Quality Assurance Plan
Assessing the Use of Erosion Control Plans for Non-Industrial Timber Management Plans

Prepared by
For the
North Coast Regional Water Quality Control Board

Version 1.0
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BD1 QAPjP-001

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Approval:

Mark J. Alpert

Project Manager **Date** July 29, 2011

Board 1 Quality Assurance Officer **Date** July 29, 2011

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A Sponsoring organization and personnel identification

A.1 Sponsoring Organization and Personnel Identification

This project is being conducted by the Timber Harvest/Non-point Source Division of the North Coast Regional Water Quality Control Board (Regional Water Board) in cooperation with the California Department of Forestry and Fire Protection (CAL FIRE). The following Regional Water Board personnel will assume the indicated roles with regards to this project.

Acting Timber Division Supervisor.....Matt St. John
Project Manager.....Mark Alpert
Assistant Project Manager ..... Fred Blatt
Board Quality Assurance Officer.....William Ray
Training Officer .....Dr. Matthew Buffleben
Waiver Amendment Coordinator.....James Burke

A.2 Quality Assurance Officer Roles

The Project Manager will have the following responsibilities:

- Oversee the project
- Troubleshoot problems
- Approval changes in the QA Plan

The Quality Assurance Officer will have the following responsibilities:

- Review and assess performance against the project procedures and the provisions of this QA Plan.
- Present issues and solutions to management.
- Authority to require corrective action implementation.

Training Officer will have the following responsibilities:

- Maintain and update the approved quality assurance project plan. Changes with the QA Plan need approval from the Quality Assurance Officer and the Project Manager.
- Conduct training.

- Maintain list of staff who has completed training.

A.3 Persons Responsible for QA Plan Update and Maintenance

The Quality Assurance Officer shall be the custodian of the current and any prior versions of this QA Plan. Plan modifications, revisions or updates may be suggested by project staff. Revised Plans will be reviewed and signed by the same parties that signed the first version. Revised Plans will be numbered using the following system.

1.0.....First version of Plan
1.X..... Revisions changing project members or schedules
X.0.....Major revisions involving the measurement system

B Project goal, objectives, and schedule

B.5 Background

On June 4, 2009, the Regional Water Board adopted Order No. R1-2009-0038, Categorical Waiver of Waste Discharge Requirements for Discharges Related to Timber Harvest Activities on Non-Federal Lands in the North Coast Region (Timber Waiver). The Timber Waiver includes conditions for controlling sediment discharges and temperature increases that also implement Total Maximum Daily Loads in impaired waterbodies throughout the North Coast region. It includes updated and additional conditions for Non-industrial Timber Management Plans (NTMPs), including those that were previously enrolled under the Categorical Waiver, Order No. R1-2004-0016 (2004 Waiver). Three petitions for review were filed with the State Water Resources Control Board.

The Regional Water Board did not intend for the Timber Waiver to create unnecessary regulatory burdens on CAL FIRE or NTMP landowners, or to create conditions that are duplicative of adequately-protective Forest Practice Rules. It was the Regional Water Board's intent to include NTMP conditions to accommodate site-specific circumstances and to provide regulatory consistency in areas where the Forest Practice Rules provide adequate water quality protection.

Therefore, the Regional Water Board adopted Order No. R1-2011-0038, that stayed the NTMP provisions in Order No. R1-2009-0038, to allow Regional Water Board staff to review the protection levels as applied to all NTMPs in the North Coast to better inform the Regional Water Board for its regulatory actions in the future.

Previous efforts by CAL FIRE to monitor the implementation and effectiveness of the Forest Practice Rules has found generally high implementation rates (Cafferata and Munn 2002, Brandow et al. 2006). Furthermore, where potential areas of discharge have been identified, these problems were mostly caused by the inadequate implementation of the Forest Practice Rules (and not the Forest Practice Rules being inadequate). However, CalFire's monitoring efforts have focused mainly Timber Harvest Plans, not on the NTMPs.

B.6 Goal

The field component of the project addresses the following goal: to assess whether Erosion Control Plans and/or Road Plans (as defined in Order No. R1-2009-0038 and No. R1-2011-0038) are necessary for NTMPs in order to meet water quality standards.

