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Zigzag Integrated Resource Project

Logging Systems Report

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For:
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Introduction

Logging systems are estimated based on aerial photo interpretation, terrain considerations and field visits. Further detailed analysis is needed in the field particularly for skyline systems to verify that they would work appropriately. Project Design Criteria (PDC) are considered standard operating procedure when analyzing the feasibility of the type of logging system. See the HorseLoggingNad83 and MudLoggingNad83 shapefiles for a comprehensive look at treatment areas and the associated proposed logging system. The available road system and logging system possibilities are considered during the early planning phase. The existing network of system roads as well as the existing road alignments of old temporary roads and system roads that were actively or passively decommissioned were assessed to determine whether they are needed for the current thinning proposal.

Temporary & Decommissioned Roads

The reuse of existing alignments is consistent with Forest Service policy as described in Forest Service Manual 7703.22. In some cases new temporary roads are proposed to access landings where the existing system roads and old road alignments do not adequately access the ground.

For this document, the term rehabilitation is used to describe the type of closure that is standard practice now for temporary roads. Most of the existing old temporary roads were not rehabilitated after clearcutting, which was a common practice at that time (30 to 70 years ago). Native surfaced temporary roads would be bermed at the entrance, water barred, decompacted and roughened as needed with the jaws of a loader or excavator, and debris such as rootwads, slash, logs or boulders are placed on the surface where available. Roads or sections of roads that have rock surfacing may be decompacted where site-specific circumstances warrant.

The technique known as “cratering,” which is a standard practice often used for system road decommissioning, may be used to decompact temporary roads or reused existing road alignments. Where the project includes the reuse of system roads were decommissioned using the entrance management technique, they would be restored as closely as feasible, to the same condition they are now. Though these decommissioned roads were identified as an existing temporary road for accessing treatment areas, the distinction can be viewed in Table #1.

The reuse of existing alignments is consistent with Forest Service policy as described in Forest Service Manual 7703.22. Because past practices for closing temporary roads and past practices for system road decommissioning varied and differ from current practices, the existing alignments used for temporary access are all different and unique. Some of them have small trees or brush growing on them while many do not. Even with vegetation growing on them, these road alignments are considered the best place to temporarily reestablish a road because

it results in less total ground disturbance compared to building another road somewhere else to access the stands.

The reuse of existing road alignments and the construction of new temporary roads are listed below in Table #1, along with the number of approximate miles and are estimated based on the judgement of transportation engineers, logging systems specialists and silviculturists. The estimation of the location and extent of roads required to facilitate harvest is based on the best information available at the time of planning. The final alignment of logging systems and the transportation infrastructure needed to facilitate that system may differ somewhat from this list and from locations shown on maps. The final alignments are proposed by contractors based on site-specific conditions, the capability of their equipment, their skills and safety requirements, but are only implemented after approval by the Contracting Officer. It is within the Contracting Officer's authority to approve or disapprove new temporary roads, use of existing alignments, landing locations and other logging system features on the ground, as needed. Final alignments would be consistent with the Project Design Criteria and the provisions of the contract. The use of these proposed existing and new temporary roads can be viewed in the HorseTempsNad83 and MudTempsNad83 shapefiles.

Table #1

Temp Road Type	Approximate Miles
Existing	2.5
New	3.9
Decommissioned roads	4.2

Landings

The project also includes the use of landings. Landings are areas on or directly adjacent to roads where logs are brought to be loaded onto log trucks. Landing sizes vary based on the logging system and the types of equipment that need to be safely accommodated. For similar projects on the west side of the Forest, the following landing sizes are typical:

- An average ground-based/endlining log landing is 50-feet wide by 70-feet long; allowing room for skidders to come and go, a loader to sort logs and room for a log deck.

