

Forest Service
Attn: Forest Plan Revision
Custer Gallatin National Forest
10 E. Babcock
Bozeman, MT 59715

Please accept my comments:

May 6, 2019 Nature's dangerous decline "unprecedented", species extinction rates "accelerating" "The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwid. This report is from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). It is not too late to make a difference, but only if we start now at every level from local to global"

With this the strongest warning to date about the health of ecosystems and the species that depend on them I am commenting to the forest service to secure the strongest ecosystem protections for the Greater Yellowstone Ecosystem in Montana. The decisions on the health of this precious ecosystem are in your hands.

After reviewing the various alternatives and the data that goes with the alternatives, many of which will allow more development, more resource extraction, more recreational impacts, and less wilderness, less secure wildlife habitat, and less protection of watershed, wildlife and wildlands, I am going to focus on Alternative D. This alternative gives the greatest protection of this national treasure, the GYE in Montana.

All the other alternatives leave far too much good wilderness off the table and allow continuing cumulative impacts to the ecological integrity of the Greater Yellowstone Ecosystem.

Alt D takes resource exploitation off the table for a lot of the forest. Here's what it would do:

- Protect most of the Gallatin Range, including the Buffalo Horn Porcupine area as wilderness.
- It would recommend wilderness for portions of the Llonhead,
- Cowboy's Heaven,
- Crazy Mountains,
- Bridger Range,
- Pryor Mountains, and
- Tongue River Breaks in eastern Montana
- as well as key additions to existing wilderness such as Emigrant Peak, Dome Mountain, Tie Creek, Deer Creek, Rock Creek, Line Creek Plateau, etc. to AB Wilderness,

Only Alt. D protects the ecological integrity of the forest. Protecting the ecological integrity of the CGNF is the most important criteria for conservation. Ensuring ecological integrity is my prime goal.

Wilderness is the Gold Standard for conservation and is the best way to protect the incredibly important Greater Yellowstone Ecosystem (GYE). Alternative D would minimize new intrusions and the cumulative impacts associated with increasing recreational and resource extraction associated with all other alternatives.

I am submitting more detailed comments on many issues that need to be addressed in the Custer Gallatin Forest Plan.

Climate Change and the Ecological Health of the GYA

How healthy is Greater Yellowstone today and what is its prognosis looking ahead?

The first comprehensive examination of that question was published in the scientific journal **EcoSphere, Yellowstone, Wildland Health Index; Ecosphere, August 2018; Dr. Andy Hansen and Linda Phillips Montana State University.** It focused on 35 key “vital signs” ranging from snowpack and rivers (water) to forests, fire, wildlife and aquatic species such as fish.

The report determined that the “Greater Yellowstone’s ecological health is challenged by growing use by people and changing climate. This report said:

- “...changes in land use and climate have reduced snowpack and stream flows, increased stream temperatures, favored pest outbreaks and forest die-off, fragmented habitat types, expanded invasive species, and reduced native fish populations,”
- That report also noted that national parks and wilderness are best able to sustain an ecosystem when the effects of climate change are factored in.
- This report about many negative impacts due to climate change raises enormous questions for the CGNF and the forest plan. The forest plan will need to address, the issue of land usage and determine if the GYA is better protected for sustainability, now and for the length of the plan- 20 to 30 years by giving many important areas wilderness designation.

Another report from the University of Montana was published in the **Proceedings of the National Academy of Science, March 11, 2018 Wildfires and climate change push low-elevation forests across a critical climate threshold for tree regeneration** Kimberley T. Davis et al. This is a study on climate change. That report drew the following conclusions.

- Species that require snow will be especially impacted: “Projections for the coming century suggest more precipitation as rain rather than snow, which will have substantial impacts to snowpack across the GYE. The net balance of the projected increases in temperature and precipitation results in a 36 percent

reduction of the average total annual snowpack during 2070–2099 relative to 1970–1999.”

- The greater GYE will have higher temperatures for longer periods and will have a 36% reduction in annual snowpack
- Climate change will also change vegetation. With hotter drier weather patterns there will be more fire. The aftermath of the fires could lead to vegetative changes
- Climate change in the American West may be crossing an ominous threshold, making parts of the region inhospitable for some native pine and fir forests to regrow after wildfires, new research suggests.
- As temperatures rise, the hotter, drier air and drier soil conditions are increasingly unsuitable for young Douglas firs and ponderosa pines to take root and thrive in some of the region's low-elevation forests,.
- Wildfires in these areas could lead to abrupt ecosystem changes, from forest to non-forest, that would otherwise take decades to centuries, the study says.
- "Once a certain threshold was crossed, then the probability of tree establishment decreased rapidly," said Kimberley Davis, a researcher at the University of Montana and lead author of the study. "The climate conditions are just a lot less suitable for regeneration."

This study that links climate change and forest tree revegetation failure could have huge implications for the CGNG and the future of the GYE in Montana. Scientists have been studying the work of Dr. Davis research project and looking at her evidence.

- Ecologists have been predicting this kind of climate-linked tree regeneration failure for years, says Forest Ecologist Andrew Larson. He wasn't involved in Davis' research project, but says Davis is the first person to go beyond just hypotheticals.
- "Nobody else has managed to find this sort of evidence yet," says Larson. "So it's right on the cutting edge of ecosystem change across the West."
- Larson says Davis' work reveals that changes in forest regeneration that scientists had been predicting would happen by 2040 or 2050 are already happening.

A government report, **Climate Change vulnerability and adaptation in the Northern Rocky Mountains** ; Holofsky et al. reports on a breath of issues that will likely affect the Rocky Mountains;

- decreasing snowpack
- declining summer flows and the effects on fishery flows, recreation, habitat ect
- increased air temperatures and gradual changes in the abundance and distribution of tree, shrub and grass species
- wildfires
- insect outbreaks

- the need for a "hedge your bets" strategy

The report states that little direct data exists on the direct effects of climate variability changes on:

- **wildlife species** and what is known on those species. A focus on wildlife that will be affected like the Canada Lynx, fisher and wolverine and their prey species. All aspects that affect their best long term survivability need to be studied. For example, what is the effect of recreation on these species? Changes in habitat; vegetation, loss of soil moisture? This data needs to be collected, monitored and analyzed. The plan needs to consider indirect and cumulative impacts
- The study also says that adaptation strategies for wildlife are focused on maintaining adequate habitat and healthy wildlife populations and increasing knowledge of the strategy for most species...connectivity is an important conservation strategy for most species in the Northern Rockies.

