SOUTH DAKOTA DEPARTMENT OF
GAME, FISH AND PARKS
4130 ADVENTURE TRAIL | RAPID CITY, SD 57702

May 13, 2021

Tracy L. Anderson, Hell Canyon District Ranger
Black Hills National Forest
1019 North 5th Street
Custer, SD 57730

Deadline: May 14, 2021
Email to: https://cara.ecosystem-management.org/Public/CommentInput?project=59737
jeffrey.underhill@usda.gov kris.hennings@usda.gov
Subject line: Pine and Aspen Restoration Project

Dear Ranger Anderson,

The Department of Game, Fish, and Parks (SDGFP), Division of Wildlife (DOW) submits comments on the above-referenced Project (Project). The DOW has reviewed the Hell Canyon Ranger District's Scoping Notice to significantly reduce native Black Hills white spruce (*Picea glauca*) across 2,800 acres northwest of Deerfield Reservoir via Categorical Exclusion (CE) (36 CFR 220.6(e)(25)). CE 25 is a new CE for meeting restoration objectives and other watershed and habitat conditions (Federal Register Vol. 85, No. 224, Nov. 19, 2020 at 73620–73632). CE 25 has never been implemented on BHNF and this demonstration project is of first impression. Proposed activities include pine plantings and likely scarification site prep, spruce thinning, and targeted spruce timber harvesting. The project proposes to treat another 200 acres of aspen per the 2018 Black Hills Resilient Landscapes Project (BHRL). A deadline extension of May 14, 2021 is generous and offers us the ability to visit the Project area. The following comments are from a wildlife habitat perspective.

BHNF has proposed a need to *"increase the occurrence of ponderosa pine and aspen in stands that historically contained higher levels of these species but are dominated by spruce*." A secondary need, per CE 25, is to provide commercial products to support the forest products industry.

DOW has historically supported vegetation diversity across the landscape, especially the early and late successional forested plant communities. These forests support habitats for those species which rise to a level of ecological concern (Emphasis Species) because their habitats are disproportionately critical to their viability and distribution across the landscape. Emphasis Species represent the need for additional conservation measures, viability assessments, and vegetation management sideboards per FS Directives.

For early successional forests, we have extensively commented in the past on the need to treat aspen and hardwood stands for release and recruitment into mature functioning systems. In order to be recruited into functional systems, some form of protection is necessary as supported by DOW knowledge and scientific literature. We support hardwood management under certain ecological and scientifically tested conditions stated herein. While ponderosa pine is the dominant conifer in western South Dakota, DOW also recognizes the loss of mature and late successional pine structural stages (SS's) for various reasons, and supports the need for this

end of the ecological scale to be represented forest-wide (Forest Plan SS's Objectives) when it compliments or does not conflict with other ecological considerations as stated herein. Spruce is an uncommon conifer in the Black Hills, and we have historically supported management of unique mature and late successional spruce and mixed conifer communities.

Where these two ecological processes and forest seral stages (early and late) meet, there are resource conditions such as the habitats described in the CE scoping notice. Nature does not consistently and clearly divide ecological processes into neat, separate seral stage compartments across a landscape. Because of this, there are flora and fauna Emphasis Species which inhabit these mixed ecological scenarios, adding to overall landscape diversity. The unique conditions of pine, spruce, and aspen all converging within the delineated project area requires a "hard look" evaluation of how BHNF is proposing to drive the ecological systems with insufficient considerations given to these uncommon mixes of habitats.

We support removing some successional stages of spruce (such as seedlings, saplings, and immature spruce) which have "*rapidly*" (Project narrative term) expanded for various reasons outside spruce's ecological zone. Historical vegetation records reach back limited years yet are used as the reference where BHNF choses to set its management benchmark (Historical Range of Variation - HRV) within the Phase II Amended Land and Resource Management Plan. We would like to discuss historic and recent vegetation SS inventories and review where spruce has expanded.

We appreciate the scoping notice's transparency that BHNF intends to continue to target removal of spruce of various SS's up to 30,000 acres. This demonstrates that such removals are foreseeable, connected, and cumulative effects actions. These foreseeable actions could invoke 10-12 CE 25's over time, which rises to the NEPA analysis level of a forest-wide EIS. However, a forest-wide EIS and ROD to approve spruce removal is lacking at this time. The Phase II Plan Amendment only anticipated a maximum of 5,000 acres of spruce removal within the lifetime of the Plan, not 30,000. Therefore, we request the consideration of a forest-wide EIS instead of incrementally removing spruce using CE 25.

