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LOGGING PRACTICES

OBJECTIVES

The purpose of these guidelines is to maximize forest resource utilization on Indian lands within the Pacific Regional Office's jurisdiction, while minimizing environmental disturbances such as erosion and mass soil movement through proper logging techniques.

FELLING PRACTICES

Trees will normally be felled across the slope. All attempts should be made to fell trees to tractor leads allowing efficient skidding and providing protection for reproduction and leave trees. Mechanical shears or other tractor mounted felling equipment shall not be used on slopes exceeding 30 percent without written permission from the OIC to the Regional Director. This written proposal should give justification, equipment limitations and specifications on the particular mechanical shear that will be used on a site-by-site basis.

On slopes exceeding 55 percent or on broken or rocky ground, the Forest Officer-In-Charge should consider the use of jacks or pulling to reduce falling breakage. Trees should be felled to lead away from watercourses, lakes and bird nesting sites should also be considered. Stump heights should be kept at a minimum (rule of thumb: not to exceed ½ the tree diameter on the high side of the tree) or as safety provides.

TRACTOR YARDING

The following standards are applicable to tractor yarding:

1. Spur roads shall be located prior to construction, so that no side-cast from construction will be deposited in or near dry or live streams and so that damage to residual trees shall be minimized.
Skidding through ephemeral or intermittent streams shall be kept to minimum, subject to approval by the Officer in Charge.
2. Slash and other debris shall not be bunched or bulldozed adjacent to residual trees required to be left standing during and after construction of logging truck roads, tractor roads, tractor skid trails, landings, fire breaks, or in locations where such debris could be likely transported into streams.

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3. Construction of new Tractor roads, skid trails, and tractor yarding will not be allowed on slopes steeper than 40 percent unless specifically justified, and approved, in writing, by the Approving Officer. Skid trails shall be planned and laid out to take advantage of ridges, skidding at angles and shall avoid skidding straight up and down slopes. Trails shall be planned to stem off of one main trail when practical (i.e. "herring bone" system). Under no circumstances will tractors be allowed on slopes exceeding 55 percent.
4. Desirable residual trees and reproduction will be protected from damage or destruction in skidding operations while breaking out logs to tractor roads or while operating on tractor roads.
5. Ground based equipment shall not be operated on known potential or active unstable areas unless approved in advance and in writing, by the Approving Officer and he/she specifies protective measures that will be taken. The Approving Officer will be responsible for ensuring the recommended specific protective measures are followed.

TRACTOR SKID TRAILS

Tractor skid trails shall not be allowed in environmentally sensitive or unstable soils areas unless specifically flagged by the Forest Officer-In-Charge and approved by the Approving Officer. Tractor skid trails shall be limited to the number and width necessary for removal of logs and shall not be allowed on slopes greater than 40 percent unless specifically justified by the Forest Officer-In-Charge and approved by the Approving Officer. In no circumstances will a 55 percent slope be exceeded.

CABLE YARDING

When cable yarding is employed, the following standards shall be followed:

1. The installing, hanging, and operating of cable lines shall not excessively damage residual trees, seedlings, or vegetation within Stream Protection Zones or in any other reserved or partial cut areas.
2. Residual trees shall not be used for rub trees, corner blocks, or cable ties unless protected from damage by effective protective devices. Extra blocks along cable lines or other measures shall be used to insure that cables do not excessively damage residual trees, and seedlings.
3. The practice of tight-lining for the purpose of changing location of cable lines is not allowed unless such practices can be performed without excessively damaging or destroying residual trees, seedlings, or

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vegetation within a Stream Protection Zone or in any other reserved or partial cut areas and approved by the OIC.

4. In any sections of a cable corridor that have been scoured by log yarding, cross-drains shall be constructed within 15 days of cessation of the use of the corridor or by October 15, whichever occurs first.
5. When tractors are used in conjunction in cable yarding operations, tractors shall be limited to the following conditions unless approved by the Approving Officer; pulling logs from a watercourse, yarding where deflection is low, using the tractor as a tailhold, and constructing firebreaks or layouts.

