otherwise described:

**(A)** Location of logging road grades greater than 15 percent for over 200 continuous feet or logging road grades exceeding 20 percent.

**(B)** Location of road failures on existing logging roads to be reconstructed.

**(C)** Location of logging roads across and landings on unstable areas or connected headwall swales.

**(D)** Location of landings that require substantial excavation and landings in excess of one-quarter acre in size.

**(E)** Location of excess material disposal sites on slopes greater than 40 percent or on active unstable areas.

**(F)** Location of logging roads and landings across slopes greater than 65 percent for 100 lineal feet or more.

**(G)** Location of logging roads and landings across slopes greater than 50 percent for 100 lineal feet or more within 100 feet of the boundary of a WLPZ that drains toward the zoned watercourse or lake.

**(6)** The location of all new permanent constructed and reconstructed, and temporary logging road watercourse crossings, including those crossings to be abandoned or deactivated, shall be shown on a map. :

~~**(6)** Road failures on existing roads to be reconstructed.~~

**(7)** ~~l~~Location of all tractor road watercourse crossings of classified watercourses except temporary crossings of Class III watercourses without flowing water during timber operations at that crossing.

**(8)** **[No change]**

**(9)** ~~l~~Location of watercourses and lakes with Class I, II, III, or IV waters.

**(10)** **[No change]*****

***** **(16)** Location of any in lieu use of heavy equipment and location of tractor roads ~~other than crossings~~ in ~~the~~ watercourses, lakes, WLPZs, marshes, wet meadows, and other wet areas.

~~**(17)** Location of any new or reconstructed road segment(s) that exceed an average 15% grade for over 200 feet.~~*****

**(bb)** Winter period operating plan where appropriate or required.

**(cc)** Explanation and justification for use of watercourses, marshes, wet meadows, and other wet areas as ~~landings, roads, or skid trails~~ tractor roads.

**(dd)-(ee) [No change]**

~~**(ff)** Explanation and justification for landings that exceed the maximum size specified in the rules.~~

~~**(gg)**~~ **(ff)** Any other information required by the rules or the Act to be included in the plan. ~~The district rules provide for exceptions and alternatives to standard requirements that require inclusion of information in the THP.~~

~~**(hh)** Where roads, watercourse crossings, and associated landings in the logging area will be abandoned, the methods for abandonment shall be described.~~

~~**(ii)** On a map complying with subsection 1034(x), the locations and classifications of roads, watercourse crossings, and landings to be abandoned shall be shown.~~

~~**(jj)**~~**(gg)** A general description of physical conditions at the plan site, including general soils and topography information, vegetation and stand conditions, and watershed and stream conditions.

**Amend 1051.1. Contents of Modified THP**

A plan submitted under ~~section~~ 14 CCR § 1051 above shall contain all the applicable provisions of 14 CCR § 1034 ~~except the following: (o), (x)(7), (z), (cc), (dd), (ee),~~ and the RPF shall:*****

**Amend 1090.5 Contents of NTMP*****

*****(w) On a USGS quadrangle or equivalent topographical map of a scale not less than 2" to the mile, the following information shall be clearly provided. Additional maps may be required to show specific details, and may be planimetric. Color coding shall not be used. A legend shall be included indicating the meaning of the symbols used. See the district rules for the appropriate minimum mapping acreages.

**(1)-(3) [No change]**

**(4)** Location of all roads to be used for, or potentially impacted by, timber operations. This shall include:

**(A)** The classification of all roads as permanent, seasonal, temporary, or proposed for abandonment.

**(B)** Roads and landings located in watercourses, lakes, WLPZs, marshes, wet meadows, or other wet areas, other than at road watercourse crossings.

**(C)** Roads that provide access to rock pits and water drafting sites, and the location of water drafting sites.

(**D**) Public roads within one-quarter (¼) mile of the harvest area.

(**E**) The location of significant existing or potential erosion sites on all roads and landings pursuant to 14 CCR 923.1(e).~~Location of public roads within the plan area, and private roads appurtenant to the timber operations where such roads are under the ownership or control of the timberland owner and are contiguous with the plan area, and classification of all proposed and existing logging roads as permanent, seasonal, or temporary roads.~~

**(5)-(14) [No change]**

**(x)-(ff) [No change]**

~~**(gg)** Where roads, watercourse crossings, and associated landings in the logging area will be abandoned, the methods for abandonment shall be described.~~

~~**(hh)**~~**(gg)** On a map complying with ~~subsection~~ 14 CCR § ~~1090.6(x)~~ 1090.5(w), the locations and classifications of logging roads, logging road watercourse crossings, and landings to be abandoned or deactivated shall be shown.

~~**(ii)**~~**(hh)** A certification by the RPF preparing the plan that he, she, or a designee personally inspected the area.

**Amend 1090.7 Notice of Timber Operations Content**

*****(n)** On a USGS quadrangle or equivalent map of a scale not less than 2" to the mile, the following information reflecting current conditions pertinent to the Notice of Operations shall be clearly provided. Additional maps may be required to show specific details, and may be planimetric. Color coding shall not be used. A legend shall be included indicating the meaning of the symbols used. See the district rules for the appropriate minimum mapping acreages.*****

**Amend 1092.09 PTHP Contents**

*****(a) – (k) [No change]**

**(l)** On a titled USGS quadrangle or equivalent topographic map of a scale not less than 2" to the mile, the information in subsections ~~(1-5)~~ (1~~) (5)~~(A)(1.-5.)), (6~~)~~(A~~) (6)(K~~G)), if applicable, ~~(7)(A)-(B),~~ and (7-11) shall be clearly shown. Additional maps, which may be topographic or planimetric, may be used to provide the information required in other subsections or show specific details, and to improve map clarity. The appurtenant roads referenced in subsection (5) may be shown on a map which may be planimetric with a scale as small as one-half inch equals one mile. Color coding shall not be used. A legend shall be included indicating the meaning of the symbols used. See the district rules for the appropriate minimum mapping acreage.