We suggest that this Project *as proposed* incorrectly presumes that CE 25 is the appropriate authority to remove various SS's of spruce and to retype mixed conifer stands to pine; a species which dominates the forested landscape. Development of the scoping notice has missed that there are *extraordinary circumstances* and therefore, an EA or EIS is warranted. A CE Decision Memo must include a finding that no *extraordinary circumstances* exist and as proposed, this Project cannot meet that NEPA criteria. We have identified *extraordinary circumstances* and assert that *uncertain* impacts on at least one FS Region 2 Sensitive Species (R2SS), the American marten, will result due to this Project. *Uncertainty* precludes use of CE authority. We suggest that the proposed Project seeks unprecedented actions which rise to a level of more rigorous, *hard look* NEPA analysis, and treatment alternatives.

Despite our past requests to retype treated pine stands to hardwoods after a hardwood release, the response has been that database and inventory exercise are outside the scope of a project. Another example is in our 10-30-2017 BHRL DEIS comment letter and BHNF's response to such request. Yet, this Project is proposing to retype spruce to ponderosa pine as part of the Project. We seek clarification. We also recommend that removal of conifers in hardwood stands should be given the same ecological restoration and inventory considerations and be retyped to hardwoods.

We invite engagement with BHNF because there are likely opportunities to take a hardlook at other areas across the landscape which may better fit into CE 25, an EA, or an EIS at a project or forest-wide level for “restoration” by removing some SS’s of spruce. As outlined herein, we provide information for BHNF’s consideration. We extend an invitation for conversations with the Hell Canyon District and BHNF Forest Biologists to discuss the various Emphasis Species which will be impacted by employment of CE 25, as proposed. Thank you for the opportunity to comment.

Sincerely,

Shelly Deisch, Public Lands Liaison and Sr. Wildlife Habitat Biologist
shelly.deisch@state.sd.us Desk: 605.394.1756

CC:

Kevin Robling, Department Secretary
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Mike Klosowski, Regional Supervisor
John Kanta, Terrestrial Section Chief
David Mallett, Wildlife Biologist
Shannon Percy, Parks and Recreation

Addendum
Pine and Aspen Restoration Project through Removal of White Spruce

Use of CE Authority, Uncertainty to R2SS, and More Rigorous NEPA is Warranted

Forest Service Handbook (FSH) 1909.15, Chapter 30, tiered to the Code of Federal Regulations (CFR) provides guidance to the Forest Service (FS) for CE determination, such as whether "*extraordinary circumstances*" exist, and if the proposed action warrants further analysis and documentation in an Environmental Assessment (EA) or Environmental Impact Statement (EIS) (36 CFR 220.6(b)). Scoping is the means to identify the presence of extraordinary circumstances that warrant a more rigorous and higher level of NEPA.

One resource condition that must be considered is the presence of Region 2 Sensitive Species (R2SS). The American marten (*Martes americana*) is a reintroduced species from extirpation and has met the criteria as a R2SS (and is a BHNF Species of Local Concern (SOLC)). Therefore, the responsible official must determine the degree of potential effects on R2SS: "*If the degree of potential effects raises uncertainty over its significance, then an extraordinary circumstance exists, precluding the use of a categorical exclusion."*

FSH states that the "*mere presence of a sensitive species*" in the Project area does not preclude use of a CE but asks the FS to determine if there is a "*cause-effect relationship between the proposed action and the potential effects on resource conditions*". The potential effects on resource conditions is not confined to the narrow assessment of only marten corridors. Potential "*extraordinary circumstances*" include the uncertainty if marten *occupy* habitats and use corridors in a proposed Project area and how proposed vegetation treatments may impact marten resources, distribution, movements, and risks to predation.

The Project proposal recognizes that the small delineated area provides marten corridors per the Phase II Plan Amendment and acknowledges that marten are or could be in the Project area. Objective 221 states that BHNF will conserve or enhance habitat (not just corridors) for R2SS and SOCL. BHNF has had extensive and significant landscape-scale habitat and resource condition changes since the 2003 marten habitat model (Fecske 2003) and the 2005-2006 Phase II Amendment NEPA efforts. For example, across the forest and within the Project area, both mature and late-successional pine and spruce have been significantly impacted and reduced by mountain pine beetle mortality, vegetation treatments, intense harvests, and other mortality factors such as fire and storms which are additive to natural background mortality levels. These landscape scale events have changed vegetation conditions on the forest unanticipated by the 2006 Phase II Forest Plan Amendment. Various structural stages of conifer stands were recently treated or harvested in the Oatman and Luhtasaari timber sales. Within the Project area, past group selection treatments in spruce-typed stands are stark from aerial photography.

