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February 5, 2018

Submitted by E-mail:

Reviewing Officer Joby Timm
ATTN: OBJECTIONS
Forest Supervisor
George Washington and Jefferson National Forests
5612 Valleypointe Parkway
Roanoke, VA 24019
Email: objections-southern-georgewashington-jefferson@fs.fed.us

Re: Nettle Patch Vegetation Management Project, Clinch District, Jefferson National Forest

Dear Reviewing Officer Timm:

Notice of Objection

I hereby file this letter of objection to the draft Decision Notice and Finding of No Significant Impact and Final Environmental Assessment for the Nettle Patch Vegetation Management Project, pursuant to 36 C.F.R. Part 218 and § 218.8. The NPP project area is located within the Clinch District on the Jefferson National Forest, in Wise County, Virginia. The responsible official for this project is Michelle Davalos, District Ranger for the Clinch District. The legal notice of the opportunity to object was published in The Coalfield Progress on December 22, 2017. This letter of objection, therefore, is timely.

Please see above for my contact information. I actively participate in the management of the Jefferson National Forest, submitted written comments at all stages of this project, and have participated in field trips and public meetings regarding this project.

Sincerely,



WAYNE BROWNING

Wayne Browning

B.S. Degree in Biology From UVA-Wise
(Minors in Environment Science & Mathematics)

*Currently working on an Advanced Degree (M.S.) in Geosciences with a focus on meteorology and climate at Mississippi State University.

Adjunct Faculty Member of the Natural Sciences Department - University of Virginia-Wise

I currently teach Field Studies In Microclimatology as part of an expanding undergraduate research program at the University Of Virginia's College At Wise.

Climate Researcher (1988-Present)

I have made many original climate discoveries during the past 30 years, which collectively are helping to rewrite the known climatology of Virginia. I started the High Knob Project for Undergraduate Research at UVA-Wise, whose goal is to use the High Knob Massif as a Natural Laboratory for the advancement of student education.

As part of climate and biodiversity research I defined the terms "High Knob Massif" and "High Knob Landform" to help bring together information learned in the field and through modeling studies of the climate and terrain, as well as to help promote public education about this extraordinary natural feature of the Appalachians. <http://www.highknoblandform.com/>

Public Forecaster (2014-Present)

I started forecasting based upon orographics (mountain generated forcing) in the early 1990s, published a periodic Climate Forecast Newsletter, then in 2014 started a pay-per-view website called the Appalachian Climate Center. <http://www.appalachianclimatecenter.com/>

Early in 2016 the Appalachian Climate Center was opened to everyone as a free site and sponsored by the University Of Virginia's College At Wise. It is now being used as both a forecast site and as a place to published work being done in undergraduate field studies at UVA-Wise.

Newspaper Column Writer (1993-Present)

I have written bi-weekly to weekly weather columns for the past 25 years, including occasional articles on other topics related to Appalachian Natural History and biodiversity.

Certified Virginia Master Naturalist (VMN)

I became a certified VMN during 2016 and continue to put in many volunteer hours related mainly to breeding bird surveys on the Clinch Ranger District and in the Mount Rogers National Recreation Area. I now teach the climate portion of this class for new students in the VMN program, as well as do occasional nature and climate related presentations to various groups (e.g., Girls Scouts).

Official National Weather Service Cooperative Observer

I started recording weather conditions around the age of 10, but became an official observer for the National Weather Service in early February 1989. I have done field surveys of storm damage for the NWS as well as had a paper published across the Eastern Region of the NWS which documented the Superstorm of March 1993.

Professional Nature Photographer

I have been a nature photographer for a couple decades, or more, but advanced into the pro class with sales of acrylic, metal and fine art photographs during recent years.

Updated Comments On The Nettle Patch Alternative Proposal

(February 3, 2018)

All my previous comments remain valid, and should be reviewed for this project.

