Missoula Ranger District
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These official comments on the Marshall Woods Project Environmental Assessment (Lolo National Forest 2015) are respectfully submitted on behalf of the Friends of the Rattlesnake, Wilderness Watch, Alliance for the Wild Rockies and the WildWest Institute. They were prepared by natural resource consultant Mike Bader in Missoula, Montana.

We represent residents of Missoula County including many residing in the Rattlesnake Creek watershed. We have used and enjoyed the Rattlesnake National Recreation and Wilderness Area for decades. Thus, we have a vested interest in protecting the natural features and conditions of the area (see attached statements of purpose), its native fish and wildlife and their habitat, and maintenance of its natural and primitive attributes for our continued use and enjoyment.

It is our position that if the Forest Service intends to implement Alternative B or its chief components, it must prepare a Full Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA). The Forest Service would also be required to conduct a full-scale watershed effects analysis pursuant to INFISH. Due to the complexity of the issues, the high level of controversy, the threatened resources at stake, and reasonably foreseeable cumulative effects, NEPA requires preparation of a full EIS.

Certain components of the project are not objectionable, including restoration work in Sections 33 and 31, replacement of the culvert on Marshall Creek, thinning and burning within 0.34 miles of residential structures within Units 61, 64, 90, 91 and 92. Without judging the efficacy or appropriateness of understory habitat burning within the Rattlesnake National Recreation Area, those projects can and should be addressed through the Rattlesnake Burn Plan (which would continue even under Alternative A, No Action).

We are adamantly opposed to Alternative B, the Proposed Action, and its commercial treatments in Units 2, 3, 4, 5 and 6. Elements of the other alternatives that contain commercial and mechanical methods are also objected to. At this point our preference is that the Forest Service pull the project, and if desirable, re-boot with a scaled-down, socially acceptable and scientifically sound proposal that spreads the treatments out over time.

Are the project goals and methodology realistic, appropriate, or attainable?

The Proposed Action (Alternative B) contains treatments that are not allowed by the Rattlesnake National Recreation and Wilderness Act (RNRAW 1980) as well as the Lolo National Forest Plan (1986) and its Goals and Standards for Management Area 28 (MA28). Several of the proposed commercial logging units and roadbuilding are within an Inventoried Roadless Area (RARE II, USDA Forest Service 1978). The mechanical, commercial removal of trees and the associated upgrades to Trail 515 to accommodate log trucks and other heavy equipment is not legal, realistic, appropriate or attainable.

The EA's description of the Regulatory Framework (page 126) contains no discussion of the Rattlesnake National Recreation and Wilderness Act or the specific management standards for the area contained in the Forest Plan.

For example, the RNRAW's intent (Interior and Insular Affairs Committee Rep. 1980:4-5) clearly states that the NRA is unsuitable for timber harvest. It states: "Due to its high watershed values, the proposed National Recreation Area is unsuited for livestock grazing, timber harvest, mining or other resource development. In addition to its Paramount watershed values, the proposed National Recreation Area also possesses outstanding wildlife habitat, opportunities for primitive recreation and scientific and educational resources. The Committee is mindful that the portion of the area not designated as wilderness contains lands that are sensitive from the standpoint of watershed values and wildlife utilization and are in need of special management attention by the Forest Service."

This matches the Lolo National Forest Plan standards for MA28, which at standard 3 (page III-145) states: "The Management Area is classified as unsuitable for timber production." At page i of the Forest Plan, it states roadbuilding is not allowed within MA28. Moreover, MA28 standard 36 (page III-148) states "The existing roads will be maintained to their present standards with maintenance emphasis on reducing mud holes and improving drainage." This is standard trail maintenance and in no way envisions the road upgrades necessary to implement Alternative B. These include making the main Rattlesnake Trail 515 usable for large log trucks weighing many tons fully loaded with at least 100 log truck loads at five thousand board feet per load.

There is a significant difference between the terms "timber harvest," "production" and "small diameter hand thinning." Webster's provides these relevant definitions of harvest. "1. The gathering of crops; 9. To catch, take or remove for use." And for production, "2. Something that is produced; a product; 3. The creation of value; the producing of articles that have exchange value."

The Congressional Report language clearly states the area is "unsuited for timber harvest" and the MA 28 Standards clearly state the area is "unsuitable for timber production." Webster's defines unsuitable as: "not suitable; inappropriate; unfitting; unbecoming."

Timber harvest and timber production are explicitly prohibited within the NRA. Trees cannot be harvested, removed or exchanged for commercial value under any scenario. Small tree thinning and understory burning are already allowed pursuant to the Rattlesnake Burn Plan and hand-thinning operations and burning of the materials on site are allowed within the Wildland-Urban Interface (WUI).

Also relevant is the first portion of MA28 Standard 3, "Tree removal will be limited to that required to eliminate safety hazards or permit construction or expansion of facilities." This pertains to cutting of hazard trees near trails or facilities, or for example, the construction of the separate trailhead and bridge for horse riders. MA28 Standard 15 states: "Timber removal will be limited to that needed to maintain or improve recreation values." This pertains to the allowance for the Forest Service to re-route or construct public recreation trails. Management seeks to maintain "natural" conditions, not unburned areas. MA28 Standard 27 states: "Programs will not entail site modification or the construction of facilities that would violate the natural appearance of the area."

Moreover, a long-established process for the RNRAW through the Limits of Acceptable Change (LAC) has been brushed aside. For example, the EA at page 288 states the LAC standard for clearance on Trail 515 will be violated, unilaterally raising it 10 feet to 14 feet to accommodate log trucks. Brushing and removal of mature trees to accommodate these trucks is also envisioned.

Considering the RNRAW, the Lolo National Forest Plan and the LAC for the Rattlesnake, there has been 35 years of consistent management. The Proposed Action is a radical and sudden departure from this management.

When designing projects, Brown, et al. (2004) argue for considering "the context of place," while Oliver (2014) noted land managers for various reasons lack "social license" to engage in restoration activities. What might be done in one place may not be appropriate in another. Merschel (quoted in Oliver 2014) "It's important to pay attention to where you are on the landscape and the history, and then you can make good, defensible decisions about the management actions you want to take."

