General Comments:

1. My advice is simple: Base all your management activities on best available science as required by NEPA, and follow the law. The USFS has clearly made significant management mistakes in the past; do not let logging and road building in the name of resisting wildfires be the next one. Try to resist the pressures being applied by politicians and bureaucrats; the forest ecosystem, future generations, and your conscience will all benefit.
2. By using "Conditions-based Analysis", the Draft EA does not give enough information to allow the public to submit significant and meaningful comments. The EA does not disclose site-specific details of where and when roads and logging will occur over the next 20 years, yet it makes clear that once those details are later disclosed, the public will have no formal process by which to analyze the environmental effects as required by the National Environmental Policy Act. Without disclosing specific locations, actions/treatments, or analyzing what impacts these actions might have, I can only speak in generalities. Location and type of vegetative manipulation do matter, as do the amount and location of new road construction, for example. It is problematic that there's a lack of analysis and therefore disclosure. It is certainly a violation of the intent of NEPA, if not the NEPA statutes. Although you state that, as implementation proceeds, you will collaborate with the public and interested groups, I have a hard time believing that. On the Westside project, every single public comment—and these were *pre-decision, not post-decision,* comments submitted by 68 people—was ignored or disregarded, except one. (The one exception was to keep the old Camas trailhead spur road open for dispersed camping, which proved to be a bad idea because it has since been repeatedly used as a dump.) With the scope, scale, and length of time required associated with implementing a CBA program, there are significant risks of managing large landscapes using false assumptions and waiting for results until all projects are complete. To solve this problem, each sub-project should also go through the NEPA process separately before implementation.
3. You have released the Draft EA with its included additional information in late March, and given the public until late April to comment. There is probably no more difficult time of year to access the project area, given the mix of bare ground and deep snow drifts. Roads are not passable by any machine, and foot travel on and off road requires very difficult mixed techniques.This timing precludes any meaningful public field review, violating NEPA. Please extend the comment period to July 1, 2021, to give the public the chance for field review in order to submit meaningful comments.
4. Do an EIS, not an EA, to analyze this project. The enormous 48,000-acre size and the presence of or potential for ESA-listed species such as Bull Trout, Lynx, Wolverine, and Grizzly call for an EIS, not an EA. The project area has also been heavily and adversely affected by past management activities, including terracing and a very high road density. And how can a 20-year-long project possibly have no significant impact? I suspect that not a single BNF employee currently involved in this project will still be here in 20 years. Federal guidance on preparing NEPA documents states that **"an EA should be a concise public document of no more than 10-15 pages"** and that **"in most cases, a lengthy EA indicates that an EIS is needed"** (**https://www.ntc.blm.gov/krc/uploads/366/NEPAHandbook_H-1790_508.pdf**) Your EA is 114

pages, not including the thousands of pages of "supporting" documents that are referenced and only available through a time-consuming online downloading process. One of these alone (PF-SOILS-006) is 1,600 pages long! An EIS will require that additional alternatives be developed in addition to No Action and could potentially result in a better project.

5. Please provide examples from this region of the northern Rockies that demonstrate the success of your methods in accomplishing the purpose and needs of the project. Please provide recent references from the scientific literature that support the project. NEPA requires that best available science be used. Your citations and reference list indicate serious omissions of recent studies and concepts. See the specific comments below for more details.
6. The Draft EA provides no discussion or guarantee of funding for post-project monitoring, reclamation, or continued road maintenance. In fact, the EA, p. 15 and p. 23, states that trail construction, road storage, road decommissioning, and non-commercial activities are subject to available funding. In a 20-year Conditions-based project, activities should be continuously monitored during and following implementation of each subproject to allow for adaptive management. Without monitoring and adaptive management, there are significant risks to large landscapes using false assumptions and waiting for results until all projects are complete. And BNF's past projects indicate that typically monitoring is not done, and that roads are neglected. CEQ's Guidance on Monitoring and Mitigation state: "*When agencies do not document and, in important cases, monitor mitigation commitments to determine if the mitigation was implemented or effective, the use of mitigation may fail to advance NEPA's purpose of ensuring informed and transparent environmental decision making. Failure to document and monitor mitigation may also undermine the integrity of the NEPA review"* (https://ceq.doe.gov/docs/ceq-regulations-and-guidance/Mitigation_and_Monitoring_Guidance_14Jan2011.pdf).
   Please include a monitoring, maintenance, and adaptive management plan in the EA, and include funding guarantees for it.