RIGGING

Hanging guy lines and other rigging on residual trees is not allowed unless these trees can be protected from excessive damage and approved by the OIC.

SLOPE STABILITY

A geologic analysis of slope stability must be conducted prior to logging on slopes greater than 55 percent or on any unstable slopes on which more than 50 percent of the timber is expected for removal. The OIC may request the geologic analysis be waived by one of two ways. A letter must be sent to the Regional Director, justifying that the proposed action(s) will not adversely affect soils, watershed, etc. or succinctly address geology in the Forest Officers Report (FOR).

A preliminary Erosion Hazard Rating (EHR) of the proposed logging area should be calculated and assessed by using Illustration 1a., "Estimated Surface Soil Erosion Hazard Form".

LANDINGS

Landings shall not be perched on slopes of over 55 percent, located in unstable areas, or within Stream Protection Zones. Landing construction shall not occur on saturated soils. Landings shall be no larger than 1/4 acre in size in all timber types except redwood and no larger than 1/2 acre in redwood timber type. Landings should be sloped or ditched to prevent water from accumulating and drainage structures should be installed where necessary. Side-cast from landing construction shall not be allowed to enter any Class I, II, or III stream. At the completion of logging operations, landings shall be ripped to a depth of 12 inches or mulched. Activity slash shall not be included in any landing fill.

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EROSION CONTROL

Logging roads, tractor roads, landings, firebreaks, and falling layouts shall be designated, located, and constructed in a manner which will control erosion. Excavation and movement of soil shall be consistent with sound forest management practices to fully utilize the timber resource, protect water quality, minimize displacement of surface soil, and control erosion while maintaining the productivity of Indian forestlands.

LOGGING ROADS

Unless guided by an approved Forest Management Plan the following standards for logging roads are to be adhered to:

Planning:

1. Prior to construction, the Forest Officer-In-Charge must approve the location, on the ground, of all logging roads to be constructed for timber operations. The location of these roads shall conform to the overall plan for road construction and development on the reservation if available. The objectives of the road plan should enhance and protect forest resources by employing proper yarding techniques while maintaining economic feasibility. The plan shall also protect fish and wildlife species while sustaining high water quality standards.

Construction:

2. Logging roads shall be laid out and constructed to maximize the use of land contours and minimize cuts, fills, steep road grades, and stream crossings. Whenever possible, roads should be constructed on top of ridges, flatter slopes and on stable soils. Road construction should be avoided in steep canyons, around marshes, watercourses or wet areas, and near existing nest sites of threatened or endangered species. Road density should also be kept to a minimum through effective road planning. Roads shall generally be constructed to single-lane width with turnouts at intervals consistent with traffic density. Both roads and turnouts shall not be wider than required to permit safe passage of logging trucks and equipment. New logging roads shall not exceed a grade of 15 percent, except that grades that do not exceed 500 feet in continuous length may be allowed to reach 20 percent. These grades and distances are not to be exceeded unless approved by the Regional Director. Road construction shall include drainage structures that will accommodate at least the 100-year maximum storm frequency. Road location shall avoid, whenever possible, soil areas with high erosion characteristics and evidence of slope instability, as identified by a qualified geologist or soils scientist and mitigation measures shall be instituted if it is impossible to avoid.

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3. The location and specifications of all drainage culverts and bridges shall be shown on the sale area maps. These locations shall be marked on the ground by the Forest Officer-In-Charge prior to advertisement.
4. Logging roads shall be constructed with no overhanging banks. Any trees over 12 inches d.b.h. made obviously unstable by road construction shall be felled concurrently. Activity slash will not be included in road fill and will be disposed of as required by the Officer-In-Charge.
5. Unstable side-cast material from road construction that has access to a stream or lake shall be end-hauled to a stable location away from water or stabilized in place. Where feasible, roads shall be constructed where the cut and fill material are reasonably balanced.
6. All fill areas created by permanent road construction shall be compacted in lifts no greater than one foot and shall be free of woody debris.
7. During timber operations, road running surfaces in the logging area shall be treated for stabilization and dust control to prevent loss of road surface material and as a safety precaution. When using a dust palliative, use mitigations per product specifications around watercourses and other water sources to minimize the product entering the water system.
8. Special planning and construction techniques to protect water quality and slope stability shall be required for all roads constructed across slopes of 50 percent and greater or where there are unstable areas, highly erodible soils, rock, or large areas of site disturbance.
9. Logging roads which are not permanent shall be restored to timber production by such methods as removing culverts, out sloping, ripping, mulching, and planting the roadbed.
10. All roads constructed shall be classified as seasonal, temporary or permanent and subsequent treatment shall be as prescribed, including decommissioning at the end of the sale.