New comments are related to detailed analysis of data sets such as Landfire, and to the study of remote sensing in graduate school, which appear to type existing vegetation in the project area more accurately than either the management codes assigned to individual stands, or the Ecozone data (Simon 2013) referenced in the Response to Comments.

Although I fully realize that remote sensing is not perfect, especially since current data is not at Lidar resolution levels, I believe existing vegetation types, represented by the Landfire data, more clearly and accurately capture the mesophytic nature of the High Knob Massif. I base this not upon mere assumptions or guess work, but from what I observe on-the-ground, and have documented through recent decades doing climate research in the field. I also base this on a study of autumn satellite imagery of the area, which depicts a rich array of colorful hues indicative of Mixed-mesophytic and Northern Hardwood forests. (i.e. not oak-dominated forests).

Although oaks are clearly present, and Northern Red Oak is an important and recognized indicator species of one type of Central Appalachian Northern Hardwoods, the abundance and ecological significance of oak species is not even close to being as high as represented by current USFS stand data.

The Landfire data set, while capturing the general coverage of Northern Hardwoods at the highest elevations, is not as accurate through cold air drainages of middle-lower elevations where the extension of species with northern affinities, including sub-canopy trees, herbaceous flora, as well as fauna (such as birds with northern affinities), is nearly continuous and not as broken in coverage as represented by Landfire data. This description is supported by local climatology.

Management activities being proposed for the Nettle Patch Project Area (PA) appear to be based upon inaccurate assessments of existing vegetation types (in the mean across the PA), leading to the inaccurate conclusion that the PA is and should be dominated by relatively dry, oak and oak-pine forests. Management activities should be postponed until existing conditions are accurately assessed and until a consensus can be reached as to how this area should be best managed in order to aid its progression into its natural climax state, as well as benefit forest health (i.e. increase resiliency). The majority of currently proposed actions will push this area farther away from its natural climax and ecological potential. Furthermore, fragmentation of one of the largest remaining blocks of “intact” mature forest is illogical, especially in Wise County where the landscape has been extensively altered by extractive industry.

Locations within Virginia that can support Northern Hardwoods and the type of mesophytic forests that grow within the High Knob Massif are limited. My research indicates the High Knob Massif area possess the wettest climate in Virginia, and the resulting unique ecology of the area deserves full consideration. It is critical that this special location be managed in ways that promote, not deter, the continued presence of existing native diversity, including the growth of mesic species.

Management actions being proposed in the new Nettle Patch Alternative are clearly biased toward the recruitment of oak species on too large of a scale, and need to be greatly reduced.

Thank you.

March 20, 2017 – Additional Comments

Since I did not receive the new DEA or any recognition for my original comments, I will re-submit them with additional comments for this new period, ending in March 2017, with respect to the proposed Nettle Patch Project.

1). Ecosystem Type Classification:

The Virginia Division of Conservation & Recreation's Natural Heritage Program (VA NHP) has reclassified Northern Hardwood Forests in the High Knob Massif as being of the Central Appalachian Northern Hardwood type. This type of ecosystem extends from Canada down along the higher Appalachians to the High Knob Massif, which is at its southern-most range limit.

Coverage of northern hardwoods within the High Knob Massif; however, are more extensive than recognized by VA NHP, due largely to its cool, wet climate and the many microclimates created by an array of complex terrain features (which allows northern species to live at much lower elevations than recognized by VA NHP...it is important to note that outside of the very small Powell Mountain Karst Preserve an intensive Biological Inventory has never been done in the High Knob Massif or Nettle Patch Project Area by VA NHP professionals).

The Nettle Patch Project Area (as recognized by the USFS) is trending back toward this type with every passing year; therefore, the USFS's reasoning to try to push this toward Pine-Oak is directly in opposition to nature. Only in edaphically pushed sites (with thin soil over rock or along cliff outcrops) do Pitch and Short-leaf pines try to dominate in this very mesic area (reference previous comments on this issue later in document).

