Subject : Comments on Need to Assess Management-Caused Landslide Hazards in Region 5 Post-Disturbance Hazardous Tree Management - Draft Environmental Assessment And Finding of No Significant Impact

The draft EA discusses the proposed action to fell and remove the post-wildfire hazard trees in order to provide safe public access and continued administration of the National Forest. However the draft EA fails to assess the proposed action's potential effects on a more severe hazard and ongoing obstacle to safe public access and administration of the National Forests: management-caused landslides hazards along thousands of miles of National Forest roads. Management-caused landslides hazards result in risks to public health and safety, infrastructure, and resources, as shown for example in Figure 1. This major deficiency in the draft EA needs to be remedied.

Figure 1 - Debris flows from fill-slope failures of road and log landing for timber salvage in the aftermath of 1960s Indian Ridge wildfire on Klamath National Forest near Happy Camp, California. Debris flows endangered community living along Indian Creek. The same area burned in the Slater fire September 2020. (1971 photo, view toward east; Happy Camp is next to right side of photo)

The following comments apply to the three draft EAs (North Zone, Central Sierra Zone, and Southern Sierra Zone), but the comments will refer to the draft EA for the North Zone as an example and because the management-caused landslide hazards are most severe and widespread in the North Zone.

Geologic hazards, such as landslide hazards, are naturally-occurring or human-altered geologic conditions that result in risks to public health and safety, infrastructure (such as roads), and resources. For example during a flood event if a stream erodes deeply into, and removes support from, the stream bank or valley side slope, then the stream erosion results in a natural landslide hazard. When road construction excavates into, and removes support from, a steep mountain slope, then the road results in a human-caused landslide hazard in the form of a steepened and unsupported slope (road cut slope). When road construction places the loose excavated material downslope to build the fill part of the road bed, then the road has created a second type of human-caused landslide hazard in the form of the road fill on a steep slope. Log landing cuts and fills on steep slopes, similar to road cuts and fills, also result in human-caused landslide hazards.

Another example: When a wildfire severely burns a forest in highly weathered and dissected granitic lands, then the wildfire has created a natural landslide hazard due to loss of vegetation and tree root support. When a timber harvest includes a clear-cut and severe slash burn in highly weathered and dissected granitic lands, then the timber harvest creates a third type of human-caused landslide hazard due to loss of vegetation and tree root support.

Because these types of human-caused landslide hazards on National Forests are the result of National Forest land and resource management they will be referred to as "management-caused landslide hazards" in the following comments. The thousands of miles of roads in the North Zone already have resulted in chronic and acute landslide damage in the form of failures of road cuts and road fills. Failures of road cuts have produced many types of landslides: rockslides, rockfalls, debris slides, translational slides, rotational slides, mudslides, etc. Failures of road fills produce slumps, debris slides, and debris flows.

Road construction (cuts and fills) on steep mountainsides is sufficient to produce management-caused landslide hazards. But roads in the North Zone were constructed not only in steep mountainsides, but also in one of the most landslide-prone terrains in the world (serpentinite,
the Franciscan Complex, schists, disintegrated granite, sheared rocks and weak overlying unconsolidated deposits).

Purpose and Need: Why do we need to act?
1. There is a need to reduce safety hazards adjacent to roads, trails, and facilities (campgrounds, trail heads, administrative sites, and range infrastructure).

The draft EA states:

> The primary purpose of this project is to provide for safe use of National Forest System roads, trails, and facilities by the public… Currently, the project area contains expansive stretches of fire-killed and fire-damaged trees adjacent to National Forest System roads, trails, and facilities. Portions of the project area also contain hazard trees requiring abatement that were killed or damaged by insect and disease, drought, or other stressors either before or after the fire. Many of these trees pose a serious risk of injury or death to those using the roads, trails, and facilities.

However, this Purpose and Need fails to recognize that currently the project area contains post-wildfire geologic hazards (landslide hazards and ultramafic rock asbestos hazards) adjacent to National Forest System roads, trails, and facilities that are the result of the wildfires or ground disturbance created by fire fighting actions. Portions of the project area also contain geologic hazards requiring abatement that were the result of other Forest Service management activities, such as timber sales, either before or after the fire. Many of these geologic hazards pose a serious risk of injury or death to those using the roads, trails, and facilities.