The Forest Service does not possess a "social license" or legal authority to commercially log and build roads within the Rattlesnake NRA. NEPA requires "a reasonable range of alternatives" in an EA or EIS. NEPA and its implementing regulations and case law do not allow an agency to develop an illegal alternative because it is not reasonable. Further analysis of Alternative B is unwarranted. Approval of Alternative B and its commercial logging, roadbuilding and upgrades would be arbitrary, capricious and an abuse of agency discretion.

The Forest Service Has Done a Poor Job on Public Process, Unilaterally Departed the Collaborative Process and Has Undermined Public Trust

The Forest Service states that it derives partial authority for the Proposed Action from the Healthy Forests Restoration Act and the National Cohesive Wildland Fire Management Strategy, Phase III. Congress passed the healthy forests law to encourage "at-risk" communities to develop fire-wise strategies through collaborative process. The Marshall Woods Project is designed to comply with several features of this approach. First, a project area must be 5,000 acres or larger; reduce risk to landscapes or communities by focusing on areas that have a high burn probability and the project must be developed through a collaborative process.

The Lolo Restoration Committee has been the collaborative partner on this project for several years. Not only has the LRC never reached consensus on the proposed commercial logging units (2 and 3) up the main Rattlesnake corridor; "With the recent project rollout at the Double Tree on March 18th that, in a sense, constituted the resurrection of the Marshall Woods project, the approach utilized by the Missoula Ranger District was less than collaborative. Not only was the outcome (i.e. recommendations the LRC reached in 2011) of our collaboration not discussed, the LRC wasn't even asked to speak during the open house nor did the new District Ranger Jennifer Hensiek agree to take any questions from the audience. This was a far cry from the meetings we held together in 2009 and 2010. In addition, there were several commercial units proposed within the Rattlesnake NRA outside of the main corridor and on the Woods Gulch side of the project area that surprised at least some members of the LRC. This was also the first time that temporary road building in the NRA was proposed. The project proposed in the apparent preferred alternative no longer focused on larch restoration as the primary component, the objective that

had drawn the LRC to the project in the first place."(April 27, 2015 Statement from Jake Kreilick, chair, Lolo Restoration Committee).

Thus, the Forest Service unilaterally changed the project in highly significant and highly controversial ways without the consent or support of the Lolo Restoration Committee. Without a collaborative partner, the Lolo National Forest has weakened its authority pursuant to the law and policy and is undermining public trust in its ability to carry out similar projects here and elsewhere.

The process used for the EA and public information and involvement has been fraught with problems including presentation of confusing and erroneous information. By the District Ranger's own admission, the rollout was "not good."

There are several aspects of the NEPA process which have been inadequate. There was a sudden notification to the broader public since the Forest Service only did a large mailing to residents in the very northern edge of Missoula within the Rattlesnake drainage.

There is also the issue of a perceived "pre-decisional bias" that is prohibited by NEPA. At the March 18th public meeting, the Lolo Restoration Committee was not allowed to speak as previously agreed to. No alternative viewpoints were presented and only maps of Alternative B, the Proposed Action, were made available to the public and they were the wall maps that were shown as well. The presentation by Silviculturist Sheryl Gunn focused almost exclusively on Alternative B and she offered an over-vigorous defense of Alternative B during both field trips.

Now the Forest Service is claiming it has no preferred alternative (District Ranger Jen Hensiek, field trips). NEPA requires that an EA or EIS contain a reasonable range of alternatives including a clearly identified preferred alternative.

Webster's defines proposal as: "1. The act of offering or suggesting something for acceptance, adoption or performance." Webster's defines action as "2. Something done or performed." The meaning of the two words used together is quite clear.

The comment period was inadequate and limited for such a complex and controversial proposal. While extended, the 24-day extension was not long enough to adequately analyze the 300+ page EA and hundreds of pages of supporting reports, documents and maps.

Moreover, the Forest Service did not adequately incorporate many scoping comments in its preferred alternative, rendering Alternative B non-responsive to the public comment. These elements of pre-decisional bias have further eroded public trust and confidence.

Most of the Project Area is Outside the Wildland Urban Interface

The EA stretches the definition of Wildland-Urban Interface well beyond the language or intent of WUI (Healthy Forests Restoration Act; Sierra Club). The primary definition is an area within 0.5 miles of residential areas within the intermix zone. Since the Lolo National Forest, Missoula Ranger District is part of a community-based, multi-entity Fire Management Plan, an area within 1.5 miles of a community and primary egress route may be considered to be part of the WUI. The string of residences within the strip of private land east of Rattlesnake Creek and across from the trailheads qualifies. Yet the project boundary and map of the WUI (page 138) doesn't

make sense. We can't believe that Five Guys Burgers and Fries and Eastgate Shopping Center on the Broadway strip are within the WUI. Even applying the more liberal definition of WUI, major portions of the Project Area, including all of Units 2, 3, 66, 81, 63, 84 and 200 are outside the WUI. Portions of Units 1, 4, 62, 80, 82 and 101 are also outside the WUI.

Common sense and reality dictate that occasional isolated residences in a very low-density setting (U.S. Census Bureau) cannot each be buffered to a 1.5 mile radius. Otherwise, much of the western U.S. would be classified as WUI, which is an unreasonable stretch of the primary definitions and intent. A previous collaborative project on National Forest land in the Rattlesnake drainage (Sawmill Gulch) relied on a much more realistic WUI zone of 0.34 miles (Lolo National Forest 2004).

Add to this the fact that most of the treatment units are north and northeast of the residential areas, and prevailing southwest winds would push the head of the fire to the northeast, away from the structures. If the fire backed down hill against the wind, it would still be a more manageable fire for direct attack within the immediate area of structures. A strong wind from the northeast could push a severe fire towards the WUI, but is much less likely than the previous scenario. Area to the west of the residential area, (Sawmill Gulch) has previously been treated (Lolo National Forest 2004).

Even when something is allowed doesn't necessarily mean it is appropriate to do so. Budget and staff shortages require managers to concentrate efforts within the highest priority areas. The commercial timber sale Units 2 and 3, which are two and three miles, respectively, up the drainage from the trailhead, could not be expected to significantly reduce the risk of extreme fire events since nobody has any idea where or when such events will ignite and where they will burn.

