KENTUCKY HEARTWOOD
Protecting the Beauty and Wellbeing of Kentucky's Native Forests

Robert Claybrook, District Ranger
Redbird Ranger District
Daniel Boone National Forest
91 Peabody Road
Big Creek, Kentucky 40914

March 3, 2022

RE: Hector Mountain Salvage project

Dear District Ranger Claybrook,

The following comments are submitted on behalf of Kentucky Heartwood and the Kentucky Resources Council in response to the scoping letter for the Hector Mountain Salvage project dated February 1, 2022. We have substantial concerns regarding this project, as we describe in detail below. If the Daniel Boone National Forest decides that it is in the public interest to move forward with this project, then we insist that an Environmental Assessment be completed. As we describe below, there are significant environmental factors that you and your staff should be aware of but have failed to disclose or address in any manner. We believe that several factors make the use of a Categorical Exclusion (CE) ill-advised and contrary to regulation and policy.

1. Landslide hazards

The Forest Service has proposed logging up to 250 acres in areas that are extremely prone to landslides. We are, quite frankly, shocked that the Daniel Boone National Forest would do so after the extensive communications we have had regarding landslide susceptibility in the Redbird District. The Forest Service has admitted, both in the South Red Bird project record and internal documents, that the northern portion of the Redbird Ranger District is especially prone to landslides following logging activities.

In an email from former DBNF Soil Scientist George Chalfant to current Soil Scientist Claudia Cotton dated November 12, 2020, Mr. Chalfant states:

> "I recall inventorying over 20 slides in clear cuts on the Red Bird and all but about 3 or so were associated with a coal seam. Most of these occurred around 5 years after harvest.

> The Fire Clay seams I recall were involved with most. I did write something up on that but I don't have a clue if it's still around."[1]

Mr. Chalfant provided to the DBNF a report on specific landslide risks relating to logging in the Redbird District. That document states, in part:

> A substantial number of slope failures have been previously documented as being associated with some coal seams, in particular the Fire Clay Rider, and the Fire Clay, with timber harvest and road construction…
>
> Slope stability problems often develop after timber harvest on steeper slopes where much of the soil strength is provided by tree roots. As roots decay after harvest, in particular clear cutting, their value diminishes rapidly. Research has disclosed that it is likely that over 50 percent of the tensile strength provided by the root system will be lost within 2 years after harvest and much more within 5 years. As much as 90 percent within 5 to 9 years…
>
> The most sensitive slopes to harvest are ones located at the head of ephemeral and intermittent streams as these are very hydrologically sensitive areas. This is even more so if a coal seam is present which has a regional dip in the direction of surface and groundwater flow (hydraulic gradient). Removal of trees here will upset the hydrologic balance that has been achieved over a long period of time. As the root system decays pore water pressure within the soil profile in response to flow from a coal seam, groundwater, subsurface and surface runoff along a failure surface will likely exceed the inherent soil strength available with cohesion and internal friction. A rapid rise in groundwater will generate a buoyancy force sufficient to exacerbate inherent risks of slope failure…
>
> Locating, designing and construction of roads as a transportation system supporting forest management on slopes possessing potential stability issues should recognize the influence coal seams may play. Excavation of a road prism in proximity below or downdip of a hidden outcrop of a coal seam or through a seam itself of a thickness comparable to the Fire Clay and Fire Clay Rider itself can potentially release a substantial flow of water previously confined within the seam. Where a seam dips to the roadway this is of highest risk for immediate problems.[2]

A review of LIDAR data and ground truthing by Kentucky Heartwood during February 2022 found more than a dozen landslides in the vicinity of the Hector Mountain project area.[3] These landslides are in addition to those documented by Kentucky Heartwood in the Group One project area, just a few miles to the east. Most of the landslides found in the Hector Mountain area are in stands harvested since 1990. And while most of those landslides cross over the Fireclay Coal

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[1] Emails and documents from Mr. Chalfant were acquired by Kentucky Heartwood as part of a January 25, 2021 FOIA response from the Daniel Boone National Forest pertaining to the South Red Bird Project.
[2] Id.
[3] See attached maps

seam, the slope failures typically begin several hundred slope feet above the Fireclay. One such landslide in the Hector Mountain area, in a stand logged in 1994, was evidenced in the KYFromAbove 2019 LIDAR data but was found to be newly eroded with exposed mineral soil extending approximately 300 ft. of slope distance, with a width of 83 feet its widest point. Slope measurements taken on site provided a slope of 56%. Fresh sediment and debris were evident in the stream channel (a tributary of Bear Creek) for as far as we walked. The location of this landslide was 37.182799, -83.679902 and is one of the delineate landslides on the attached maps. Another active landslide was found in this same unit at 37.182814, -83.678717. These landslides are in addition to the active slump at the top of the landslide for which road reconstruction has been proposed in this project. Together these all demonstrate that the impacts to soil, water, and vegetation from logging on these steep and unstable slopes can continue for decades following completion of timber harvest.