B.7 Objectives

Collect field observations on the frequency of sediment discharge, or the potential of sediment discharge, from stream crossings and logging roads within NTMPs.

B.8 Schedule

The monitoring effort will be conducted during the summer and fall months of 2011. Once training is conducted, field crews will conduct inspections on NTMPs until 5% of approved NTMPs have been inspected. More NTMPs will be inspected as time allows, with a secondary goal of inspecting 10% of the approved NTMPs. Currently, there are approximately 550 NTMPs located in the North Coast Region. Since it will take approximately one day to inspected an NTMP (including travel time to the site location), the project will take a least 28 staff days dedicated to field observations, and will likely go up to 55 staff days.

Data analysis will be conducted during September and October. A report for the Regional Water Board describing the results of this monitoring program will be prepared by November.

C Linking data to project goal

Data will be collected on NTMP operations. If few or no potential sediment discharge sites are identified in areas that have Erosion Control Plans, this observation will provide evidence that Erosion Control Plans are helpful in meeting water quality standards.

Likewise, if potential sediment discharge sites are identified in NTMPs that do not have Erosion Control Plans and/or Road Plans, this will provide evidence that Erosion Control Plans and/or Road Plans are needed to meet water quality standards.

Since stream crossings have been identified as areas that have a high risk of sediment discharge, some stream crossings will undergo a systematic review. Roads outside of stream crossings will also have a qualitative assessment.

D Type, quality, and quantity of data needed

Data will consist of observation collection forms completed with all observations and scoring as required. If additional observations are needed to assess use and effectiveness of Erosion Control Plans, those will be made via recorded notes, photos and other evidences; and will be combined into a report of findings.

Data will be collected on a minimum of 5% of approved NTMPs. If present, four stream crossings will undergo a systematic evaluation (two for ECP areas and two for areas without ECP), although more information will be collected if time is available.

E Acceptance or performance criteria

The procedure to be used does not call for sample collection and subsequent analytical testing as it is strictly observational. In order to assure the quality of any observation, two practices are used. The first is to see to proper training in the procedure for all persons who will be conducting the observations and the second is a observation by a second trained person to provide some consistency in assessments.

Training will be conducted by the Project Training Officer. Once training is complete and the Training Officer is satisfied that the Trainee understands the procedure, a certificate will be issued to the Trainee. Only those with this certification may conduct the procedure. Persons wishing to observe the procedure may do so, but are not considered trained until certified by the Training Officer.

Observations by a second trained person will be conducted on at least 10% of all observations. These observations can be made concurrently. The second party must be another trained person or the Training Officer.

F Sampling plan and sampling QA/QC requirements

No samples will be collected although photos should be taken when possible to document observed conditions. However, the completeness of observation collection forms will consist of self-evaluation of the data collection forms for completeness in the field and a second evaluation of the forms by Project staff. Questions will be resolved through direct communication with the observer.

The project will also assess completeness of the overall project by matching observation collection forms with a list of assessed sites. There is to be a one-to-one match of completed forms and assessed sites.

G How the data will be analyzed

Data will be analyzed collected and divided into two groups: areas that had Erosion Control Plans and areas without. The rate of the stream crossings with potential sediment delivery will be compared.

Roads outside of stream crossings will also be compared between the two groups.

A report will be made of project activities, collected data, evaluated data, and summary findings.

H Appendices

Appendix A Field procedures and forms

1 Procedures for Field Review
2 Overall rating form
3 Road effectiveness form
4 Stream crossing form
5 Road Plan from R1-2009-0038

Procedures for Field Review

Prior to field visit

Review the Non-Industrial Timber Management Plan (NTMP) and its file. Determine if the NTMP has an Erosion Control Plan (ECP). Generally, NTMPs approved before R1-2004-0016 are not required to have an ECP. ECPs are sometimes submitted with Notice of Timber Operations (NTOs) or an amendment to the NTMP. If contained within the NTMP, ECPs are usually located in section 2 or 5 of the NTMP.