The Purpose and Need should state that the "need to reduce safety hazards adjacent to roads, trails, and facilities**"** includes landslide hazards and ultramafic rock asbestos hazards because:

1) Landslide hazards (such as rockfalls and unstable road cuts and road fills) and ultramafic rock asbestos hazards would be health and safety risks to timber salvage contractors, road maintenance contractors, and Forest Service staff working on the proposed action for hazard tree treatments.
2) To <u>safely</u> accomplish the hazard tree proposed actions requires design features for geologic inspection before and during project implementation in order to detect, avoid or reduce the landslide hazards and asbestos hazards and/or to manage the risks to health and safety.
3) Some hazard trees (leaning or cracked or twisted or split) may be due to unstable slopes and landslide activity, and are another example of risks to timber salvage contractors, road maintenance contractors, and Forest Service staff working on the proposed action for hazard tree treatments.
4) Reopening public access after hazard tree treatment but without treating the landslide and asbestos hazards and risks would result in unnecessary and preventable risks to public health and safety. Failure to include landslide hazards and asbestos hazards reduction and

risk management would not meet the Number 1 Purpose and "need to reduce safety hazards adjacent to roads, trails, and facilities**".**

5) Moreover, the proposed action ground disturbance for hazard tree treatment would increase the landslide hazards and asbestos hazards and increase the risks to public health and safety.

Recommendation: State in the Purpose and Need that the "need to reduce safety hazards adjacent to roads, trails, and facilities**"** includes landslide hazards and ultramafic rock asbestos hazards. Hazard and risk management priority would include sites where hazard tree treatment would increase the landslide hazards and asbestos hazards and increase the risks to public health and safety.

Purpose and Need: Why do we need to act?
2. There is a need to maintain the integrity and utility of National Forest System roads, trails, and facilities.

The draft EA states:

> Along with the need to reduce safety hazards on National Forest System roads, trails, and facilities is the need to maintain an available and useful system of roads, trails, and facilities for the public…If hazard trees are not removed, they will likely fall in the next several years, and many will negatively impact the roads, trails, and facilities as well as the people using them, separate from the risks of human injury or death caused by falling trees.

However, this Purpose and Need fails to recognize landslides hazards such as failures of road cuts and fills are a much greater problem than tree hazards to maintain an available and useful system of roads in the North Zone National Forests. If landslide hazards are not remediated, they will likely result in rockslides, debris slides, slumps, debris flows and other types of road cut and fill slope failures in the next several years, and many will negatively impact the roads as well as the people using them.

> **Recommendation:** State in the Purpose and Need that the need to maintain the integrity and utility of roads requires remediation of landslides hazards such as unstable road cuts and fills. Hazard and risk management priority would focus on sites where the landslide hazards (unstable road cuts or fills) pose the greatest threat to public access and the integrity and utility of roads.

Purpose and Need: Why do we need to act?

4. There is a need for economic and operational efficiency.

The draft EA states there is a need to be economically efficient and operationally efficient in addressing the tree hazards which are numerous and widespread in the project area. For the same reason, the draft EA should state there is a need to be economically efficient and operationally efficient in addressing the landslide hazards and ultramafic rock hazards which are numerous and widespread over the project area.

> **Recommendation:** State in the Purpose and Need that there is a need to be economically efficient and operationally efficient in addressing the landslide hazards and ultramafic rock hazards which are numerous and widespread in the project area.

Issues

The ultramafic rock asbestos hazards issue was discussed and recommendations provided in my comments submitted April 23, 2022 with subject line: Asbestos Hazard Comments on Region 5 North Zone Post-Disturbance Hazardous Tree Management - Draft Environmental Assessment And Finding of No Significant Impact. Therefore, the following comments on various sections of the draft EA will focus on landslide hazards.

> **Recommendation:** Add this issue to the list of "Issues Analyzed in Detail" (p 25):
>
> Landslide hazards - Ground disturbing project activities within 300 feet of road centerlines have the potential to increase management-caused landslide hazards along thousands of miles of roads and result in 1) costly, ongoing damage to roads and other infrastructure, 2) ongoing obstruction of public access and administration of National Forests, 3) impacts on natural resources, 4) increase risks to public health and safety.

