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Montana Forest Action Plan

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I am encouraged that the Forest Action Plan rhetorically recognizes fire as an appropriate ecological process and the interruption of historical fire occurrence has threatened the sustainability of fire adapted ecosystems that provide human benefits. However, I have concerns regarding apparent inconsistencies between the recognition of profound recent (several hundred years) human interruption of fire as a historically (millennia) formative and sustaining ecological process, and a lack of discussion describing how appropriate ecological fire will be realistically restored at landscape scales. Relatedly, I specifically comment on the lack of appropriate definition and discussion of community wildfire risk, effective reduction of wildland-urban (WU) fire risk, and how the threat of community destruction presents a profound obstacle to restoring ecologically appropriate fire (prescribed fire and wildfire) at landscape scales.

Indigenous Peoples and Introduction

Page 4, 9: The Action Plan states “In order to best understand Montana’s forests, we must understand how the presence of indigenous people has shaped … the landscape…” Importantly, I did not read where the Plan recognizes significant indigenous burning since Paleolithic times (more than 11,000 years). Given the

millennia of indigenous human burning (not unique to North America), "natural" fire as an ecological process needs to include human ignitions. This is in stark contrast to the Plan's inclusion in the "Wilderness" section (p. 56) of the definition of wilderness from the 1964 Wilderness Act excluding humans from "nature." This inclusion plus the general discussion of implied fire control from suppression to prescribed burning sends a mixed message that seems to accept without question European cultural aversions to fire and the historical normalcy of human burning. My criticism is not specific to the "Wilderness" section; the Wilderness section exemplifies an aspect of the unreal paradigm that created the wildfire exclusion policy resulting in our uncharacteristic environmental conditions (p. 9) and seems to be an undercurrent of the Plan's approaches and activities. By not recognizing humans (indigenous) as a contributor to fire as an ecological factor in the development and maintenance of most North American ecosystems, the Plan fails to convincingly present the current need for extensive prescribed burning in a historical, ecological context.

Page 9: The Plan's discussion of changing forest composition, density and continuity due to recent settler perceptions and expectations resulting in behaviors such as attempted fire exclusion and timber harvesting or perhaps extraction is excellent. This discussion ends with the statement, "The current conditions of our forests requires us to think strategically and apply the best available science…" Current available science indicates significantly greater historical landscape fire occurrence across all forest types. Fires ignited by humans and lightning variably burned across landscapes during all conditions of weather and fuels whenever fire could spread. Severe fire behavior accounts for less than 10 percent of conditions (> 90th percentile NFDRS), so most burning occurred during a wide range of moisture content for woody fuel sizes and duff creating a patchwork of fuel consumption and effects. For frequent, largely surface fire regimes, the patchwork produced fire intensity variations. For less frequent high intensity, stand replacement fire regimes, the patchwork produced variations in patch size. When severe dry, windy conditions occurred, fires burned in a diverse patchwork of available fuels with greater fire behavior response to modulating diurnal, daily and weekly weather conditions producing greater burn heterogeneity and less extensive severe fire effects (resilient forests and rangelands). Current extensive landscapes having greater continuity of available surface and canopy fuels (pp. 9, 31, 37), burning during severe conditions, are producing extensive areas of severe fire effects (not resilient) that are largely accounting for the significant ecological fire occurrence during the 2-5 percent of wildfires that escape initial attack fire suppression. Although our land management rhetoric recognizes fire suppression as an obstacle to appropriate ecological fire occurrence, there is no significant trend in fire suppression operations reflecting the rhetoric. The Plan doesn't sufficiently explain how fire suppression will be reduced as much as it discusses how activities will make fire suppression/control more effective (pp. 10, 11).

Our rapidly changing climate is exacerbating the fire resilience problem. Although climate change is recognized in the Plan (pp. 31-32), the Plan doesn't seem to recognize wildfire suppression as an ongoing obstruction to ecological adaptation to rapidly changing climatic conditions. Given the rapidity of changing environmental conditions, wildfire suppression should probably cease in response to climate change (except for very local protection) while remediation of uncharacteristic forest conditions is accelerated. Clearly that won't happen, but the climate change response discussion (p. 41) avoids the obvious inconsistency between rhetorically recognizing decades of fire suppression producing unsustainable conditions (p. 9) and the continued priority of increasing firefighter effectiveness (p. 40). The Plan discusses the multi-faceted activities for doing mechanical treatments and prescribed burning, while it recognizes (p. 32) that "Currently the scale of forest health issues far exceeds management capacity to help restore forests to be more resilient..." I found little if any recognition for how restoration activities, particularly prescribed burning, would be practically implemented at significant landscape scales over a short enough time period sufficient to prevent continuing disastrous fire effects from wildfires during severe conditions. I cannot see how increasing collaboration of will sufficiently increase the restoration of ecologically appropriate fire while the collaborators continue to work under an aversion to wildfire and a paradigm of fire control (even regulatory constraints).