**(1)-(4) [No change]**

**(5)** ~~Location of public roads within the PTHP, and private roads appurtenant to the timber operations where such roads are under the ownership or control of the timber owner, timberland owner or timber operator, and classification of all proposed and existing logging roads as permanent, seasonal, or temporary roads.~~ The following logging road- and landing-related features shall be shown on a map of the appropriate type and scale as described in subsection (l) above:

**(A)** Location of all roads to be used for, or potentially impacted by, timber operations. This shall include:

**1.** The classification of all roads as permanent, seasonal, temporary, or proposed for abandonment.

**2.** Roads and landings located in watercourses, lakes, WLPZs, marshes, wet meadows, or other wet areas, other than at road watercourse crossings.

**3.** Roads that provide access to rock pits and water drafting sites, and the location of water drafting sites.

**4.** Public roads within one-quarter (¼) mile of the harvest area.

**5.** The location of significant existing or potential erosion sites on all roads and landings pursuant to 14 CCR 923.1(e).

**(6)** The following shall be mapped at the appropriate scale required under subsection (l), whichever is applicable, for all constructed and reconstructed logging roads and landings, unless otherwise noted:

**(A)** Location of logging road grades greater than 15 percent for over 200 continuous feet or logging road grades greater than 20 percent.

**(B)** Location of road failures on existing roads to be reconstructed.

**(C)** Location of logging roads across or landings on unstable areas or connected headwall swales.

**(D)** Location of landings that require substantial excavation and landings in excess of one-quarter acre in size.

**(E)** Location of excess material disposal sites on slopes greater than 40 percent or on active unstable areas.

**(F)** Location of logging roads and landings across slopes greater than than 65 percent for 100 lineal feet or more.

**(G)** Location of logging roads and landings across slopes greater than 50 percent for 100 lineal feet or more within 100 feet of the boundary of a WLPZ that drains toward the zoned watercourse or lake.

**(7)**~~**(6)** Location of proposed and existing landings in the watercourse and lake protection zone, and landings outside the zone that are greater than 1/4 acre in size or whose construction involves substantial excavation.~~The location of all new permanent constructed and reconstructed, and temporary logging road watercourse crossings, including those crossings to be abandoned or deactivated, shall be shown on a map. This requirement may be met by depicting the intersection of a logging road and a watercourse.

~~**(7)** Road failures on existing roads to be reconstructed.~~

**(8)** Location of all tractor road watercourse crossings of classified watercourses except temporary crossings of ~~c~~Class III watercourses without flowing water during timber operations at that crossing.

**(9)** **[No change]**

**(10)** Location of watercourses and lakes with Class I, II, III or IV waters.

**(11)** *****

**Amend § 1093.2. Contents of Road Management Plan.**

The Road Management Plan shall, at a minimum, contain the following information:*****

*****(3) The operational element shall, at a minimum, address proposed road

management operations, stated time frames for actions, clear lines of responsibility for implementation, and schedules to be implemented in a plan, including:

**(A)** A road construction, reconstruction and use component to ensure that operations occur on a stable operating surface, consistent with 14 CCR 923.6. ~~that does not produce sediment in quantities that may cause a visible increase in turbidity of downstream waters in receiving Class I, II, III or IV waters or would violate Water Quality Requirements.~~ This component shall include, at a minimum, restrictions for wet weather operations, surfacing objectives, and provisions for water drafting.*****

**Amend § 1104.1. Conversion Exemptions.*****

*****(E)** Timber operations may be conducted during the winter period. Tractor operations in the winter period are allowed under any of the following conditions:

**1.** During dry, rainless periods but shall not be conducted on saturated soil conditions that may produce significant sediment discharge. ~~sediment in quantities sufficient to cause a visible increase in turbidity of downstream waters in receiving Class I, II, III or IV waters or that violate Water Quality Requirements.~~ Erosion control structures shall be installed on all constructed skid trails and tractor roads prior to sunset if the National Weather Service forecast is a "chance" (30% or more) of rain within the next 24 hours.*****

# BOARD OF FORESTRY TECHNICAL RULE ADDENDUM NO. 5

# GUIDANCE ON HYDROLOGIC DISCONNECTION, ROAD DRAINAGE, MINIMIZATION OF DIVERSION POTENTIAL, AND HIGH RISK CROSSINGS

## Purpose

The purpose of this technical rule addendum is to provide guidance to Registered Professional Foresters (RPFs), Licensed Timber Operators (LTOs), Timberland Owners, and agency personnel on hydrologic disconnection of road segments and logging road drainage, as required by the Forest Practice Rules pursuant to 14 CCR § 923 *et seq.* [943 *et seq.*, 963 *et seq.*]. Logging roads cannot be completely disconnected from watercourses in all locations. This addendum provides assistance in understanding where disconnection is necessary and where site-specific field observations indicate that key areas and problem indicators combine to result in significant existing or potential erosion sites. The information contained herein is designed to be integrated with site-specific evaluation of logging road conditions in the field.

Part I of this addendum presents an introduction to the concept of hydrologic disconnection, a method to evaluate existing hydrologic connectivity, and treatment measures available to achieve hydrologic disconnection. Part II contains guidance on the appropriate location of drainage facilities and structures, installation of energy dissipators, road surface outsloping, and placement of rolling dips. Part III describes diversion potential at watercourse crossings and the importance of critical dip installation. Part IV describes crossings with higher risk of failure and potential

approaches that can be used to reduce the risk of catastrophic failure. Part V concludes with a table and several figures that illustrate the concepts discussed in the text of the addendum.