Potentially Affected Environment - Need to add geologic analysis and Geology section to assess existing condition of natural and management-caused landslide hazards

The draft EA for North Zone has some brief statements about landslides in the Potentially Affected Environment for Soils, Watershed and Hydrology. These brief statements are understandable because landslides are normally covered in a Potentially Affected Environment for Geology. However, the draft EA has no Potentially Affected Environment for Geology. The absence of a Geology section in the draft EA is inexplicable. Geologic science is a fundamental requirement to assess landslides hazards. Moreover, geology is the foundation of ecosystems and

watersheds. A Potentially Affected Environment for Geology is relevant to and needs to be considered in assessing several of the Issues Analyzed in Detail (p.25).

Even worse and more inexplicable, the draft EAs for the Central Sierra Zone and Southern Sierra Zone not only lack a Potentially Affected Environment for Geology, but also fail to mention landslides in the Potentially Affected Environment for Soils, Watershed and Hydrology. However, a Potentially Affected Environment for Geology is relevant to and needs to be considered in assessing several of the Issues Analyzed in Detail.

> **Recommendation** - Add a Potentially Affected Environment for Geology to the EAs for the North Zone, Central Sierra Zone and Southern Sierra Zone.

Potentially Affected Environment for Geology - Assess existing condition of natural and management-caused landslide hazards

The proposed action has road maintenance activities that includes "cleaning culverts, ditches, drains, and cattleguards, and grading road surfaces and reestablishing rolling dips or other drainage features of the roadbeds on haul routes within the project area" (p. 9). The proposed action does not mention any landslide removal or repairs (Figure 2). Landslide removal or repairs can be challenging and costly major activities that go beyond routine maintenance. Indeed, the proposed action can not be implemented unless any landslides on roads are removed or remediated.

Figure 2 - Example of multiple landslide hazards caused by road cut slope (rockslides, rockfalls, debris slides, slumps, overhang collapse). Logging above the road cut increased the landslide hazards.

The draft EA fails to provide an estimate of the number and magnitude of landslides that need removal or stabilization before log haul can be permitted. Since landslides can have significant environmental impacts and economic costs, the draft EA needs to disclose the scope and cost of work needed for landslide removal or stabilization before log haul can be permitted.

The North Zone draft EA has proposed treatment areas along 2, 708 miles. If not already accomplished, the Forest Service needs to inspect the 2,708 miles of road for any landslides that need to be removed or remediated, including unstable road fills and road cuts that need removal or stabilization before log haul can be permitted. The inspection also needs to report on landslide deposits or landslide activity affecting the road that originates from landslides above the road cut or below the road fill. The EA needs to 1) disclose the location, magnitude and number of landslides that a current road inspection identifies as needing to be removed or stabilized, 2) disclose the landslide removal or stabilization work in the proposed action, along with cost estimates and time delays to implement hazard tree treatments.

> **Recommendation** - Identify the location, magnitude and number of existing landslides (natural and management-caused landslides) that currently block or damage the roads, and thus, need to be removed or stabilized as part of the proposed action.

The Potentially Affected Environment for Geology needs to consider not only the existing landslides blocking or damaging roads but also the potential for landslides due to natural and management-caused landslide hazards in the project area and especially in road cuts and road fills. The landslide potential of a specific section of road cut or road fill may be low, moderate or high when the road was initially constructed. The hazard can vary with time, for example going from a low potential to a moderate potential or a high potential depending on many factors such as weathering, freeze-and -thaw, repeated storm events, amount of road maintenance, earthquakes, long-term, ever-present force of gravity, impacts from timber harvest and wildfires upslope from the road (Figure 2).

To assess the landslides hazards of road cuts and road fills it is necessary to describe the pre-road site-specific geologic conditions, and then, describe the degree to which the road cut and road fill have altered the pre-existing geologic conditions relevant to slope stability (see Figure 2).

The pre-road site-specific geology includes type of bedrock (granite, schist, ultramafic rocks (serpentinite), sandstone, shale, limestone, etc,); type of overlying unconsolidated materials (colluvium, soil, talus, alluvium, residuum, landslide deposits, glacial deposits, volcanic deposits,

etc.); geologic structures, discontinuities, and planes of weakness, including the contact between bedrock and overlying unconsolidated material; slope of natural ground surface; slope (percent or angle) of cut slope and fill slope; mass strength properties of bedrock and overlying unconsolidated material in cut slope; mass strength properties of fill and sidecast materials; surface water and groundwater; vegetation cover; type of landslide hazards (such as progressive failure of fill slope), etc.