Uncertainty in the impacts of the proposed Project lies, in part, that DOW does not have marten abundance index or population estimate since these resource condition changes. Smith (2007) tested track plate methods to estimate marten occupancy. However, BHNF nor DOW have conducted recent forest-wide population estimate nor do either agency have a recent re-analysis of forest-wide marten habitat abundance (Fecske 2003) to meet Phase II Amendment directives such as Objective 211. Fifteen years have passed since the Phase II Amendment FEIS and ROD. Forest-wide monitoring of marten habitat acreage was last published for FY 2013-2014. With an increase in spruce abundance and distribution, we cannot erroneously

presume that younger age classes and early SS's equate to quality marten habitat or corridors. Marten depend upon mature and late successional spruce and mixed conifer stands.

Black Hills 2018 Resilient Landscapes Biological Specialist's report indicated that the proposed and selected action could cause *direct* marten mortality compared to no action alternative. Further fragmentation and loss of habitat (extensive removal of mature and late-successional pine and limited spruce removal) was expected in MA 5.1. Road construction in BHRL was assessed as creating additional habitat degradation and disturbances to marten. These cause-effect actions in and adjacent to the Project area (Oatman and Luhtasaari) together with the proposed Project, leave an uncertainty to marten and its habitat components (such as corridors, logs, CWD, and prey such as small mammals). Again, BHNF is precluded from using CE Authority, and preparation of an EA or EIS is warranted (FSH 1909.15, 31.2, 36 CFR 220.6(b)(2), FSH 1909.15 Chapter 10 Section 1.6 Exhibit 01)).Scoping identifies past, present, or reasonably foreseeable future actions with the potential to create uncertainty over the significance of cumulative effects and should be commensurate with project complexity (FSH 1909.15 Chapter 30 31.1).

The cause-effect relationship of the proposed Project includes uncertainty to the impacts to R2SS including but not limited to American marten, northern flying squirrel (*Glaucomys sabrinus*) which prefer mixed conifer stands, Cooper's snail (*Oreohelix strigose cooperi*), and sensitive plants such as prairie moonwart (*Botrychium campestre*) and lesser yellow lady's-slipper (*Cypripedium parviflorum*). It is "*reasonably foreseeable*" that the proposed Project includes uncertain risks of marten displacement out of the Project area and adjacent preferred habitats due to this CE Project and other more recent projects. It is reasonably foreseeable that BHNF intends on conducting similar CE 25 projects throughout marten habitats which are "connected actions". Lastly, the loss of mature and late successional conifers through various mortalities listed above has resulted in "significant cumulative effects", precluding the use of CE Authority and an EA or EIS is warranted

American Marten Life Requirements and Black Hills Status

Marten have very distinct habitat requirements of mature and late successional forests. Habitat alterations in these limited seral and structural stages increase the risk of marten displacement, declines in an already limited population, or at worst, extirpation. Thus, the species indicates *ecosystem integrity* because declines in its distribution and abundance are a barometer to *ecosystem deterioration* (Fecske et al. 2002).

Fescke (2003) provides some historical context of the long-term persistence of the Project area's habitat because in the late 1800's early 1900's, a trapper was paid for marten pelts which he trapped between Deadwood and Newcastle. In 1929-1930, a local trapper trapped 17 marten in the Beaver Creek Drainages near the SD-WY border, near or including the Project area. This indicates that mature and late successional spruce and mixed conifer stands have existed in the Project area for well over a century and have existed in this region tree generation after tree generation. Between 1930 and 1979, no records exist for marten and were thought to be extirpated from the Black Hills. By 1976, DOW began planning to reintroduce the native predator and furbearer. There was an identified need to have marten, a species *integral to the ecology and integrity of dense, mature spruce and pine habitats*, return to the Black Hills. Various public groups have an interest in this native predator. Two reintroduction phases occurred in the 1980's and 1990's (SDGFP Internal Files, Fecske 2003, and B. Waite, reintroduction biologist, 2021 Pers. Comm). One reintroduction site is near the Project area (SDGFP Internal Files, Fecske 2003).

Marten have a low reproduction potential with only 1 pup/year. Past research has indicated that marten occurrence is associated with areas of high precipitation, near prior release locations, and mature aged conifer forests (Smith 2007). Marten are an indicator of late successional forest in 9 out of 13 forests in which they are found. They need deadfall, both leaning and downed, for hunting and traveling. The Project area is potentially one of the most important examples of marten habitat along Cold Creek and Castle Creek drainages. Mature and late successional spruce, pine, and mixed conifer habitats are already fragmented. Further fragmentation as proposed in this Project could "*exacerbate bottleneck effects and threaten long-term viability….. and long-term planning include protection of mature forest stands surrounding occupied areas.*" (Smith 2007). Mature and late-successional pine stands are also critical to assuring connectivity corridors are linked to mature conifer stands. Marten life requirements, available and preferred habitats, and adjoining habitats are critical to Project planning.