2017 MONTANA CLIMATE ASSESSMENT Bozeman and Missoula MT: Montana State University and University of Montana, Montana Institute on Ecosystems made the following projections;

- Average temperature Since 1950, average statewide temperatures have increased by 0.5°F/decade (0.3°C/decade), with greatest warming in spring; projected to increase by 3-7°F (1.7-3.9°C) by mid century, with greatest warming in summer and winter and in the southeast. Maximum temperatures have increased most in spring and are projected to increase 3-8°F (1.7-4.4°C) by mid century, with greatest increases in August and in the southeast.
- Extreme heat days are projected to increase by 5-35 additional days by mid century, with greatest increases in the northeast and south. Minimum temperatures Minimum temperatures have increased most in winter and spring and are projected to increase 3-7°F (1.7-3.9°C) by mid century, with greatest increases in January and in the southeast.
- Frost-free days Frost-free days are projected to increase by 24-44 days by mid century, particularly in the west

Present and Future Climate Change in the Rocky Mountains

www.rockymountainclimate.org/reports_6.htm September 2014 Union of Concerned Scientists and Rocky Mountain Climate Organization

Temperatures have risen more in the Rocky Mountain region than in the nation as a whole over the past 20 years.

- Exceptional heat and dryness from 1999 to 2003 triggered major impacts on forests.
- Projections show that temperatures will continue to rise, even with significant cuts in heat-trapping emissions. If emissions remain unchecked, temperatures could rise twice as fast.

Climate Change and Wildlife

The CG forest plan does not adequately address the effects of climate change on wildlife. An example of the lack of action is how little protection there is for the wolverine. Over 3 years ago Judge Christensen said; "No greater level of certainty is needed to see the writing on the wall for this snow-dependent species standing squarely in the path of global climate change" ... "take action at the earliest possible time to protect against the loss of biodiversity...for the wolverine, that time is now"

The science on wolverines says they use the entire Gallatin Range and they avoid roads, snowmobile trails, logged habitat and areas of high human use. Only Alt D gives wolverines, with an incredibly small population of 300 in the U. S. the best chance to survive climate change and human presence. Forest Service monitoring of the wolverine is inadequate. Has the USFWS conducted an analysis of the indirect and cumulative impacts to wolverine of all of the alternatives?

The Forest Service monitoring question is, "what is the trend in persistent snow" It will be measured by looking at "NRCS Snowtel Sites (5 yr intervals)"

The Forest Service response to this snow dependent species facing climate change is inadequate; nothing about the impacts of recreation, no direct, indirect or cumulative analysis of the impacts of the other alternatives, other than saying Alt D is the most protective.

For this reason alone, Alternative D should be selected.

These climate change studies all project the same future conditions that will be present in the 20-30 year length of the Custer Gallatin Forest Plan. Unfortunately, the plan does not adequately address the issue.

The Draft EIS states on page 151

- “For example, dry forests that already occur at the edge of their climatic tolerance are increasingly prone to conversion to non-forests after wildfires due to regeneration failure (Stevens-Rumann et al. 2018).
- This trend is likely to continue in the future across all forest types as large wildfires remove local seed source and suitable climate space for tree regeneration becomes increasingly rare (Bell et al. 2014, Harvey et al. 2016b, Andrus et al. 2018). Page 151
- “Indeed, the ponderosa pine systems of the pine savanna ecosystems have experienced high rates of cover type conversion due to recent fires. In Ashland, for example, in the 1990s approximately 219,214 acres were classified with forest cover, in 2012 approximately 116,708 acres were classified as forested. The net change is an almost 50 percent reduction of the forest cover from what occurred in the 1990s (U.S. Department of Agriculture 2014).”
- Conversion to non-forest is a most-crucial insight. It points to a significant risk for the future of trees, in this case the future of ponderosa pines. Specifically, it identifies a risk that ponderosa pines may not or simply can not be resilient after disturbance *such as* fire.

If the ponderosa won't be resilient, what tree will? Apparently not the Douglas fir. Confirming a trend already cited with the DEIS above reference to Stevens-Rumann et al, a recent 2019 PNAS study (Davis et al, “Wildfires and climate change push low-elevation forests across a critical climate threshold for tree regeneration.” pdf attached) found that, basically, the same hot, dry conditions favorable to fire are unfavorable to post-fire survival of Ponderosa pine and Douglas fir seedlings alike. This leaves the question of what tree species might be resilient in the hot dry conditions where the two conifers aren't. It's important to have answers to this question because, as the DEIS plainly states, “*Resilience* is defined as the degree to which forests and ecosystems can recover from one or more disturbances without a major shift in composition or function” Page 151

Resilience is clearly not evident on the Ashland, which has already lost 50% of its tree cover. This already evident conversion to non-forest, especially in light of findings by Stevens-Rumann et al (2018) and Davis et (2019 pdf attached), raises a tightly related management question that is nicely spelled out in the DEIS: “Approaches to address forest and ecosystem management in the face of an uncertain and variable future **should be flexible**, emphasize ecological processes; **and have the capacity to change**, and to adapt, to new information as it becomes available (Millar et al. 2007).

At this point, where resilience of Ponderosa pine and Douglas fir may well be a lost cause, **management flexibility** and **capacity to change** must move beyond the conifers at risk.

For example, in the case of the Ashland, the DEIS would have us believe that, “While most of this area will likely regenerate naturally or with planting efforts, ...” Well, yes, but given the information recently available, it is also likely that the affected acreage will remain unforested if the Custer Gallatin National Forest pins its hopes for the Ashland on seeding of Ponderosa pine and/or Douglas fir. Again, the likely and even expected future of hot, dry conditions favorable to fire are also unfavorable for seedling survival in these needleleaf trees. This expected future, as you likely know, has been documented; e.g., “Increasing air temperature, through its influence on soil moisture, is expected to cause gradual

changes in the abundance and distribution of tree, shrub, and grass species throughout the Northern Rockies, with drought tolerant species becoming more competitive.” (Keane et al)

National Academies of Sciences Fourth National Climate Assessment, March 2018, Kim Davis’s study was published March 11 in the *Proceedings of the National Academy of Sciences* Wildfires and climate change push low-elevation forests across a critical climate threshold for tree regeneration Kimberley T. Davis¹, Solomon Z. Dobrowski¹, Philip E. Higuera¹, Zachary A. Holden¹, Thomas T. Veblen¹, Monica T. Rothermel¹, Sean A. Parks¹, Anna Salas, and Marco P. Maneta

- We found that regeneration exhibited a threshold response to annual climate conditions and the forests we sampled crossed these climate thresholds in the past 20 years, resulting in fewer recruitment opportunities through time. In areas that have crossed climatic thresholds for regeneration, stand-replacing fires may result in abrupt ecosystem transitions to nonforest states.
- After a fire, all kinds of grasses, shrubs and trees have a blank slate to recover. But trees, especially low-elevation species, need more soil moisture and humidity than their smaller plant cousins. Before the mid-90s, those good growing seasons rolled around every three to five years. The study shows such conditions have evaporated on virtually all sites since 2000.
- “The six sites we looked at in the Bitterroots haven’t been above the summer humidity threshold since 1997,” Higuera said. “Soil moisture hasn’t crossed the threshold since 2009.”