Review the NTMP maps. If present, choose at least four crossings to inspect, preferably at least two in areas that had an ECP. The selection is not random. Focus on areas that you suspect may have potential sediment discharge.

Select roads you'll want to observe. The selection is not random. Focus on areas that you suspect may have potential sediment discharge. These are often roads that have a steep gradient (>10%), on hillslopes with steep gradients (>40%), or located adjacent to watercourses.

During field visit

If the NTMP had an area that had an ECP and other areas that did not have an ECP, fill out a separate form for each area. If present, include two stream crossings for each area.

When conducting assessment of roads, only conduct the assessment for roads inside the NTMP area.

For roads outside of stream crossings, focus erosion that has, or the potential, to deliver sediment to watercourses. Focus observations on waterbreaks and inside ditch relief culverts. Look for evidence of sediment transport (gullying) beyond the road prism. Make an assessment if discharge and gullying is dissipating or enlarging and if it is connected to the stream network. If gully is enlarging, you can assume connectivity with the stream network.

As you observe the road system, document observations of sediment discharge, or potential sediment discharge, on the qualitative field form. If necessary, use additional pages to document discharges. Take photos and mark location on map.

Fill out the Stream Crossing Form for each crossing that you evaluate. Stream crossings include the road approaches. The length of road to be evaluated is determined by the points where drainage from the road surface, cuts and fills no longer carries to the stream crossing. The evaluation includes the cut-off drainage structure, which should route water away from the crossing.

For photos, remember to note their location. An easy way to accomplish is to take a picture of the field form. Also for stream crossings, take four photos directed toward the crossing; two from the approaches and one looking upstream and one looking downstream at the crossing.

Prior to leaving the site

Identify the areas visited and watercourse crossings surveyed. Highlight these areas on the map. Review the forms and ensure that they have been completed.

Upon return to the office

Return all forms to training officer. Discuss any problems with training officer. Transfer digital photos to network drives.

List of Items to take to the Field

- QAPP, Procedures for Field Review
- At least 2 Road Effectiveness monitoring forms
- At least 4 Stream Crossing forms (probably at least a dozen)
- At least 2 Overall Evaluation forms
- NTMP maps, including maps of recent NTOs
- Writing utensils, highlighter, clipboards, extra paper or notebook
- Digital camera
- Tape measure (for measuring culvert diameter)
- Clinometer
- GPS

Definitions and guidance for qualitative field form

Controllable Sediment Discharge Sites (CSDS) are defined as sites or locations, within the Project area that meet all the following conditions:
1. is discharging or has the potential to discharge sediment to waters of the state in violation of water quality requirements or other provisions of the waiver,
2. was caused or affected by human activity, and
3. to the maximum extent practicable may feasibly and reasonably, respond to prevention and minimization management measures.

The priority considers, at a minimum, the estimate of the deliverable volume of sediment, the imminence of failure, and the sensitivity of beneficial uses of water in receiving streams. In general, the highest priority is assigned to sites with large sediment discharge sources that show an imminent risk of failure and that will discharge to waters that support domestic water supplies or fish. Priority may be indicated as low, medium, or high.

The components of a Road Plan are included in R1-2009-0038. A Road Plan includes all the components of an ECP and, generally, it addresses prevention of surface erosion and inspection requirements better than ECPs.

Definitions and guidance for stream crossing form

(Modified from FORPRIEM procedures and Methods, September, 14, 2007).

Section 1: Fill Slopes of the watercourse crossing

Gullies: Gullies are greater than 6" deep. Determine as best as possible if the gullies appear to be enlarging and whether there is deposition into the watercourse channels.

Cracks: As you survey the fillslopes, also note any evidence of cracks on the slope. Often these are present at the upper edge of the fillslope. Cracks are common as fill settles. Assess whether the cracks appear to be stabilized or widening (active). Look for signs of vegetation, litter or rounded edges to identify older features, and for sharp edges that indicate recent cracking.

Slope Failures/Perched Fill: While surveying the fillslope, note instances of slope failure or where fill has a high risk of failure. Slope failures are indicated by movement of soil in blocks or slumps, rather than by rills, gullies or sheet erosion. Estimate the size of the failures, or potential failure, as small (< 10 yds^3) or large (> 10 yds^3) and circle if it is a failure, perched fill or both.