Figure 1. Fresh landslide in 1994 harvest area (looking up) at 37.182799, -83.679902

Figure 2. Fresh landslide in 1994 harvest area (looking down) at 37.182799, -83.679902

Figure 3. Sediment below landslide in 1994 harvest area

Figure 4. Active landslide in 1994 harvest unit at 37.182814, -83.678717

Figure 5. Active landslide in 1994 harvest unit at 37.182814, -83.678717

In response to Kentucky Heartwood's concerns about the Group One/North Redbird landslides repeating in the South Red Bird project area, the Forest Service argued strenuously in the South Red Bird Soil and Water Resource Report that the Fireclay was particularly to blame, and that protective measures could be put in place around the Fireclay during harvest operations.

The South Red Bird project Soil and Water Report states:

> Upon closer review of the geology of Harvest Units 14 and 18, there occurred two coal seams known as Fireclay and Fireclay Rider. Both coal seams are known to be underlain by rooted clays that act as a restricting layer to normal soil water percolation, allowing groundwater to potentially perch (KGS, 2010). Analysis indicates these coal seams are lower in the slope profile, occurring anywhere from 80 to 280 feet above the stream. In both harvest units, skid trails crossed the Fireclay coal seam.
>
> The catalyst of the landslides in Harvest Unit 18 and potential landslide in Unit 14 appeared to be a combination of increased precipitation, slope, geology, and skid road placement.
>
> When the dozer operator was improving the skid trail that failed in Harvest Unit 18, it bumped up against bedrock and had to move closer to the intermittent stream. This bedrock was the Fireclay coal seam. As the perched water continued to accumulate, it saturated the soil beneath the skid trail.
>
> Precipitation was higher in 2018 and 2019 in this area compared to the preceding eight years (Table 1). This likely resulted in more accumulated water in the soil profile, and could have exacerbated the weight of the saturated soil, increasing the probability for a landslide."[4]

The South Red Bird Soil and Water Report further describes how this issue was addressed, specifically by analyzing locations of the Fireclay (and Fireclay Rider) with respect to harvest areas:

> Each harvest unit in the SRB project was examined for interactions between slope and the Fireclay and Fireclay Rider coal seams. Out of 77 units, eight contained the Fireclay and/or the Fireclay Rider coal seam. Other coal seams occur in the units but are not as susceptible to landslides as the Fireclay and Fireclay Rider.
>
> Maps of each harvest unit that depict median unit slope, Fireclay and Fireclay Rider coal seams, and the SMZ, revealed that most of the Fireclay and Fireclay Rider coal seams fall within the SMZ (Appendix 2). When the Fireclay and Fireclay Rider fall into the SMZ, equipment should not cross over either coal seam when the slope is greater than 35%, which should minimize the potential for a landslide. Thirty-five percent was chosen as a slope threshold because Forest Plan standard DB-VEG-2 references that slope as a maximum limit for mechanical site preparation (p. 2-24). The presence of a Fireclay or

[4] *See:* Soil & Water Report for the South Red Bird Project, January 27, 2020

Fireclay Rider coal seams does not preclude management around the seam, but skid trails should not cross these seams to minimize the potential of landslides…

Only one unit in the Little Flat Creek area has the Fireclay coal seam crossing the main portion of the harvest unit, Stand 2701-0023 (Figure 12, harvest unit farthest to the left). It is recommended that either non-commercial actions take place in this harvest unit, therefore excluding skid trails, or that the unit be dropped altogether to reduce the potential of landslides.[5]

While we argue that the protective measures provided in the South Red Bird project are in no way adequate, it must be pointed out here that the Hector Mountain project fails to include even the most basic protective measures, or even acknowledge landslide susceptibility in the project area.

The Fireclay crosses through every harvest unit in the Hector Mountain project, and for the most part appears well above the SMZ. Kentucky Heartwood performed a slope analysis using LIDAR data from the Kentucky Geological Survey and estimated that 67% of the proposed harvest areas are on slopes ≥37%. More than a third of proposed harvest areas exceed 50% slope, with a mean slope of 45%.