The Project Boundary Includes Areas of Land Not Included in the Project

The project boundary includes more than 1,000 acres of City of Missoula Open Space lands. The City of Missoula is not a project partner and its lands are already managed under a different program (Bryon von Lossberg, Missoula City Council Ward 1 representative for the Rattlesnake area, pers. comm.) The project boundary also includes the lower Rattlesnake residential area, miles away from the project's treatment units.

The only reason we can think of doing so is to artificially swell the project area size so it will comply with the Healthy Forests Act and National Fire Policy. The actual treatment units, when summed, are less than 5,000 acres. Artificially expanding the project area boundary also skews the figures presented for how much of the project area is within the NRA. NEPA requires a clear and understandable analysis for public review and comment and manipulation of numbers does not comply.

Another issue in regards to the healthy forests law is that projects should be focused on areas with "high" burn probability. The EA displays in Figure 31 that Missoula County has a "moderate" mean burn probability. The finger of structures within the public land corridor may have higher burn risk, but this can be addressed without a 14,000 acre project area.

Methods and Goals Are Not Likely To Be Achieved

The EA and supporting documents are largely predicated on the desirability of mimicking pre-settlement stand conditions. A stated project goal is favoring retention and recruitment of large, widely spaced ponderosa pine and western larch and exclusion of Douglas fir, generating stands that are guestimated to be facsimiles of pre-settlement conditions. This vision is hypothetical versus broad-scale on-the-ground scientific findings. Two large-scale studies found a different story. Odion, et al. (2014) found that "…the traditional reference conditions of low-severity fire regimes is inaccurate for most forests of western North America," and "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." Williams and Baker (2012) found that historically, dry forests were structurally variable. Only 3, 12, 40 and 62% of their four landscapes fit a low-severity fire model and 38-97% had evidence of higher-severity fire. They found some large wildfires such as Rodeo-Chediski, described by others as catastrophic, had "fire severity congruent with historical variability." They conclude "a set of laws, policies and initiatives that aim to uniformly reduce fuels and fire severity is likely to move many of these forests outside their historical range of variability with adverse effects on biological diversity." Their macro-scale studies "reveal higher-severity fires were and are a part of the normal dynamics of dry forests."

These historic conditions may serve as a guide, yet numerous authors have cautioned that pre-settlement conditions cannot be replicated through restoration (Reinhardt, et al. 2008) "…since historical conditions varied in time and space, selecting a single target stand structure is somewhat arbitrary and inappropriate." (Subsection 2.7). Attempts to do so "will not be desirable or feasible." (Brown, et al. 2004 citing several authors). Spies (quoted in Oliver 2014) "We'll want to keep some areas in dense condition, and we've identified places in the landscape where denser forests would have been natural - even in the pre-Euro-American period…"

There may well be unintended consequences of attempted stand conversion. Shugart and West (1981:652) write: "If a management decision changed the proportion, the landscape would not return over time to its former proportion, but would remain at the new one. These landscapes could be most unforgiving to a land manager who made an incorrect decision regarding the stewardship of the land. An undesirable landscape configuration, once produced, would not revert to its former state when left alone; it would remain in the undesirable state until it was actively transformed to some other state." Fixing such mistakes would involve further inputs of time, effort and scarce financial resources. The EA cites a few cautionary research findings, yet has failed to act upon them or incorporate them into the project design.

The Project Will Increase Fuel Loading

Non-mechanical thinning and burning may be appropriate in certain areas, but will only be effective in aiding structural protection if the treatments are immediately adjacent to residential areas and only if the structures themselves are made less flammable (Reinhardt, et al. 2008).

At page 30 of the Silviculturists Report (SR) it states that under Alternative B, many units would see short-term increased fuel loads. At page 9 of the SR, it states historic average fuel loading in tons/acre in dry ponderosa pine forests was approximately 5-10 tons/acre while in Douglas fir stands was approximately 11 tons/acre. The Fire & Fuels Specialists' Report states that current fuel loading in the project area is approximately 12 tons/acre, likely within the Historic Rate of

Variation (HRV) for Ponderosa and Douglas fir stands. But the Project Goal of 5-25 tons/acre, where the lower loads are presumably on grassy areas to be underburned only and the higher loads on thinned forested areas represents a potential doubling of the current average fuel loading. This may be a high-risk strategy within the WUI and elsewhere.

Ecological restoration is a relatively nascent science and some early assumptions are now being challenged. Zachmann, et al. (2014) found after 15 years of data collection in the Lake Tahoe Basin that fine fuels, as well as live trees and seedlings were not increasing in untreated plots, but in treated plots, fine fuels and woody materials converged with and in some cases surpassed fuel loads in untreated plots. They conclude assumptions guiding fuel reduction planning in many western forests may have to be re-examined.

Treatments that leave too much fuel behind can be a waste of money and effort and some effects of restoration treatments will inevitably not be those predicted and "fire behavior is variable enough that it is impossible to precisely predict future fire behavior from a given stand density and structure." (Ecological Restoration Institute, Northern Arizona University). In fact, it has often been reported and cited that thinning can increase surface fire potential and severity through increasing the ground fuel load, increasing windspeeds at ground level and increased solar radiation resulting in drier, flashier surface fuels (Reinhardt, et al. 2008; Wuerthner 2014).

The EA and supporting documents state the goal of proposed thinning treatments is removal of 30-60% of the existing canopy coverage, through removal of smaller diameter ladder fuels in the understory as well as larger trees to be removed through commercial methods. Extensive removal in one treatment will likely result in an unmanageable amount of slash. For example, Covington, et al. (1997) while demonstrating success in restoring ponderosa pine through thinning reported "…the 37 tons per acre of thinning slash posed a major problem. Because there was no market for this material, it was hauled to a borrow pit and burned; the removal required about 75 loads in 18-wheel dump trucks." Many researchers have recommended that treatments be spread out over time in approximately three-year increments over 20 years or more to increase the likelihood of success (Covington, et al. 1997). Conversely, the EA at page 143 assumes a single treatment will be effective for up to 20-30 years.

My own experience thinning fuels in advance of approaching fire fronts is that amazing amounts of slash were gathered from a very small geographic area. My sector in the government area of Canyon Village involved four hand crews, four dump trucks and an endloader. The larger sector included the hotel and employee dormitory complex, Ranger Station and Visitor Center, General Store, Post Office and tourist cabins as well as numerous maintenance buildings. They generated even larger mountains of slash that was piled and burned in a rocky softball field surrounded by fire engines. The huge man-made bonfire represented an extreme spotting risk in such weather conditions.