- An average skyline/tethered log landing is 40-feet wide by 70-feet long; allowing room for a yarder, a loader to sort logs and a log deck. The standard practice today is to use parallel skyline settings wherever possible. This practice results in a much smaller disturbed area: no additional landing construction is needed because the landing overlaps the road prism and requires very little additional clearing. Often in the original clearcut logging, fan shaped settings were used that resulted in larger landings and greater levels of ground disturbance as corridors converge at the landing. In thinning operations, parallel skyline settings avoid this disturbance. Some landings provide access for a tractor unit on one side of a road and a skyline unit on the other side.

- An average helicopter landing size is approximately 100-feet wide by 200-feet long with some additional trees removed for the flight path coming into the landing. Some service landings, approximately 60-feet wide by 60-feet long, are also needed where helicopters land and are refueled. Where possible, helicopter landings utilize existing openings such as rock quarries or road intersections. Since helicopters were not used for the original clearcut logging, many units that are proposed for helicopter logging today have existing skyline or ground-based landings that would not be reused.

Many units that were logged before have existing landings that would be reused where feasible. Some existing landings have brush or small trees growing on them that would need to be removed. Most of the landing disturbance overlaps with the road prisms or other created openings that remain on the landscape from past timber management activities.

The landing analysis is Table #2, is a reasonable approximation of the number and type of landings that would be used per logging system, see the HorseLandingsNad83 and MudLandingsNad83 shapefiles for anticipated locations of these landings. Where appropriate, helicopter and service landings would be located in previously used landings, roads, or rock quarries. If there are changes to the logging systems during the final field analysis and layout, more helicopter landings may be needed, however they would likely be located in previously used roads, landings and quarries. If additional helicopter landings and/or locations are needed, the appropriate Interdisciplinary Team (IDT) members will be consulted. For all other logging systems, existing landings would be reused, resulting in little to no new ground disturbance, although some level of blading and reconditioning would occur on these areas. New landings would occur along the new temporary roads that would be built. Some landings would be used for multiple logging systems landings, including a helicopter service or log landing. In those cases, the logging system landing that has the largest estimated footprint were used to calculate the approximate number of landings and approximate acres columns in Table #2. The final landing locations and sizes are approved by contract administrators using the project design criteria (PDC). The PDCs include minimum spacing away from streams and post-harvest restoration.

Table #2

Landing Type by Logging System	Approximate number of landings	Approximate Acres
Ground Based/Endlining - Existing	133	10.7
Ground Based/Endlining - New	39	3.2
Cable/Tethered - Existing	147	9.5
Cable/Tethered - New	11	.8
Helicopter - Log	8	3.7
Helicopter - Service	2	.2

Ground-Based Systems

Ground based logging operations generally require the use of a tractor skidder with grapple and 100 feet of bull line in order to winch logs. A self-leveling, track mounted, timber harvester equipped with a dangle head processor designed for complete log processing at the stump, including removal of all branches and cutting logs to length and diameter, may be used to cut and pre-bunch logs to skidtrails. The timber harvester is assumed to have a minimum boom reach of 25 feet, with a track width not to exceed 10 feet, and a track length not to exceed 14 feet.

Endlining Systems

Endlining logging systems are typically used in places where there is a small or narrow steep area that a harvester cannot reach with their cutting mechanism and a skidder can't reach with the grapple and has to use the 100 feet of bull line that typically are on skidders. This would also include narrow areas such as along road systems where the unit is not wide enough off the road to warrant setting up skyline corridors as you would see in a cable logging system. Typically in these areas trees that can't be reached by a harvester are hand felled and then pulled out using the 100 feet of bull line by the skidder.

Cable Systems

Skyline logging systems would utilize a yarder and carriage capable of transporting logs in single span and multi span configurations. The equipment would be capable of logging spans of 1,500 feet or more, with a slack pulling, fixed position carriage, rigged to obtain one end log suspension over the full length of each skyline corridor. Corridors are generally 12 feet wide.

Sometimes a skyline cable needs to be attached to the far side of a stream to gain proper lift or to yard logs across the stream. The quantity and spacing of these corridors are constrained by the PDCs. Other stream crossings would be rare and few if any are anticipated. Where trees are yarded in a skyline corridor, a width of approximately 12 feet is typically cleared between the trunks of trees to allow for safe operations. Where these trees are felled in the protection buffer they would be left on site.