ROAD DRAINAGE

All permanent drainage facilities required to control erosion shall be installed concurrently with construction of the logging road. These facilities shall be installed according to land contour, drainage patterns, and road design and shall be engineered to minimize erosion or washout of the logging road as determined by at least 100-year

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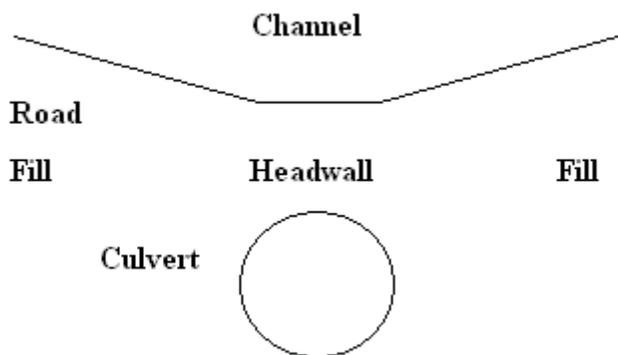
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maximum frequency storm. Culvert outflow shall not be discharged on erodible fill material and shall have rocks, downspouts, or other suitable structures placed to dissipate water velocity and reduce erosion. In fish bearing streams, culverts shall be designed for unrestricted fish passage. All berms not intentionally constructed for road grade fill protection shall be breached or removed from logging roads and all other erosion control work shall be kept current immediately preceding expected periods of precipitation and/or runoff. The road grade shall be rolled so that out-sloped sections with slight dips allow drainage at least every 300 feet and at draws.

Permanent watercourse crossings, fills and approaches should be constructed in a manner which, should the culvert become plugged, allows water to flow over the road through a slight channel, minimizing water diverting down the road, minimizing road bed and fill erosion. (see Figure 1).

Figure 1. Cross-section of water diversion structure



TRACTOR SKID ROADS

Tractor skid trails shall not be allowed in environmentally sensitive or unstable soil areas without prior approval of the Approving Officer. If approved, such trails shall be flagged only by the OIC. Tractor skid trails shall be limited to the number and width necessary for the removal of logs and shall not be allowed on slopes greater than 40 percent unless specifically justified by the Forest Officer in Charge and approved by the Approving Officer. In no circumstances will slopes over 55 percent be exceeded.

CROSS-DRAINS

1. Cross-drains on tractor roads, tractor skid trails, cable roads and all other roads and landings, which do not have acceptable permanent drainage facilities, shall be constructed within 15 days of cessation of use or by October 15, whichever occurs first. Waterbreaks shall also be installed on all constructed skid trails and tractor

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roads prior to the end of the day if the U. S. Weather Service forecast is a "chance" (30 percent or more) of rain before the next day and prior to weekend or other shutdown periods outside of the winter period. Cross-drains on firelines shall be constructed with the construction of the firelines.

The following table gives the recommended spacing for cross-drains on temporary roads, tractor roads, skid trails, cable corridors and firelines. (Use these spacing guidelines also for permanent roads when drainage facilities for permanent roads are lacking.)

TABLE 2
MAXIMUM DISTANCE BETWEEN CROSS DRAINAGES 1/ FOR
TEMPORARY ROADS, TRACTOR ROADS, SKID TRAILS, CABLE
CORRIDORS AND FIRE LINES

Estimated Hazard Rating (EHR) 2/	Road or Trail Gradient (in percent, %)			
	10 or less	11-25	26-50	> 50 3/
	Feet	Feet	Feet	Feet
Extreme	100	75	50	50
High	150	100	75	50
Moderate	200	150	100	75
Low	300	200	150	100

1/ Above spacing is to be measured on the slope.