Table 1. Hector Mountain Harvest area slopes

Slope %	Percent of harvest areas
<37%	33%
37-51%	30%
51-67%	24%
67-76%	7%
>76%	6%

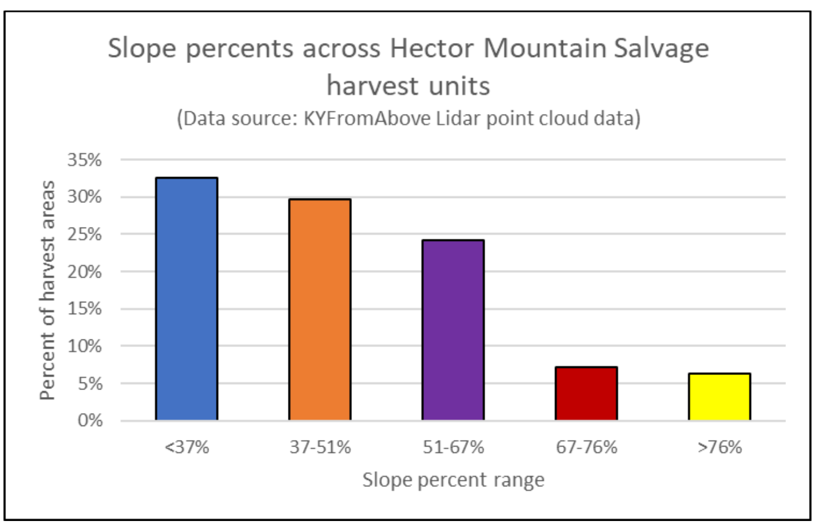


Figure 6. Hector Mountain harvest area slopes

[5] Id

The use of a CE to skirt analysis for this project is inappropriate. High landslide risk is precisely the sort of location specific risk that requires site-specific analysis and mitigation. The issues at play here are not hypothetical, but well-known to the Forest Service. Attempting to use a CE here sadly demonstrates the Forest Service's unwillingness to take the landslide issues in the Redbird District at all seriously.

2. Inappropriate us of 36 CFR 220.6 (e)(20)

The Forest Service proposes reconstruction of Forest Service System Road 1730 "to stabilize the road, increase public safety during ingress and egress to Hector Mountain, and to facilitate safe passage of large trucks and heavy equipment." To be clear, this section of road is safely accessible, and passable, by passenger vehicle. What the Forest Service has failed to disclose in the scoping letter is that the instability at that location is an active slump below the roadbed representing the unstable head of a large landslide that appears to have occurred following harvest of that unit in 1994. Examination of by LIDAR and on the ground show how the significant mass wasting extends several hundred feet downslope. The burying of skid roads by debris, and similarity in age and size classes of trees growing on spoil to those outside of the slide zone make it clear that the landslide did, indeed, occur after logging.

The scoping letter states that the agency will utilize 36 CFR 220.6 (e)(20) "which allows for reconstruction and maintenance of roads." This is a misapplication of 36 CFR 220.6 (e)(20), incorrectly exempting road reconstruction from the appropriate level of analysis.

36 CFR 220.6 (e)(20) describes the specific category of action under this provision as follows:

> (20) Activities that restore, rehabilitate, or stabilize lands occupied by roads and trails, including unauthorized roads and trails and National Forest System roads and National Forest System trails, to a more natural condition that may include removing, replacing, or modifying drainage structures and ditches, reestablishing vegetation, reshaping natural contours and slopes, reestablishing drainage-ways, or other activities that would restore site productivity and reduce environmental impacts. Examples include but are not limited to:
>
>> (i) Decommissioning a road to a more natural state by restoring natural contours and removing construction fills, loosening compacted soils, revegetating the roadbed and removing ditches and culverts to reestablish natural drainage patterns;
>>
>> (ii) Restoring a trail to a natural state by reestablishing natural drainage patterns, stabilizing slopes, reestablishing vegetation, and installing water bars; and
>>
>> (iii) Installing boulders, logs, and berms on a road segment to promote naturally regenerated grass, shrub, and tree growth.

The scoping letter states that the purpose of the proposed road reconstruction is to “stabilize the road, increase public safety during ingress and egress to Hector Mountain, and to facilitate safe passage of large trucks and heavy equipment.” The proposed action does not include or describe activities that would “restore, rehabilitate, or stabilize lands… ***to a more natural condition***,” (emphasis added). The purpose is to “facilitate passage of large trucks and heavy equipment.”

36 CFR 220.6 (e)(20) has been in existence since 2013, and as originally promulgated it allowed for the rehabilitation of lands occupied by unauthorized roads. In 2020 it was expanded to allow these same activities on lands occupied by system roads, under the rationale that these same activities would have the same effects whether the road being decommissioned was in the system or not. The new version of the CE cannot be understood to include road reconstruction, because the old version absolutely could not have covered reconstruction (because reconstruction of an unauthorized road is not allowed).