Specific comments in order of the EA:

p. 1: definition of resilience: Like the term "forest health", resilience is a vague and meaningless term. Your definition includes no ways to measure or assess it. For example, who is to decide "when ecosystem components and processes are functioning properly"? Will it be the silviculturalists and timber companies, who want to increase growth of the crop trees, or will it be forest ecologists studying the forest as a whole? I see no forest ecologists on the IDT list. Please elaborate on your meaning and proposed assessment of resilience. Please provide references that demonstrate the efficacy of your proposed treatments in increasing resiliency according to your detailed definition.

p. 3, Departure from historic conditions: According to Nacify et al. (2010), in the Bitterroot region, past logging practices have had a much larger affect on any departure from historic conditions than fire suppression. You are proposing to fix the problems created by past logging by doing more logging. Seriously? And if fire risk to communities is high, it is only because the areas within 100 feet of homes is at high risk; it has nothing to do with fire risk in the so-called "WUI"(Cohen, J.D.

2002.Wildland-urban fire: A different Approach. [1611] [http://www.firelab.org/]). Justifying the project this way to an uninformed public is unethical.

> Nacify, C., Sala, A., Keeling, E.G., Graham, J., Deluca, T.H., 2010, Interactive effects of historical logging and fire exclusion on ponderosa pine forest structure in the northern Rockies Ecological Applications, 20(7), 2010, pp. 1851–1864. *"Fire-excluded ponderosa pine forests of the northern Rocky Mountains logged prior to 1960 have much higher average stand density, greater homogeneity of stand structure, more standing dead trees and increased abundance of fire-intolerant trees than paired fire-excluded, unlogged counterparts. In other words, logging increases fuel loads and produces the densest forest over the long term.*

p. 3, Departure from historic conditions: SILV-001 states: "Frequent (5-20 year average fire return interval), low-intensity fire created stands of mature open-grown ponderosa pine". FIRE-001 states, similarly, average fire interval of 11-16 years. You have missed some key references here, most importantly that Arno and Peterson (1983) calculated pre-1900 mean fire interval (MFI) for Montane slopes (PP-dominated + some DF, 4,200-6,200' elevation) *in the West Fork area* at 31 years. And Arno et al. (1995) found MFI to be 50 years at their nearby Fales Flat site (PP-dominated + some DF; 5,400-5,900' elevation), *also in the West Fork area*. Arno and Peterson (1983) and Fryer (2016) also pointed out problems with basing fire history on fire scar studies using the common method of "adding up" all individual fire scars in a study area. This means that the MFI decreases as the study acreage increases (Arno et al, 1995). Other researchers (see list below) have pointed out the difficulty of determining the historic extent of high severity fires, and concluded that mixed severity fires were historically common in Ponderosa-pine-dominated forests. These studies make the case for reintroducing fire without first doing extensive fuel treatments, and shed doubt on the claim that we need to make forests more resilient to wildfire. Pierce and Grant (2008), who studied fire history of the last 2,000 years in central Idaho Ponderosa forests using geology and carbon dating, succinctly summarize these common conclusions and recommendations when they state:

> *Evidence for geomorphically effective stand-replacing fires in Idaho ponderosa forests supports other studies that demonstrate a diverse pre-settlement fire regime in ponderosa pine-dominated forests in the Colorado Front Range, Montana, and the Black Hills of South Dakota, one that includes high-severity fires (e.g. Brown et al., 1999; Huckaby et al., 2001 Ehle and Baker, 2003; Romme et al., 2003; Barrett, 1988; Arno et al., 1995; Shinneman and Baker, 1997; Baker et al., in press). Recent research demonstrates that a model of low-severity fire alone is not suitable as a basis for restoration efforts in all ponderosa-dominated forests (e.g. Baker et al., in press). In addition, reference conditions for ponderosa forests that are defined based on fire regimes during the cooler, effectively wetter conditions of the Little Ice Age cannot apply to warmer climates of the present and probable future. Attempts to 'restore' a forest to either (1) a fire regime that is less diverse than those of the past, or (2) fire regimes characteristic of a climate that no longer exists, may therefore be both costly and ineffective. Given that our results support a natural regime of mixed-severity fire in ponderosa-dominated forests in Idaho, a fire model that only includes frequent, low-severity fire is not applicable to this region. With predicted future warming, a high probability of severe fires in ponderosa forests will likely persist.*

Arno, S.F.; T. D. Peterson. 1983. Variation in estimates of fire intervals: a closer look at fire history on the Bitterroot National Forest. Research paper INT-301. Ogden, UT: USDA, Forest Service, Intermountain Forest. and Range Exp. Station.