## I. Hydrologic Disconnection

As defined in 14 CCR § 895.1, hydrologic disconnection means the removal of direct routes of drainage or overland flow of road runoff to a watercourse or lake. The goal of hydrologic disconnection is to minimize sediment delivery and hydrologic change derived from road runoff being routed to a watercourse (Refer to Figure 1). Hydrologic disconnection is achieved by creating a road surface and drainage configuration that directs water to discharge from the road in a location where it is unlikely to directly flow into a watercourse. Hydrologic disconnection can be accomplished by directing road runoff onto effective filter strips. Filter strips should have high infiltration capacity and dense vegetation and/or obstructions (e.g., woody debris, slash) to dissipate energy, facilitate percolation, and resist or prevent erosion and channelization. Hydrologic connectivity increases the potential for the road segment to deliver road-derived sediment and road chemicals, including spills, to a watercourse. When roads are connected to watercourses, this effectively increases the drainage density of the watershed, producing hydrologic changes that can alter the magnitude and frequency of runoff delivery to watercourses. The proportion of road prisms that are hydrologically connected is strongly controlled by road location, road design, road maintenance, local topography, geology, and factors that control the amount of road runoff (e.g., the amount of annual precipitation).

Hydrologically connected roads can deliver water and sediment via inside ditches that drain to a watercourse crossing; by a connected road drainage structure or facility (i.e., ditch drain culvert, rolling dip, waterbreak, or lead-off inside ditch that delivers runoff to a watercourse channel); or by direct runoff from the road running surface to a watercourse at road crossings (Refer to Figure 1). **In the western U.S., road-watercourse crossings account for the majority of the connected road length**, followed by gullies formed by concentrated runoff at drainage structure or facility outlets. Evidence of connection below a road drainage structure or facility is provided by: (1) indication of surface flow between the drainage structure outlet and a defined channel or a flood prone area; (2) a channel that extends from a road drainage structure outlet to the high water line of a defined channel or a flood prone area; (3) a sediment deposit that reaches the high water line of a defined channel or a flood prone area; (4) observation of turbid water reaching the watercourse during runoff events; or (5) indications of channel widening and/or incision below a drainage structure resulting from increases in flow ~~volumes~~.

Primary mechanisms for decreasing hydrologic connectivity are: (1) installation of a "disconnecting" drainage facility or structure close to the watercourse crossing; (2) increasing the frequency of ditch drain (relief) culvert spacing for roads with inside ditches; (3) converting crowned, or insloped roads with inside ditches, to outsloped roads with rolling dips; (4) removing or breaching outside berms on crowned or outsloped roads to facilitate effective drainage; (5) applying treatments to dissipate energy, disperse flows, and minimize erosion at road drainage outlets not connected to watercourses; and (6) avoiding concentration of flows onto unstable areas. In particular, the distance between a watercourse crossing and the first upslope

adequately functioning and sized road drainage facility or structure is of high importance because this distance has a large influence on the volume of water and sediment delivered to a watercourse.

Not all road segments are hydrologically connected and complete hydrologic disconnection is not possible for most roads. For example, insloped road segments with an inside ditch will generally include a segment that is connected between the watercourse and first road drainage facility or structure located up-grade from the watercourse crossing (Refer to Figure 2). The likelihood of connectivity generally decreases rapidly as the distance between the road and the watercourse increases. Low delivery potential roads also include road segments on flat terrain that do not intersect watercourse channels. For all existing road segments where hydrologic connection may be present, 14 CCR § 923.1(e) [943.1(e), 963.1(e)] requires that an evaluation be conducted to identify which segments need to be disconnected and how the disconnection will occur.

**A. Key Areas to Evaluate for Hydrologic Connectivity**

When evaluating the hydrologic connectivity of logging roads, particular attention should be devoted to identifying road segments with a high number of watercourse crossings and those located close to watercourses (e.g., <200 feet). Key areas to consider in this context include, but are not limited to:

- Road segments with road drainage structure or facility outlets near watercourses.
- Insloped or crowned road segments with inside ditches.
- Crowned or outsloped road segments with outside berms.

- Steep road or ditch grades (e.g., > 7 percent).
- Roads on steep hillslope gradients (e.g., > 40 percent).
- Roads located on lower hillslope positions (as opposed to mid-slope and upper hillslope positions).
- Throughcut and incised road segments that are difficult to adequately drain.
- Areas with relatively high hillslope instability (e.g., Franciscan mélange terrain).
- Areas with high precipitation amounts and intensity, and/or high levels of snowmelt runoff (e.g., transient and seasonal rain-on-snow zone).
- Road segments with surfaces prone to erosion (e.g., non-cohesive soils such as decomposed granitic soils) and/or significant rutting from intensive use.
- Road segments with wet weather use.
- Areas with little surface roughness or vegetative cover (e.g., areas recently burned), or compacted soils with low infiltration capacities.
- Unsurfaced roads that are graded on a regular basis.
- Inside ditches that are graded on a regular basis.
- Roads with high traffic volumes (e.g., primary roads in a road network, as opposed to secondary, low-use roads).
- Roads with maintenance issues (e.g., road segments with damaged or plugged drainage structures) and/or limitations regarding ownership or control (e.g., public roads, private non-appurtenant roads, roads with unauthorized use).

**B. Indicators of Significant Existing or Potential Problems**

Indicators of significant existing or potential problems with the existing road drainage conditions include, but are not limited to:

- Evidence of direct sediment entry into a watercourse or a flood prone area from road surfaces or drainage structures and facilities (e.g., ponded sediment, sediment deposits, delivery of turbid runoff from drainage structures during rainfall events).
- Ditch scour or downcutting resulting from excessively long undrained ditches with infrequent ditch drain (relief) culverts or other outlet structures or facilities. This condition can also result from design inadequacies (e.g., spacing not altered for steep ditch gradient), inadequate erosion prevention practices (e.g., lack of armoring), or ditches located in areas of erodible soils.
- Gullies or other evidence of erosion on road surfaces or below the outlets of road drainage facilities or structures, including ditch drain (relief) culverts, with transport or a high likelihood of transport to a watercourse.