The most significant marten predator are great horned owls (B. Waite, 2021, Pers. Comm). Great horned owls inhabit a wide variety of habitats, but have a component of being more open. As BHNF becomes more open due to MPB, logging, fire, and other tree mortality factors, there are antidotal observations that great horned owls may be more abundant; at least their preferred open habitats are more abundant. The dense cover provided by mature and late successional conifers provides more hiding and escape cover for marten. Opening the Project area canopy cover and fragmenting connective canopies may increase mortality risks to marten.

BHNF Plan standard 3215 requires retention of at least 50% canopy cover but canopy cover can be denser. Thinning to remove overstory in dense areas to 50% is minimum and every effort should be made to retain at or above 50% of spruce, pine or mixed-conifer in SS's 3B, 3C, 4B, 4C, and 5 with at least 50% of the BA in conifer species and at least 40% of the BA in white spruce regardless of forest typed conifer stands (Buskirk 2002, BHNF Burns 2011). Corridor linkages must expand beyond the Project area to provide quality marten habitat for the Northern Hills subpopulations. Logs and CWD must also be retained (Standard 2308).

The responsible official for this proposed Project shall use the best available scientific information (BASI) (36 CFR 219.3). Use of BASI must be documented for the project analysis/assessment, the project decision, and the monitoring program. Local research should be primary to other sources. For example, while marten may not use or depend on pine or mixed spruce-pine stands elsewhere in its range, it uses and depends upon these mixed stands in the Black Hills for their life and habitat requirements (Fecske 2003). Marten are disconnected from other marten populations outside the Black Hills, and are potentially disconnected between two subpopulations. Any project which creates uncertainty in how actions may impact a limited marten subpopulation the northern hills, may jeopardize not only that northern tier, but may jeopardize the Black Hills population as a whole. There is a second subpopulation in Custer State Park and Norbeck Wildlife Preserve. The two existing subpopulations already have challenges and high risks of exchanging individuals through migration where connected corridors are lacking.

Emphasis Species

The FS Region 2 Forester identified certain species as "sensitive" and for which population viability is a concern:

a. Significant current or predicted downward trends in population numbers or density.

b. Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (FSM 2670.5)." (2005 Phase II Amendment FEIS a at III-75).

The rationale for SOLC final determination was: "*Limited population and habitat, extremely low reproductive rate, and single small population on the Forest. Extremely susceptible to disease and parasites. Need management to maintain habitat and undisturbed areas."*

Management Indicator Species within the project area include ruffed grouse and Golden crowned kinglet. Former DOW employees were interviewed recently and stated that the Project area has some of the best ruffed grouse habitat due to the mix of spruce and aspen. Historically, some of the highest occurrences of ruffed grouse existed for the western Black Hills because the grouse depended upon both early and late successional habitats year-round.

Demand Species: Spruce and mixed spruce-pine communities provide cover (hiding, screening, and winter and summer thermal) for deer and elk and their young (DePerno 1998.). Greater than 40% canopy cover is required for wild turkey (*Meleagris gallopavo merriami*) (Rumble and Anderson 1996)

FS Definition of Objective

FS defines an objective as, "*Concise statement of desired measurable results intended to promote achievement of specific goals. Attainment of objectives is limited by the application of standards and guidelines. Objectives should be expressed in terms of outcomes, not actions; and must be attainable within the fiscal capability of the unit, determined through a trend analysis of the recent past budget obligations for the unit (3 to 5 years)"* What are the expected costs of the CE NEPA, treatments, and harvest?

FS Definition of Restoration and Ecosystem Restoration

CE 25 relies on "restoration". FS definition of restoration (https://www.fs.fed.us/restoration/) includes *"creating and maintaining healthy, resilient forests capable of delivering all the benefits that people get from them: clean air and water, carbon sequestration, habitat for native fish and wildlife, forest products, opportunities for outdoor recreation, and more……Monitoring and evaluation of restoration projects are essential adaptive management steps for achieving sustainable ecosystems….. Restoration activities will complement management to maintain conditions in areas with ecological integrity…..The expectation is that forest restoration treatments will lead to forest resilience and a lower probability of a catastrophic disturbance and that consequently, more carbon will continue to be sequestered than would otherwise occur without the treatment.*"

"*Assessing current and potential future conditions should result in a detailed description of the composition, structure, pattern, and ecological processes of the ecosystem as it moves along an ecological trajectory through time. Moving along a trajectory means that ecosystems are not static and may have changing characteristics ….Restoration spans a number of initiatives in various program areas, including the invasive species strategy; recovery of areas affected by high severity fires, hurricanes, and other catastrophic disturbances; fish habitat restoration and remediation; riparian area restoration; conservation of threatened, endangered, and sensitive species."*