3. Temporary road construction location not identified

The Forest Service has failed to state where the ≤ ½ mile of temporary road will be located. Furthermore, there has been no disclosure of what other types of ground disturbance will be incorporated into the project design. Specifically, the Forest Service has utilized extensive construction of full-bench skid roads in the Group One/North Redbird project area beyond the “temporary roads” described in project documents. As we addressed extensively in our comments on the South Red Bird project, the environmental impacts – including erosion, mass wasting, and invasive species establishment – have been extensive across the many 10s of miles of skid roads that were constructed in that project area. These structures are objectively and substantially different – and more impactful – than lightly bladed skid trails. They represent substantial earth moving in sensitive terrain.

4. Natural disturbance vs. “dead and/or dying trees”

The Forest Service has failed to provide any indication of how trees will be assessed for damage severity and chosen for harvest, or provided any estimate of anticipated basal area following harvest. From the areas that Kentucky Heartwood has been able visit during this public comment period, many of the trees which were damaged exhibit canopy breakage well within their natural capacity to recover. Ice storms and other forms of canopy disturbance are natural, even necessary, forest processes. Studies across old-growth forests in Kentucky and the eastern deciduous forest as a whole show that old-growth trees regularly exhibit varying periods of suppression and release as a result of disturbance. Damaged trees may take decades to recover their pre-disturbance growth rate, while lesser-impacted trees surviving major disturbance may exhibit markedly increased growth rates.

The scoping letter states that the damage from the storms “has predisposed the stands to forest pathogens, insect-related diseases, reduced annual growth, reduced quality of the wood itself, and ultimately early mortality.” That trees my exhibit “reduced annual growth” or “reduced quality of wood” bears no relation to whether or not a forest is healthy or within its natural range of conditions. That such damage leads “ultimately (to) early mortality” is contradicted by vast troves of dendrochronological studies. Predisposition to forest pathogens and insect-related diseases is vague and speculative.

Disturbance events, including ice and wind storms, are largely responsible for the patterns of suppression and release found in natural, including old-growth, forests. For example, Tackett (2012) in their study of Rock Creek Research Natural Area in the Daniel Boone National Forest, found major synchronous release events int eh 1950-60s and 1980s, despite no logging occurring in this important old-growth forest.[6]

Pederson (2010) states:

> Architecture of tree crowns can also be a good indicator of old age in EDF trees. Thick, large, and “gnarled” branches have long been known as indicators of older trees (Swetnam and Brown 1992; Stahle and Chaney 1994; Kaufmann 1996; Stahle 1996). These crown architecture traits likely reflect a tree that has endured numerous disturbance events. Canopy openings cause trees to increase growth in or towards these new openings, which will result in larger size of the residual branches…
>
> While the bark, trunk, and crown characteristics of old trees described above hold true for this species, including sinuosity (Figure 7), one of the most consistent external characteristics of > 200 year old *L. tulipifera* trees is a broken top (Figure 8). *L. tulipifera* trees with broken tops and reiterations, lateral branches re-forming a new crown below the point of breakage, have often turned out to be at least 200 yrs old, occasionally greater than 300 yrs old and, in one case, > 500 yrs old (Eastern OLDLIST 2010). While trees with broken tops can have thinner crowns, broken tops also suggest a growth history of slower radial growth as stored; and newly-created carbohydrates are likely used to re-establish its crown and leaf area. When broken tops are found on individuals with diameters of medium to larger sizes, it is often the case that these trees have been growing slower than those without severe crown damage. It is hard to say if significant crown damage to these trees allows for greater ages as resources are shifted from growth to repair and reconstruction; size might be a more important factor in individual growth decline than age (Mencuccini et al. 2005), suggesting that greater longevity occurs in smaller trees. However, a population of a high density of 300+ yr old *L. tulipifer*a grows on acidic sites, which might have reduced growth rates beyond those caused by severe crown damage (North American Dendroecological Fieldweek 2007, unpubl. data). It has been my experience in coring 173 *L. tulipifera* that, of all the indicators of old angiosperms, a broken top with heavy branch reiteration is the most consistent indicator of old age for this species.[7]

[6] Tackett, Kacie Lee (2012). Forest Dynamics of Two Multi-Aged Hemlock-Mixed Mesophytic Forests in the Northern Cumberland Plateau, Kentucky. Master’s Thesis, Eastern Kentucky University.
[7] Neil Pederson. External Characteristics of Old Trees in the Eastern Deciduous Forest. Natural Areas Journal, 30(4), 2010