Helicopter Systems

Helicopter logging systems would be used which utilize heavy-lift helicopters to remove cut trees by lifting them on cables attached to a helicopter to a designated landing.

The economic viability of helicopter logging is marginal given the value of the timber and the high cost of jet fuel. The accomplishment of these marginal helicopter units relies on the fluctuations of the timber market and the cost of jet fuel at the time of bidding. One way to reduce the cost of helicopter operations is to have the ability to use harvesters to cut and "pre-bunch" the trees in the treatment areas. This operation has safety and cost benefits to the logger as it limits the employees being exposed to hazards and reduces the number of

employees needed in the operation. Another benefit is that pre-bunching allows the logger to get the maximum amount of volume per turn which helps to increase productivity by reducing the amount of turns needed to complete operations. The ability to use harvesters in these areas would also need to be consistent with the Project Design Criteria.

Tethered Systems

Tethered logging operations commonly take place on slopes that in the past have typically been harvested using skyline operations. Tethered logging is a new practice on the forest but is gaining popularity. This operation has safety and cost benefits to the logger as it limits the employees being exposed to hazards as well as reduces the number of employees needed in the operation. The cost of this operation to the logger falls somewhere in between ground based and skyline operations but can vary.

Though there can be slight variations in the equipment used in a tethered system, this logging system typically involves tethering a harvester to a piece of equipment such as an excavator with a winch. The harvester is lowered down the slope and reaches out up to approximately 25-30 feet to then harvest the tree. At this time, the most common yarding method on these slopes is to set up a skyline yarding system to yard the trees to the landing. The skyline corridors are typically 150-200 feet apart. Since the harvester typically will have a maximum reach of 25-30 feet, it will typically make a couple of passes down the slope between skyline corridors in what is commonly known as “ghost trails”. These are places where the harvester is lowered down the slope as described above, but they are able to maneuver in between trees while harvesting and move down the slope without creating an opening similar to a skyline corridor. As they are harvesting trees down the slope, the harvester will place the trees in the direction of the closest skyline corridor in order to reduce the lateral yarding distance needed to bring the tree or logs back to the carriage. Tethered logging typically does not take place on downhill yarding operations and only typically occurs where uphill yarding occurs.

This is an operation that may take place in this project with a purchaser request and Contracting Officer approval. This operation would also need to be consistent with the Project Design Criteria. Since this operation is similar to a skyline operation, the acres that are in the Cable(Uphill) /Tethered row in Table #3 below will have only one number and will reflect both logging systems since it is unknown at this time which logging system will be used at the time of operations.

The table below describes approximately how many acres may be logged with the different logging systems. These numbers only reflect the logging system acres before Project Design Criteria (PDC) are applied and thus it is expected that the acres will be reduced as PDC’s are applied:

Table #3

Total by System	Acres
Ground Based	1224
Cable(Uphill)/Tethered	476
Cable(Downhill)	26
Helicopter	484
Endlining	19

Operations near high voltage power lines

When logging near power lines there are additional requirements that need to be implemented in order to reduce the dangers. Here are some of the general guidelines for logging near high voltage power lines.

- Contact the power line operator to get specific information and requirements when operating near their power lines.

- Access roads should be kept reasonably free of equipment, forest products, and debris. The power line operator may need to have road access for emergencies. In this case "reasonably free generally means: roads could be cleared within an hour of notice; and roads would be left clear and passable when contractors leave the area for more than an hour at a time.

- Logging trucks and equipment should be parked on the right-of-way only during emergencies. When this occurs, the truck/equipment should be properly grounded.

- Haul roads and skid trail locations should be at least 50 feet from wood poles or steel structures.

- Yarders used near power lines should be grounded with approved copper wire attached to an approved copper rod pounded six to eight feet in the ground. Skyline cables should be grounded as described above at the tail hold. Chokers should be allowed to contact the mineral earth prior to contract any personnel or equipment. Track-mounted equipment is recommended for use near transmission lines to promote drain off of induced voltage. If rubber-tired machines are used, a chain should be used to drain off voltage.