Additionally, if a road and/or ditch runoff is hydrologically connected to a watercourse, the following factors elevate the risk of sediment delivery to a watercourse:

- Existing or high potential for cutbank sloughing or erosion into inside ditches.
- Native surfaced road exhibiting erosion.
- Native-surfaced road composed of erodible soil types (e.g., granitic soils).
- Rilled, gullied, or rutted road approaches to crossings.
- Existing ditch drain (relief) culverts or other road drainage structures with significant plugging from sediment and/or small woody debris.
- Existing ditch drain (relief) culverts or other road drainage structures with decreased capacity due to damage or impairment (e.g., crushed or bent inlets, flattened dips due to road grading).

- Decreased structural integrity of ditch drain (relief) culverts, waterbreaks, or other road drainage structures (e.g., excessive ~~pipe~~ culvert corrosion, breached waterbreaks, or rutted road segments).

**C. Design and Treatment Measures to Achieve Hydrologic Disconnection**

Treatment measures for existing logging roads are necessary where site-specific field observations indicate that key areas and problem indicators combine to result in significant existing or potential erosion sites. Proposed and reconstructed roads should be designed to achieve hydrologic disconnection to the extent feasible. Additional restrictions and requirements specified under 14 CCR § 923.4(a) [943.4(a), 963.4(a)] apply for new or reconstructed roads, while 14 CCR § 923.5(a) [943.5(a), 963.5(a)], and 923.6(g) and (h)(3) [943.6(g) and (h)(3), 963.6(g) and (h)(3)] apply to existing roads.

Measures to hydrologically disconnect logging road segments include, but are not limited to:

- Installation of a road drainage facility or structure as close as possible to the watercourse crossing. Typically, this distance is 30 to 100 feet above the crossing (Refer to Figure 2), but may be up to 200 feet or more based on road drainage design and site-specific conditions. For example, the distance from the watercourse crossing to the road drainage facility or structure might be based on the location of where the buffering capacity of the filter strip is the greatest (i.e., densest vegetation and ground cover). Note that this spacing may be closer than the maximum distance specified under 14 CCR § 923.5(f) [943.5(f), 963.5(f)], or as needed for conformance with 14 CCR § 923.5(g) [943.5(g), 963.5(g)].

Depending on the road drainage design, the road drainage facility or structure can be a ditch drain (relief) culvert, rolling dip, waterbreak, or other effective facility or structure. Surface drainage designs or facilities that concentrate runoff (e.g., crowned or insloped road surfaces) require more buffering distance between the drainage outlet and the watercourse than those that disperse runoff (e.g., outsloped road surfaces).

- Installation of additional road drainage facilities or structures above (upgrade of) the closest road drainage facility or structure to the watercourse crossing that are appropriately sized and located in conformance with 14 CCR § 923.5(b) and (c) [943.5(b) and (c), 963.5(b) and (c)]. Maximum waterbreak spacing for roads is specified under 14 CCR § 923.5(f) [943.5(f), 963.5(f)]. Appropriate spacing for rolling dips is considered in Section II.C. of this Technical Rule Addendum.

- Installation of ditch drains that are sufficiently spaced to minimize: ditch scour, prevent exceedance of ditch drain hydraulic capacity, and erosion at drain outlets. Local experience, knowledge and site specific conditions (e.g., hydrology, soil and geologic material present) should be considered by the RPF in the location and spacing of ditch drains. Spacing of ditch drains should be adjusted in response to: (1) poor filtering capacity or potentially unstable areas at the outlet (additional factors are listed in the following section), and (2) proximity to a watercourse. Near a watercourse, the ditch drain spacing should be closer so that smaller amounts of flow are routed down the ditchline, thus providing an added factor of safety for high flow conditions and potential failure of drainage facilities. An example of ditch drain (relief) spacing guidelines is displayed in

Table 1 (see Section IV of this addendum). In the preparation of THPs, NTMPs, and PTHPs, RPFs may develop and use other spacing guidelines that better match the field conditions where their plans are proposed. For example, the RPF can observe the length of road necessary to initiate significant rill erosion and use these observations to adjust spacing guidelines to local conditions.

- In general, if ditch drain (relief) culverts are used, they are recommended to be at least 18 inches in diameter to lower the potential for plugging from soil and small woody debris.

- Elevation of the crossing slightly above the road grade to insure that the crossing (e.g., bridges or relatively flat road approaches) does not serve as the low point for road surface runoff (Refer to Figures 2 and 7). Where applicable, this does not alleviate the necessity for installation of a critical dip to mitigate diversion potential.

- Installation of outside berms to decrease hydrologic connectivity where they direct flow to a more suitable discharge area.

Many road segments will have a small portion of their length still connected, even following implementation of 14 CCR §§ 923.2(a)(5) [943.2(a)(5), 963.2(a)(5)], 923.5(a) [943.5(a), 963.5(a)], and 923.6(g) and (h)(3) [943.6(g) and (h)(3), 963.6(g) and (h)(3)]. Additionally, treatment of road approaches for connected road segments next to watercourses may be necessary pursuant to 14 CCR § 923.5(i) [943.5(i), 963.5(i)].