Given the information recently available, natural regeneration is likely wishful thinking, and planting of seedlings is likely an exercise in futility. And, moreover, in direct contradiction to above claims for natural regeneration and planting, the DEIS immediately follows those claims by adding that, **“it is likely that a significant portion will remain unforested for at least the next few decades due to a lack of seed source.”** **“Page 151**

Management change and flexibility thus requires planning for trees capable of resilience under the expected hot, dry climate conditions where the conifers are likely to fail.

More specifically, management change and flexibility requires the Custer Gallatin National Forest to consider the bur oak, a native Montana tree. The DEIS makes no mention of the bur oak.

These conditions beg the question, What about wildlife? Where will they go, how will they survive? Policy and management have focused primarily on ... fire suppression and fuels management. These strategies are inadequate to address a new era of western wildfires.

The best management in the Gallatin, Bridger, Crazy ranges and other large intact ecosystems is to leave them alone; use only management that benefits the ecosystem and best shields it from the impacts of climate change. Let it be said that the best that is in your power was done.

The CGFS plan will be in effect for 20 years, or 30 if it follows the current plan timeline. The plan must address the effects of a hotter, drier climate and the effects on habitat, especially with tree regeneration less certain. Species that require forest habitat, like grizzly, lynx, moose and others, this loss of forest habitat is critical. The CGNF needs to anticipate and plan for the possible inevitability of habitat turning from forested to grassland/scrublands.

This will be very important for wildlife species that require large habitats and need to be able to move, like the grizzly. To safely move, they will need corridors that provide linkage to other large protected areas with intact ecosystems like the Northern Rockies Ecosystem or the Salmon-Selway.

Corridors

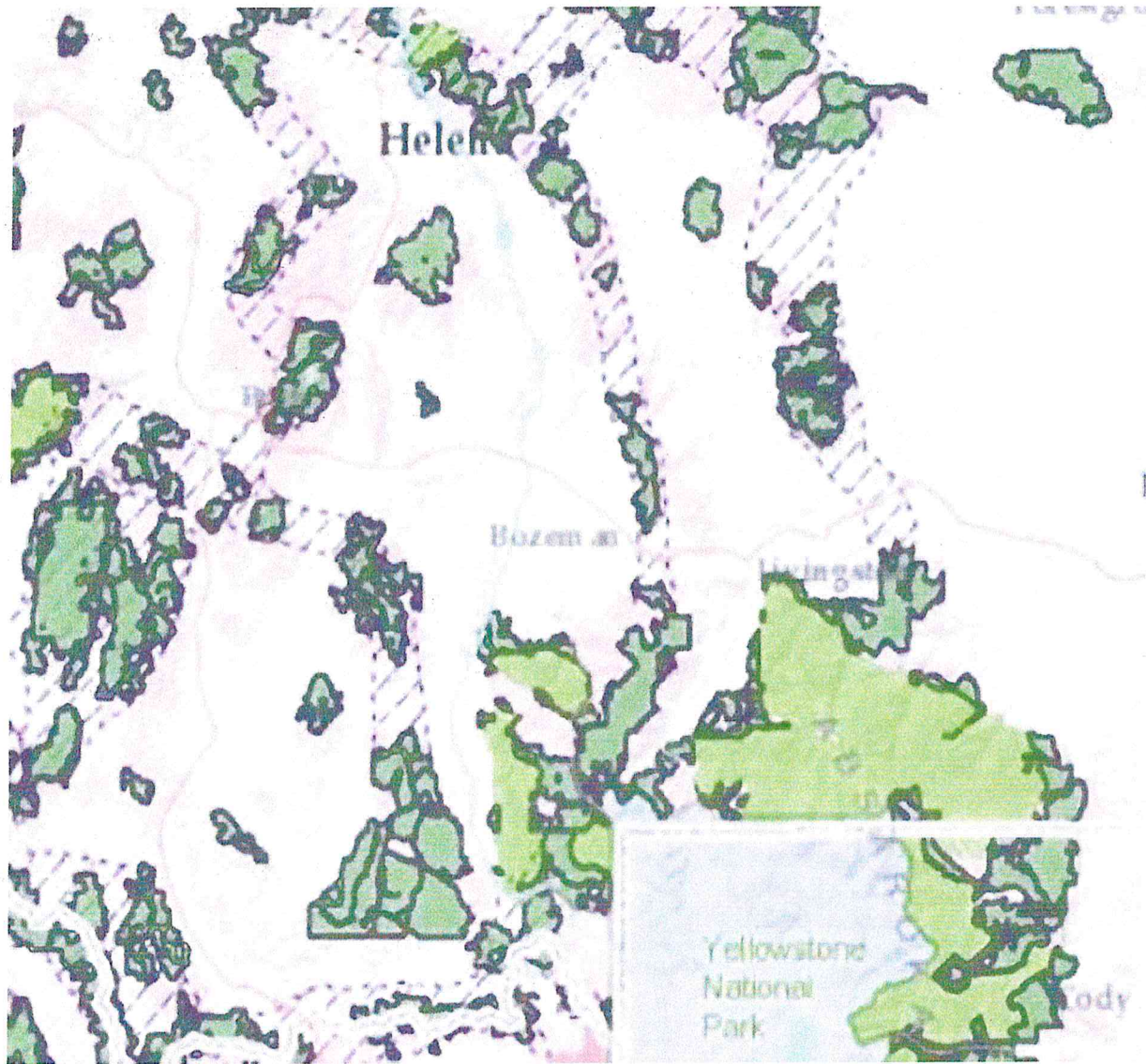
Corridors provide linkage.

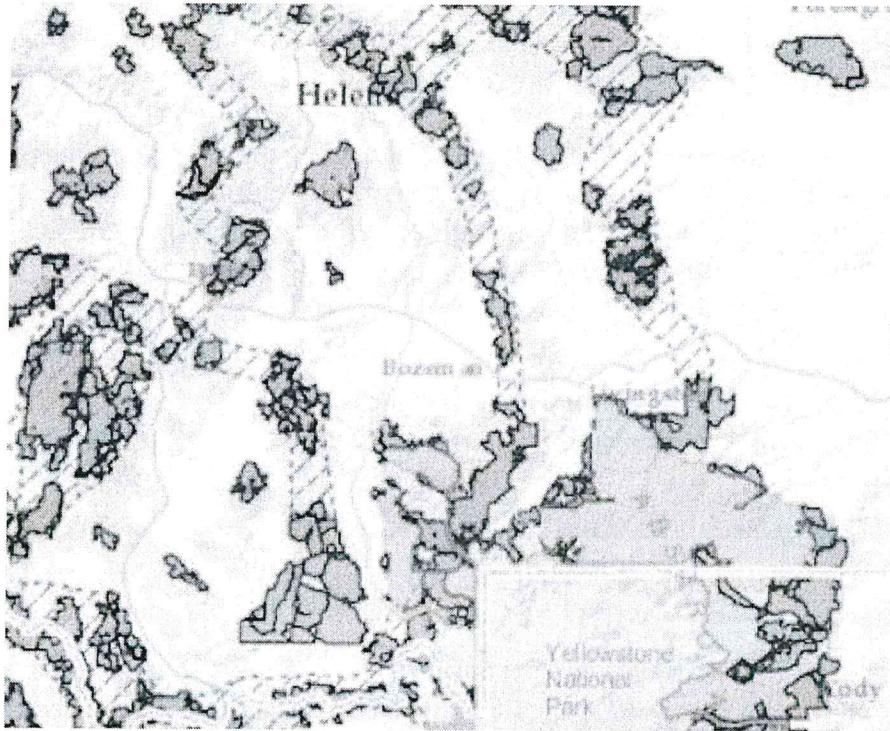
When conditions in part of the ecosystem change, wildlife needs to be able to move. Corridors are necessary to provide the following functions:

- corridors provide movement between protected areas
- corridors knit together areas and give wildlife the best chance for survival.
- corridors need to give wildlife the ability to move north, which is likely with increased temperatures with climate change.