> **Recommendation** - Provide a geologic assessment of the current condition of landslide hazards (natural and management-caused landslide hazards) that need to be identified in order to assess the potential effects of the proposed actions on these landslide hazards. Include a slope map with the best available data such as LIDAR.

Environmental Impacts related to Landslide Hazards Issue

Ground disturbing project activities within 300 feet of road centerlines have the potential to increase management-caused landslide hazards along thousands of miles of roads and result in 1) costly and chronic damage to roads and other infrastructure, 2) ongoing obstruction of public access and administration of National Forests, 3) impacts on natural resources, 4) increase risks to public health and safety.

The proposed action would conduct ground disturbing activities within 300 feet of road centerlines on National Forests known for natural and management-caused landslides. The ground disturbing activities include log landing construction, construction of skid trails or skid roads, using heavy mechanized equipment on sloping ground, log skidding, yarding, timber felling/bucking/delimbing, piling and burning timber slash, chipping operations, road maintenance, road grading, road ditch and culvert cleaning, etc.

The proposed action is heavily focused on logging operations above the road because of the potential for hazards trees to fall on to the road. Logging operations above the road cut slope but within 300 of the centerline would severely disturb steep ground with skid trails, skid roads, heavy equipment dragging logs across the ground, and the clearing, piling and burning slash, etc. In addition, the logging operations would change the surface drainage with skid trails, skid roads and other heavy equipment used to treat slash. which would collect, concentrate and divert storm flows onto the cutslope.

Road cuts - Logging operations would impact the stability of road cuts by 1) felling and dropping trees on the steep cut slopes and dragging (yarding) down the cut slopes, 2) felling and dropping trees from above the steep cut slopes and dragging (yarding) the trees down the cut slopes, 3) remove trees already felled during fire suppression or rehabilitation activities above the roads by dragging, winching, and yarding the trees across steep cut slopes. Road ditch cleaning, especially

with oversized equipment or less skilled operators, may result in undermining the base of the cut slope.

Road fills - Logging operations would impact the stability of road fills by 1) felling and dropping trees on the fill slopes and dragging (yarding) up the fill slopes, 2) felling and dropping trees from below the fill slopes and dragging (yarding) the trees up the fill slopes, 3) remove trees already felled during fire suppression or rehabilitation activities below the roads by dragging, winching, and yarding the trees across fill slopes. Inadequate maintenance of road cross-drain and culverts leads to road stormwater flowing into road fills and may result in fill slope failure of the fill and a debris flow that could gouge a path of destruction for hundreds or thousands of feet downslope.

The existing road cuts and fills already have various degrees of landslide hazards due to the initial road construction alteration of geologic conditions affecting slope stability by 1) excavation of cut-slopes which undercut and removed support from natural slopes, 2) cut slope always is a steeper (and so less stable) slope that the natural slope, 3) placement of loose, excavated material (fill or sidecast) on natural slopes which adds weight and load stress to the natural slope, 4) cut slope provides a free face allowing shallow groundwater seepage flows to gradually weaken and undermine the cut slope and result in a failure of the cut slope, 5) cut slope intercepts shallow groundwater and subsurface stormwater flows, and thus, adds these waters to the stormwater surface flows affecting the stability of road cuts and road fills, 6) roadbed and road ditch concentration of storm waters that can spill onto fill slopes and result in fill slope failures. 7) failures of road fills and log landing fills on the North Zone and other National Forests in California have resulted in debris flows that travel hundreds or thousands of feet downslope and endangered public health and safety, infrastructure, and resources (Figure 1).

> **Recommendation** - Provide a geologic assessment of the proposed actions's potential to increase (make worse) the existing management-caused landslide hazards along thousands of miles of roads and result in 1) costly and chronic damage to roads and other infrastructure, 2) ongoing obstruction of public access and administration of National Forests, 3) impacts on natural resources, 4) increase risks to public health and safety.

The EA also needs to assess the proposed actions's potential to increase (create new) management-caused landslide hazards. For the part of the proposed action where logs or trees would not be dragged down across road cut slopes, the project description needs to be revised to take a "hard look" at how logging operations would be conducted on, and confined to, the steep ground above the road cut slopes. The project description states that "Skyline, helicopter, and

cable-yarding methods would not be used". As a result, ground-based systems such as skid trails would be used.