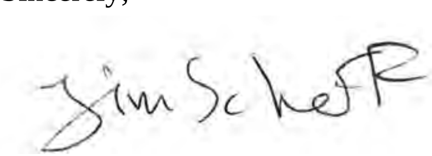
In discussing growth patterns in trees sampled in Lilley Cornett Woods (and old-growth forest in Letcher County, Kentucky), McEwan et al (2014) state:

> There was some indication that ring widths increased consistently over the life span of the trees sampled here (grey line, Fig. 1b). Individual series exhibited long-term growth patterns characterized by suppression and growth pulses. For example, the oldest tree in the FHC was a *Quercus montana* (top panel, Fig. 2) that exhibited ca. 100 yrs of suppression followed by a growth release that resulted in a step change increase in growth rate. The overall pattern, as evidenced by individual series (Fig. 2) and the mean for all samples (Fig. 1b), suggests that maximum growth rates for these trees were being achieved near the end of the chronology, after the trees were ca. 200 yrs old.[8]

The Forest Service appears to be operating on an erroneous assumption that *any* damage to a tree that could cause growth suppression – however temporary – equates to a forest health emergency. There is simply no evidence to support this. The main concern here appears to be, as the Forest Service states, "reduced annual growth (and) reduced quality of the wood itself." The concerns here are economic, not ecological. Many of the trees examined by Kentucky Heartwood exhibited moderate to minimal canopy damage well within the trees' physiological capacity to persist or recover. Many of those trees exhibited substantial new growth that occurred during the 2021 growing season following the ice storms.

The Forest Service intends to avoid a more rigorous environmental analysis by relying on the Categorial Exclusion under 36 CFR 220.6 (e)(13) which allows for "Salvage of dead and/or dying trees not to exceed 250 acres, requiring no more than 1/2 mile of temporary road construction." However, there are few "dead and/or dying trees" as a result of the ice storm. It is an arbitrary and capricious leap to assert that a majority of the trees impacted by the ice storm are "dying," or will otherwise die in the near future. At the very least, the Forest Service needs to provide a clear and objective guide for assessing damage and decline in impacted trees prior to approving and implementing and salvage logging.

Sincerely,



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[8] Ryan W. McEwan, Neil Pederson, Adrienne Cooper, Josh Taylor, Robert Watts, and Amy Hruska. Fire and gap dynamics over 300 years in an old-growth temperate forest. Applied Vegetation Science 17 (2014) 312-322.

Figure 7. Example of LIDAR indicated landslides in 1994 harvest units in Hector Mountain project area. Landslides indicated here were all ground-truthed by Kentucky Heartwood in February 2022. Orange line indicates location of Fireclay coal seam.