Commercial removal of material from MA 28 is not allowed, so this slash must be burned on site, presenting problems of increased fire risk, unintended mortality of large trees and the risk of an "escape fire." The California Department of Forestry (calfire.org) rates moderate slash as one of the highest burn rating categories, with estimated flame heights of 8 feet at standard modeling parameters. This would result in excessive scorching and unintended mortality of larger diameter "leave trees" and more crowning behavior and be beyond the ability of firefighters to use direct attack methods. For example, Table 17 (EA page 13) shows that at 4-8 foot flame

heights, hand line cannot be relied upon, requiring deployment of engines and aircraft. Flame heights above 8 feet present serious control problems.

The accompanying risks to firefighters can be substantial. Fox and Ingalsbee (1998): "…within the U.S. Forest Service, there has been more of an interest in mechanical fuels reduction treatments using commercial thinning for fuelbreak construction to lower the risk of crownfires. Proponents argue that using commercial thinning to reduce canopy densities would increase firefighter safety and prescribed fire efficiency during wildfire suppression, and are necessary treatments to prepare for future prescribed burning. However, we suggest that these kinds of mechanical treatments create their own fire risks and fuel hazards that can potentially cause problems for wildland firefighter safety and prescribed fire efficacy." They also note that "After generating abundant slash through mechanical thinning and before disposing of that slash, the program may become stalled due to lack of funding, air quality, or other political concerns. This scenario would leave firefighters worse off as they face both the untreated high risk fuels and vast areas of new slash." Ingalsbee (2005) provides a cogent analysis and discussion on the efficacy and risks associated with creation of fuel breaks for future fire suppression.

Wuerthner (2014): "…prescribed burning is risky, and the opportunity for agencies to set fires is limited to short time frames. Many forest managers are loath to okay a prescribed burn unless conditions are ideal for containment. No one wants to be the person who signed off on a prescribed burn and then had it get away and burn homes to the ground." Prescribed burns are usually carried out during the early season, when plants and shrubs are not historically adapted to fire and when heavy fuels will not be consumed. There is also the issue of having the proper fire staff available at the right time, as they may well be deployed on fires on other districts, forests or even regions.

The Proposed Action also departs from standard diameter recommendations for "thinning from below' (Brown et al. 2004) which is generally limited to stems less than or equal to 8" diameter at breast height. It raises it to less than or equal to 10" dbh. This will result in a larger percentage of stems of larger size that will be downed, significantly increasing the fuel load component that is more resistant to rapid decomposition due to its volume. This increased fuel loading may move conditions in the opposite direction of what the Forest Service claims to be trying to achieve.

Many authors caution against "cook-book, one-size-fits-all" plans (Ecological Research Institute; Reinhardt, et al. 2008). Oliver (2014) reports a study in Oregon "…provides solid evidence that not all mixed-conifer forests should be managed using the same approach when resilience is the goal," and "The availability of solid scientific evidence showing that mixed-conifer forests are not a one-size-fits-all landscape is helping these various stakeholders see with more clarity the range of possible restoration strategies for the different forest types…"

As discussed above, we feel there has been an inappropriate level of pre-decisional bias towards Alternative B and vigorous defense of it. Fox and Ingalsbee (1998) discuss the risks of such phenomena: "Organizationally, many programs become partisanly protected by vested employees. Such employees create bureaucratic inertia that keep the program grinding away even after grave errors become recognized, the program has completed its mission, or conditions change such that the program becomes irrelevant. Vested decision-makers, who derive status and sense of self-worth from the program, often focus on what is good for the program and can aggressively defend the program against criticism. When criticisms of a program are taken personally, the response action may be unreasoned or reckless and lead to irrational decisions

that place firefighters in jeopardy." We have seen this dynamic at play during the public process for Marshall Woods.

The evidence is clear that one time thinning creates an overwhelming amount of slash. The EA does not include a risk analysis of the effects of the excessive slash loading predicted in the EA. These risks include raising the current fire risk above existing levels and the risk of an escape fire doing more harm than good. The Forest Service has limited its options to address this risk by tiering the project to the Healthy Forests law, which requires qualifying projects be completed within two years. Within the life of the project fuel loads are predicted to increase. NEPA requires a "hard look" at all reasonably foreseeable potential effects and a comprehensive risk analysis is required.

Thinning and Burning for Fire Suppression is Misguided Beyond the Structure/Wildland Fuel Interface

Some of the major goals of the proposed project are thinning and burning of understory vegetation to promote fire safety, aid in future suppression and help prevent large catastrophic fire events. This strategy has been shown to be self-defeating by numerous researchers. For example, Reinhardt, et al. (2008) write: "Treating fuels to facilitate suppression is an example of circular logic. If fuel treatment makes suppression more successful in general, then less area will be burned in the short run and more acreage will tend to burn under extreme conditions, when suppression is ineffective. The inevitable result is that more area is burned in fewer, more unmanageable events with greater consequences." They suggest a more successful approach is to focus on the area directly adjacent to structures and reduce the flammability of the structures themselves.

Moreover, Reinhardt, et al. (2008) and others (Wuerthner 2014; Ecological Research Institute) discuss the geographical and environmental limits of effective thinning and burning strategies At page 1999 Reinhardt, et al. write: "Destruction in the WUI is primarily the result of the flammability of the residential areas themselves, rather than the flammability of the adjacent wildlands." Relatively small areas can easily be overwhelmed by large fires in extreme environmental conditions (Brown, et al. 2004; ERI).

Wuerthner (2014) cites the 1988 Yellowstone fires, 2002 Hayman Fire in Colorado, Biscuit Fire in Oregon 2002, the 2007 Murphy Fire in Idaho and the Rim Fire near Yosemite in 2013 as well-known large blazes with one thing in common: they all burned in extreme environmental conditions that overwhelmed all fuel types and spotted across many others. He cites another study concluding more than 96% of all acreage burned was the result of 2% of the fires and half of all acreage burned occurred on less than 0.1% of all fires while Reinhardt, et al. (2008) cite the Brookings Institution (2005) as finding 1% of the fires account for 85% of fire suppression expenses.