2). Climate Of Nettle Patch Project Area & High Knob Massif:

The climate of the High Knob Massif area is the wettest in Virginia, wetter than indicated by PRISM or analogous models. The City of Norton Water Plant (data period 1983-present) has the highest annual mean precipitation of any location in Virginia outside of the massif. The Appalachia Lake Water Plant (data period 1985-present) has the second highest mean annual precipitation total reported in Virginia outside of the massif (i.e., locations within the High Knob Massif are significantly wetter than both Norton and Appalachia Lake water plant locations). The Big Stone Gap Water Plant, located in South Fork of Powell River Gorge, is trending toward having the second highest mean annual precipitation in Virginia (pushing the Appalachia Lake site to third highest) for places not within the High Knob Massif.

When including fog drip from trees and rime deposition on trees with the precipitation amounts observed above 915 meters in the High Knob Massif the effective mean annual input of moisture into the landscape is firmly within the 2000 to 2500 mm range.

All run-off and sedimentation estimates related to the Nettle Patch Project are based upon MUCH lower values, and also do not take into consideration that the Nettle Patch Project Area is northern slope dominated = naturally cooler, wetter conditions in the mean throughout the year versus locations with southern dominated exposures.

3). Microclimate Of Nettle Patch Project Area & Biodiversity Refugium Potential:

Wetness noted in comment 2, above, combines with cold air drainage and orographics to generate a cooler, wetter environment than would otherwise exist if the High Knob Massif were not present in this area (i.e., impacts extend beyond just the upper elevations).

Over time many species with northern affinities have made the massif and Nettle Patch Project Area their home, and indications are that it continues to attract northern species (such as with the Hermit Thrush observed now for consecutive breeding seasons, and Winter Wrens, by Dr. Philip Shelton of UVA-Wise) as the large-scale climate warms. It is essentially an island in the sky that is cooler and wetter than surrounding locations. The Nettle Patch Project Area, thus, needs to be professionally inventoried throughout all seasons before any activities are allowed.

Specifically, related to the large Clear Creek Basin, the nocturnal downslope flow of cold air typically taps lower dewpoint (drier) air aloft and allows it to drain downward to enhance the cooling at middle-lower elevations. During the day, by contrast, orographic lifting of air upward through drainages like the Clear Creek Basin allows air to cool (bringing temperature-dewpoint closer together). Collectively, these processes work to generate a cooler, wetter mean annual climate, allowing species with northern affinities to live lower in elevation than would otherwise be expected. This increases the extent of northern woods, and species with northern affinities, within the massif and Nettle Patch Project Area (which needs extensive study).

In a world with a warming climate places like the High Knob Massif, and northern slope dominated Nettle Patch Project Area, in specific, become increasingly important as both buffers against climate change and as refugia for biodiversity.

It is especially pertinent to understand that the complex terrain of the High Knob Massif, and of the Nettle Patch Project Area, frequently generates weather conditions which are different from the surrounding atmosphere (i.e., forming microclimates which are notably different from the surrounding mean climate of the region). Research suggests that places which often have conditions different from that of the surrounding, large-scale atmosphere become favored as buffers against climate changes and strong-holds for the preservation of biodiversity (Daly, et. Al, 2009).* These places are not detected by global climate models.

**International Journal of Climatology (2009), C. Daily et. al., Local atmospheric decoupling in complex topography alters climate change impacts.*

Since the Nettle Patch Project Area lies entirely within the 54,500 acre Clinch River Management Area, it is especially important to protect these headwaters of the most diverse river in the nation. Microclimates at the head of this diverse river are critical to sustaining downstream diversity of species, with alteration and disturbances of these microclimate habitats in past decades likely playing a role in the loss of numerous endemic species since flow dynamics of the Clinch River channel does not appear sufficient to explain the historic loss of species.