2/ EHR's based on general area around road or trail, not on bare area itself.

3/ May require handwork instead of angle dozer.

2. Effective cross-drains shall be constructed at all natural water-courses, regardless of the specified minimum distances, except where culverts or bridges are provided.

3. Cross-drains shall be cut diagonally at 30 degrees from a line normal to the road, shall drop 2 degrees (approximately 4 percent) or more to the road grade, shall be cut a minimum of 6 inches into the firm roadbed, skid trail, or firebreak surface, and shall have a continuous firm embankment of a least 6 inches in height immediately adjacent to the lower edge of the cross-drain cut.

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4. Cross-drains shall provide that water be discharged and spread into the adjacent area in such a manner that there will be minimum erosion in the discharge area. Water shall be discharged into vegetation or non-erodible areas to dissipate energy and reduce erosion whenever possible.
5. Cross-drains shall be maintained to assure continued proper function during the life of the contract.
6. Deeply cut cable roads diverting water from natural drainages for more than 100 feet shall have cross drains installed at 100 foot intervals.

PERMANENT STREAM CROSSINGS

Stream crossings shall be kept to an absolute minimum and shall be consistent with the overall plan for road development. All permanent stream crossings will be either log stringer bridges, concrete bridges, railroad cars, or metal culverts and shall be designed to accommodate at least the 100-year maximum frequency storm. Metal culverts used as permanent stream crossings shall be properly installed below stream grade and backfilled with compacted fill. Fish bearing streams shall have functional fish passage structures installed. Culvert outlets shall be installed where sufficient length does not permit water to spill into the fill portion of the road. All permanent stream crossings shall be maintained throughout the succeeding Winter Periods during the life of the contract to assure continued proper functioning.

TEMPORARY STREAM CROSSINGS

Temporary stream crossings shall be kept to an absolute minimum. Preferred structures for this purpose shall be either log stringer bridges or railroad cars installed to maintain stable stream banks. Culverts may be installed as temporary crossings, if stable stream banks are not excessively excavated and if all fill is removed with the culvert. Where temporary crossings are necessary, removal of all structures not designed to accommodate the 100-year maximum frequency storm is to be accomplished prior to the completion of the contract. No temporary crossings may be installed during the winter season. Log culverts are not to be used as temporary crossings at any time on Class I or II streams when the contract will extend into the winter season.

MISCELLANEOUS LOGGING PRACTICES

Improper handling of fuels, paints, solvents and lubricants can cause soil and water contamination. Handle these with care and report all incidences of spillage. Remove all litter when leaving the logging site and dispose of it properly.

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Always employ the highest safety standards.

All OSHA standards apply to all BIA approved forest operations and all contractors will comply with these standards.

WINTER OPERATIONS GUIDELINES

Winter operations are defined as any operation performed between October 15th and April 1st of the following year unless defined otherwise in an approved forest management plan. This pertains to all forestry related activities.

1. Regional Director Approval of Winter Operations Plan - If a Purchaser/Contractor intends to perform any contract work during the winter operations period, the Agency/Tribe must submit a winter operations plan to the Regional Director requesting approval of winter operations at least two weeks prior to October 15. The plan must describe why it is advantageous for the Tribe or for the Tribes' Contractor to be working during this period. Any additional mitigation measures that will be required should be detailed in this plan.
2. Officer in Charge (OIC) Approval - After the Regional Director has approved the winter operations plan, the OIC shall give approval to the contractor on a daily basis for operations to continue. This must be in writing with a copy faxed to the Pacific Regional Office. The OIC shall shut down operations (for any length of time necessary) where weather conditions make it environmentally inappropriate to continue operations. The OIC shall ensure that all required mitigation measures are followed.

The following standard mitigation measures will be implemented where winter operations guidelines have not been described in an approved Forest Management Plan.