Arno, S.F., Scott, J.H., and Hartwell, M.G., 1995, Age class structure of old growth Ponderosa Pine/Douglas Fir stands and its relationship to fire history: USFS Intermountain Research Station, Ogden Utah, Research Paper INT-RP-481, 29 p.

Baker WL (2017) Restoring and managing low-severity fire in dry-forest landscapes of the western USA. PLoS ONE 12(2): e0172288. https://doi.org/10.1371/journal.pone.0172288. *Frequent low severity fire rates have been overestimated in dry forests, meaning that understory shrubs and small trees could fully recover between low severity fires. Therefore less restoration treatment (thinning) is needed before reintroduction of fire.*

Baker, W.L., and Ehle, D., 2001, Uncertainty in surface-fire history: the case of ponderosa pine forests in the western United States: Canadian Journal of Forest Research. V. 31, p. 1205–1226. DOI: 10.1139/cjfr-31-7-1205. *Examines the biases in fire scar studies, and finds that average fire return interval is much longer than previously thought.*

Baker, W.L., T.T. Veblen, and Sherriff, R.L. 2007. Fire, fuels and restoration of ponderosa pine Douglas-fir forests in the Rocky Mountains, USA. Journal of Biogeography, 34: 251-269. *"Exclusion of fire has not clearly and uniformly increased fuels or shifted the fire type from low- to high-severity fires. However, logging and livestock grazing have increased tree densities and risk of high-severity fires in some areas. Restoration is likely to be most effective which seeks to (1) restore variability of fire, (2) reverse changes brought about by livestock grazing and logging, 3) ensure that degredation is not repeated."*

Brown PM, Kaufmann MR, Shepperd WD (1999). Long-term, landscape patterns of past fire events in a montane ponderosa pine forest of central Colorado. *Landscape Ecology* 14: 513-532.

Dellasala, D.A., Ingalsbee, T., and Hanson C.T, Everything you wanted to know about wildland fires in forests but were afraid to ask: Lessons learned, ways forward: https://forestlegacies.org/images/projects/wildfire-report-2018.pdf *Comprehensive summary of historical wildfire compared to modern conditions, ecological benefits of wildfire, best practices for home protection.*

Fryer, Janet L. 2016. Fire regimes of Northern Rocky Mountain ponderosa pine communities. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula Fire Sciences Laboratory (Producer). Available: www.fs.fed.us/database/feis/fire_regimes/Northern_RM_ponderosa_pine/all.html

Odion D.C., Hanson C.T., Arsenault A., Baker W.L., DellaSala D.A., Hutto R.L., Klenner W., Moritz M.A., Sherriff R.L., Veblen T.T., Williams M.A. 2014. Examining historical and current mixed-severity fire regimes in ponderosa pine and mixed-conifer forests of western North America. PLoS ONE 9: e87852. "*Our findings suggest that ecological management goals that incorporate successional diversity created by fire may support characteristic biodiversity, whereas current attempts to ''restore'' forests to open, low-severity fire conditions may not align with historical reference conditions in most ponderosa pine and mixed-conifer forests of western North America."*

Pierce, J., and Meyer, G., 2008, Long-Term Fire History from Alluvial Fan Sediments: The Role of Drought and Climate Variability, and Implications for Management of Rocky Mountain Forests: International Journal of Wildland Fire, v. 17, n. 1, DOI: 10.1071/WF07027

Swetnam, T.W., and Baisan, C.H., 1996, Historical Fire Regime Patterns in the Southwestern United States Since AD 1700, *in* CD Allen (ed), Fire Effects in Southwestern Forest: Proceedings of the 2nd La Mesa Fire Symposium, p. 11-32: USDA Forest Service, Rocky Mountain Research Station, General Technical Report RM-GTR-286. *Elevation and forest type were often weak determinants of fire frequency. Some of the variations in fire interval distributions between similar elevation or forest types were probably due to unique site characteristics, such as landscape connectivity (Le., ability of fires to spread into the sites), and land-use history. Differences in the sizes of sampled areas and fire-scar collections among the sites also limit ability to compare and interpret fire interval summary statistics.*

Williams, M.A., W.L. Baker. 2012b. Comparison of the higher-severity fire regime in historical (A.D. 1800s) and modern (A.D. 1984-2009) montane forests across 624,156 ha of the Colorado Front Range. Ecosystems 15: 832-847. *Recent high severity fires in Ponderosa-Doug Fir forests in Colorado are not outside historical (1800s) averages.*