But corridors need to be available where wildlife needs them. For example,

- corridors need to connect to other protected wilderness areas
- In the CGNF, corridors, need to link with the northern Rockies and the Salmon Selway.
- These corridors are studied in a PLOS research paper; [Identifying Corridors among Large Protected Areas in the United States](#)
- Corridors have been mapped and the mapping is based on wildlife movement modeling
- Models are consistent. Here is a map of the Gallatin-Bridger-Big Belt corridor and the AB-Crazy-Little Belt corridor.





- This is the Northern Rockies Ecosystem Protection Act (NREPA) map of the section that is in the CG forest. It shows the connections/corridors for wildlife..
- We must ask for wilderness through the Gallatin Range and the west side of the Bridger Range and in the Crazies, no other land classification will protect the integrity of the corridor and habitat connectivity for wildlife.
- **NREPA has been introduced into Congress by Rep. Carolyn Maloney from New York.**

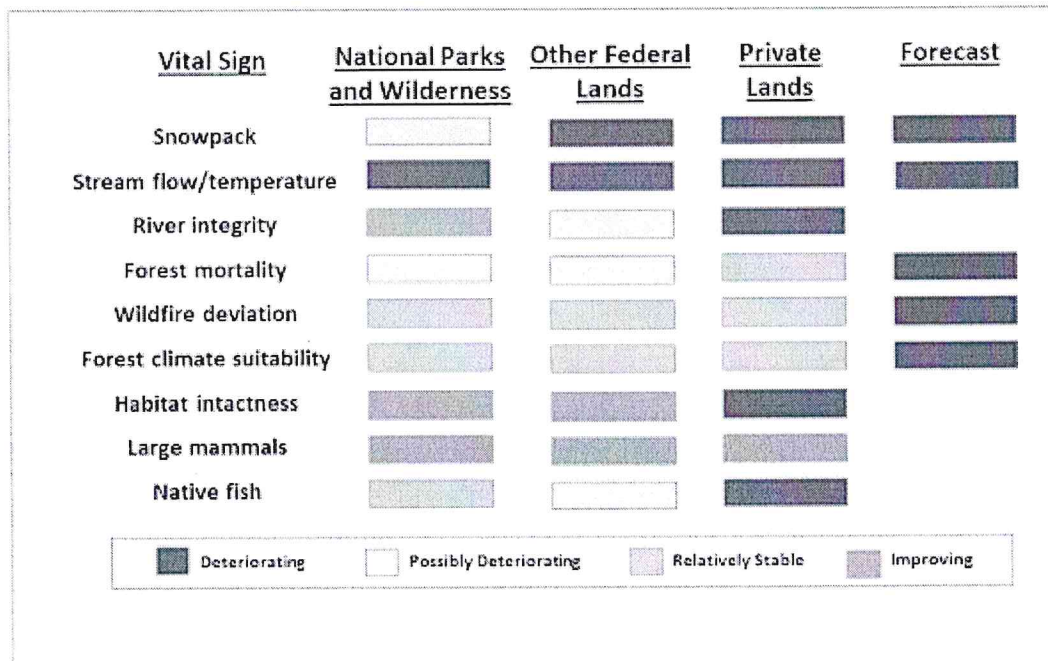
Habitat Fragmentation and Wildlife

The effects of habitat fragmentation were featured in a recent scientific report prepared by researchers Andrew Hansen and Linda Phillips at Montana State University. They concluded:

- species to varying degrees will have their range and distribution affected by climate change and development. Hundreds of others could be added to the roster of impacted animals.
- "On private lands, in contrast, vital signs relating to snow, stream flow and temperature, river condition, native fish, and wildlife habitat were rated as deteriorating," they conclude.
- "Even within designated protected areas, wildlands are being reduced due to downgrading, downsizing, and degazettement. Currently, 33 percent of the global












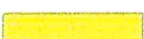
























protected area coverage is under intense human pressure,” the EcoSphere article notes.

- The following chart shows different land classifications and the protective values of each. It is clear that National Parks and Wilderness are the most protective. The CGNF needs to put critically important lands (corridors/connecting lands) in that category, and other areas such as the Porcupine/Buffalo Horn. The chart below is quantified and from MSU Hansen, Phillips.



Habitat fragmentation caused from human use is also an issue addressed in; Wilderness, Wildlife, and Ecological Values of the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area, Dr Lance Craighead. He states;

- Most wildlife species, particularly those prized for hunting, viewing, and photographing, are sensitive to human-caused disturbance and habitat alteration.
- The amount of disturbance to wildlife caused by trail users is greatest from all-terrain vehicles (ATVs) or offroad vehicles (ORVs) followed by mountain bikes, horseback riders, and hikers according to most existing studies
- Disturbance due to human activities reduces the amount of habitat available for use by wildlife, increases stress, and depletes energy reserves, thus reducing the carrying capacity of the habitat: the best habitat for wildlife is found in areas with the least human disturbance.

<u>Vital Sign</u>	<u>National Parks and Wilderness</u>	<u>Other Federal Lands</u>	<u>Private Lands</u>	<u>Forecast</u>
Snowpack				
Stream flow/temperature				
River integrity				
Forest mortality				
Wildfire deviation				
Forest climate suitability				
Habitat intactness				
Large mammals				
Native fish				
 Deteriorating  Possibly Deteriorating  Relatively Stable  Improving				

- To ensure that wildlife have sufficient habitat for population persistence into the future, and to confer resilience in the face of climate change and land use change, there must be an adequate amount of protected habitat available among the spectrum of lands that are accessible to those wildlife.
- The more permanent that protected habitat is, and the larger the area is, the more certainty there is that wildlife populations can persist.
- Fragmenting the HPBH WSA into smaller pieces of protected habitat would greatly diminish its value for wildlife habitat and the provision of ecosystems services, and could nullify its ability to function as a refuge from climate change. Wilderness, Wildlife, and Ecological Values of the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area, Dr Lance Craighead
- The above mentioned document is not in the CG forest plan reference list. I have brought my copy to every meeting with the Forest Service, stating the importance of this document. The Forest Service has always said that they know of it and have read it, so why is it not listed as a reference?