Surface Erosion: Look for evidence of surface erosion that reaches the stream, either sheet erosion, rill erosion. Soil pedestals are a key indicator of surface erosion. Small area is less than 100 ft^2 while a large area is greater 100 ft^2.

Section 2: Road draining to crossing

Gullies: Determine if gullies (greater than 6" deep) are present on the road surface draining towards the crossing. Determine if the gullies appear to be enlarging and whether there is deposition into the watercourse channels.

Cutoff Drainage Structure (Rolling Dip, waterbar, ditch relief culvert): Evaluate the cutoff drainage structures to determine if they are preventing the passage of water down to the crossing location. If road topography limits the road approach, identify that category is not applicable (N/A).

Slope Failures/Perched Fill: While surveying the road, note instances of slope failure or where fill has a high risk of failure. Slope failures are indicated by movement of soil in blocks or slumps, rather than by rills, gullies or sheet erosion. Estimate the size of the failures, or potential failure, as small (< 10 yds^3) or large (> 10 yds^3) and circle if it is a failure, perched fill or both.

Inside Ditch Condition: If the inside ditch is present, evaluate its condition and how functional it is in routing water down to the inlet of the culvert.

Ponding: Observe the road surface for evidence of ponding of surface runoff. Normally, ponds form at the low points of the surface, where a berm or other feature prevents drainage. Minor ponding is to be expected, so examine the fillslope below areas where ponding is evident, to determine if the ponding has resulted or could result in slippage or failure of the fill.

Rutting (from vehicles): Determine if ruts from vehicles are present, and whether the ruts impair road drainage.

Surface Erosion: Look for evidence of surface erosion that reaches the stream, either sheet erosion, rill erosion. Soil pedestals are a key indicator of surface erosion. Small area is less than 100 ft^2 while a large area is greater 100 ft^2.

Section 3: Culvert design/configuration

Scour at Inlet and Outlet: Observe the stream channel at both the inlet and outlet of the culvert. If scour is evident, rate as minor or major. Major scour extends more than 2 channel widths below outlet, or undercuts crossing fill at either the inlet or the outlet.

Diversion Potential: Examine the grade of the roadway at the crossing. If the crossings fails (plugs or fails to carry all of the flow), will the stream be diverted out of its channel and down the roadway, or is there a critical dip to redirect the flow back into the channel? If road topography redirect overflow to the channel (e.g. the course is located at a low point in the road), identify that category is not applicable (N/A).

Plugging: Examine the inlet of the culvert and determine the presence and degree of blocking of the capacity of the culvert by debris (woody debris, soil, or rock).

Alignment: Observe the channel as it enters the culvert inlet and determine if there is basically a straight shot for water and debris to enter the pipe, or if there is a considerable angle between the channel and the pipe.

Degree of Corrosion: Use a screwdriver or similar tool and test the competency of the metal for steel pipes.

Crushed Inlet/Outlet: Determine if machinery, or other impacts, has deformed the pipe inlet or outlet.

Pipe length: Determine if the pipe length is appropriate for the fill placed at the crossing, or if the pipe length is causing erosion problems.

Gradient (Inlet or outlet): Determine if the gradient is appropriate or inappropriate. Improper gradient is evident when the pipe inlet or outlet is set too low in the channel or too high in the fill.

Piping (includes pipe separation): Examine the crossing fill and determine if piping of water around the culver is occurring, whereby water is passing through the fill without going through the culvert.

Section 4: Non-culvert crossings (e.g. Rocked Class III crossings)

Armoring: Evaluate the armoring present and determine if it is preventing downcutting at the crossing location.

Scour at Outlet: Observe the stream channel at the outlet of the crossing. Estimate the total amount of scour that has occurred.

Diversion of Flow: Examine the watercourse crossing and approaches to determine if they have been maintained to prevent diversion of stream overflow down the road should the crossing structure become plugged.