Lessons learned and shared from my own experiences (Bader 1998) is that successful defense of structures in record-breaking fire weather conditions (head-on 60 mph winds, running crown fires, > one mile spotting, live trees drier than kiln-dried lumber, relative humidity around 10%; air operations grounded), largely depends upon a few factors:

1) pre-fire fuel reduction and removal;
2) availability of water and pumps for sprinkler systems and/or fire engines with deck guns (predicated upon a sound egress plan);
3) availability of ground firefighters to jump on spots (predicated on immediately accessible survival zones);
4) luck

Additionally, Reinhardt, et al. (2008) find that reducing the flammability of the structures themselves through building materials, design and modification of adjacent vegetation greatly increases structure survivability even when direct ground defense or air attack may not be possible.

Proposed Action Alternative B Would Violate the Federal Endangered Species Act and the Act's Critical Habitat Provisions

Rattlesnake Creek is designated as critical habitat for the Threatened bull trout and is also designated as a Priority Watershed pursuant to INFISH. The Endangered Species Act (16 U.S.C. § 1531 et seq.) provides for the "conservation of the ecosystems upon which threatened and endangered species depend."

Critical habitat is defined in the Act 16 U.S.C. 1532 (5)(A) and (3) as:

(i)the specific area within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection: and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. "Conservation" means the use of all methods and procedures needed to bring the species to the point at which listing under the Act is no longer necessary.

Conservation is a concept that is broader and more protective than mere survival, it is defined by the ESA as "the use of all methods . . . which are necessary to bring any endangered species . . . to the point at which" the protections of the ESA are no longer needed, i.e. to the point at which the species is recovered. 16 U.S.C. § 1532(3); *Middle Rio Grande Conservancy Dist. v. Norton*, 294 F.3d 1220, 1230 (10th Cir. 2002). Simply meeting the "no jeopardy" standard in Section 7 does not suffice for the overall requirement that species be recovered. Critical habitat is the key link to transition from jeopardy situations to recovery.

The "adverse modification" standard where critical habitat designation thwarts damaging action is designed to prevent more than just a species extinction - its insures that recovery can proceed by protecting habitat from modifications that adversely affect the conservation and recovery of the species. *Id*. at 439 *citing* 50 C.F.R. 402.02

Rieman and McIntyre (1993) found that bull trout historically occurred as genetically linked meta-populations predominated by the migratory life history form. This multiple population structure spreads risk as not all the eggs are in one basket in the event some populations are temporarily extirpated by extreme environmental events (ex: landslides). Historically these areas were recolonized by migrants or re-founders from nearby populations.

The best available scientific information on bull trout supports the following specific, numeric and measurable standards for protection of Primary Constituent Elements and maintaining or re-attaining conditions necessary to support recovery.

Clean- The bull trout is virtually synonymous with water quality. Bull trout require very clean water and favor streams with upwelling groundwater for spawning (Fraley & Shepard 1989; Baxter & Hauer 2000). Of the many threatened and endangered fish species, bull trout are the most sensitive to changes in water quality, particularly from fine sediments generated by roads, logging and grazing activities. Fine sediments can smother spawning beds and degrade other habitat components. A key determinant is the level of fine sediment ≤ 6.35 mm (Weaver & Fraley 1991). Protection of critical habitat includes standards to maintain and improve water quality and control lethal sediments. For example, fine sediments < 6.4 mm in diameter must be limited to < 20% in spawning habitat (Espinosa 1996).

Cold- Bull trout also require colder water than other native fish. Rieman & McIntyre (1993) report that researchers recognize temperature more consistently than any other factor influencing bull trout distribution (see also, Pratt 1992). Habitat protection efforts must seek to maintain or reacquire natural cold water conditions. Specifically, stream temperatures in current and historic spawning, rearing and migratory corridor habitats should not exceed 6-8 C for spawning, with the optimum for incubation from 2-4 C (McPhail & Murray 1979); 10-12 C for rearing habitat, with 7-8 C being optimal (Goetz 1989); migratory stream corridors should be 12 C or less.

Complex- Bull trout habitat isn't just a set of places, but rather a complex arrangement of environmental conditions. Noting that "watersheds must have specific physical characteristics to provide habitat requirements for bull trout to successfully spawn and rear," in its 1998 listing rule the Service listed the habitat components: "water temperature, cover, channel form and stability, valley form, spawning and rearing substrates, and migratory corridors." Id at 31648. Implicit in this list of habitat requirements is the understanding that habitat critical to bull trout viability consists of a specific set of physical conditions in addition to particular places. For example, the Service explained that "[m]aintaining bull trout habitat requires stream channel and flow stability." Id at 31648. And further explained that "[a]ll life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders and pools." Id. at 31648. Bull trout not only need clean, cold water, they need places to rest, hide, feed and travel.

Connected- The sciences of conservation biology and conservation genetics show that bull trout have naturally occurred throughout the Northern Rockies and Pacific Northwest in a system of connected watersheds comprising migratory meta-populations of bull trout (Rieman & McIntyre 1993). Blockages to historic migration routes, both physical and thermal, must be addressed to provide access to spawning streams and protect the genetic integrity of the bull trout. Historically occupied, but currently unoccupied habitat must be protected and reoccupied to reconnect bull trout populations throughout their range.

a. Fragmentation and Isolation Have Threatened the Migratory Life Form of Bull Trout.

In *Friends of the Wild Swan v. U.S. Fish and Wildlife Service*, 945 F. Supp. 1388 (D. Or. 1997), the case first challenging the Service's listing decision, wherein the Court overturned the agency's "warranted but precluded" designation, the Court found that,

"The species was recognized in 1978, but two general factors have contributed to a significant reduction in its numbers. First, the steady elimination of its migratory form has threatened the species's continued existence in the continental United States."

In addition,

"successful bull trout spawning and development of embryos and juveniles requires very cold water temperatures," id., and, although migratory forms of bull trout facilitate genetic interchange and help restore extirpated local populations, "migratory bull trout have been restricted and/or eliminated due to stream habitat alterations *** ." Id. "The disruption of migratory corridors, if severe enough, will result in the loss of migratory life history types and isolate resident forms from interacting with the metapopulation." Id.