What has been done to address the effects of habitat fragmentation and connectivity?

NREPA, but it is not the only wildlife corridor conservation act

Udall, Beyer Introduce Wildlife Corridors Conservation Act To Safeguard America's Biodiversity

December 8, 2018 - 8:45am

U.S. SENATE News:

- introduced the Wildlife Corridors Conservation Act of 2018 to protect and restore fish, wildlife, and plant species, in particular, those that are at risk to habitat loss and fragmentation--a major factor in species decline and extinction.

Montana Connectivity Project: Statewide analysis Executive Summary-October 2011

Corridors are recognized as a national issue and have long been a Montana issue. Here are excerpts the Montana Connectivity Project: Statewide analysis Executive Summary-October 2011

- the connectivity project was started following the initial work on the Crucial Areas Planning system(CAPS). As one of the first states to begin working on the Western Governors Association's(WGA)Crucial Habitat and Corridors Initiative, Montana began examining species and habitat connectivity at the landscape level in 2008...work was largely completed in 2011

- the top five ranked species for each ecotype combination were selected as candidate focal species.
- the final focal species list was designated with the assumptions that: satisfying the connectivity needs of these species will satisfy the connectivity needs of most vertebrate species in Montana
- Forest generalist black bear, elk, grizzly, mountain lion, mule deer
- Forest specialists lynx, moose, wolverine, Cassins finch
- grassland/shrub pronghorn, swift fox, ferruginous hawk, Baird's swallow, long billed curlew, mountain plover
- riparian piping, rough legged hawk, Townsend big eared bat, trumpeter swan, northern leopard frog
- alpine rosy finch

Connectivity and corridors are recognized nationally, regionally and by the state, but this is not adequately covered in the cg forest plan.

Economics

The annual value of nature tourism to the region, for Yellowstone and Grand Teton parks alone and led by growing interest in wildlife watching, is more than \$1 billion. Montana data has been gathered for Montana by the University of Montana.

The UM, Institute of Tourism and Recreation Research, conducts yearly non resident tourism data collection. In 2018 over 12 million non residents visited Montana and contributed 5.24 billion dollars to Montana communities and created 58,000 jobs.

It is clear how important tourism is to Montana in both dollars and jobs. The Forest Service table on jobs in the GYE counties is very telling;

- Gallatin County-industries percentage of private employment; timber.2%, mining.4%, agriculture 1.6%, travel and tourism 25.0%
- Madison County- timber.6%, mining 6.2%, agriculture 10.8%, travel and tourism 23.4%
- Park County-timber 1.9%, mining .1%, agriculture 6.4%, travel and tourism 32.2%

Here are the top three activities that tourists come to Montana for:

- Hiking and trail running 67%
- Camping 66%
- Bird watching and wildlife watching 49%

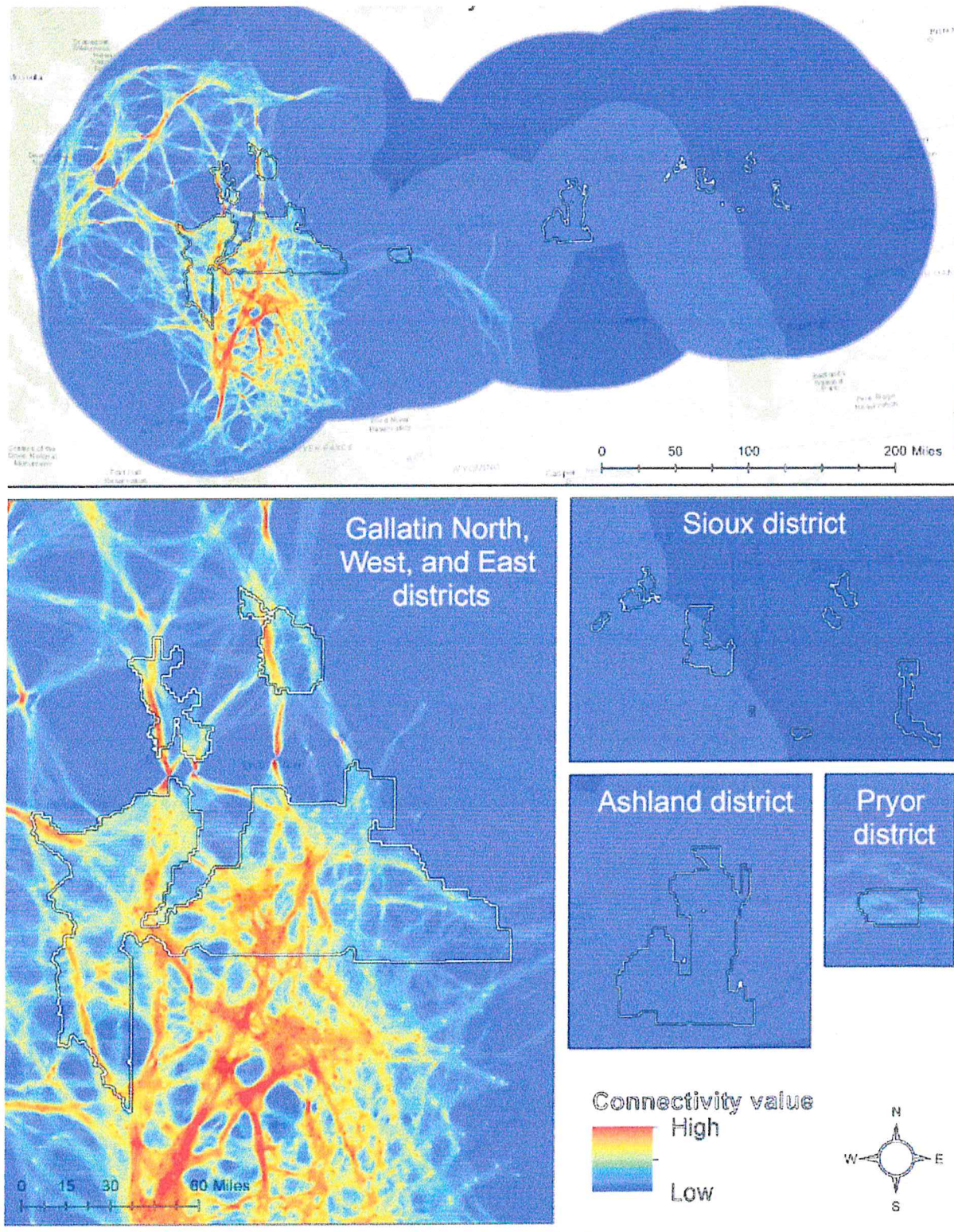


Figure 9. Results of connectivity analysis for the "large forest specialist" generic species, assuming an optimal movement behavior. Results are shown for the full study extent (top panel) and in

These activities require intact ecosystems like we have in the Montana ranges of the GYE.