## II. Road Drainage, Energy Dissipation, Outsloping and Rolling Dips

### A. Location of Drainage Facilities and Structures

In addition to drainage structures and facilities being located: (1) to disconnect road drainage upslope of watercourses, and (2) at a sufficient interval (spacing) to avoid volume concentrations and associated erosion, as discussed above, there are additional factors that should be considered prior to placing drainage structures and facilities in the field. To assist in identifying sites best suited for a drainage structure or facility, the following criteria should be considered. These criteria should be evaluated and appropriately weighted based on site-specific conditions, so that the effectiveness of the drainage structure or facility is maximized and potential problems are avoided or minimized. RPFs should maintain or restore natural drainage patterns as much as possible, while considering the factors listed below. Drainage structures and facilities should be placed:

- To avoid the concentration of flow onto unstable or potentially unstable areas, such as known active landslides, hummocky ground, concave headwalls, or steep fillslopes.
- To discharge onto divergent (convex) to planar slopes where possible, to allow for better dispersion and infiltration (Refer to Figure 3).
- Before hydrologic divides to prevent water from one hydrologic basin mixing with, and potentially impacting, another hydrologic basin not conditioned to receiving the additional flows.

- Above breaks in the road grade that transition from low-gradient to high-gradient to remove the water off of the road before it gains velocity and erosive power on the downslope steep road segment.
- To drain localized or emergent groundwater, springs, and wet areas present in the road prism.

**B. Installation of Energy Dissipators for Drainage Structures and Facilities**

Where the natural topography, soil surface texture, and vegetation is inadequate to dissipate the energy of flowing water, energy dissipators (e.g., slash, rock armor, flow diverters, downspouts, etc.) should be placed at outfalls of drainage structures and facilities to disperse flows and promote infiltration, consistent with the requirements stated in 14 CCR § 923.5(h) [943.5(h), 963.5(h)]. The use and selection of an appropriate energy dissipator should be based on field conditions and is a function of flow, erosion characteristics of the soils, slope gradient, slope roughness and cover, and distance to a receiving watercourse. Effective energy dissipators commonly used in the forest setting, include, but are not limited to:

- Dense vegetative ground cover.
- Wood slash that is “packed” into place with heavy equipment (ideally) or by hand.
- Pit-run rock. Generally composed of competent local rock that has a range of rock sizes and is of sufficient size to resist movement from road runoff.
- Properly located, sized, and maintained stilling basins.

**C. Logging Road Outsloping and Installation of Rolling Dips**

Outsloped roads are built with a slight angle of the road surface towards the ~~fill slope~~ outside edge (Refer to Figure 4). This configuration allows road surface runoff to drain in a dispersed manner over the fillslope onto undisturbed forest soils. As defined in 14 CCR § 895.1, outsloping means shaping the road surface to drain toward the outside edge of the logging road or landing.

Rolling dips are typically constructed on outsloped roads to ensure adequate drainage of the road surface. As defined in 14 CCR § 895.1, a rolling dip means a drainage facility that is constructed to remain effective while allowing passage of motor vehicles at reduced road speeds.

An outsloped road's running surface is considered hydrologically disconnected as long as runoff is effectively transported across rather than down the road surface, outside berms do not restrict runoff, and the road prism does not encroach upon the watercourse. Rolling dips should be installed on outsloped roads to ensure that surface flow is routed off the road surface in situations where outsloping alone may not be effective to prevent concentrating flow or eroding the fill (Refer to Figure 5). Outsloped roads with rolling dips are typically not appropriate for roads with a gradient in excess of ten percent (10%) because of the steepness of the dip approach grades that would be required and the added difficulty to effectively drain the road surface. The maximum amount of outsloping achievable depends on the type of traffic that will use the road (e.g., lowboys, log trucks, pickup trucks), and the road surfacing. Outsloped roads are not appropriate in all situations due to safety concerns, timing of use, or expected traffic (e.g., winter use in snow zones).

The spacing of rolling dips must be in conformance with 14 CCR § 923.5(g) [943.5(g), 963.5(g)]. As with ditch drain (relief) culvert location, the location of rolling dips is to be modified based on the site buffering capacity at proposed installation locations and avoidance of concentrated flow onto unstable areas. Spacing of rolling dips is a function of: (1) road grade, soil erodibility, and road surface area draining to the dip, and (2) proximity to a watercourse. Near a watercourse, the rolling dip spacing should be closer so that smaller amounts of flow are routed towards each dip, thus providing an added factor of safety for high flow conditions and potential failure of drainage facilities. Local experience and knowledge of soil and geologic material present should be considered by the RPF in the location and spacing of rolling dips. An example of general rolling dip spacing guidelines is displayed in Table 1. In the preparation of THPs, NTMPs, and PTHPs, RPFs may develop and use other spacing guidelines that better match the field conditions where their plans are proposed.

**III. Diversion Potential at Watercourse Crossings and Critical Dip Installation**

Diversion potential at watercourse crossings is typically associated with large storm events, and can be a significant source of erosion and sediment. Watercourse crossings have diversion potential if overflow at a plugged culvert inlet diverts the watercourse down the road rather than over the crossing and back into the natural watercourse channel. Diverted flows can create excessive erosion where the flows erode non-channeled surfaces and where they exceed the channel capacity of non-original channels. Diversion potential exists on roads that have a continuous climbing grade across the crossing or where the road slopes downward away from the crossing in at least one direction (Refer to Figure 6). Forest Practice Rules 14 CCR § 923.10(k) [943.10(k), 963.10(k)] requires diversion potential on constructed (new) and existing

logging roads to be addressed; similar requirements have existed since 1990. As specified in 14 CCR § 923.10(j) [943.10(j), 963.10(j)], critical dips are incorporated into the construction or reconstruction of logging road watercourse crossings utilizing culverts, except where diversion of overflow is addressed by other methods stated in the plan. The critical dip should be constructed at the point where the potential for erosion and the loss of fill is minimized (Refer to Figure 7).