For purposes of interagency discussions, we are unclear how established, historically typed spruce and mixed conifer stands do not provide *composition, structure, pattern, and ecological*

processes necessary to facilitate terrestrial and aquatic ecosystems sustainability, resilience, and health under current and future conditions. In 200 acres, there is proposed to be 5-acre group retention of "large" diameter pine (no dbh given) to "*promote*" (the narrative did not say "*to retain*") late successional pine. The mere under-representation of SS5 appears that BHNF is trying to create an ecological component on 200 acres where it does not exist and may have existed at one time but for MPB and/or recent harvest treatments. We support allowing mature pine stands the time to become SS5, but that opportunity has existed across the forest for decades and more specifically since 2006 Phase II Amendment. We know of areas left untreated in one project as "future late succession" only to have another harvest entry in less than 10 years because "the mature overstory is ready for harvest." The scoping notice negated to describe why pine stands treated in Oatman and Luhtasaari did not identify, retain, and recruit pine into SS5 or future SS5 under a *resiliency* directive (BHRL 2018). The Project area is 10,712 acres and all pine SS's are not expected to be found on all acres, especially within small delineated project areas. Project analysis should discuss why now and why here is BHNF choosing to drive the ecological system to create SS5 where it doesn't exist, in favor of removing or at least degrading late successional spruce and mixed conifer stands.

Based on FS restoration definitions and guidance, not having SS5 within a small Project area does not appear meet the ecological site conditions for an ecological restoration CE. Rather, the historical stands of mature and mixed conifer meet MA 5.1 desired conditions and Objective LVD 239 for a *mosaic of forest structure and diversity*. Removing mature and late successional spruce in mixed stands in a forest dominated by pine and replanting to pine will actually reduce mosaic forests. Mature and late successional stands of spruce are disproportionately important to providing overall forest ecological integrity, diversity, functioning, and *resilience* and should not be treated in this particular area.

Shepperd and Battaglia (2002) stated that the furthest western occurrence of white spruce (*Picea glauca*) is in the Black Hills. There are two or three spruce community types which disproportionately provide habitat for species not available in other forested types. Because of the limited abundance and spatial distribution of spruce community types, they are important to the BHNF's goal of species diversity across the landscape.

The scoping notice states that the Project is for ecological restoration to be consistent with historical vegetation conditions. Ecological restoration is defined as: "*The process of assisting the recovery of an ecosystem that has been* ***degraded, damaged, or destroyed****. Ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystem sustainability, resilience, and health under current and future condition…..ecological restoration may seek a historical reference condition*." (36 CFR 219.19 and FSH 1909.12).

Upon review of the BHNF Phase II Amendment FEIS, spruce was not a common or dominant conifer species across the landscape. The EIS stated that spruce was maybe 5,000 acres over its Plan's objective of 20,000 acres. Phase II never stated that there was an urgency to remove mature and late successional spruce and mixed conifer stands because spruce had little to no commercial value: "*Spruce timber harvests are unlikely as the wood is not as desirable as ponderosa pine*." (2005 Phase II FEIS at III-27).

The scoping notice did not state how the Project area is *degraded, damaged, or destroyed* especially since a *resiliency* project authority (BHRL 2018) has recently and continues to treat the area. It seems illogical that a resiliency project left a project area in such a condition that it

now needs restoration. The Project notice failed to identify and explain how current conditions are not meeting ecological integrity when historically typed spruce and mixed-spruce stands are being proposed to be converted to pine, a ubiquitous species. The only criteria that the Project proposal appears to address are an historical reference from the 2006 Forest Plan Phase II Amendment of spruce acreage objective and that SS5 pine is absent from the Project area.

The Project proposed to harvest 800 acres dominated by spruce which have been historically typed as spruce and have already been treated in the past based on aerial photography. Group selection purpose is "*to regenerate uneven-aged stands in 3-5 acre patch cuts*" yet this appears to be redundant. Spruce > 7 " dbh would be removed in favor of pine and aspen inclusions. We cannot support removal of mature and late-successional spruce and mixed conifers for reasons given herein. This treatment is driving the spruce ecological system to a deteriorated state and doesn't appear to be a restoration treatment per FS definition of restoration.

1,900 acres of mixed conifer stands are proposed to be patch cuts and retyped to pine. This treatment does not meet the FS definitions of restoration and creates uncertain impacts to marten habitats and corridors. 100 acres of pine-typed stands with spruce understory and aspen inclusions will have succeeding spruce removed. Why isn't the pine also going to be removed and the stand retyped to aspen? Non-commercial spruce and pine (dbh < 9") should be hinged to protect aspen and deciduous shrub communities.