Please provide references that show the necessity of commercial logging in the wildlands before reintroduction of fire. Most of the references you have provided so far (from PF-scoping comment responses: Safford, 2009, Omi, 2010, Peterson, 2005, Stephens, 2012, Strom and Fule 2007; Peterson 2007; Omi and Martinson 2002 & 2004; Agee and Skinner, 2005; Graham et al. 2004 & 2009; Pollet and Omi 2002; Fule et al. 2001; Hudak et al, 2011; Prichard et al. 2020), emphasize reducing surface fuels, removing small non-commercial trees, and concentrating on the areas within ¼ mile of homes, are modeling studies without empirical data, or are so nuanced and full of variables as to be inconclusive (e.g., Prichard et al 2020).

p. 3 Need to: "Reduce crown fire hazard potential within the wildland-urban interface (WUI), adjacent community protection zone" The Forest Service is a funny place. You often state that wildfire is necessary for forest health and that people need to learn to live with wildfire. But you have spent decades instilling the fear of fire in people, resulting in the current demand to "do something" about these fires. That "something" always seems to be commercial logging. In the P and N, you infer that wildland fuel treatments in the WUI will reduce the risk of homes burning. Extensive research by Jack Cohen and others does not support this inference, and it is disingenuous to suggest it to the public. In fact, Jack Cohen's comments on the Montana Forest Action Plan, which proposes actions similar to the Mud Creek project, state: "*home ignition potential can be sufficiently reduced within the HIZ (within 100 feet of homes) to prevent community destruction without having surrounding fuel treatments and controlling extreme wildfire. This provides an opportunity to more effectively define wildfire community risk as a home ignition problem, not a wildfire control problem. This changes the paradigm of community wildfire risk and separates it from the risk of inappropriate ecological fire……The important inconsistency between the Forest Action Plan and available science is the Plan's claim of significant community wildfire risk reduction using wildland fuel treatments."* In addition, the WUI is not a scientific boundary; it does not include factors such as forest type, aspect,

topography, prevailing wind direction, or even distance to structures. Please remove the inference that treating the WUI will protect human communities and structures.

p. 3 Need to: "Reduce stand densities, increase age class diversity, and favor shade intolerant species to promote resilience to stressors (e.g., drought, insects, and diseases)." Please give examples where past treatments similar to the proposed treatments have improved resilience to these stressors. Please give scientific references that demonstrate the efficacy of proposed treatments. There are plenty of studies that argue against such treatments because the individuals best adapted to survive drought, insects, and disease cannot be determined visually:

Bailey, J.K., Deckert, R., Scheitzer, J.A., Rehill, B.J., Lindroth, R.L., Gehring, C., and Whitham, T.G., 2005, Host plant genetics affect hidden ecological players: links among *Populus*, condensed tannins, and fungal endophyte infection: Canadian Journal of Botany, v. 83, p. 356–361 (2005) doi: 10.1139/B05-008. *Genetic differences in Cottonwoods that cannot be visually determined have profound effects on the forest ecosystem.*

Carswell, C., 2016, Genetic research lays foundation for bold conservation strategies: High Country News, June 8, 2016. *Pinyon pines susceptible to moths turn out to be the most drought resistant and survive over healthy appearing ones.*

Christiansen, E., R.H. Waring, and A.A. Beeryman. 1987, Resistance of conifers to bark beetle attack: Searching for general relationships: Forest Ecology and Management, v. 22, p. 89-106. *Review of factors in bark beetle resistance showing complexity and suggesting it is difficult to determine visually which trees will be resistant.*

McNulty, S.G., Boggs, J.L., and Sun, G., 2014, The rise of the mediocre forest: why chronically stressed trees may better survive extreme episodic climate variability: New Forests, v. 45, p. 403-415. *Finds that the healthy looking trees are not the ones that best survive climate change due to slower growth and higher root to foliage ratios. You cannot select for adaptive trees; only nature can do that.*

Six, D.L., Biber, E., and Long, E., 2014, Management for Mountain Pine Beetle Outbreak Suppression: Does Relevant Science Support Current Policy? Forests, v. *5*, p. 103-133, doi:10.3390/f5010103. *Thinning results in less live trees afterwards than just letting MPB go their course. You may actually be selecting the wrong (genetically less resistant) trees by thinning.*