The project description refers to "skid trails". However a "skid trail" may be bladed or unbladed depending on slope. A bladed skid trail is excavated into the ground resulting in a cut-and-fill slope that is a skid road. This distinction is important to recognize because of the greater environmental impact of a skid road (bladed) vs a skid trail (unbladed). Similarly the draft EA refers repeatedly to "skid trails" without making the distinction that some "skid trails" are "skid roads". Skid roads would create new slope stability hazards by constructing cuts and fills and by concentrating and diverting stormwater flows.

For any given slope, a log landing typically has a wider and deeper cross-section (prism) than a road cross-section (prism). Compared to roads, log landings typically require deeper excavation into the mountainside and result in higher cut slopes and larger fills.

Log landings on steep slopes or along roads are substantial construction that create new slope stability hazards. Revise the project description to disclose the number and locations of log landings needed to accomplish the proposed action. Provide a map location of where log landings would be constructed. Provide a table showing the number of proposed log landings categorized by % slope class.

> **Recommendation** - Provide a geologic assessment of the proposed actions's potential to increase (create new) management-caused landslide hazards along thousands of miles of roads and result in 1) costly and chronic damage to roads and other infrastructure, 2) ongoing obstruction of public access and administration of National Forests, 3) impacts on natural resources, 4) increase risks to public health and safety.
>
> **Recommendation** - Revise the project description to make the distinction between "skid trails" and "skid roads". Show the location of proposed skid roads on a slope map and a geologic map. Provide an estimate of the miles of skid road construction and categorized by % slope class and geology. Assess the potential for skid roads to create new landslide hazards.
>
> **Recommendation** - Revise the project description to show the location of proposed log landings on a slope map and a geologic map. Provide a table with log landings categorized by % slope class and geology. Assess the potential for slog landings to create new landslide hazards.

Environmental Impacts - Act in Haste, Repent at Leisure

There are several reasons to expect that the logging operations and ground disturbance affecting landslide hazards in road cut and fill would be severe and would impact many road miles including creating linear clear-cuts along many sections of roads.

Reason 1 - The Purpose and Need in draft EA (p. 4) states the intention of "being overinclusive in identifying and removing trees" :

> Because it is impossible to accurately predict whether and when a particular tree will strike a road, trail, or facility, the Forest Service made a policy choice to take a conservative approach to hazard tree abatement, erring in favor of being overinclusive in identifying and removing trees rather than being underinclusive and risking injury or death to forest users.

Reason 2 - The proposed action would use the "Streamlined Approach" in a just published (March 2022) technical report where the procedures for cutting down trees include:

> The inspection process described above does not mean that every single tree within a treatment area requires a lengthy, detailed inspection. For example, in an area with high burn severity, it may be clear (from remote sensing images or prior field surveys) that all the trees in that area are dead. Therefore, an individual assessment of each tree's failure potential would not be necessary. Similarly, an individual assessment of a tree's potential failure zone may not be necessary for a group of tall trees directly adjacent to a road, where the target is clearly within the failure zone of those trees. In all cases, though, the marking crew must ensure that that the trees selected for abatement meet both screening criteria.
>
> > (Appendix 4 (p. 36) in "Streamlined Approach To Hazard Tree Abatement After Catastrophic Events" Hazard Tree Identification and Mitigation -Forest Health Protection Technical Report Revised: March 2022 (FHP Report # RO-22-01) USDA Forest Service - Pacific Southwest)

Reason 3 - The Purpose and Need in draft EA (p. 6) states there is a need for economic and operational efficiency:

> Another important component of implementation efficiency relates to the timing of treatments and requires abating hazard trees that will imminently fall (within the next year) as well as those likely to fall within the next 5 years. While removing trees at most imminent risk of falling is a priority, it is neither practical nor necessary to have a series of separate projects to abate existing hazard trees in the same location over several years. Doing so is not only inefficient from a planning perspective, but also inefficient and unnecessarily detrimental to the environment from an operational perspective (it would require multiple entries by loggers and equipment to the same parcel of land in locations where there is a mix of imminent and non-imminent hazard trees). Furthermore, it is

> often difficult to predict exactly when a hazard tree will fall, but dead and dying hazard trees become less stable with time, posing an increasing safety hazard to the contractors felling and removing the trees. Therefore, it is important to remove the hazard trees as soon as possible.