Community Wildfire Risk

p. 40: The Plan identifies communities as a priority area (p. 21) and largely assumes that fuel treatments around communities, mechanical and prescribed burning, is an important tool for reducing wildfire community risk. Although the Plan identifies increasing personnel skills, technology and collaboration with others (p. 39) to increase prescribed burning, the Plan doesn't appear to address how landscape scale prescribed burning can be accomplished without necessitating multi-day burning across extensive areas and meet the unrealistic socio-political expectations of direct control. There emerges from the Plan an unaddressed conundrum: How can ecologically appropriate landscape scale fire occurrence be restored to reduce the wildfire risk to communities, in the presence of communities? The threat of an escaped prescribed burn causing community fire destruction is a major if not the greatest obstacle for conducting landscape scale prescribed burning. The Plan states: "The current conditions of our forests requires us to think strategically and apply the best available science to identify opportunities to … reduce wildfire risk to communities..." I will apply this statement in my following discussion.

The current uncharacteristic forest conditions indicate our fire management strategy has not been working, and that strongly suggests the paradigmatic basis for the strategy is inappropriate. Available science shows how community risk from high

intensity wildfires is governed by home ignitions that are principally determined within the home ignition zone (HIZ), a home's ignition characteristics in relation to burning objects within 100 feet from a home (including flammable attachments). Thus, home ignition potential can be sufficiently reduced within the HIZ 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. This opportunity is documented in two of the articles cited in the Plan: Calkin et al. 2014 and Reinhardt et al. 2008. A third article, Finney M A; Cohen J D. 2008. Expectation and evaluation of fire management objectives. USDA Forest Service Proceedings RMRS P-29. 353-366., uses risk analysis, the probability of loss, to discuss the differences between wildland fire management, natural resource losses, and disastrous community fire destruction.

Available science shows how wildfire susceptibility differs between ecosystems and communities and how that changes their risk management. The Plan appropriately identifies risk (p. 27) as the likelihood (probability) of hazard and susceptibility to loss; however, the management of hazard and susceptibility is profoundly different for wildland resources compared to homes and collectively, the community. Wildland ecological resources are exposed to fire at landscape scales (thousands of acres). Ecological resources are adapted variably to fire; they developed and were sustained with fire as an ecological factor. The HIZ, orders of magnitude smaller, defines the home exposure scale specifically related to the density, continuity and extent of the community. Homes are not fire adapted and during WU fire disasters, any sustained home ignition commonly results is total loss.

Fire management of natural resources addresses critical exposures determined by the sustainability (susceptibility) of the ecosystem vegetation; thus, in short-interval, largely surface burning fire regimes (the focus of the Plan), reducing fire intensity is a principal objective. Mechanical removal of live and dead vegetation and prescribed burning, the principal fuel treatment activities to manage wildfire exposures, must be sufficiently effective to prevent high loss during severe wildfire conditions. This, of course, does not apply to the significant proportion of forest cover types that burn with ecologically appropriate high intensity, stand replacement fire.

Effective management of home wildfire exposure occurs within the HIZ and may benefit from wildland fuel treatments but does not depend on these treatments. Available science indicates that high intensity flame fronts more than 100 feet from a home's exterior wood materials is insufficient for ignition. Thus, the management of flammable fuels (tree and shrub thinning and vegetation and human debris removal) within the HIZ is sufficient to prevent high intensity burning and structure flame

contact sufficient for ignitions. The remaining wildfire exposure is from burning embers (firebrands). Regardless from how far firebrands originate, they do not present an ignition exposure without directly contacting flammable structure materials. Because fuel treatments do not stop wildfires, some degree of firebrand exposure during extreme wildfires are a given. Firebrand susceptibility can be effectively managed with structure materials and building design along with the removal of flammable debris that eliminate many sustained ignitions. Recognizing that typical homes cannot be fireproofed, ignitions that sustain are few slow to involve the structure such that available fire protection can be effective.

The important inconsistency between the Plan and available science is the Plan's claim of significant community wildfire risk reduction using wildland fuel treatments (largely a conclusion of the DNRC Roaring Lion Fire home destruction examination, 2017 report). I think this inconsistency primarily results from an institutionalized perspective, and thus paradigm of wildfire occurrence as the problem instead of the results of the wildfire, both ecological and community. The generally perceived relationship between extreme wildfire and community destruction is based on wildfire intensity and ignores the available science on how homes ignite and how WU fire disasters occur during extreme wildfires (Calkin et al. 2014). The recognition that communities independently burn due to internal, residential burning initiated during extreme wildfires is critical to effectively preventing WU fire disasters. Ironically, recognition of ignition resistant, low wildfire risk communities, would significantly facilitate the restoration of ecologically appropriate wildland fire in all forest fire regimes.

I think the Plan can become consistent with available science and be more effective by focusing on ecological fire restoration in its natural history context and addressing community wildfire risk as an important issue related to wildfire but separated from and independent of wildland fuel treatment benefits. Many of the Plan statements on pp. 38 and 40 are appropriate and important, but presented in secondary importance to primary institutional activities of wildfire protection and fuel treatment.