4). Old Growth In High Knob Massif Can Not Be Classified By Southern Region:

There is great need for more old growth in the High Knob Massif (allowing forests now to grow to become “new” old growth), but this cannot be classified as noted here:

“In June of 1997, the Regional Forester issued new guidance on the definition and management of old growth forest communities in a report entitled "Guidance for Conserving and Restoring Old Growth Forest Communities on National Forests in the Southern Region."”

Due to factors already cited above (via climate and complex terrain) old growth in the High Knob Massif is of a mixed-mesophytic character that trends toward Maple-Beech and northern hardwoods. Although both Central Appalachian & Southern Appalachian overlap of northern woods occur within the massif, the area as a whole (especially those basins such as Clear Creek, Burns Creek and Machine Creek, with dominant northern exposures) possess a character more like northern woods to the north (i.e., of the Central Appalachian Northern Hardwood type).

There is increasing evidence that the High Knob Massif is ideal, due to its diversity of microclimates, for development of old growth forests that can act as climate change buffers (Frey & Hadley, et. Al, 2016).*

*Ecology (2016), Frey S.J.K., and Hadley, A.S., et. al., Spatial models reveal the microclimatic buffering capacity of old-growth forests.

Old-growth is best developed naturally by working to unfragment the forest, not by creating new disturbance where previous disturbances have occurred.

Short-leaf and Pitch pines should be allowed to grow naturally along cliff lines and rocky outcrops where edaphic conditions favor their recruitment amid an otherwise mesic forest setting. Northern Red Oak will take its position with Sugar Maple, American Beech and Yellow Birch in the northern woods surrounding outcrops where Pitch and Short-leaf pines are currently found in association with other mixed species.

Reference additional comments below regarding old growth-unfragmented forests.

5). Opening The Viewshed Along Forest Service 238 – Osborne Rock Area:

A productive project as part of the Nettle Patch proposal would be to open the viewshed along Forest Service 238 at Osborne Rock where a historically scenic view has been seen and enjoyed by residents, photographers, and tourists prior to growth of small woody species along the roadway (related to past disturbances).

6). Deficiencies Of Nettle Patch Project DEA:

Given comments above, and those noted below submitted previously, the deficiencies associated with the new Draft Environmental Assessment are many.

These deficiencies are rooted in a lack of recognition for the climatic wetness and coolness of the Nettle Patch Project Area (with under-estimates of run-off and sedimentation rates), the type of ecosystem this wet-cool climate supports (naturally trending toward Maple-Beech dominated northern hardwoods), the significance of this in a world of warming large-scale climate, as well as implications this lack of recognition has to biodiversity within the Clinch River Management Area (recognized as the most biodiverse in the USA). In addition, these deficiencies are rooted in a complete lack of recognition for the massive anthropogenic disturbances surrounding the Clinch Ranger District (of the Virginia coalfields).

Knowing that the High Knob Massif is the wettest area in Virginia, and that it possesses a unique topography via having a great width with many elevated valleys, hollows, drainages-gorges that can act to often make places within it different from the surrounding atmosphere, the currently proposed Nettle Patch Project is in nearly complete opposition to what needs to be done to take advantage of these known scientific facts. Here exists a beautiful potential to work with nature and accelerate the natural trends currently being observed since past disturbances occurred.

Collectively these scientific facts make the High Knob Massif the number one area in western Virginia for conservation of biodiversity (as I often tell forecasters, elevation alone is NOT the only aspect that is important). Unfortunately, recruitment of “Yellow Pine” within northern slope dominated basins in the wettest terrain in the state of Virginia via burning 1400+ acres where a natural fire has never been documented (i.e., the Nettle Patch Project Area) is in opposition to the type of biodiversity conservation needed. Cutting over hundreds of acres in order to promote commercial oak recruitment within this mixed-mesophytic forest where nature is clearly developing northern hardwood forest is in opposition to the type of action needed for biodiversity conservation. Arguments for “open” areas in the forest fade into absurdity when viewing the massive areas of strip-mined, logged, and developed lands surrounding the Clinch District on all sides. The Clinch of the High Knob Massif and Pine Mountain need to be managed for intact forest ecosystems to counter these massive, anthropogenic disturbances (more so than within any other ranger district in Virginia).