Section 5: Removed, Abandoned, or Catastrophic Failure

Bank Stabilization: Determine if exposed soil on bank cuts have been stabilized to prevent transport of deleterious quantities of eroded soils to a watercourse.

Gullies: Gullies are greater than 6" deep. Determine if the gullies appear to be enlarging and whether there is deposition into watercourse channels.

Slope Failures/Perched Fill: While surveying the fillslope, note instances of slope failure or where fill has a high risk of failure. Slope failures are indicated by movement of soil in blocks or slumps, rather than by rills, gullies or sheet erosion. Estimate the size of the failures, or potential failure, as small (< 10 yds^3) or large (> 10 yds^3) and circle if it is a failure, perched fill or both.

Channel Configuration: Examine the restored channel configuration to determine if it is as wide or wider than the natural channel and as close as feasible to the natural watercourse grade and orientation.

Excavated Material: Examine the sites where excavated soil material has been placed to determine if they are sloped back from the channel and stabilized to prevent slumping and minimize input the channel.

Maintenance Free Drainage: Determine if the abandonment procedure does, and will continue to, provide permanent maintenance-free drainage.

Downcutting/Grade Control: Examine the channel and determine if the channel has downcut after the restoration of the channel.

NTMP # _____ Inspection area had an ECP (Y/N)__
Observers _____ Year of last NTO (if known) _____
Inspection Date _____

Overall Rating Form

Rate Road system (includes road connectivity and CSDS sites outside of watercourse crossings) and circle selection

1 – No potential for sediment discharge. Examples:
There are no Controllable Sediment Discharge Site (CSDS).
Road connectivity is minimized (generally < 10%) and where road segments are connected, road surface has been treated.
Road surface has no rutting.

2 – Minor water quality impacts exist. Examples:
There are several low to moderate priority CSDS.
Roads connectivity is minimized (< 10%) and where road segments are connected additional surface treatment is needed.
Road surface has minor rutting, but no gullying is observed beyond the fill slope of the road.

3 – Moderate water quality impacts. Examples:
There are several moderate priority CSDS.
Roads have some connectivity (10% – 30%) and where road segments are connected additional surface treatment is needed.
Road surface has some rutting, but discharge is not near riparian zones

4 – Major water quality impacts. Examples:
There are several high priority CSDS
Roads have substantial connectivity (> 30%) and where road segments are connected additional surface treatment is needed.
Road surface has major rutts and discharge likely reaches watercourses (for example large gullies formed at the waterbreaks)
Fill failures exist and reach watercourses.

Rate Watercourse crossings based on observations. Circle selection

1 – No potential for sediment discharge (e.g. there are no CSDS).

2 – Minor water quality impacts exist (e.g. there are several low to moderate priority CSDS).

3 – Moderate water quality impacts (e.g. there are several moderate priority CSDS).

4 – Major water quality impacts (e.g. there are several high priority CSDS).

Overall evaluation

Does the area inspected for this NTMP need an ECP or updated ECP?
Yes No (circle which if yes)

If NTMP does not have an ECP (i.e. approved prior to the 2004 waiver), are observed CSDS sites adequately addressed in the plan? Yes No

Does this NTMP need a road plan? Yes No

NTMP NTO ROAD EFFECTIVENESS MONITORING

NTMP #_____ ECP (Y/N) Observer(s):_____ Year of NTO(s):_____ Date:_____

Roads: New or Existing (circle one) Type(s) of Road Observed: Permanent/Seasonal/Temporary/Abandoned/ (circle all that apply)

Directions: Observe as much of the NTO(s) road network as is practical. After observation of road network, make the following ratings for the ***dominant*** road type found on the NTO(s). Circle one dominant road type: **1) Permanent, 2) Seasonal**, or **3) Temporary**

Road Surface, Cutbank, Fill Slope Erosion (circle one; indicate main source as RS, CB, or FS in front of categories a) through f))