Six, D.L., Vergobbi, C. and Cutter, M., 2018, Are survivors different? Genetic-based selection of trees by mountain pine beetle during a climate-change-driven outbreak in a high-elevation pine forest: Plant Science, Plant Sci., 23 July 2018 | https://doi.org/10.3389/fpls.2018.00993 *Genetic differences that cannot be determined visually determine the variable susceptibility to bark beetles in lodgepole pine.*

Sthultz, c.M., Gehring, C.A., and Whitam, Deadly combination of genes and drought: increased mortality of herbivore-resistant trees in a foundation species: Global Change Biology, v. 15, 1949–1961, doi: 10.1111/j.1365-2486.2009.01901.x *The least vigorous pinyon pines with growth slowed by moth caterpillars had much greater survival rates during drought than healthy appearing trees.*

p. 4: Purpose to "improve resilience….. by modifying forest structure and composition" narrows the alternatives to include only one remedy: to modify forest structure and composition. This prevents any other alternatives to be considered, even if other alternatives might be more effective at improving resilience. For example, recent research (see above reference list) suggests the best way to improve resilience to insects and disease is through passive management to let the forest adapt. CEQ's A Citizens Guide to NEPA, p. 16, states: "The purpose and need statement explains to the reader why an agency action is necessary, and serves as the basis for identifying the reasonable alternatives that meet the purpose and need" (https://ceq.doe.gov/get-involved/citizens_guide_to_nepa.html). Your purpose rules out all other alternatives to achieving the purpose of "improving resilience" without any justification. In a way, though, you are being more honest by admitting that a purpose is to get the cut out. But you need to provide and analyze additional alternatives to the proposed action.

p. 4: Purpose to: "improve habitat and forage quality and quantity for bighorn sheep, mule deer, elk, and other regionally sensitive species". Please give examples of other similar past BNF projects that have improved habitat and forage. Please provide scientific studies that demonstrate the efficacy of your proposed action in improving habitat and forage. I have only seen examples of the opposite. For example, the Hayes Creek Fuel Reduction Project, completed in 2012, resulted in an open, evenly spaced, pine plantation with an understory of knapweed with subordinate St Johns wort and cheatgrass that I call a knapweed savanna. See photo below:

p. 5: " Proposed trail construction and decommissioning activities were developed through discussions between forest recreation specialists and the Ravalli County Off-Road Users Association." A need of the project, EA p. 3, is "to provide for additional recreational opportunities,

by creating motorized and *non-motorized* trail opportunities when resource concerns can be mitigated", so where are the non-motorized opportunities in this proposal?

p. 7: Issues and resources not carried forward for analysis: Greenhouse Gas Emissions. Numerous studies (listed below) found that logging contributes more greenhouse gases to the atmosphere than any wildfire. Therefore, even if your proposal did lessen wildfire, it would still result in a net gain of greenhouse gases. This project is a long way from both the workforce and any mills, and will require large amounts of fossil fuel. In addition, there is evidence that logged forests sequester less carbon than untreated forests. And your argument that the project is too small to matter on global scale is ridiculous. Isn't that sort of thinking that got us into this climate change in the first place? NEPA requires you to thoroughly analyze greenhouse gas emissions and the impacts of the project on climate change (Center for Biological Diversity v. Nat'l H'wy Traffic Safety Admin., 538 F.3d 1172, 1217 (9th 2008)) **.**

Campbell, J.L., Harmon, M.E., Mitchell, S.R., 2011, Can fuel reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? Frontiers in Ecology and Environment, doi:10.1890/110057. *No evidence that thinning will decrease CO2 emissions in the long or short term; in fact it may be the opposite.*

Harris, N.L., and 6 others, 2016, Attribution of net carbon change by disturbance type across forest lands of the conterminous United States: *Carbon Balance Management, v. 11, 24 p.* DOI 10.1186/s13021-016-0066-5. *Timber harvest in western forests resulted in 4 times more carbon storage loss than wildfire.*

Law, B.E., and Waring, R.H., 2015, Carbon implications of surrent and future effects of drought, fire, and management on Pacific Northwest forests: Forest Ecology and Management, v. 355, p. 4-14.

Law, B.E., Hudibug, T.W., Berner, L.T., Kent, J.J., Buotte, P.C., and Harmon, M.E., 2017, Land use strategies to mitigate climate change in carbon-dense temperate forests: PNAS, www.pnas.org/cgi/doi/10.1073/pnas.1720064115. *Logging is Oregon's biggestCO2 polluter, much more so than wildfire.*

Mildrexler, D.J.,et al, 2020, Large Trees Dominate Carbon Storage in Forests East of the Cascade Crest in the United States, Pacific Northwest: Frontiers in Forests and Global Change, v. 3, p. 1-15, Article 594274.