Phase II Amendment does not direct that a single project area must meet a forest-wide SS5 objective within MA 5.1. If spruce in the Project area is out of historical ecological context, we invite discussions to better understand why Project area stands have been typed and previously managed as spruce for decades. For context, BHNF has identified in its inventory and managed databases, that spruce is alleged to be 30,000 acres beyond objective. This didn't happen in a short time period. We'd like to better understand why surplus spruce was not addressed in the recent forest-wide *resiliency* project (BHRL 2018) which is expected to be viable for at least 10 years (2028). BHRL removed pine and spruce from hardwoods and if spruce is of ecological integrity and restoration concern, why wasn't it included in BHRL? We realize the BHRL questions are beyond the scope of this proposed Project, but these questions are relevant in the context of proposing to employ a "*restoration*" CE with merchantable timber as a secondary outcome in an area of high importance to BHNF Emphasis Species.

In summary, we ask BHNF to consider that this Project is looking to completely change the habitat conditions by tree species and structural stages to satisfy "*ecological integrity*" via use of a *restoration* CE. When in fact, the indicator of the Project area's ecological integrity is already present through marten and marten-preferred habitat components, and other Emphasis Species. Ecological integrity takes more than trees into consideration, as stated above. Significantly changing the current tree conditions of the project area will cause *ecosystem deterioration*, which is contrary to the "*restoration*" BHNF suggests is needed in Project area.

Proposed Hardwood Treatments

200 acres are proposed to be treated under BHRL authority. The site description says that aspen may not have regeneration present. How did BHNF assess the hardwood regeneration; was there regeneration but it was being browsed? Would it be better to state that there has not been recruitment into the clone of various aspen age classes? This demonstrates the reasons for protection of regenerating aspen. And, the site description did not indicate the condition of these residual aspen. Are they overmature inclusions and likely not to regenerate? If so, removing mature spruce to retain dying aspen inclusions does not meet the definition of

ecosystem restoration and more than likely, the aspen will die before it can regenerate enough stems/ac to create another age class or another functioning clone.

As stated in our BHRL Draft EIS comments (October 30, 2017 – see BHNF project Administrative file) incorporated by reference, and the attached hinging guideline (Mallett and Deisch 2021), non-commercial conifers should not be "*removed*" but hinged within hardwood stands to protect sapling and immature aspen from wild and domestic ungulates. Aspen research in western forests discuss that simply removing conifers from hardwoods is only one prong of aspen restoration because here in the Black Hills, aspen require protection in order to be recruited into functioning clones. Without protection, is has been shown over and over in the Black Hills, that removal of all conifers simply allows much easier access to ungulates to browse aspen. This defeats the purpose of aspen recruitment for ecological integrity. And, conifer slash should not be reduced to 18" or less. The long-term protection of more fire-resistant hardwoods far outweighs the temporary fuels loads of conifer slash. This proposed project lacks design criteria/features to actually meet the intent of forest "restoration" and needs to incorporate attached hinging and taller slash guidelines.

Site Prep and Pine Plantings

Site prep by scarification (SDGFP Comments 2017 BHRL DEIS) and replanting spruce stands to ubiquitous pine are not supported by DOW. The abundance of pine within the project area and the quick reproduction of ponderosa pine in the Black Hills (research by C. Boldt and others) preclude the need for this ground disturbing, archaic process of reforestation.

Additional Data Requested

The following inquiries should be available for public review and included in project analysis:

- Have criteria used to type stands to spruce, mixed-spruce, pine, mixed hardwood-conifer, and hardwood changed since the 2006 Phase II Amendment?
- Compare the Project area vegetation, tree species composition, and structural stage composition both before and after treatments in Oatman and Luhtasaari.
- What is the definition of a "*pure*" stand of all forest tree types in the context of percent species and structural stage composition?
- What is the structural stage composition and percentages of structural stages in Project area mixed conifer stands?
- DOW would like to discuss BHNF's mapping or other means of inventory which have estimated that in 25 years since 1997, spruce is now over 30,000 acres beyond the 1997 and 2006 Plan objective. At that rate of spread, spruce should have been at least 10,800 acres over the 20,000 acre objective by 2006 and yet, Phase II stated it was only 5,000 acres over objective. This appears to suggest that the 30,000 acres over objective are spruce in the younger age classes and should be targeted for thinning. A review of the overall structural stages of spruce and mixed spruce stands would be beneficial.

Other Considerations

The SDGFP snowmobile trails may occur within the Project area. Consultation with Shannon Percy at shannon.percy@state.sd.us 584-2731/584-3896 is required.