_____	a) Rilling	Little or no evidence	Rills present, do not leave road surface		Rills present which continue off road surface
_____	b) Gullying	None or very infrequent	Infrequent to moderate size, frequency		Moderate to high size, frequency
_____	c) Mass wasting	None to <5 yd^3 of material	Infrequent, material not moved to channel		Frequent, large, or slide material enters channel
_____	d) Bank slough	None to <5 yd^3 of material	Infrequent, material not moved to channel		Slough material enters channel
_____	e) Rutting	None	Infrequent, material not moved to channel		Moderate to high frequency
_____	f) Perched fill	None	Stable/low potential for delivery	Moderate potential	High potential

Dominant Road Drainage Design (circle one)

a) Type	Insloped with inside ditch	Outsloped with rolling dips	Crowned	
b) Connectivity	Low (< 10%)	Moderate (10-30%)	High (> 30%)	
c) Inside ditch condition	NA	Open	Partly Blocked	Blocked	Downcutting

Road Drainage Structures (circle one)

a) Dominant type	Waterbar	Rolling dip	Cross drain culvert	Other
b) Size of structures	Exceeds need	Meets need	Marginally inadequate	Inadequate
c) Spacing of structures	Exceeds need	Meets need	Marginally inadequate	Inadequate
d) Construction of structures	Exceeds need	Meets need	Marginally inadequate	Inadequate
e) Maintenance of structures	Exceeds need	Meets need	Marginally inadequate	Inadequate
f) Erosion at outlet	None or very minor	Minor	Moderate	High with transport to channel

Recent Grading Impacts (circle one)

a) Estimated date of grading (road surface and/or inside ditch):	None in past 10 yrs	3-10 yrs ago	0-3 yrs ago	
b) If recently graded (0-3 yrs), estimated impact to sediment generation	High	Moderate	Low	NA

Road Surfacing (circle one)

a) Surfacing Information	Native surface	Rocked	Rocked approaches	Other
b) Surfacing occurs where needed	Yes	Marginal	No	NA
c) Surfacing depth, coverage quality:	High	Moderate	Low	NA
d) Surfacing near crossing approaches adequate?	Exceeds need	Meets need	Marginally inadequate	Inadequate NA
e) Where high risk factors present, management practices addressing CSDS? (slopes >7%, highly erodible soil, etc.)	Exceeds need	Meets need	Marginally inadequate	Inadequate

Road Effectiveness Monitoring Form

Record Main Causes of Road Erosion Features Observed and the type of road (permanent, seasonal, temporary) they are found on:

_____
_____
_____
_____

Rapidly estimate number and dimensions for active gullies and recent mass wasting features related to road design, construction, maintenance, and abandonment for the areas observed. Record delivery potential of these features as low, moderate, or high. Document the magnitude of the impact as minor, moderate or high.

_____
_____
_____
_____

Rapidly estimate number and dimensions for areas that have potential sediment features related to road design, construction, maintenance, and abandonment for the areas observed (e.g. fill cracking that has potential for failure and delivery). Record delivery potential of these features as low, moderate, or high. Document the magnitude of the impact as minor, moderate or high.

_____
_____
_____
_____
_____

Provide additional comments when moderate or major impact categories are selected below.

_____
_____
_____
_____

Rate Overall Impact to Water Quality Based on the Information Recorded Above (circle one):

No potential for sediment discharge Minor impact Moderate impact Major impact

Map Areas of the NTO(s) observed; highlight roads observed; attach highlighted map to field form.

Stream Crossing Form - NTMP waiver amendment monitoring

7/26/11

1. Site Information

NTMP No. _____-_____-_____ Crossing No. _____ Observer(s) _____ Date_____

Number of crossings in NTMP: _____ Number of crossings in NTO: _____

Watercourse Class (circle one): I II III IV

Type of road (circle one): permanent seasonal temporary abandoned other_____

Type of crossing (circle one): bridge culvert pipe-arch open-bottom-arch ford other_____

Date of recent NTO: _____

Date of the Installation was (circle one): prior to NTO part of NTO

Current status (circle one): existing abandoned

Culvert diameter (circle one): N/A 12" 18" 24" 30" 36" 42" 48" 60" 72" Other_____"

Multiple Culverts: N/A number of pipes _____ sizes__"; "; "; "; "; "

Photos of this crossing/approaches taken, annotated and attached to this monitoring form? Yes No