Reinhardt, E., and Holsinger, L, 2010, Effects of fuel treatments on carbon-disturbance relationships in forests of the northern Rocky Mountains: Forest Ecology and Management, v. 259, p. 1427–1435. *Modeling indicated that fuel treatments decreased fire severity and crown fire occurrence and reduced subsequent wildfire emissions, but did not increase post-wildfire carbon stored on-site. Conversely, untreated stands had greater wildfire emissions but stored more carbon.*

Segerstrom, C., 2018, Timber is Oregon's biggest carbon polluter: High Country News, May 16, 2018.

Stenzel, J.E., et al, 2019, Fixing a snag in carbon emissions estimates from wildfires: Global Change Biology, v. 25, 3985-3994, DOI: 10.1111/gcb.14716. *Regional wildfire emissions estimates using widely implemented combustion coefficients are 59%–83% higher than emissions based on field observations.*

Stephenson, N.L. et al, 2014, Rate of tree carbon accumulation increases continuously with tree size: Nature, v. 507, p. 90-93, doi:10.1038/nature12914

Wilson N., R. Bradstock , and M. Bedward, 2021, Comparing forest carbon stock losses between logging and wildfire in forests with contrasting responses to fire: Forest Ecology and Management, v. 481, 118701. *Logging reduced above ground carbon stocks much more than wildfire in Australia.*

p. 7: Issues and resources not carried forward for analysis: Soil Organic Matter. I cannot tell what the 1600 pages of PF-SOILS-006 is saying, and you are proposing a forest plan amendment for CWD. It does not appear that you have justified not analyzing this issue.

p. 10, Conditions-based planning approach. This is discussed on p. 1 of these comments.

p. 13, Design Features: "Resource concerns are often mitigated by design features, as well as adherence to forest plan direction, best management practices, and all other applicable laws and regulations." Past BNF projects demonstrate that design features are often inadequate to mitigate resource concerns, or are often not followed or monitored. For example, parts of the Como, Hayes Creek, and Westside projects have become infested with invasive weeds, despite the Design Criteria inference that washing equipment would mitigate the problem. Ground based logging occurred on slopes up to 55% in steepness on the DLL 2 and Westside projects, despite design criteria and the Forest Plan's prohibition on slopes steeper than 40%. The Westside project violated the Forest Plan's statement that "timber harvest and road construction will not be readily visible from major road and trail corridors". Both the Westside and DLL 2 projects violated Montana Streamside Management Zone rules. While NEPA allows the use of mitigation measures to be considered, CEQ's Guidance on Monitoring and Mitigation also states: *When agencies do not document and, in important cases, monitor mitigation commitments to determine if the mitigation was implemented or effective, the use of mitigation may fail to advance NEPA's purpose of ensuring informed and transparent environmental decision making. Failure to document and monitor mitigation may also undermine the integrity of the NEPA review* (https://ceq.doe.gov/docs/ceq-regulations-and-guidance/Mitigation_and_Monitoring_Guidance_14Jan2011.pdf). How will you ensure that your design features and design criteria to limit resource damage will be followed and be successful, given your poor record outlined above?

p. 15, Vegetation Management, Forest Health: Project file SILV-001 states that vegetation analysis is primarily done using a GIS database, and "complete FSVeg data coverage, including habitat types, is unavailable for the project area at this time". The GIS dataset used in the Montana Forest Action Plan is incomplete and inaccurate in the Lost Horse area where I live, and probably is also in the Mud Creek project. SILV-001 states that walk-through surveys have been completed on 4,000 acres (<10%) of the Mud Creek project. Walk-throughs were shown to be insufficient for identifying and analyzing old growth on the Westside project, and old growth was logged as a result. The GIS database is no substitute for field work, and the entire project area should be field surveyed for all ecosystem components before any project implementation or approval. This includes field surveys for vegetation, wildlife, soils, and fisheries. This should have been done before the EA was released.

p. 30, Openings greater than 40 acres. You are proposing numerous clearcuts up to 200 acres in an attempt to mimic fire. Logging is not fire, and does not have the same effect. A better solution

would be to let natural fires burn, especially because you continually state that the root of all problems is the lack of wildfire. If the Forest Plan prohibits allowing natural fires for this area, then propose a site-specific Forest Plan amendment. You have no problem proposing Forest Plan amendments that allow for increases in roads or logging, and this one would be much more ecologically sound. Clearcuts are unacceptable to the public owners of this forest, and I suspect will bring much trouble to the USFS. I'd advise thinking ahead.