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Hinging Conifer Species To Protect Hardwood Shoots And Saplings

Tree DBH Specific to the Norbeck Wildlife Preserve Project

By David Mallett and Shelly Deisch, SDGFP Division of Wildlife

March 2021 - Techniques Paper In-Prep

PURPOSE OF HINGING

Hinging is both a mastered technical skill and art form (Fig. 1). Without some type of intervention such as fire, conifers (ponderosa pine, Black Hills spruce, and planted Douglas Fir) quickly encroach upon and dominate early-successional hardwoods such as aspen, birch, bur oak, green ash, and deciduous shrubs (referred hereafter as "hardwoods"). Releasing hardwoods from conifer dominance can stimulate the emergence of hardwood shoots and saplings. But these emerging stems also need protection from domestic and wild ungulates. The purpose of hinging is to employ a cost-effective technique to provide some protection to emerging stems by using on-site materials (standing live conifers) (Fig. 2) (Kota and Bartos 2010). Most hardwood sites in the Black Hills of South Dakota are isolated and relatively small (< 1 ac) or are found in dwindling inclusions of only 3-12 mature stems. Without protection, the hardwood release treatment is likely ineffective, may result in loss of the clone or inclusion, and may be an economic loss of valuable funds and personnel time. Where large herbivores exist, simply removing conifers is generally insufficient to ensure recruitment of new stems into the clone, stand, or shrub community. Immature regeneration needs to reach up and out of the browse level of ungulates such as livestock, deer, and elk. Protection may need to remain in place for 10 or more years.

CONCEPT OF HINGING

Hinging conifers provides a physical barrier protecting hardwood shoots from browsing by ungulates. This is accomplished by placing individual conifer canopies over hardwoods with branches, which prevents access to stems, or by windrowing conifers around hardwoods (fence), which prevents access to the stand.

A hinging sawyer must be a master of his/her/their skill because hinging can be dangerous. A conifer bole (stem) is back-cut approximately 4 feet above the soil surface (Fig 3). The sawyer must also be able to directionally fell and place conifers in the area to be protected and deter access by browsers. Felling trees is dangerous and hinging can result in a "barber chair" or unexpected snap (Fig. 4).

A back-cut into a standing, live conifer is conducted to create a flexible hinge out of the tree bark and inner cambium layers; leaving the tree bole "attached" to the residual stump at a height of 4 feet. (Fig. 5). The purpose of the tall and aerial angle of the felled and hinged tree, is to deter ungulates from entering the hardwood stand and browsing on vulnerable shoots.

A hinging sawyer is also an artist because he/she/they must be able to assess and visualize the concept of a protected hardwood stand in order to assist in successful recruitment. Protection *and* successful recruitment into a hardwood stand (or shrub) are goals to achieving functional clones and plant communities.

The sawyer must hinge and fell the conifer into existing or presumed hardwood regeneration. Improper cuts and/or the weight of the felled tree sometimes results in a failed hinge (Fig. 6). The sawyer must be able to identify emerging and existing hardwood shoots, predict where wild and domestic ungulates may enter a hardwood stand, and assess the surrounding landscape to detect the topography which may funnel ungulates into the hardwood stand to be treated. Layout and directional felling are keys to successful hardwood protection (Fig. 7). A hinged tree is not delimbed but left as-is to create a barrier to ungulates. The length of time a hinged tree is effective, depends upon site conditions and annual precipitation. However, the concept is to create as much barrier as possible with available materials. It is better to fully protect a smaller pocket of hardwood regeneration than to randomly scatter each conifer which will only, by itself, protect a few shoots for a short period. Hinging is only as effective as the sawyers' skills and the on-site conifers which will be used to create a short-term, but critical barrier to hungry ungulates. An on-site demonstration of site assessment and hinging is essential to new sawyers and is offered by SDGFP.

ESSENTIAL SITE CONSIDERATIONS

- *Conifer Tree Selection and Size*
    - Any size live tree (conifer or hardwood) can be hinged, but the probability of hinge breakage and the danger of the tree doing something unexpected increase as the tree size increases
        - Trees 3-9" dbh* are ideal. The larger the dbh and mass of tree, the harder it falls.
    - Trees that cannot be hinged should still be cut at a ground level and left whole (do *not* slash, lop or scatter).
    - Trees that break-off of hinge and are light enough to lift, should be placed onto the remaining stump and left whole. Break-offs too big to lift should be left whole to make a barrier (do not slash, lop, or scatter).
    - Hinged trees felled into previous hinged trees, may break the hinge of the previous tree. Leave the broken hinged tree whole and do not slash, lop, or scatter).
    - Hinge small trees first and then hinge cut the larger trees that will be felled in that area.
        - A few of the smaller trees may be knocked off their hinge, but this method will make it safer and easier to move around the site.