1. Timber Falling- No additional requirements will normally be required for timber falling. No mechanical harvesting will be used during the winter period unless approved in the winter operations plan.
2. Tractor Logging & Mechanical Site Preparation- During the winter period, tractor logging or mechanical site preparation shall not be conducted except during dry, rainless periods where, in the best judgment of the OIC, an unacceptable amount of soil compaction or erosion will occur. Erosion control structures shall be installed on all constructed skid trails and tractor roads prior to the end of the day if the U. S. Weather Service forecast is a "chance" (30 percent or more) of rain before the next day and prior to weekend or other shutdown periods. The OIC will inspect all work on a daily basis to verify that unacceptable soil disturbance and compaction is not taking place.

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3. Cable Yarding - Cable corridors that are gouged sufficiently to divert and carry water away from natural drainage patterns shall have water bars installed as detailed in Table 2 of the Pacific Region Logging Practices or other appropriate erosion control measure as directed by the OIC. Erosion control structures shall be installed on all corridors prior to the end of the day if the U. S. Weather Service forecast is a "chance" (30 percent or more) of rain before the next day and prior to weekend or other shutdown periods.

4. Roads and Landings- During the Winter Period, loading and hauling shall not be conducted except during dry, rainless periods where, in the best judgment of the OIC, an unacceptable amount of road damage or road resource damage will occur. A road bed is considered to be experiencing significant damage when the travel way deforms to the point that surface runoff is being diverted into the deformation or when vehicles have to use traction devices (chains) or four wheel drive to safely operate in muddy conditions. Significant damage to resources resulting from road use is considered to be occurring when road surface runoff has the potential to impact water quality in any class stream and/or when road graded material cannot be contained in equipment blades until it can be deposited in an approved disposal area. Roads shall not be constructed during the Winter Period, unless approved in the winter operations plan. Drainage features and erosion control structures shall be maintained on all roads and landings throughout the life of the current contract to assure proper functioning.

Logging practices that will increase road longevity should be used (for example, driving slower, lower tire pressure, off setting tracks, intermittent rocking, back blading, temporary suspension of hauling, etc.)

5. Liquidated Damages- Violation of any of the winter operations guidelines may subject the operator to liquidated damages as described in the standard provisions part B of the timber sale contract or other appropriate contract agreements. A statement to this effect should be included into the contract.

6. Endangered Species/Threatened & Endangered Species - In addition, mitigations as set forth by the USFWS, NMFS, and the BIA PRO concerning wildlife protected under the ESA will be followed when operating within the Winter Period. All consultations and protocols will be conducted prior to the start of any operations.

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FORM 1 - BIA PRO

ESTIMATED SURFACE SOIL EROSION HAZARD RATING FORM

SOIL FACTORS				FACTOR RATING BY AREA		
A. SOIL TEXTURE	Fine	Medium	Course	A	B	C
1. DETACHABILITY	Low	Moderate	High			
Rating	1-9	10-18	19-30			
2. PERMEABILITY	Slow	Moderate	Rapid			
Rating	5-4	3-2	1			

B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK

	Shallow	Moderate	High			
	1"-19"	20"-39"	40"-60"			
Rating	15-9	8-4	3-1			

C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2 MM IN SIZE INCLUDING ROCKS OR STONES

	Low	Moderate	High				FACTOR RATING BY AREA A B C	
	(-) 10-39%	40-70%	71-100%					
Rating	10-6	5-3	2-1					
SUBTOTAL								

II. SLOPE FACTOR

Slope	5-15%	16-30%	31-40%	41-50%	51-70%	71-80%(+)			
Rating	1-3	4-6	7-10	11-15	16-25	26-35			

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE

	Low	Moderate	High			
	0-40%	41-80%	81-100%			
Rating	15-8	7-4	3-1			

IV. TWO YEAR, ONE-HOUR RAINFALL INTENSITY (Hundredths Inch)

	Low	Moderate	High	Extreme			
	(-) 30-39	40-59	60-69	70-80 (+)			
Rating	1-3	4-7	8-11	12-15			

TOTAL SUM OF FACTORS

EROSION HAZARD RATING

	<50	50-65	66-75	>75			
	Low (L)	Mod (M)	High (H)	Extreme (E)			
THE DETERMINATION IS							