Given the importance of the Clinch-Powell River Management Areas, centered upon the High Knob Massif, priorities need to be shifted toward conservation and a reduction of roads and extractive activities as currently exemplified by the Nettle Patch Project. Removal of invasive species created by past disturbances related to logging needs to be done but not via more logging and large-scale burning. Opening of the scenic viewshed is appropriate along the already existing Route 238 in the Osborne Rock area.

It is my hope that you will consider this big picture and shift the currently proposed Nettle Patch Project toward conservation and recovery of its natural environment in a manner that is consistent with currently observed trends in nature.

Objections To The Nettle Patch Project Proposal

- Objection One - Is related to the Jefferson National Forest Revised Land and Resource Management Plan (from 2004) which is outdated and becoming obsolete in wake of a changing climate, a changing economic base in the Clinch Ranger District with emphasis shifting increasingly toward a tourism based economy, and a lack of recognition for what the High Knob Massif (the large, entire mountain mass) represents from perspectives of the natural sciences (which includes its climate).

Activities being proposed by the U.S.D.A. Forest Service Plan have not, and do not, take into account changes in climate and economic conditions. Actions proposed by the Nettle Patch Project will increase carbon input into the atmosphere via both burning of biomass and fragmentation of a forest habitat trying to recover from massive anthropogenic disturbances throughout past decades.

These actions have not considered larger community initiatives toward developing a tourism based economy centered upon the High Knob Massif, since it remains the best and most valuable resource where outdoor recreation can be focused within an area where massive mining of coal, timber cutting, and gas well drilling have been dominant for more than a century. Thus, lacking these considerations, there are too many roads, gas wells, and other activities (such as timber cutting) on public lands which fragment the natural environment of the High Knob area. The Nettle Patch Project, as currently proposed, will add to this history of man caused disturbances.

The climate of the High Knob Massif has never been accurately represented in any forest planning, with previous values listed for annual snowfall and rainfall being far less than actual values observed and recorded (a USDA weather station located in Wise does not represent, in any way with accuracy, the climate of the High Knob Massif, especially the upper elevations, cold air drainages, and high valleys).

Activities based upon such erroneous assumptions, via attribution of the climate of the High Knob area as being analogous to other places in Virginia, are dangerous to both its environment and the communities surrounding the many watersheds which are contained within its sprawling mountain mass.

A most disturbing fact is that the USDA Forest Service has never considered the setting amid which the High Knob Massif is located, within a coalfields region where massive disturbances of the environment are widespread. The Clinch Ranger District, given this fact, should be striving for large tracts of unfragmented forest and place the main emphasis of work upon increasing scenic and recreational opportunities that do not fragment or destroy existing habitat (allowing past disturbances to be healed over time and reclaimed by nature with help from decommissioning of specific roads that currently fragment the forest and allow invasive species to increase). Instead, the Nettle Patch Proposal would only continue this pattern of degradation. Eventually, it might be learned that tourism based outdoor recreation generates more money for local economies than extraction of timber and forest fragmentation.

- Objection Two - Is related to the disruption of the natural habitat..."many mixed hardwood stands in the Project Area are gradually converting towards later successional shade tolerant species, such as maple and beech."

That this is occurring is the natural tendency amid the wet, seasonally cool climate of the Nettle Patch Project Area of the High Knob Massif. If left alone this is the natural trend and will eventually lead to a more complex forest ecosystem that will be capable of enhanced sequestration of carbon (reducing input into the atmosphere), output of oxygen (improving air quality), water holding capacity (reducing flash flood severity and frequencies) as well as scenic quality (e.g., autumn coloration will continue to be enhanced by brilliant maples and rustic beeches...among many other mesic species).