As the Service has found:

"The second set of general factors affecting the bull trout is land and water management. As FWS has concluded, 'Virtually every bull trout population within the coterminous United States is threatened by a wide variety of land and water management practices.' Id. at 23. These practices, which degrade the bull trout's habitat, combine with the loss of the migratory form to increase the threat to the species:

The interrelated effects of habitat degradation, hybridization, isolation, and overutilization have significantly impaired metapopulation function and made it impossible for many populations to recover from natural or manmade perturbations. Even without additional habitat losses, most isolated populations are not likely to persist. Even the few remaining "healthy" bull trout populations are at risk as habitat fragmentation and degradation continues." Id. at 24.

b. Bull Trout Have More Complex Habitat Requirements Than Other Salmonids

In discussing the Columbia Basin population, the Court also noted:

"On June 13, 1997, as noted above, USFWS published its proposed rule to list the Klamath River and Columbia River population segments of bull trout pursuant to the ESA. *62 Fed. Reg. 32268*. Noting again that 'bull trout display a high degree of sensitivity at all life stages to environmental disturbance and have more specific habitat requirements than many other salmonids,' *id. at 32268,* USFWS emphasized that "several bull trout life history features make them exceptionally sensitive to activities directly or indirectly affecting stream channel integrity and altering natural flow patterns.'" *Id. at 32269*.

For example, from the Declaration of Service biologist Gary Frazer in the critical habitat case, Page 15, #29:

"First, as we noted in the last final listing determination (64 Fed. Reg. 58927), compared to other salmonids (salmon and trout), bull trout appear to have more specific habitat requirements that appear to influence their distribution and abundance. Important habitat parameters may include water temperature, cover, channel form and stability, valley form, spawning and rearing substrates, and migratory corridors. Additionally, research has indicated that watersheds must have specific physical characteristics to provide the necessary

habitat requirements for bull trout spawning and rearing, and that the characteristics are not necessarily ubiquitous throughout watersheds in which bull trout occur."

c. Metapopulation Structure is Essential to Bull Trout Survival and Recovery

The 1998 listing rule recognized that the metapopulation concepts of conservation biology theory are essential to bull trout viability:

"A metapopulation is an interacting network of local subpopulations with varying frequencies of migration and gene flow among them. Local subpopulations may become extinct, but can be reestablished by individuals from other subpopulations. Metapopulations provide a mechanism for spreading risk because the simultaneous loss of all subpopulations is unlikely. Habitat alteration primarily through the construction of impoundments, dams, and water diversions that create unsuitable conditions, has fragmented habitats, eliminated migratory corridors, and isolated bull trout often in the headwaters of tributaries." Id. at 31649.

The Service warned that:

"maintenance of migratory corridors is essential to provide connectivity among subpopulations. . . and enables the reestablishment of extirpated subpopulations." Id at 31670.

The best available scientific information is extensively reviewed and discussed by Frissell (2014).

In addition to these standards, roadless and low road density watersheds deserve special protection measures. Numerous scientific studies and reviews have consistently reported that bull trout strong populations, presence and biomass are inversely related to road densities (Huntington 1995; Quigley, et al. 1996; Rieman, et al. 1997). Bader (2000) found that 78% of bull trout "strong populations" were in roadless area with most of the remainder directly downstream from roadless area. Quigley, et al. (1996) reported that roadless and wilderness areas can provide "strong anchors" for salmonid recovery.

In recognition of this strong body of scientific evidence, the U.S. Fish & Wildlife Service (1998) recommended that remaining roadless areas within bull trout range be maintained in roadless condition.

Likewise, habitat complexity is not described by measurable indices and fine sediments < 6.35mm are vaguely described as "a minimal amount," while the best available scientific information provides specific measurements. For example, Weaver and Fraley (1991) reported that when substrates are comprised of 35% and 40% fines < 6.35mm, bull trout embryo survival rates decline by 66% and 75%, respectively. Despite this information, the Flathead Basin Forest Practices, Water Quality and Fisheries Cooperative Program's stream rating system (Flathead Basin Commission 1991) did not rate a stream as "threatened" until fines are > 35% in spawning areas, and not "impaired" until fines are > 40%. Thus, managing up to the highest tolerable levels will only result in further declines in bull trout population numbers and distribution. The failure to adopt specific, numeric standards at optimum levels for bull trout, can have dramatic effects on bull trout reproductive success and recruitment.

Rattlesnake Creek plays a critical role in bull trout survival and recovery due its role as the only major bull trout spawning tributary in a nearly 50 mile section of the middle Clark Fork River. In recognition of this fact, the Montana Department of Fish, Wildlife & Parks, in collaboration with others, installed a fish passage structure for bull trout at the dam on lower Rattlesnake Creek, just below the NRA in 2004.

The Proposed Action, Alternative B, calls for commercial logging and associated trail to road upgrades within the riparian zone of Rattlesnake Creek. These actions would create fine sediments and pose negative effects to bull trout and westslope cutthroat trout.

For adequate protection of core and nodal bull trout habitats, the Montana Bull Trout Scientific Group (1998 at page 58) identified two approaches:

(1) the 100 year floodplain as described by FEMAT (1993) plus a zone at least 150 feet from either side of the outer edge of the floodplain;
(2) a zone comprising the hydrologic boundary of the watershed.

They concluded that an additional 150 feet on either side of the 100 year floodplain is required for the following reasons, also at page 58:

"(1) it encompasses one site-potential tree height at most locations; (2) it provides sufficient width to filter most sediment from non-channeled surface runoff from most slope classes; (3) it provides some microclimate and shallow groundwater thermal buffering to protect aquatic habitats inside the channel and channel migration zone; and (4) it provides an appropriate margin error for unanticipated channel movement, hillslope, and soil stability, blowdown, wildfire, operator error, tree disease, and certain other events that may be difficult or impossible to foresee on a site-specific basis."

All the National Forests within the Columbia River Basin were amended by either PACFISH (salmon and steelhead bearing) or INFISH (Inland Native Fish Strategy). INFISH contains standards for protection of riparian zones, or Riparian Habitat Conservation Areas (RHCAs). These generally extend to 300' on either side of a permanent inhabited stream. While these INFISH standards provided additional protection for bull trout, they were found not sufficient as per the findings of federal Judge Jones. Thus, the U.S. Fish & Wildlife Service was required to designate critical habitat for bull trout.