**IV. Crossings with Higher Risk of Failure and Higher Risk to the Environment**

Some watercourse crossings have a higher relative risk of failure due to the landscape in which they are installed (e.g., areas prone to debris flows or landsliding); or due to seasonal lack of access or remoteness, both of which limit effective emergency maintenance. Additionally, crossings that employ larger than typical fills to achieve running surface elevations often present a higher risk to the environment if they fail due to the large volumes of fill that could be introduced to downstream watercourses. In these cases, it is recommended and/or required (Forest Practice Rule 14 CCR § 923.11(i) [943.11(i), 953.11 (i)] that such crossings be oversized, designed for low maintenance, reinforced, or removed before the completion of timber operations. As discussed in *Designing Watercourse Crossings for 100-year Flood Flows, Wood and Sediment* (Cafferata et al., 2004), where temporary crossings are not used, rock ford or rock armored fill crossings are often a better alternative to culverts on small to medium sized watercourses in areas where winter maintenance is difficult or debris flows are more likely; the same holds true in areas prone to earthflows or other types of landsliding. Overall, fords (including native surface, rock, armored fill, and vented) are more apt to effectively transport flows, sediment, and debris in unstable landscapes and areas with poor access for emergency monitoring and repairs than culvert crossings.

Where culverts are used, and fills are large, Cafferata et al. (2004) recommend that the diameter of the culvert be increased by 6 inches for every 5 feet of fill above the ~~pipe~~ culvert on the discharge side of the crossing. The additional culvert diameter reduces the risk of failure by allowing more room for transport of flow, sediment and debris, and is relatively inexpensive compared to the cost of replacement of a failed crossing. Crossings may also be reinforced by utilizing large rock designed to resist movement during high flows to line fill faces and by incorporating large critical dips to allow flow passage if the culvert ~~is~~ becomes plugged. Temporary crossings typically provide the least environmental risk since flow is unimpeded after the crossings are removed.

## V. Table and Figures

The following table and figures are provided as examples to illustrate design concepts. These are not intended to serve as default performance standards.

Table 1. An example of ditch-relief culvert and rolling dip spacing guidelines is found in the University of California's Publication 8262, *Rural Roads: A Construction and Maintenance Guide for California Landowners* (Kocher et al. 2006, adopted from Keller and Sherar 2003). Note that spacing of rolling dips and ditch relief culverts should be a function of proximity to a watercourse, with closer spacing near the channel.

| Road Grade (percent) | Soil Erodibility | |
|---|---|---|
| | Low to Non-erosive soils | Erosive soils |
| 0-3% | 400' | 250' |
| 4-6% | 300' | 160' |
| 7-9% | 250' | 130' |
| 10-12% | 200' | 115' |
| 12+ | 160' | 100' |

**Note:** (1) **Low Erosion Soils** = Coarse Rocky Soils, Gravel, and Some Clay
(2) **High Erosion Soils** = Fine, Friable Soils, Silt, Fine Sands

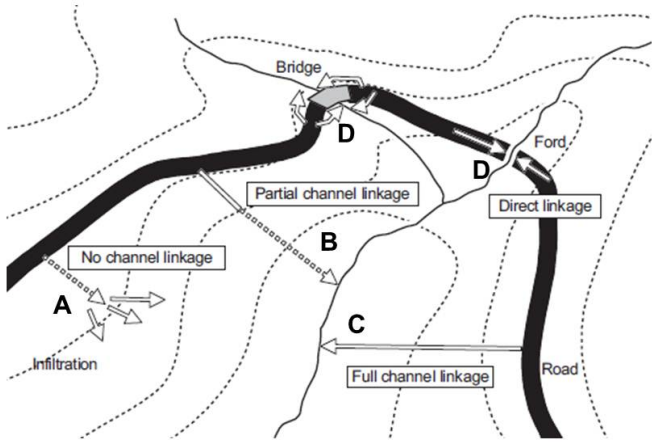
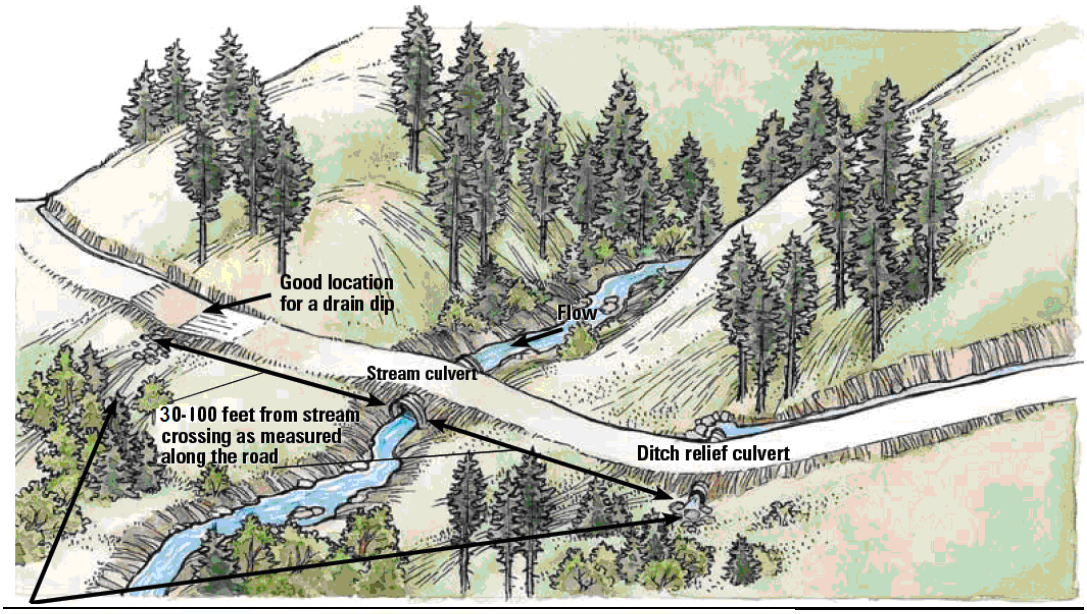



Figure 1. The range of hydrologic connectivity (i.e., linkage) for a road. Ideally, road runoff is drained to an effective filter strip where runoff and sediment is dispersed onto the forest floor (A). Roads can be partially connected when a portion of runoff and sediment reaches the watercourse (B). Full hydrologic connectivity can occur when road runoff initiates channels or gullies (C), or is drained directly into watercourses at road crossings (D). Figure adapted from Croke and Hairsine, 2006.