Was this crossing identified in an ECP? Yes No. Date of ECP (if known) _____

If included in a previous ECP, has the crossing been repaired? Yes No

2. Make sure the THP Map showing the watercourse crossings sampled is attached.
3. After evaluating the crossing (page 2), is this crossing in its current condition a Controllable Sediment Discharge Site? Yes No
4. Additional Comments (If necessary, continue comments on additional pages): _____

_____

_____

[ALL] Fill Slopes (Check appropriate box on each line for all crossings. If identified in #3, circle slope failure or perched fill)

1)	Gullies (>6" in deep)	N/A	None	Small gullies, but not enlarging	Large gullies or enlarging
2)	Cracks	N/A	None	Cracks present but stabilized	Cracks threaten stability of fill
3)	Slope Failure/ Perched fill	N/A	None	Small (< 10 cubic yards)	Large (>10 cubic yards)
4)	Surface Erosion	N/A	None	Small area (< 100 square ft)	Large area (> 100 square feet)

[ALL] Road Draining to Crossing (Check appropriate box on each line for all crossings. If identified, circle slope failure or perched fill)

1)	Gullies (>6 in deep)	N/A	None	Small gullies, but not enlarging	Large gullies and enlarging
2)	Cutoff Drainage Structure	N/A	Functional	Allows some water to reach crossing	Allows all water to reach crossing
3)	Slope Failure/ Perched fill	N/A	None	Small (< 10 cubic yards)	Large (>10 cubic yards)
4)	Inside Ditch Condition	N/A	Open	Some cutbank accumulation	Blocked (cutbank failures) or downcutting
5)	Ponding	N/A	None	Ponding present but fill is stable	Ponding present and threatens fill failure
6)	Rutting	N/A	None	Some ruts but drainage not impaired	Rutting impairs road drainage
7)	Surface Erosion	N/A	None	Small area (< 100 square ft)	Large area (> 100 square feet)

[ ] Culvert Design/Configuration (For culvert crossings, check box and check appropriate box on each line below, 1 thru 11.)

1)	Scour at Inlet	N/A	None	Minor scour—not undercutting fill	Major scour, may be undercutting fill
2)	Scour at Outlet	N/A	No evidence of scour	Minor scour—extends < 2 channel widths and no undercut of crossing fill	Major scour, extends > 2 channel widths or scour undercuts crossing fill
3)	Diversion Potential	N/A	Critical Dip		If culvert fails, flow will be diverted
4)	Plugging	N/A	None	Sediment/debris blocking <30%	Sediment/debris blocking >30% of inlet/outlet
5)	Alignment	N/A	Appropriate	Low angle channel approach	High angle channel approach
6)	Degree of Corrosion	N/A	None/minor	Moderate—some metal missing	Severe—pipe easily punctured
7)	Crushing Inlet/Outlet	N/A	None	Pipe deformed but <30% blocked	Pipe deformed and >30% blocked
8)	Pipe Length	N/A	Appropriate	Length causing minor fill erosion	Length related to major erosion around pipe
9)	Inlet Gradient	N/A	Appropriate	Inlet slightly too low or high in fill	Inlet too high or low—causing debris to collect
10)	Outlet Gradient	N/A	Appropriate	Outlet slightly too low or high in fill	Outlet too high or low—causing major scour
11)	Piping (includes separation)	N/A	None		Flow passes beneath or around culvert

[ ] Non-Culverted Crossing (For non-culverted crossings, check box and check appropriate box on each line below, 1 thru 3.)

1)	Armoring	N/A	Appropriate	Minor downcutting evident	Major downcutting evident
2)	Scour at Outlet	N/A	None	Minor scour—not undercutting fill	Major scour, maybe undercutting fill
3)	Diversion	N/A	Critical Dip		Overflow will be diverted down road

[ ] Removed/Abandoned Crossings/Catastrophic Failure (Check box, circle type and check appropriate box on each line below, 1 - 7.)