Critical habitat requires additional protections beyond those contained in INFISH. For example, upland influences must specifically be considered. Thus, the area of protection around critical habitat is a much more elastic concept than INFISH, which relies on simple linear distance measurements.

The Fisheries Specialist's Report at page 34 comes to the simple and erroneous conclusion that Alternative B will have no significant effects on bull trout and that all alternatives have a "not likely to adversely affect" bull trout or their habitat. At page 33 it states that there would "50 foot no activity barriers" around Rattlesnake Creek. This is totally inadequate according to the best available scientific information. Within INFISH RHCAs, "Activities that retard the attainment of the RMOs are not allowed within these default RHCAs." The 300' on either side of the creek is 6 times that proposed as the no activity zone. Commercial logging Units 2 and 3 include

commercial removal in the riparian area between Trail 515 and the creek itself. These units also follow every bend and turn of Rattlesnake Creek, substantially increasing the likelihood that fine sediments will be delivered into the streambed itself.

While critical habitat and INFISH don't prohibit projects per se, they do not allow any further degradation to the current habitat conditions which include the numerous Primary Constituent Elements.

Any trail to road upgrade to accommodate what may be up to 200 truck loads would have significant impacts on fine sediment delivery, as would the associated logging and burning. There is no literature showing that these methods would result in long-term positive effects on bull trout, as claimed.

Physical connectivity in this area has been improved significantly through removal of Milltown Dam and installation of the fish passage structure on Rattlesnake Creek. However, the Fisheries Report shows that rising stream temperatures are a concern in the lower section of Rattlesnake Creek. The project area is within the lower 1/3 of the drainage.

Thermal barriers are a known obstruction to bull trout movements and have the capability to fragment and isolate populations, limiting or eliminating the migratory form of bull trout and increasing the threats from genetic isolation and the ability to re-found after extreme landscape events. Bull trout become fragmented into low number populations lacking Minimum Viable Population size (Rieman and Allendorf 2001).

The Fisheries Report notes Rattlesnake Creek is the only south-facing bull trout spawning tributary, and increased water temperatures are a concern. Yet there is no analysis of the impact of removing canopy cover and understory vegetation on shade or the potential for site warming. Both could be threats to bull trout habitat, particularly in the face of climate change. Rising watershed air temperatures were cited by Rieman, et al. (2007) as a prominent threat to bull trout survival.

Extinction risk is rated as moderate for bull trout in Rattlesnake Creek (Fisheries Report at page 20). The three indicators for water quality are water temperature, sedimentation and chemical contamination/nutrients. All three are functioning "at risk" in Rattlesnake Creek (Fisheries Report page 25).

Due to its location and role within the system, effects on bull trout in Rattlesnake Creek will have far-reaching effects throughout the middle section of the Clark Fork River Basin. Rattlesnake Creek provides spawning opportunities for a large percentage of the adult bull trout in this section of the Clark Fork. The adverse modification requirements explained above apply. To properly assess the potential effects pursuant to the ESA and INFISH, a comprehensive watershed assessment is required.

A central purpose and goal of management in the NRA and Wilderness is protection of water quality and watershed values. The significant earth moving and vegetation removal within the Rattlesnake Creek corridor would certainly have negative effects. In fact the Fisheries Report at page 26 states "Effects to water quality would arise from short-term sedimentation inputs associated with haul roads…"

Rattlesnake Creek is also listed as an A-1 "closed" watershed. The Fisheries Report states at page 3 that a goal for Forest water quality is "meet or exceed State water quality standards,' and at page 4 "meet or exceed Federal and State water quality standards." Yet it also states: "If during contruction stream turbidity and sediment loads are anticipated to exceed state water quality standards, a 3A authorization is acquired from the Montana DEQ." This is hardly the definition of "meet or exceed State water quality standards. "

The EA does not contain an effects analysis on the removal of extensive amounts of forest canopy (up to 60%) and extensive removal of ground cover on air and stream temperatures in the project area and downstream to the Clark Fork River. The level and geographic scope of risk and the potential to violate numerous federal laws and standards including NEPA requires preparation of a full Watershed Analysis at the EIS level. The Forest Service also needs to re-consult with the USFWS on PACFISH/INFISH in bull trout critical habitat since bull trout critical habitat was designated after PACFISH/INFISH was signed.

The EA Contains No Analysis on the Effects on Recreation Use and Public Enjoyment of the Area

It is amazing that the EA contains no detailed analysis of the effects on recreation since it is a central purpose of the National Recreation Area, including non-trail based primitive, wilderness type use. The RNRAW, the Forest Plan Standards for MA28 and the Limits of Acceptable Change Process have provided consistent management direction for 35 years. Now the Forest Service is proposing a radical departure from this management direction without a detailed analysis of impacts. Totally subjective comments such that removing large cobbles from Trail 515 will smooth it out and make it more pleasant for recreationists wanting a smoother ride are no substitute for a detailed analysis.

The EA also states Alternative B would require a Forest Service amendment allowing changing the current Visual Quality Objective "retention," which requires maintaining the NRA in a natural appearing condition. Leftover stumps, slash, skid trails, removal of vegetation including large trees along Trail 515 to accommodate log trucks would have effects lasting over many years. What effects would this have on visitor use and enjoyment?

What cumulative effects would closing the area to public use for several weeks for two summers have on the public? What effects would result from transferring this use to other areas of the forest? What effects would there be on primitive and wilderness recreational opportunities? The noise and ugliness of commercial logging and log truck traffic would be both audible and visible from a wide area of the RNRAW.

There is also the risk that the Trail 515 upgrade to a log haul road will lead to future use and further seasonal closures. What are these long-term risks?

There is also the risk that the cleared corridors to accommodate high lead-line and skidding operations may be converted to illegal trails by mountain bikers, thus creating serious resource damage and enforcement problems. The EA contains no analysis.