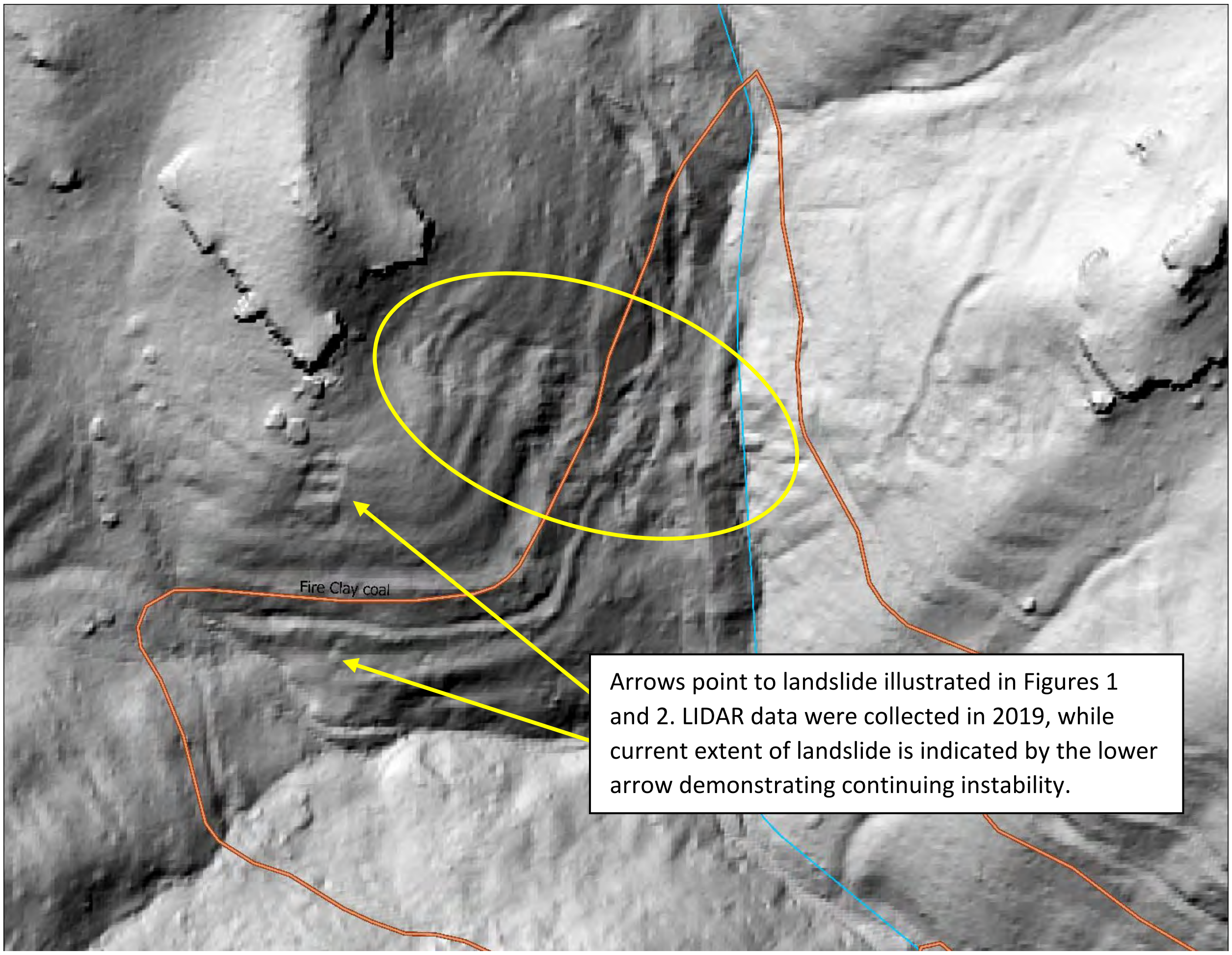

Figure 8. Locations of confirmed landslides in the Hector Mountain project area in relation to proposed road reconstruction and coal seams. Dates in stand polygons are "Year of Origin" data from the Daniel Boone National Forest GIS database.