In reality, as E. Lucy Braun well documented in the 1930s, the climax state of the Cumberland Mountains is Mixed-Mesophytic in nature. This means that the current trend observed in the Nettle Patch is working toward restoration of this previously disturbed (by man) habitat back toward its natural climax state.

How did the most diverse temperate deciduous forest on the North American continent ever develop in this area without management by man?

Please answer this question completely.

- Objection Three - Is with this statement..."Areas that were once dominated by early successional, shade intolerant yellow pine such as shortleaf and pitch pine are being lost due to insect attack and encroachment of mountain laurel and rhododendron."

This is simply absurd. Early successional habitat was only created by man caused disruption of the natural habitat. By blatant and vast clear cutting around-after the turn of the twentieth century, and by repeated disturbances since that time via road building, timber cutting, and other activities that fragment the forest ecosystem.

Anyone from this area who has knowledge of the forests of the Cumberland Mountains knows that shortleaf and pitch pine have always been limited in nature and generally restricted to the rocky outcrops. It is once again absurd to force a naturally trending mixed-mesophytic habitat toward growing these species (outside of allowing them to naturally grow along cliff lines). This will do much more harm than good, and if done will result in a larger disturbance to the forest ecosystem and an increased number of standing dead pines in future years when these also are lost to insect attack and death amid an un-natural place for them to grow.

- Objection Four - "There is a need to increase structural heterogeneity and improve early successional habitat while maintaining the resiliency of the mid and late seral successional habitat."

When looking at the High Knob Massif, as a whole, and the Cumberland Mountains, there is more than enough early successional (and highly disturbed) habitat. The need is for more late successional-climax forest which is unfragmented in nature where biomass can accumulate over

time and slowly decompose as nature intended. The greatest resiliency would be within such a setting, but perhaps even of greater significance in this region is increased climax and old growth-unfragmented habitat in the High Knob Massif and Pine Mountain could help to offset the huge imbalance currently existing with all the surrounding strip-mined lands.

- Objection Five – "There is a need to reduce stand density and open the canopy in the Project Area to sustain forest health, facilitate pine and oak regeneration, increase tree vigor and growth, improve wildlife habitat, enhance vegetative diversity and minimize insect and disease attacks. There is a need to reduce current infestations and future spread of non-native, invasive plants."

Once again, it is simply the epitome of absurdity to generate more disturbance of a forest ecosystem that is naturally in recovery mode (moving back toward it's natural climax state) in order to try and correct past disturbances which caused these problems. Invasive species, for example, tend to be highly limited within unfragmented forest habitats, especially those which are in or approaching their natural climax state. That this is not the case in portions of the Nettle Patch area shows that it has already been highly disturbed by man.

While the definition of forest health varies depending upon motives of the interested parties, it seems illogical to "facilitate pine and oak regeneration" in an area where the natural trend is toward mesic species given that the Nettle Patch Project Area is part of the wettest terrain in Virginia and dominated by cool, northern exposed slopes and cold air drainages.

This is not Oklahoma or the Western USA, southern yellow pine species tend to be relegated to rocky-cliff line habitats and do not naturally occur in the forest ecosystem which is dominated (in the Nettle Patch Project Area) by mixed-mesophytic species.

Since part of this "facilitation" is via prescribed fire (woodland) on 1,118 acres and prescribed fire (site prep) on an additional 337 acres, this truly reaches the pinnacle of absurdity amid the core of the wettest terrain in Virginia where natural fire is a very rare occurrence (the [USDA Fire Database](#) itself shows that no natural fires have ever been documented within the Nettle Patch Project Area going back through the 1980's and beginning of the fire database).

Burning 1455 acres in the wettest terrain in Virginia is ridiculous, to say the least, and shameful on part of a government agency that should be acting as a national and global leader in striving to reduce greenhouse gas emissions instead of contributing to them.

Given this, there is no justification for this type of harmful action on such a large-scale.