Travel and Tourism are a leading industry. Recreation is an element of travel and tourism, but not the leading industry for this area.

Montanans also have a lot to say about what they value on a local and state level. The UM Montana poll is below. A local survey shows 76% want scenic beauty protected, 75% want wildlife habitat protected, 71% want to know that in the future wilderness will be available, 70% want wilderness for the future. What we want is protected space that only wilderness can provide.

Montanans also support strong ecosystems like we find in WSAs and Wilderness Areas. This support is documented by the University of Montana's Crown of the Continent and Greater Yellowstone Initiative survey of Montana voters

- the survey is done every two years "to get a clear picture of where Montanans stand...on proposals and policies regarding the management of our shared public lands"
- the UM does not take positions on the results, but "do stand by the integrity of every voter survey"
- the survey showed that only 11% of Montanans supported eliminating protections for WSAs. 84% of Montanans say keep them as they are or add more.
- the survey showed that Montanans are more often on the side of enhancing public lands not removing protections. That support is intensifying and is stronger today than it was four years ago

These activities mentioned above require intact ecosystems like we have in the GYE. The CG plan needs to ensure that these outdoor activities, bird watching, wildlife watching, hiking and others are sustained; that is why people come. It is in the economic best interest of the local community, state and the nation to maintain a healthy ecosystem that supports wildlife.

This CG forest plan should not alter the HPBH WSA, it is not what Montanans want.

The Greater Yellowstone Ecosystem in Montana-GYE/Montana

The GYE/Montana values are apparent, attracting ever more visitors and permanent residents to the region.

Part of the GYE/Montana is the Gallatin Range that comprises a very important piece of the Greater Yellowstone Ecosystem. The Greater Yellowstone Ecosystem is the largest, essentially intact, functioning ecosystem in the temperate zones of the world.

In the GYE, which is centered around Yellowstone National Park, Wilderness has been designated north, east and south of YNP. The only areas that have no wilderness protection are the northwest corner and the west side of YNP. The lack of Wilderness designation puts more pressure on this section of the GYE.

The Gallatin Range in particular has been a focus of tremendous local conservation efforts.

The CG forest plan needs to recognize the decades of effort that citizens have contributed to make a Gallatin Wilderness possible

- The Gallatin Range was taken out of the historic checkerboard pattern, and put it into the Hyalite Porcupine Buffalo Horn WSA and other protected roadless areas with the goal of the area becoming wilderness.
- Conservationists and others focused on the facts that the Gallatin Range contains the last major roadless area in the northern Greater Yellowstone Ecosystem and priceless wildlands. For decades, conservationists advocated for wilderness designation for the range under the 1964 Wilderness Act. Partial protection came with the 1977 designation of the 155,000-acre Hyalite Porcupine Buffalo Horn Wilderness Study Area.
- Conservationists then worked to solidify public lands the Gallatin Range from YNP through the range. This solidification was finally achieved in 1993, when, the Forest Service, the State of Montana and the Congress of the United States provided funding. There was great interest in safeguarding key wildlife habitat areas and secure a 40-mile-long unbroken habitat link for grizzly bears and other species between Yellowstone National Park and the outskirts of Bozeman

The CG forest plan needs to address the fact that because the GYE in Montana is not protected with a Wilderness designation it is faced with many challenges that other areas around YNP do not face. The CG plan should reflect the years of hard work that went into solidification to keep the Gallatin Range intact. The CG plan should also recognize that it is more important now than ever to keep it intact because of;

Growing use by people

- in *EcoSphere*, Dr. Andy Hansen, professor of ecology at Montana State University in Bozeman and colleague Linda Phillips write, "Greater Yellowstone's ecological health is challenged by growing use by people and changing climate." The human population has doubled, and housing density has tripled in Greater Yellowstone since 1970 and both are projected to double again by 2050. Human development now covers 31 percent of the ecosystem.

Wildlands are Shrinking

- “The Earth's remaining tracts of wildlands are being altered by increased human pressure and climate change. Yet, there is no systematic approach for quantifying change in the ecological condition of wildland ecosystems.” Between 1993 and 2009, the footprint of humanity, which already had resulted in wild places being relegated to merely a fraction of the land mass that started the 20th century, expanded by 9 percent globally.

Lack of Comprehensive Planning

- The Forest Service needs to think cohesively in ways that transcend political and administrative boundaries. The Greater Yellowstone Coordinating Committee has been in existence for several decades but there is no collaborative or complementary equivalent involving the 20 counties in Greater Yellowstone or the municipalities, which play crucial roles in shaping the health of the public land base.
- The importance of these areas needs to be identified and left intact for wildlife
- GYE/Montana could become a sacrifice area for many uses

What Needs to be done to best protect GYE/Montana

The Forest Service, the largest landowner in the GYE/Montana needs to be involved in ensuring the sustainability of the GYE. Wilderness best ensures sustainability, and planning should include these elements;

- Wilderness does not require as much management -Wilderness is left alone
- Roadless areas that qualify should become wilderness
- Areas that are identified as a wildlife corridor should be protected
- Areas of critical importance for wildlife should be left for wildlife, like the Buffalo Horn, Porcupine, Chestnut Mountain, West Pine

The GYE/Montana may be the largest of its kind, but it is not large.. The GYE/Montana is an island surrounded primarily by a domesticated and heavily populated greater landscape. In order for many species to survive long-term, their populations need genetic refreshing best brought on by connecting to, and co-mingle with other, nearby populations.

The Forest Service plan needs to state future conditions and less about the wants of some groups and individuals today.

We need to express thankfulness to those who have left us these great natural landscapes to enjoy, the Forest Service plan should state that it will leave these lands and all its resources in better shape..

The Forest Service needs to identify and protect known wildlife migration routes

- The historical migration route from YNP up Tom Miner down Porcupine through Big Sky and down Jack Creek into the Madison valley; this route has been largely closed because of Big Sky development. The Forest Service needs to look at what is left. Are there other designations that could counter some of the damage done by Big Sky development? Cowboy Heaven appears on the Forest Service Connectivity Map appears to be a critical corridor.
- The migration route down Buffalo Horn and through the Taylor Fork to the Madison, these need to be kept for wildlife. Human use has intruded enough.

The GYE/Montana and Land Uses

The GYE/Montana is presently a land of many uses, even though much of it qualifies as wilderness. Looking at the lands of wilderness quality and the wilderness alternatives, only one alternative, D, has wilderness almost the length of the Gallatin Range and the west side of the Bridger Range,

The other wilderness alternatives would designate the entire Gallatin Range as backcountry use, another would carve up the HPBH WSA and leave a rock and ice island in the Gallatin Range. Another would truncate wildlife migration at the northern end of the Gallatin's with recreation use areas and wildlife management areas. Anything other than connected wilderness is unacceptable for many areas of the GYE/Montana.