The EA Fails to Recognize the Wildland/Wilderness Setting in Which the Project is Proposed

The Rattlesnake NRA buffers the Rattlesnake Wilderness from the urban setting of nearby Missoula and the relatively heavy recreation use of the lower Rattlesnake NRA. Yet, like many trailheads leading into Wilderness, hiking through the lower Rattlesnake is part and parcel of many Wilderness trips. Though one might encounter more crowding or encounters with mountain bikes in these lower reaches, the physical setting and nature-managed landscapes in the lower Rattlesnake contribute to a seamless wildland transition into the designated Rattlesnake Wilderness. Moreover, traveling through several miles of undeveloped country before entering the Rattlesnake Wilderness greatly enhances the sense of remoteness and adventure beyond what one would normally expect in a 30,000-acre Wilderness.

The proposed action, with its extensive proposals for management interventions into the wildland landscape, could significantly change both the scene and the experience for those traveling through the NRA as part of their Rattlesnake Wilderness experience. This problem will only grow if the Forest Service, as proposed in the EA, perpetuates the notion that the forests of the Rattlesnake NRA are unhealthy and in need of intensive human management. Conversely, a light on the land approach to administering the NRA will perpetuate the uniqueness of the Rattlesnake NRA/Wilderness complex as an extraordinary wildland experience that is an essential part of the character of Missoula.

The EA Contains No Analysis of Impacts to Traffic, Neighborhood Safety or Noise

The EA contains scant information related to projected effects of logging truck traffic traveling several miles up and down a narrow road through a residential neighborhood with road side schools. It simply says that traffic will be staggered to avoid school bus drop-off and pick-up times. When or how it does not say. The analysis on page 299 is incomplete, confusing and the figures do not add up correctly. But at the least the Proposed Action would require over 100 log trucks fully loaded with logs up to 35-40' in length, representing heavy and long loads. Nor are the effects of noise and dust generated by this traffic estimated or revealed.

The Effects on Elk From Loss of Hiding Cover Was Not Evaluated

The EA evaluates the effects a 30-60% loss of canopy cover would have on elk, concluding there would be no effects on thermal cover. Yet there is no analysis of a key component of elk habitat: hiding cover at ground level. It is classic wildlife research technique to use black and white checkerboards to evaluate percent of hiding cover at variable distances. This project proposes to extensively remove surface vegetation over large areas yet has not analyzed the effect this would have on elk habitat use and security. The main Rattlesnake corridor is heavily used by recreationists and loss of hiding cover could easily increase habitat disturbance and avoidance effects.

The Proposed Action is Fiscally Irresponsible

The economic analysis of Alternative B projects maximum revenue at $163,000 against expenses of $2,282,000 leaving a total loss of $2,119,000. Spending over two million dollars of scarce taxpayer resources to violate an act of Congress, numerous Forest Plan standards and isolate a sizeable portion of the local community is fiscally reckless and unwarranted.

The proposed action will likely create the need for repeated entries to maintain the environment it claims it will create, thereby committing the public to a long-term, expensive management regime. A much less expensive strategy that focuses on protection of structures would be better suited to this landscape.

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Mike Bader is a natural resource consultant with 30 years of direct experience in land, wildlife and wildfire management and conservation. He holds a B.S. in Resource Conservation from the University of Montana School of Forestry and a National Park Ranger Training Certificate from Santa Rosa Jr. College. He has also completed graduate level courses and holds numerous training certificates in fire management.

He has published approximately a dozen scientific papers in peer-reviewed forums, ranging from grizzly bear biology and management, bull trout conservation, to ecological reserve system design. He was a central participant in the listing of the bull trout under the ESA (main author of the original petition) and subsequent critical habitat designation, negotiating directly with the U.S. Fish & Wildlife Service in Washington, D.C. to arrange a Consent Decree favorable to bull trout. He did occasional field work with the Yellowstone Interagency Grizzly Bear Study Team, including trapping/tagging and relocation of grizzly bears and he worked closely with the Yellowstone Grizzly Bear Management Office.

His opinion pieces on wildland fire management and firefighter safety have been published nationally in syndication and appeared in major newspapers including the Milwaukee Standard; Miami Herald; Minneapolis Star-Tribune and the Los Angeles Times.

He has testified before Congress numerous times and authored a professional analysis of S. 1478, The Forest Jobs and Restoration Act. He has also been a frequent guest lecturer at the University of Montana.

He has significant experience and personal interest in fire management and experienced-based opinion and has been quoted in books on fire history. He has completed courses in Wildland Fire Management, Wildland Fuel Management, Helicopter Operations and Freight Loading and much on-the-job training. He was a member of the Canyon Village Volunteer Fire Department (structural) and served as Radio Dispatch at the National Park Service Inter-Regional Fire & Rescue Cache (home of Yellowstone HeliTak). In addition to working line on district fires, he was a "line-doggie" on the "Siege of '87" wildfires in northern California.

He served in several capacities for four months during the 1988 Yellowstone Fire season on 10 named fires including hand crew Crew Boss & Squad Boss; Resource Advisor to Type I Overhead Teams; Unit Leader (four hand crews, dump trucks, endloaders on pre-suppression fuel reduction); relief dispatch and incoming resources manager at the Inter-Regional Fire Cache; relief helibase operator (Canyon Helibase; 7 ships including CH-47s, Vertols and Blackhawks), and engine crew member. He played a major role in evacuation and defense of Norris and Canyon Villages including several National Historic structures including the Norris Museum and National Park Ranger Museum and he also participated in the defense of Grant and Tower Villages. He was crew boss for fuel reduction structure protection of the National Historic Trail Creek Cabin and Barn and was also crew boss on post-fire rehabilitation in the Canyon District. As a consultant he worked on residential structure protection in the West Fork of the Bitterroot 2000 Fires.

He is quick to say that he was never a Smoke Jumper or a Hot Shot. He knows from personal experience working with them that they are the elite special forces of America's wildland fire fighting professionals.

Select Professional Publications

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Awards

Salinas Memorial Scholarship, Wildlife Biology Department, University of Montana.
Outstanding Student Award, Associated Students of the University of Montana.
Clancy Gordon Award, Environmental Studies Department, University of Montana.
Brass Cup Award for Conservation, Montana Wilderness Association.

Select Major Media Interviews

New York Times; Wall Street Journal; Washington Post; CNN; British Broadcasting Corporation; National Public Radio; CBS Radio; Associated Press; National Geographic; Christian Science Monitor; Chicago Tribune; Seattle Times; Dallas Morning News; San Francisco Chronicle; Denver Post; Minneapolis Star-Tribune; Los Angeles Times; Seattle Post-Intelligencer.