1)	Bank Stabilization	N/A	Dense cover or stabilized	>50% of banks covered and/or stabilized	<50% of banks have effective cover or or stabilized
2)	Gullies (>6 in deep)	N/A	None	Small gullies, not enlarging	Large gullies or enlarging
3)	Slope Failure/ Perched fill	N/A	None	Small (< 10 cubic yards)	Large (>10 cubic yards)
4)	Channel Configuration	N/A	Near natural	Minor difference from natural channel	Major difference from natural channel
5)	Excavated Material	N/A	no erosion	<1 cubic yard transported to channel	>1 cubic yard transported to channel
6)	Maintenance Free Drainage	N/A	Sufficient	Minor problem(s) noted	Major problem(s) noted
7)	Downcutting/Grade Control	N/A	None	Minor incision	Major difference from restored channel

Road Plan from R1-2009-0038

Categorical Waiver E: Nonindustrial Timber Management Plan

5. Road Plan
The Discharger shall submit a long-term management plan for the road system (Road Plan), developed by a qualified professional and designed with the goal of preventing and minimizing sediment discharge from roads in the NTMP area. Roads refer to logging roads as defined in the Forest Practice Rules; a road other than a public road used by trucks going to and from landings to transport logs and other forest products. The Discharger shall submit the Road Plan within five years of enrollment in the Categorical Waiver. The road system described in the Road Plan shall be constructed, reconstructed, and maintained to prevent or minimize sediment discharge to streams. This shall be accomplished by dispersing road surface drainage, preventing surface erosion from entering streams, protecting stream crossings from failure or diversion, and preventing failure of unstable fills, which would otherwise deliver sediment to streams.

The Road Plan shall include, at a minimum:

- The location of all roads and watercourse crossings within the logging area;
- The current status of each road, including road surface material, road and watercourse design, and use restrictions;
- The future plan and implementation schedule for each road; and
- A long term inspection and maintenance schedule designed to ensure that prevention and minimization measures are functioning as intended and to identify and correct any problems that could cause sediment discharge in a timely manner. All roads must either be:
    - inspected and maintained annually, or
    - hydrologically maintenance free, i.e., do not alter natural hydrology of the hillslope, or
    - decommissioned

Roads (including road prism and watercourse crossing drainage structures) that are constructed or reconstructed after enrollment in Categorical Waiver E, shall at a minimum, comply with the standards listed below.

Existing usable roads will be upgraded to the standards below according to a schedule developed by the Discharger and approved by the Executive Officer of the Regional Board. It is expected that significant portions of the road system will be upgraded concurrently with timber harvest activities or through compliance with other regulatory programs. Roads that are not needed as part of the long-term road system and that discharge or threaten to discharge earthen material to waters of the state shall be scheduled as necessary for abandonment or obliteration as Controllable Sediment Discharge Sources under the Erosion Control Plan. The implementation schedule may be revised as warranted by changed conditions if agreed to in writing by the Executive Officer.

Stream Crossings:

- All stream crossings must have a drainage structure designed for the 100 year return interval discharge and pass any reasonable amount of debris;
- Stream crossings must be designed so that in the event of plugging, the stream is not diverted out of its channel;
- Stream crossing inlets and outlets must be protected from erosion;
- Stream crossing outlets must not discharge onto road fill;
- Stream crossing inlets must have low potential for plugging;
- Culvert inlet, outlet, and bottom must be open and in sound condition;
- Fills must be stable, and unstable fills are removed or stabilized;
- Road surfaces and ditches must be disconnected from streams;
- Decommissioned roads must have all stream crossings completely excavated to original grade; and
- Fish bearing streams must have no barriers to fish passage

Road and Landing Fills

- Unstable and potentially unstable road and landing fills are removed; and
- Excavated spoil is placed in locations where earthen material will not discharge to a stream

Road Surface Drainage

- Road surface runoff must be dispersed by outsloping where feasible;
- Road surfaces and ditches must be disconnected from streams to the extent feasible. Road segments that cannot be disconnected from streams shall be stabilized to prevent surface erosion;
- Ditches must be drained frequently by functional rolling dips or ditch relief culverts;
- Outflow from ditch relief culverts must not discharge to streams, onto erodible fill, or onto active or potential landslides; and
- Gullies must be dewatered to the extent feasible