- *Tree Assessment*
    - Only hinge or fell live conifers.
        - Do not fell dead or obviously dying conifers (conifers impacted by hail and that only have dead needle ends are not considered dying).
        - Do not fell hardwoods or deciduous shrubs
    - Is the tree leaning one direction?
        - Depending upon the severity of the lean, the tree will most likely have to be hinged in the direction it is leaning.
    - Branch balance and distribution: Does one side of the tree have heavier branches or more branches than the other sides?
        - As with the lean, the direction to hinge the tree will most likely have to be to the side with the heaviest or most branches.
    - With smaller diameter trees (<7"), the lean and branches will not be as important
        - These smaller trees can be manipulated more easily (e.g., pushing by hand or pole) to fall in a desired direction.
    - Do not hinge or fell live conifers with a cavity. Northern flying squirrels may inhabit these trees in the winter. Some owls are cavity nesters February – spring. Bats may have winter hibernation sites.
        - GPS, map, and photograph the cavity if possible, and clearly flag the cavity tree and contact a wildlife biologist for assessment.

- *Direction of Felled Hinged Tree*
    - This step is critical because if aerial barriers are not created in such a fashion to dissuade ungulates, hinging efficacy will be low and resultant hardwood recruitment will be minimal or clone loss may occur.
    - Work in teams, especially at the start of learning how to hinge and protect an area.
    - Assessment of the standing conifers is essential to a successfully hinged area
    - Layout of hinged conifers should be planned before any cutting and is based on how conifers are arranged in relation to hardwoods.
    - Individual conifer tree assessment is just as important to determine which way the tree should be hinged.
    - Ensure everyone agrees to the layout and is out of the way of each other.
    - The direction a conifer will be hinged will be dependent on which way the sawyer is comfortable taking the tree (based on assessment of lean, branches, wind, etc.) and where the existing and presumed hardwood regeneration is located.
    - For the outer perimeter of hardwood stands, conifers should be hinged up to 100' from the last known hardwood stem which may be hard to find if the stem is less than 1 foot tall.
    - Outer perimeter conifers should be felled to create an outer fence or windrow when possible.

- If the on-site materials are few or extremely scattered, the sawyer must assess the regeneration or where hardwoods are likely to expand and make a judgement call where hinging will provide the best, concentrated protection.
- It is better to hinge a group of trees to form a protected pocket, than to hinge the group of trees in a scattered fashion which will not protect shoots and regeneration.
- Hinging conifers will also remove immediate conifer seed sources. Hinge conifers even if they may not appear to be providing much advantage to the hardwood treatment site as a felled tree.
- When possible, minimize damage to individual hardwood trees by not felling conifers into an established mature tree.
    - Hinged trees hung up in the canopy of hardwood trees is an extremely dangerous situation and will harm the live hardwood tree.

- Time of Year
    - Best hinged when sap is flowing.
    - Best not to hinge after days and days of extreme cold temperatures. Test a few trees first. Larger diameter may not hinge as well as smaller.
    - If hinging is not working, do not continue to just fell trees without a hinge.

- Wind
    - Light wind speeds are preferred when hinging. Stronger winds may only allow the tree to be felled in the direction they are blowing which may defeat the objective for directional felling and clone protection.

HINGING DIRECTIONS

- The Cut
    - There is only one back cut made to create a hinge
    - The hinge should be between 4-5' above the ground
        - This creates a visual obstruction as well as a physical one
    - The cut should be angled at 30-45º above horizontal
        - The angle allows more leverage with a wedge
        - Angled back cuts typically are more successful in keeping the hinge attached than a flat back cut
    - Keep bar as level as possible to avoid twisting of the tree when it falls
    - Insert wedge as soon as possible behind bar when making cut
        - This keeps the kerf open if tree starts rocking or going backwards
        - This starts tree moving forward
    - When 2/3's through the tree, start cutting more slowly (i.e., feathering throttle, taking small portions)
        - Want to leave as much wood as possible for hinge
    - Keep working the wedge in as far as possible and taking small amounts of wood at a time
    - Monitor tree at all times and as soon as tree starts to fall on its own, stop cutting and move away
    - Hinging trees below 3" dbh is not always practical, but can be effective if there are many in an area
        - Make the back cut lower on the tree (2-4' above the ground)
        - Works better with spruce because they have more branches lower to the ground

* larger diameters can be hinged.

Citation: Kota, A.M. and D.L. Bartos. 2010. Evaluation of Techniques to Protect Aspen Suckers from Ungulate Browsing in the Black Hills. 25(4). Pp 161-168. Western Journal of Applied Forestry.

Fig. 1 Hinging ponderosa pine is a skill and an art

Fig. 2 Hinging protects emerging regeneration which increases the success of recruitment

Fig. 3 Hinged trees are cut approximately 4 – 5 feet above the soil surface

Fig. 4 Improperly cut or broken hinges are dangerous

Fig. 5 Flexible hinges are created by leaving bark and inner cambium layers

Fig. 6 Improper back cuts result in hinge failures

Fig. 7 Site assessment, layout, and directional felling are keys to successful hardwood protection

Photos by Mallett or Deisch, SDGFP