**Ditch drainage should be directed into vegetation and undisturbed soil filter, and not allowed to continue flowing down the ditch and into the stream.**

Figure 2. Diagram showing implementation of road drainage disconnection facilities/structures to limit sediment delivery into a watercourse. Note the absence of an apparent critical dip at the

crossing. (modified from Oregon Forest Resources Institute 2011, 2nd Ed., used with permission ~~(to be obtained)~~).

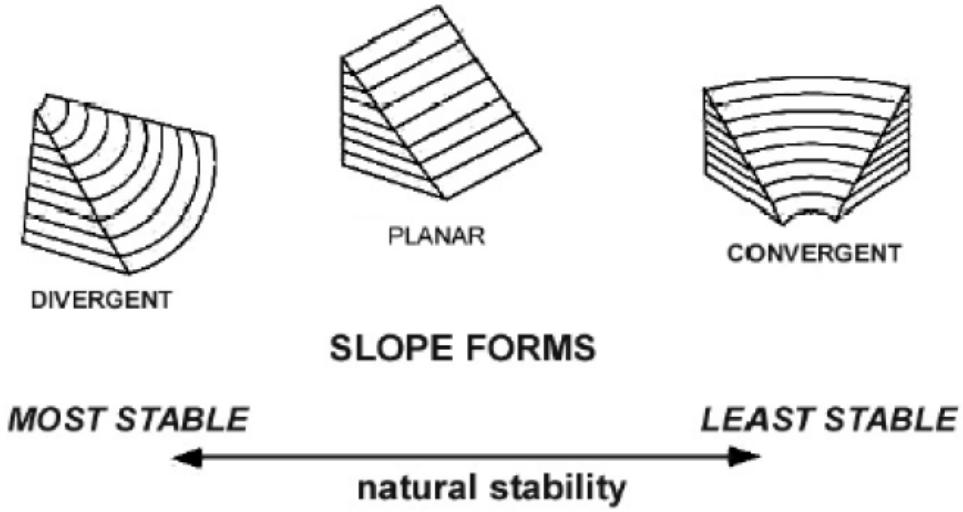



Figure 3. Three major slope forms; water should be discharged onto divergent (convex) to planar slopes where possible (from WFPB 2004).

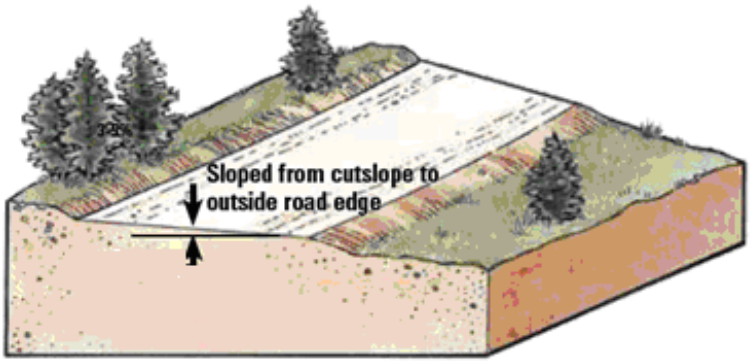



Figure 4. Diagram displaying a typical outsloped road (modified from Oregon Forest Resources Institute 2011, 2nd Ed., used with permission ~~(to be obtained~~).

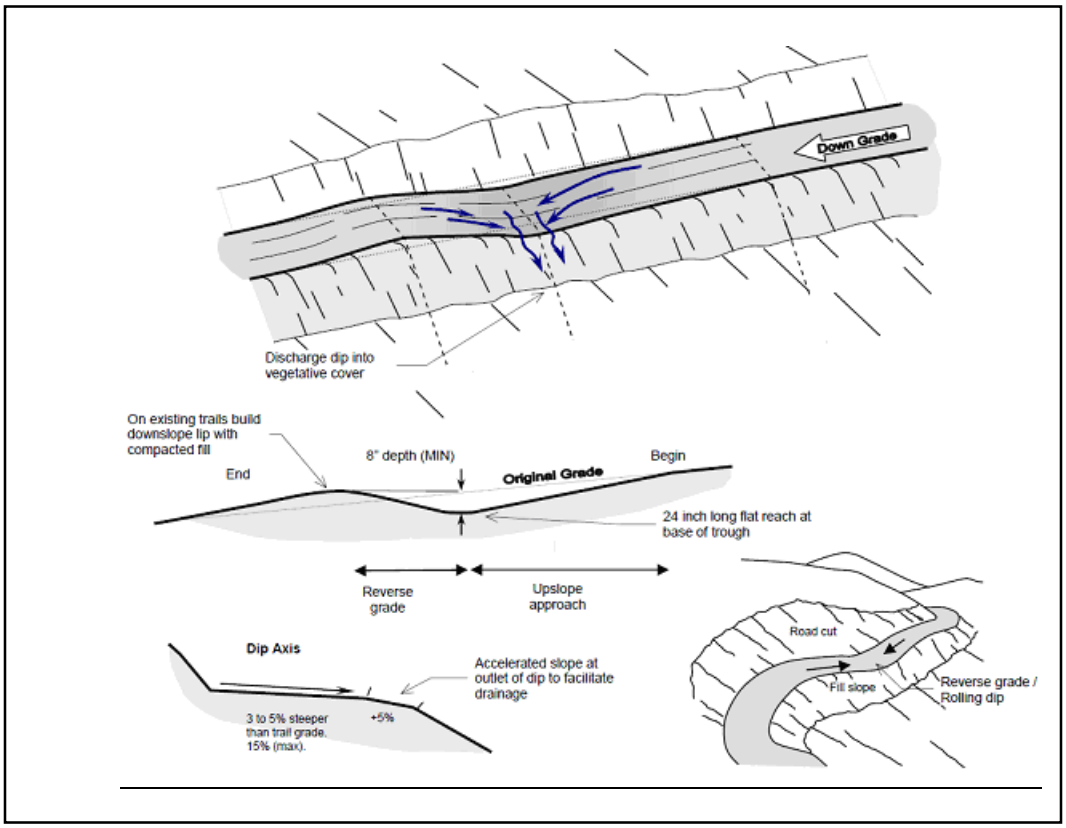



Figure 5. Example of rolling dip specifications (modified diagram provided by Tim Best, CEG).