- Maintain a minimum separation of 25 feet between power line conductors and equipment, personnel, and machinery. (Actual distance to be determined by the type and voltage of the power lines, ask the operator for specific distances.)

- No skyline yarding should occur across/perpendicular to the power line right-of-way.

- Avoid loaded helicopter flights over transmission facilities.
- No slash or debris burning should occur on or near the right-of-way. Concentrated columns of smoke from slash burning off right-of-way should be avoided in order to prevent electrical arc.
- Log decking or storage of logs should not occur on the transmission line right-of-way.
- Loading of logging trucks should not occur on the right-of-way. Logging trucks should not be loaded to a height greater than 14 feet above the roadbed when traveling underneath power lines.
- Hand falling adjacent to the powerline corridor has an increased risk of trees falling into the power lines, harvesters used near powerlines need to be properly grounded and care taken to ensure that the arm and tree are kept a safe distance from the lines.
- If a tree comes in contact with the transmission line, do not attempt to remove it. Quickly remove personnel from the immediate area. Contact the power line operator immediately.

For further details, check the general standard requirements of OSHA Standard 29 CFR 1910.333(c)(3)

ECONOMICS – FINANCIAL ANALYSIS

The Forest acting alone cannot achieve the purpose and need. The proposal is to auction the rights to remove and utilize the timber to qualified contractors in exchange for accomplishing silvicultural treatments and other identified projects. For this work to be achieved the value of the timber needs to exceed costs. The Forest has considerable experience packaging high cost portions of a project with lower cost portions to gain operational efficiency and to develop a project that is likely to receive bids. Even though the proposed action identifies the use of helicopter systems, there is a chance that they may not happen if economic factors change that are difficult to predict. One of the aspects of the proposed action is to identify helicopter opportunities to be better positioned to respond when market conditions are favorable.

One of the aspects of the purpose and need and one of the dual goals of the Northwest Forest Plan is to provide a sustainable level of forest products for local and regional economies and to provide jobs. The Northwest Forest Plan Final Environmental Impact Statement has an in-depth analysis of the economic basis behind the goal of providing forest products for local and regional economies. It also contains an analysis of the social and economic benefits and impacts of preservation, recreation and other values. To benefit local and regional economies, timber is auctioned to bidders. For contracts to sell they must have products that prospective purchasers are interested in and they must have log values greater than the cost of harvesting and any additional requirements.

The purpose of this analysis is to provide a comparison of the alternatives.

With no action, no forest products would be provided and the goals of the Forest Plan and Northwest Forest Plan goal of maintaining the stability of local and regional economies would not be met.

The proposed action would provide for jobs associated with logging and sawmill operations and would contribute to meeting society's forest product needs. The NFP (p. 3&4-297) contains an analysis of employment in the timber industry. The annual incremental contribution of each million board feet of timber is approximately 8.3 jobs.

The purpose and need is not solely to create jobs but to provide forest products consistent with the Forest Plan and Northwest Forest Plan goal of maintaining the stability of local and regional economies. Thinning is needed to keep forests healthy and productive to provide wood products now and in the future – people need and use wood products. Approximately 25 MMBF of wood products would be produced now and stands would be made healthier and more productive for future management.

Cost effectiveness is considered in the design of the project and in the road treatments proposed.

Based on past experience with similar stands with similar prescriptions, it is likely that there would be sufficient value of timber removed to accomplish proposed work. The exception may be with helicopter logging which is very expensive. The economic viability of helicopter logging is marginal given the value of the timber and the high cost of jet fuel. A recent similar helicopter offering received a minimal bid.

Consistency with Management Direction

Forest plan standards and guidelines that are relevant to logging systems and the protection of forest resources, are addressed in other specialist reports that discuss impacts to soils, geologic stability, water quality, fish, wildlife, botany, recreation and scenery.