There has been a great deal of land use, done under the CGNF multiple use designation, in the GYE/Montana, and the CGNF needs to consider;

- The impacts of logging projects/vegetation treatments. One example is a Forest Service logging project that just had an injunction temporarily placed, stopping a logging and road building project along the northwestern border of Yellowstone National Park. Nearly 16 miles of logging roads would have been bulldozed through grizzly bear habitat. The judge concluded that the Forest Service had failed to consider how the project would affect the Canada lynx, which has been listed since 2000 as a threatened species under the Endangered Species Act.
- almost the entire Gallatin range is listed as critical lynx habitat the Forest Service plan must consider how every aspect of the forest plan might affect the Canada Lynx
- equally effected species, the Grizzly and the Wolverine need special consideration
- climate change
- wildlife corridors and connections in the GYE/Montana and with the Northern Rockies Ecosystem

- addressing wildlife requirements that include recreation impacts on wildlife, areas of critical importance for wildlife. Some say that recreation, even mountain biking has no effect on wildlife. This is not true, Lance Craighead's study shows many effects.
- Another expert states; **Griz Expert Says 'Mountain Bikes Are A Grave Threat To Bears'** When it comes to safeguarding bears, scientists say wilderness-caliber lands, free of riders, are important to bruin persistence **Mountain Journal May 22, 2019**
 - The effects of categorical exclusion logging projects in the GYE/Montana.
 - the forest plan must reflect the latest ruling of Judge Christensen on grizzly bears stating that the United States Fish and Wildlife Service had erred in removing the bear's threatened status. This plan must address the genetic connectivity of the Yellowstone grizzly and the Northern Continental grizzly.
 - **Potential paths for male-mediated gene flow to and from an isolated grizzly bear population.** CHRISTOPHER P. PECK,^{1,4} FRANK T. VAN MANEN,¹, CECILY M. COSTELLO,² MARK A. HAROLDSON,¹ LISA A. LANDENBURGER,¹ LORI L. ROBERTS,² DANIEL D. BJORNLI,³ AND RICHARD D. MACE
 - This study maps the least cost models for grizzlies. The models go from the Gallatins through the Bridgers

The GYE/Montana deserves special recognition, which Wilderness best supplies.

Public Input

The UM poll tallied the top three activities that Montanans participate in:

Hiking and trail running 67%
Camping 66% Bird watching
Wildlife watching 49%

These activities require healthy ecosystems. It is in all of our best interest to sustain healthy ecosystems, and the protection of wilderness provides the best protection.

Backcountry and Recreation Emphasis areas do not provide adequate protections and both areas can be developed so as not to provide adequate protections for this important ecosystem.

Naturalist Says Outdoor Recreation Can Have Huge Impacts on Wildlife Mountain Journal March 2, 2019

Recreational impacts on wildlife many people assume or claim that because they don't actually witness animals running away at their approach wildlife is not being displaced

- **realization that wildlife displacement is happening, whether involving backcountry skiers invading habitat for bighorn sheep and wolverines, mountain bikers and ATV riders aggressively pushing for more trails A single hiker walking down a trail causes wildlife displacement of 150 feet. But a hiker with a dog on leash results in a wildlife displacement of 280 feet in one direction. When the panoramic radius on both sides of the trail is combined to create total diameter, it means a zone of 560 feet. It's one thing if the displacement causes an animal to flee and it is able to return to its preferred habitat after the person and dog are gone, but the disruption can become chronic, if not permanent, when the trail receives a stream of near-constant or heavy use.**
- **The displacement comes at a cost, not only by the stress it causes and amount of energy expended by the animal to leave, but it might mean abandoning the prime places where it finds the best forage and security cover, Thompson says. Such scenarios are playing out across the Greater Yellowstone region,**
- **Often, mountain bikers insist they are no more disruptive to wildlife than hikers and equestrians, Thompson says. The problem is that riders travel faster and cover much longer distances than hikers; they tend not to make noise; riders while navigating trails are more concerned about avoiding rocks and trees than being fully attentive to their surroundings, and the way they ride makes their presence less predictable, he says.**
- **If a single mountain biker is traveling twice the distance as a hiker, then it could be argued, Thompson says, that the cyclist is having twice the spatial impact in terms of potential wildlife disruption. And, with rising numbers of mountain bikers and local clubs pressuring the Forest Service to let them upgrade and build new trails, the impacts are hardly benign.**
- **"The obvious thing at stake in Greater Yellowstone, the simple answer is that what we have in this place is not present in those other places," Thompson told me. "We are confronting the old tale of dwindling wilderness and natural systems. We've become a prominent symbol of**

the metaphor and no one knows yet if we'll be able to hang on to what we have—avoid the mistakes those other places have made."

Wildlife and the HPBH

Proclaimed by prominent scientists as a "complete, intact ecosystem" within the larger Greater Yellowstone Ecosystem, the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area in the Gallatin Mountains is renowned for its wildlife. It holds more diversity of species than most national parks in the Lower 48. Right now, it sits at the center of a huge debate over how to safeguard it amid rising recreation pressure and impacts from climate change

Significant scrutiny is being directed toward the Custer-Gallatin and its management of the 155,000-acre Hyalite-Porcupine-Buffalo Horn Wilderness Study Area that, ecologists say, contains incredible wildlife diversity and superior habitat in the Gallatin Mountains between Yellowstone and Bozeman.

Scientific researchers Lance and April Craighead identified it as being among the most important habitat for wildlife.

The Craighead strongly recommended, based on their research, that the Hyalite-Porcupine-Buffalo Horn should be protected from further human alteration and disturbance. This protection should be as restrictive of human uses as possible and should be as permanent as possible."

The HPBH area has a great deal of background data that has been compiled over the years and speaks to the public support to keep this area for wildlife. Testimony to Congress at hearings in 1993 from FWP, GYC and WS clearly state this importance. Congress allocated millions to purchase checker boarded sections for protected wildlife habitat... Due to its proximity to Yellowstone National Park, it provides important wildlife habitat for a wide range of native species, including elk, grizzly bear, moose, bighorn sheep, and wolverine. Due to these habitat values, the area includes nine sections of Montana Fish Wildlife and Parks Gallatin Wildlife Management Area intermingled with Custer Gallatin National Forest lands. The area provides important habitat connectivity between the Gallatin and Madison Ranges for migrating wildlife moving out of Yellowstone.