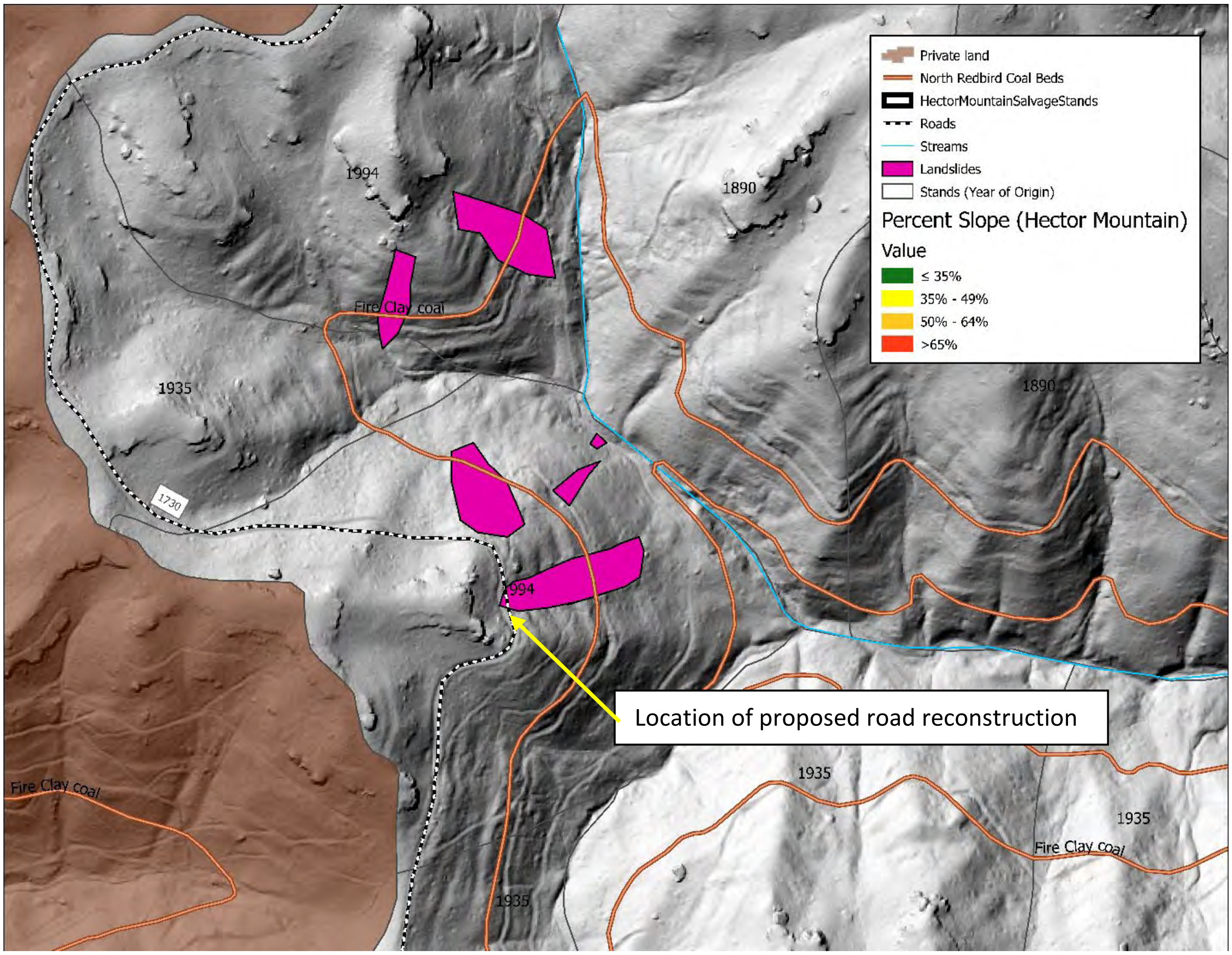

Figure 9. Hector Mountain salvage logging unit (South) slope data in relation to landslides and coal seams

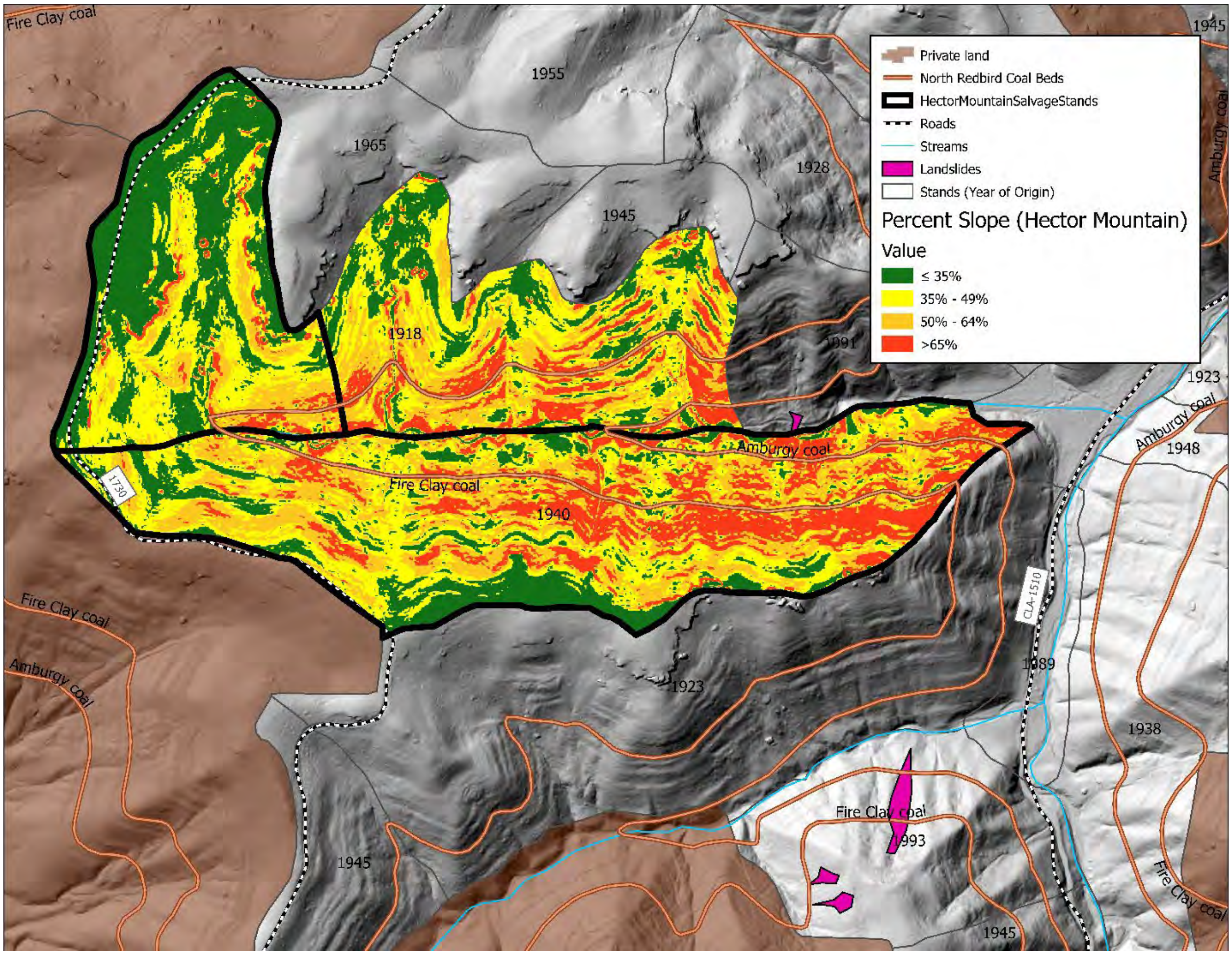

Figure 10. Hector Mountain salvage logging unit (Middle) slope data in relation to landslides and coal seams