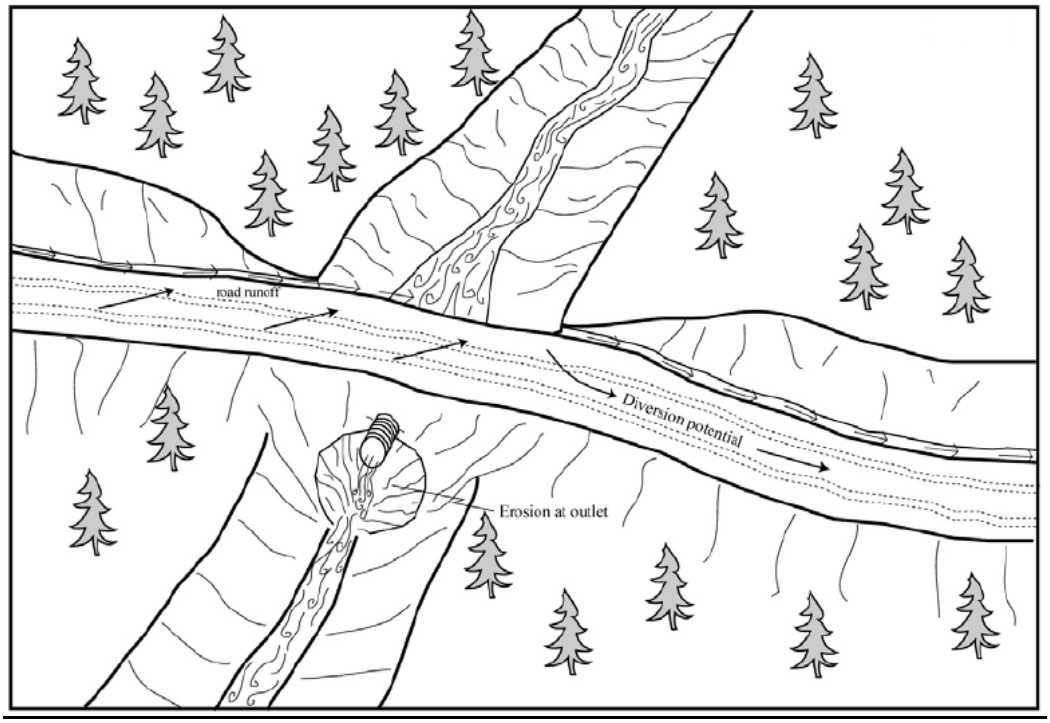



Figure 6. Diagram illustrating diversion potential at a watercourse crossing (from DFG 2006).

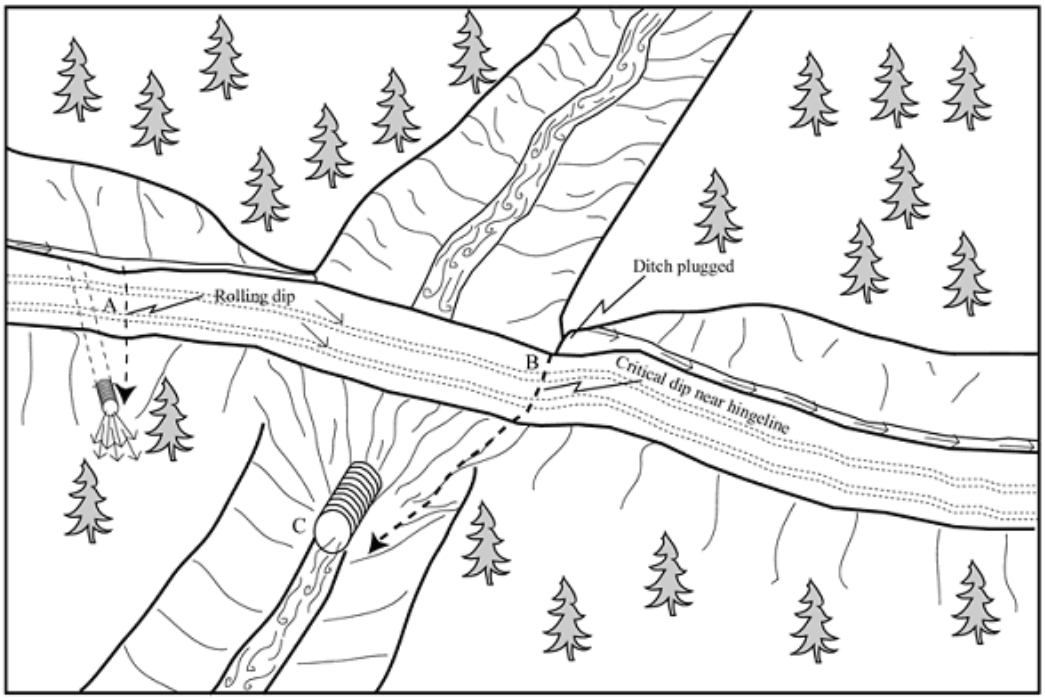



Figure 7. Illustration of a critical dip installed at a watercourse crossing to remove diversion potential (from DFG 2006). The critical dip should be constructed at the point where the potential for erosion and the loss of fill is minimized.