p. 34, Forest Plan Amendment for EHE: You have used site-specific EHE amendments on all previous BNF timber projects in my memory. What is the cumulative effect of all these amendments? They amount to a Forest-wide amendment to the Forest Plan, which I see you also have proposed. Anything that permits more roads is bad for all wildlife, not just elk. EHE protects many other species. BNF Wildlife Biologist Dave Lockman has previously commented that EHE is used to protect habitat of many other species: "*The EHE standard results in areas of secure habitat for a range of species including grizzly bears".* (p. 10, Gold Butterfly Biological Assessment; p. 9 DLL 2 BA). That you will not be able to "manage" some of the forest if you are not granted the amendment is a good thing for the forest. Follow the principles of Hessburg et al, 2015, that recommend decreasing road densities for improved habitat connectivity.

Hessburg, P.F., et al., 2015, Restoring fire-prone Inland Pacific landscapes: seven core principles: Landscape Ecology, v. 30, p, 1805–1835. DOI 10.1007/s10980-015-0218-0

p. 34, Forest Plan Amendment for Thermal Cover: Project file WILD-001 shows that thermal cover is less important than forage, and justifies the amendment on the basis that the project will increase forage. However, you have not provided references or examples showing that the proposed management activities will improve forage, and so these improvements are highly speculative (see comments above). In addition, there are many other species to consider. What will the effects of less thermal cover be on them? Please provide references and examples from past projects showing that your proposed treatments will improve forage.

p. 35, Forest Plan Amendment for Old Growth: While in many ways, the more inclusive standards of Green et al (1992) will allow more areas to be defined as old growth, there could be negative consequences to this. Old growth could conceivably be cut down to Green et al's bare minimum of 8 trees per acres. I'm sure that was not their intention. Adding more acreage of old growth also has the potential to allow more logging of old stands because the 3% minimum (MA 1) and 8% minimum (MA 2) could be more easily met. Old growth on BNF has declined greatly from historic conditions, and all remaining old growth should be preserved intact. Fielder et al (2007a) and Hessburg et al (2015) recommend retaining all or nearly all old/large trees. Fielder et al (2007b) state that "old-growth functions increase as numbers of large trees, snags, and downed logs increase", again suggesting more is better. Also note that Greene et al (1992) surveyed 4,847 plots of Western Montana, Zone 1, Ponderosa-Doug Fir-Western Larch old growth and found that they averaged 17 old growth trees per acre (well above their minimum of 8), an average basal area of 161 ft^2/acre, and 6 snags per acre.

On the Westside project, the logging eliminated almost all Doug Fir, even the OG. OG Doug Fir must have been part of "historic conditions". Hartwell et al (2000) found that Doug Fir comprised 19% of the basal area historically along the Bitterroot Front between 4,500' and 5,800'. I found the OG logged on the Westside project to have consisted of 10% Doug Fir. I hope you will retain the OG Doug Fir on Mud Creek, even if they are "diseased". As stated earlier, there is much evidence that visual inspection cannot be used to determine which trees are best adapted to resist disease, insect outbreaks, and drought. And cutting large/old Doug Firs because they showed signs of Armillaria root rot, as was done on the Westside project, does nothing to control Armillaria because it survives in the stumps, soil, and dead wood. Insects, disease, and drought drive adaptation, naturally thin the forest, and are important components of forest ecology (e.g. Hadfield et al, 2000; Heath and Alfero, 1990).

Old growth is about more than the trees. The soil, ground cover, understory, CWD, and snags are all important components. On past commercial logging projects, these have all been degraded in addition to the loss of old/large trees. Please limit work in OG to non-commercial treatments. Cut no old or large trees. To really promote and recruit old growth, it makes sense to impose a maximum diameter limit of 18" on logging in the whole project area. Leaving all old or large trees is not only ecologically sound (Hessburg et al, 2015), it will sequester more carbon (Mildrexler et al, 2020; Stephenson et al, 2014).