- Objection Six – "Stand improvement/mechanical and pesticide application of 464 acres of shade tolerant mid and understory to provide diffuse sunlight require for oak regeneration culturing....1155 acres of Prescribe fire treatment and site prep to facilitate yellow pine and oak potential regeneration, maintain the yellow pine forest type, and improve wildlife habitat."

Once again this is working against the "grain" of nature and trying to force a natural, mesic (wet

habitat) ecosystem into something that is un-natural for it. Left alone, given time, the natural state begins to emerge and the increases observed today in mesic species shows that this is indeed the case. This is not eastern Virginia or the dry (by comparison with the High Knob Massif) central-northern parts of the state. The outdated Jefferson Forest Plan has never taken local wetness into account with respect to management, and again this illustrates that point very well. In this case, ignorance of the facts is not bliss but harmful to both the environment and objectives of local communities striving to increase visitation to what could be a prime recreation-travel destination.

- Objection Seven – The Nettle Patch Project Proposal From A Climate-Biodiversity Perspective.

The High Knob Massif is the wettest area in Virginia, with the City of Norton being the wettest location in Virginia possessing an official National Weather Service rain gauge (outside of the High Knob Massif, the City of Norton Water Plant measuring site is the wettest location in all of Virginia with precipitation records / it tends to receive significantly less than the massif).

The driest years on record in the High Knob Massif, including adjacent sites such as the Head of Powell Valley, Appalachia Lake Water Plant and the City of Norton Water Plant, are near to or above the annual average precipitation of most places across the Old Dominion.

Mean annual SSW-SW air flow trajectories, in combination with SW upslope flow and channelization, are key in long-term wetness with limited upstream moisture extraction occurring via other terrain features between the High Knob Massif and Gulf of Mexico.

Precipitation enhancement during the cold season on SE air flow trajectories, with upslope flow and channelization in combination with an occasional Thermally Indirect Mesoscale (TIM) Circulation (unique to the High Knob Massif), adds to long-term wetness.

The High Knob Massif, Town of Wise, and City of Norton are the snowiest locations in Virginia for any location, town, or city, and the snowiest in the southern Appalachians for their respective elevations. Excellent exposure on northerly air flow trajectories, in combination with SW Upslope and TIM Circulations adds to long-term snowiness.

The atypical width of the High Knob Massif plays a vital role in seeder-feeder processes related to orogenic precipitation enhancement, including enhanced riming during the cold season of both snowflakes and upright objects (trees and vegetation).

Cold season rime deposition on trees, and fog drip from trees during the warm season, are important secondary moisture sources in the High Knob Massif that greatly add to its already wet, annual precipitation budget. Increasing the number of large trees will only enhance this via mathematical calculation of surface area for moisture extractions.

Cold air drainages, which are not recognized by the USDA Forest Service, possess unique mixtures of flora & fauna that greatly add to the biodiversity of basins such as that of Clear Creek, Machine Creek, and Burns Creek of the Nettle Patch Project Area. Basins like these have

never been systematically studied in any extensive and intensive manner.

Nocturnal temperature inversions and decoupling of boundary layer winds are factors in cold nights, with the High Knob Massif possessing many elevated coves, valleys, and hollows with settings favorable for cold temperatures throughout the year under such conditions.

The above factors, plus many more, suggest that the High Knob Massif may have been and could again act as a climate change refugium for many species of flora and fauna. This being best supported by increasing old growth-unfragmented habitat within the High Knob Massif.

The current Nettle Patch Proposal either does not recognize or is in opposition to these facts.

Final Comment

While I believe the High Knob Massif needs to be protected, with the primary focus placed upon low impact recreation and tourism-based nature activities, if any logging is done I only support uneven-aged harvesting of selected trees via low impact extraction such as with horses and helicopters.

There is great need for increasing old growth habitat and unfragmented habitat (that means protecting current roadless areas and increasing them over time by decommissioning roads that currently fragment the forest in selected areas to form larger blocks of contiguous forest (unbroken by roads of any type).I would like to receive any EA and all reports that are published on this project.

Thank you.

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