So, instead of conducting logging operations spread out over a period of 5 years, the proposed actions would conduct all the logging operations "as soon as possible", and thus, concentrate the ground disturbing impacts in a short period..

Reason 4 - The draft EA is largely generic boiler-plate rather than site specific analysis of the many project areas with different geologic conditions resulting in different landslides hazards. The glaring symbol of generic boiler-plate is the wrong cover photo for the North Zone draft EA. The cover photo shows the Sierra National Forest, Creek Fire instead of one of the North Zone National Forests. Worse still, the photo shows a burned area on gentle slopes with little or no road cut or fill slopes. It is not representative of the steep slopes with large road cuts and fills which are common in the North Zone as well as other National Forests in California. The cover photo of gentle slopes is misleading and especially appalling for a draft EA that is supposed to assess a proposed action in the steep landslide prone terrain with a notorious history of management-caused landslides.

Reason 5 - The draft EA contains some design features that are implausible in the steep terrain of the North Zone. For example, one design feature is:

> New landings will be located on gentle slopes (less than 20 percent) to minimize earthwork, and will avoid unstable areas, steep slopes below landslide benches, and slope positions where they could deliver sediment to streams.

If this design feature were to be enforced, it could have the potential to dramatically reduce the area in which the proposed action could be implemented. If so, then because of the urgent need for hazard tree treatment, this design feature is likely to be overlooked, modified, or dropped during timber sale prep or administration of timber sale contract. As a result, the environmental impacts of log landing construction may be significantly worse than indicated by the draft EA.

On the other hand, if the design feature is enforced, then it may result in unintended consequences such as having to construct temporary roads or much longer, bigger impacting skid roads.

> **Recommendation** - The EA needs to make site specific assessment of implementing design features for log landings, and take a hard look at the potential to create new landslide hazards directly or indirectly.

Reason 6 - The Purpose and Need in draft EA (p. 6) states there is a need for economic and operational efficiency:

> Unfortunately, the agency's financial and staff resources do not match the magnitude of the problem. Therefore, it is critical that we are as efficient as possible in addressing the hazards.

Due to the magnitude of the problem, the stretched financial and staff resources, the rush to implement the project as soon as possible, there is concern about the environmental impacts of a rush job and expediency. For example, for a small slump in road fill, as shown in Figure 3, the expedient action might be to add more fill to restore a level road bed. The rush to implement the tree hazard project and remove commercial timber before it loses value have the potential for such expedient actions.

Figure 3 - Example of landslide hazard caused by progressive failure of road fill. Adding more fill to level up the road surface would increase the hazard and may lead to total failure of the fill and a debris flow that could gouge a path of destruction for hundreds or thousands of feet downslope.

However, adding more fill would increase the hazard and may lead to total failure of the fill and a debris flow that could gouge a path of destruction for hundreds or thousands of feet downslope.

The EA needs to pay special attention to the proposed action's potential to result in failure of road or log landing fills and result in debris flows with potential risks to public health and safety, infrastructure, and resources located downslope. The good news is that there are procedures (design features) to detect these hazards, avoid catastrophic failures, and prevent loss of lives and infrastructure: for example, see attached Collins, T.K. Debris flows caused by failure of fill slopes: early detection, warning, and loss prevention. *Landslides* 5, 107–120 (2008). https://doi.org/10.1007/s10346-007-0107-y

The unstable road fill and log landing and resulting debris flow hazards that endangered the Indian Creek community near Happy Camp in 1971 were detected and assessed by a Forest Service geologist (Figure 1). As a result, the Happy Camp District Ranger held public meetings to inform the community of the hazard and consider ways to reduce risks.

The same area near Happy Camp burned in the Slater fire September 2020. Portions of the unstable road fills and log landing that produced the debris flows in 1971 remain on the mountain and may be affected by the Slater fire. While this part of the Slater fire is not part of this proposed action, it is a reminder of the potential long term consequences of management-caused landslide hazards related to post-wildfire timber salvage as well as the potential consequences of acting in haste.

> **Recommendation - The EA needs to take a hard look at potential environmental consequences in light constraints due to the magnitude of the proposed action, the stretched financial and staff resources, the rush to implement the project as soon as possible, and the likelihood that some critical design features would be overlooked, modified, or dropped during timber sale prep or administration of timber sale contracts.**

Thomas Collins
May 11, 2022