Fiedler, C. E., P. Friederici, M. Petruncio, C. Denton, and W. D. Hacker. 2007a. Managing for old growth in frequent-fire landscapes. *Ecology and Society* **12**(2): 20. URL: http://www.ecologyandsociety.org/vol12/iss2/art20/

Fiedler, C. E., P. Friederici, and M. Petruncio. 2007b. Monitoring old growth in frequent-fire landscapes: *Ecology and Society* **12**(2): 22. URL: http://www.ecologyandsociety.org/vol12/iss2/art22/

Hadfield, J.S., Mathiason, R.L., and Hawksworth, F.G., 2000, Douglas Fir Dwarf Mistletoe: Forest Insect and Disease Leaflet 54, USDA-FS, 10 p. *Your own USFS pamphlet states "it is a pest only where it interferes with management objectives, such as timber production". In other areas, it is important for wildlife habitat. It also states that spread rates are faster in open stands than dense stands.*

Hartwell, M.G., P. Alabeck, and S.F. Arno, 2000, Comparing Historic and Modern Forests on the Bitterroot Front *in* The Bitterroot Ecosystem Management Research Project: What We Have Learned: USDA-FS Rocky Mountain Research Station, General Technical Report RMRS-GTR-17 p. 11-16.

Heath, R., and Alfero, R.J., 1990, Growth response in a Douglas fir-lodgepole pine stand after thinning of lodgepole pine by the mountain pine beetle: A case study: Journal of Entomological Society of British Columbia, v. 87, p. 16-21.

Hessburg, P.F., et al., 2015, Restoring fire-prone Inland Pacific landscapes: seven core principles: Landscape Ecology, v. 30, p, 1805–1835. DOI 10.1007/s10980-015-0218-0

Mildrexler, D.J.,et al, 2020, Large Trees Dominate Carbon Storage in Forests East of the Cascade Crest in the United States, Pacific Northwest: Frontiers in Forests and Global Change, v. 3, p. 1-15, Article 594274.

Stephenson, N.L. et al, 2014, Rate of tree carbon accumulation increases continuously with tree size: Nature, v. 507, p. 90-93, doi:10.1038/nature12914

p. 37, Transportation management. You are proposing almost 10 miles of new system roads and 33 miles of temporary roads in an area with an already very high road density. Decommissioning (on paper) roads that are currently revegetated and naturally reclaimed in no way offsets the building of these new roads. You are also proposing to use undetermined roads for access into riparian conservation areas. Generally, these undetermined roads need to be reconstructed, an activity that is sure to bring negative consequences. Roads fragment habitat, take land out of the productive ecosystem, spread weeds, and increase stream sediment. Please develop an alternative that builds no new roads and includes bringing existing roads up to standards and maintaining them in perpetuity, with funding secured. Past projects have shown that once the commercial logging is finished, the roads quickly fall into disrepair. And on the Westside project, some of the promised road decommissioning/reclamation was never done , although the trees were logged from the new bypass road.

Building roads and log hauling is sure to have a deleterious effect on aquatic species like the ESA-listed bull trout. Your arguments that they will not harm aquatic species are unconvincing. For example, disturbance of the bull trout of lower Rhombo Creek will be insignificant because they are rare (<20) there. Isn't that why they are on the ESA list—because they are rare? Then you state that conditions will later improve because of road decommissioning, but road decommissioning is subject to available funding and not guaranteed (EA, p. 15). You go on to say that in the same area, because west slope cutthroat are common, there will be no effect on them either. Your logic is convoluted and contradictory.

p. 57, Existing potential fire types: The table here shows that less than 1% of the project area is susceptible to active crown fire, with 53% being susceptible to passive crown fire, and 45% likely to only experience ground fire. Yet none of the discussion in the EA distinguishes between passive and active crown fire; only the alarming (to the public) term "crown fire" is used. On EA, p. 58, you state that proposed commercial harvest will make "it difficult for fire to sustain itself in the crowns due to the discontinuity of canopy fuels". But the <1% active crown fire potential shown on page 57 shows that it is already difficult for fire to sustain itself in the crowns. **Pl**ease provide a map showing the existing potential fire types superimposed on your treatment areas. You provided this map in the Westside project EA; interestingly, and not surprisingly, it showed no potential for active crown fire in any of the commercial units, even though a purpose of the project was to reduce active crown fire.

p. 70, Insects and disease: Please back up the efficacy of your proposed treatments in decreasing insects and diseases, especially over the long term. On p. 5 of these comments, I provide discussion and numerous references showing the opposite.

p. 73, Climate change: Please provide scientific evidence demonstrating that the preferred action will increase carbon storage. Your citations (Halofsky et al 2019; Birdsey et al 2019) give no recommendations supporting your treatments, and no real data addressing your treatments' effects on climate change. I discuss climate change on pages 7-8 of these comments, please see for more detail.

To address other issues in the EA, I fully incorporate and support all comments submitted by Friends of the Bitterroot concerning the Mud Creek EA.