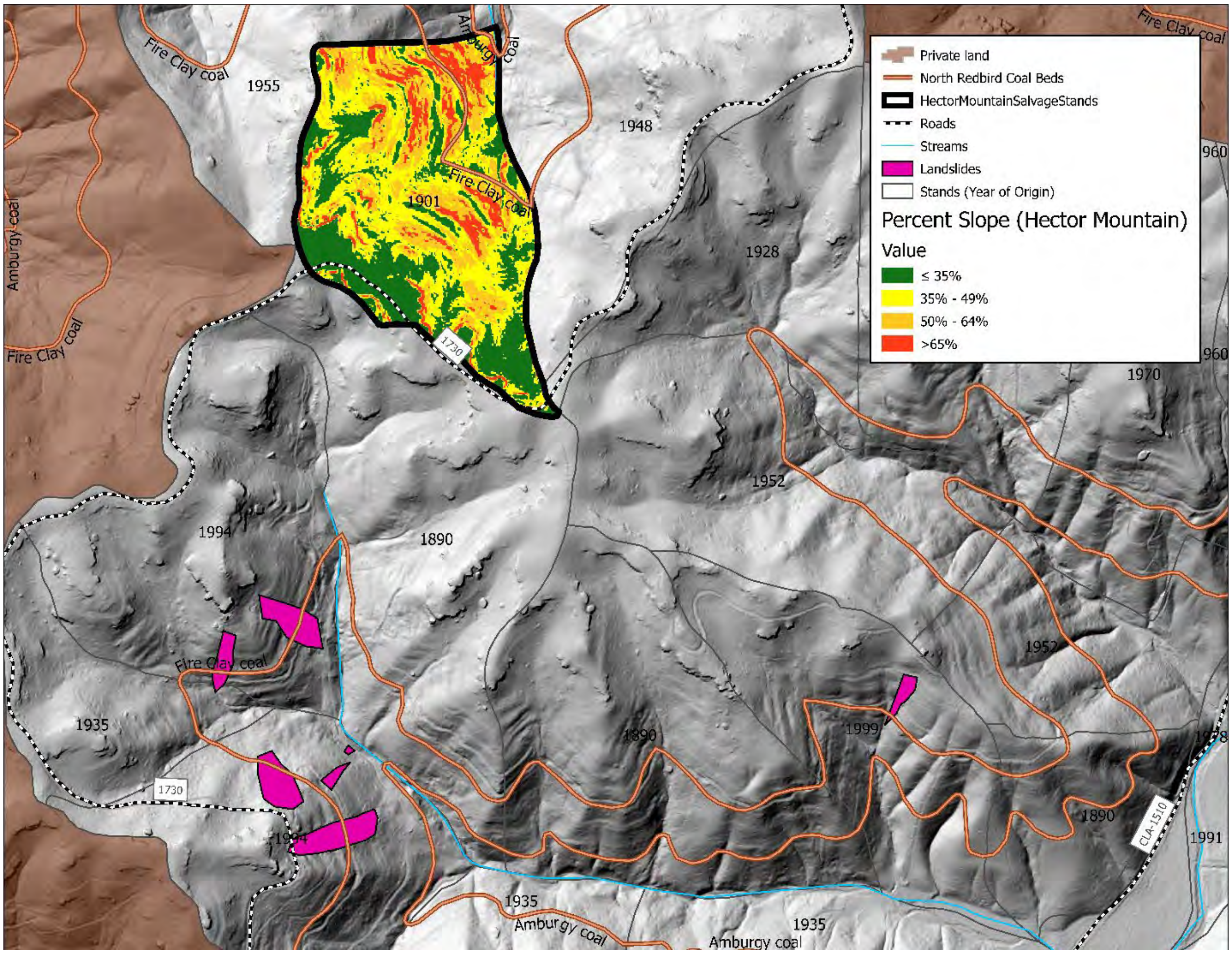

Figure 11. Hector Mountain salvage logging unit (North) slope data in relation to landslides and coal seams