The Porcupine/Buffalo Horn area has been identified as an important area for wildlife. Here is what FWP testified when they spoke to congress in 1993 when asking for federal funds to secure a world class wildlife resource

- Extremely important to the recovery of the Grizzly Bear
- there is Currently occupied grizzly habitat in the Porcupine
- It is Critical winter range for the highest concentration of wintering moose in the Gallatin –particularly the Porcupine

- porcupine a primary migration route for 2,500 elk
- important spring/summer/fall range for elk, moose and mule deer
- important habitat for mountain lions, wolverines, plus other furbearers
- important habitat for bald eagles, golden eagle and peregrine falcons-plus a wide variety of hawks and owls
- Headwaters of 14 tributaries of the Gallatin and Yellowstone Rivers-important to cutthroat trout survival. The Gallatin and Yellowstone are both classified as Blue Ribbon trout fisheries
- these wildlands include some of the most important wildlife/biological corridors in the west

One of the leading scientists to study the Hyalite Porcupine Buffalo Horn WSA is Dr. Lance Craighead. He wrote, Wilderness, Wildlife, and Ecological Values of the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area. Here are some of his conclusions:

- Although solitude and primitive types of recreation are still important wilderness values, we have learned much more about the ecological importance of wilderness areas in the decades since the Wilderness Act, and the Montana Wilderness Study Act, were passed. We now know that intact, roadless areas of secure habitat are critical for maintaining healthy ecosystems, particularly in the face of our rapidly changing climate. Intact, functioning ecosystems are our best hope for removing carbon dioxide from the atmosphere and sequestering it, and for buffering the impacts of climate change. Intact areas with wilderness characteristics are essential for maintaining the fish and wildlife populations that provide Montanans with a quality of life that has disappeared from most other states.
- HPBH WSA is an ecologically intact landscape that still contains about 99% or more of the vertebrate species that historically used the area (bison are still missing but could recolonize the area if they were not prevented from doing so by state agencies)
- Most wildlife species, particularly those prized for hunting, viewing, and photographing, are sensitive to human-caused disturbance and habitat alteration
- Disturbance due to human activities reduces the amount of habitat available for use by wildlife, increases stress, and depletes energy reserves, thus reducing the carrying capacity of the habitat: the best habitat for wildlife is found in areas with the least human disturbance. To ensure that wildlife have sufficient habitat for population persistence into the future, and to confer resilience in the face of climate change and land use change, there must be an adequate amount of protected habitat available among the spectrum of lands that are accessible to those wildlife. The more permanent that protected habitat is, and the larger the area is, the more certainty there is that wildlife populations can persist. Fragmenting the HPBH WSA into smaller pieces of protected habitat would greatly diminish its value for wildlife habitat and the provision of ecosystems services, and could nullify its ability to function as a refuge from climate change.

We realize that there have been impacts to the Porcupine/Buffalo Horn since those statements were made that have negatively affected wildlife. Namely, the large

developments in the Big Sky, Moonlight Basin and the Yellowstone Club which was a major historic wildlife migration route

This CGNF plan has the opportunity to halt any further deterioration of this national treasure.

Wilderness

Wilderness protects our clean, cold water, elk herds, mule deer, grizzly bears, wolverines, birds, forests and landscape. It also provides refuge for people: a place free from light and noise pollution. Wilderness is a place of solitude in an ever increasing world filled with commotion and distraction. It's our responsibility to protect this special place before it's too late -- our children will thank us.

The current CGNF Gallatin Crest Wilderness recommendation of 70,614 is inadequate. We recommend, at a minimum, that the existing Hyalite Porcupine Buffalo Horn Wilderness Study Area (HPBH) officially receive wilderness designation. We additionally advocate that the boundaries of the 155,000-acre HPBH be expanded upon to the north to the interstate to provide for wildlife connectivity to the Bridger Range. This will signal an enduring responsibility to protect the wildlands and wildlife north of Yellowstone National Park.

Other sections of the CG forest plan that need wilderness designation are;

- the Crazy Mountains
- the roadless areas on the west side of the Bridger Range
- the Pryor Mountains
- the Lions head area
- additions to the AB Wilderness

Custer Gallatin National Forest needs to protect the best of last of the GYE/Montana.

Management of WSAs

Montanans want WSAs to be managed as wilderness; here is what Montanan's say;

- **Montana Statewide Survey | April 2018**
- **Most voters want to keep WSAs as they are now**
- **TOTAL ADD NEW/KEEP ALL** • **81%**
- **Eliminate protections in all 29 Wilderness Study areas** • **11%**

Montanans do not want WSAs to be geographically altered so non wilderness uses can be permitted in the WSA. Other uses would include motorized and non motorized mechanized use, intense recreation that will threaten imperiled species like wolverine, Canada Lynx and Grizzly bear. Montanans in the UM poll, Crown of the Continent are clear in their expectations

The CG forest plan should not alter the HPBH WSA.

The CG plan needs to take into account the effects of the FS plan on YNP

- If the CG forest plan does allow development and fragmenting, it could affect the future survival prospects for wild species in the YNP.
- As climate zones shift, many plants and animals will need to migrate into or out of protected natural areas to stay within temperature and moisture ranges where they have evolved over thousands of years. Scientists are outlining plans to ensure futures for at least some of these species by making it easier for them to move to different habitats. But studies on “climate connectivity” warn that if public lands around national parks are used for drilling, mining, logging and commercial development, they won’t function as survival paths for wild species.
- “You can’t manage a national park by itself. That’s increasingly a strategy for failure,” Northern Arizona University biologist Paul Beier said. “Your park is embedded in the landscape, and we have to get smart about managing the entire landscape, because the climate is moving.”
- This research signals that if the goal is to guard the endurance of wild species for future generations, Congress and federal agencies will need to find new ways of managing the nation’s million square miles of federal public lands. National parks will need to depend on healthy adjacent national forests, wildlife refuges, monuments and rangelands, maintained in their natural state.

This plan should look at another report that deals with climate change and the need for more data to address direct, indirect and cumulative effects on wildlife species.

A government report, Climate Change vulnerability and adaptation in the Northern Rocky Mountains reports on a breath of issues that will likely affect the Rocky Mountains;

- decreasing snowpack
- declining summer flows and the effects on fishery flows, recreation, habitat ect
- increased air temperatures and gradual changes in the abundance and distribution of tree, shrub and grass species
- wildfires
- insect outbreaks
- the need for a "hedge your bets" strategy

The report states that little direct data exists on the direct effects of climate variability and change on:

- **Wildlife species** and what is known on those species. A focus on wildlife whose habitat characteristics are high elevation and snowy such as the Canada Lynx, fisher and wolverine and their prey species, the snowshoe hare needs to be intensively studied with a focus on all aspects that affect their best long term survivability.
- The study also says that adaptation strategies for wildlife are focused on maintaining adequate habitat and healthy wildlife populations and increasing knowledge of the strategy for most species...connectivity. Connectivity/corridors are an important conservation strategy for most species in the Northern Rockies.

The Custer Gallatin needs to take a "hedge your bets" strategy and focus on how can we best protect the ecosystem for the future.

Nancy Schultz

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Continued warming could transform Greater Yellowstone fire regimes by mid-21st century

<https://www.pnas.org/content/pnas/108/32/13165.full.pdf> Anthony L. Westerling^{a,1}, Monica G. Turner^{b,1}, Erica A. H. Smithwick^c, William H. Romme^d, and Michael G. Ryan^e

