



Forest Plan Revision Team
Flathead National Forest
650 Wolfpack Way
Kalispell, MT 59901

Delivered via email: flatheadplanrevision@fs.fed.us

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Dear Revision Team:

Congratulations on releasing the forest management plan revision Proposed Action on schedule, on March 6. Please include our comments in the official record.

Headwaters Montana works to protect the water wildlife and traditional outdoor recreational values of the Crown of the Continent. We work primarily west of the Continental Divide to the Idaho border, encompassing the Flathead and Kootenai national forests and Glacier National Park. We also assist conservation efforts north of the border in southeast British Columbia and southwest Alberta. We initiated the Whitefish Range Partnership effort by bringing state and national conservation groups and then local stakeholders to the table. This effort led to the unanimous support of the partnership Agreement.

Headwaters Montana has participated in the plan revision process summer field trips and the Meridian Institute's collaborative conversations. We commented on both the forest Assessment of the Flathead National Forest and the Wilderness Assessment. We provided additional comment to the Wilderness Assessment through the interactive mapping tool, and have done so as well with the Proposed Action.

We look forward to continuing our participation in the public process that will help define the future of the Flathead National Forest, a "Flagship Forest" amongst all National Forest. Our scope of work takes in some of the most biologically rich landscapes in the Rocky Mountains. The growing human population and climate change will pose considerable risk to this region in the years ahead.

We have arranged our comments as follows:

- Geographic area (GA) - specific comments
- Management Area (MA) - specific comments under each GA section for mapped MAs
- Issue-specific comments

Geographic Area-specific Comments

Hungry Horse GA - Under Objectives, we note specifically the reference to maintaining the 110 mile loop drive around Hungry Horse Reservoir, and the absence of an objective to maintain Quintonkon Creek Road for driving pleasure. No such objective can be reasonably or economically justified. This road needs to be closed and converted to a trail to conserve road maintenance dollar, increase wildlife security and watershed integrity for the long haul.

Headwaters engages citizens of the Crown of the Continent in the region's critical conservation issues: water and wildlife conservation, and climate change.

Mapped Management Areas within the Middle Fork GA:

- Recommend Quintonkon and Sullivan creeks as eligible for Wild and Scenic River for significance as outstanding bull trout and west slope cutthroat trout fisheries, outstanding wildlife habitat (some of the best grizzly habitat on the forest). **Mark Deleray**
- Consider consolidating MA6a areas into Backcountry (MA5) to eliminate cherry stemmed management areas and block up wildlife habitat. These cherry stemmed 6a areas include: Posy, Ball, Branch, Conner, and Slide Creeks. We submitted approximate delineations via the on-line mapping tool. Our recommendation in this regard is slightly more 'conservative' than the boundaries suggested by Dr. John Weaver in his amended comment letter (dated, April 23, 2015), conservative in the sense that we recommend consolidating MA6a into MA5 at the lowest possible elevations. We have include more area blocked as 'backcountry' to further consolidate management under this MA.
- We again ask that the FNF consider our backcountry and recommended wilderness boundaries presented in our February 2014 report, "*Swan Mountain Range, Flathead National Forest Recommendations.*" We concur with most of Dr. John Weaver's recommendations for this GA generally, but recognize that winter snowmobile use overlaps with his wilderness recommendation. We considered snowmobiling and other mechanized use in this area when we presented our recommendations. These would allow mountain biking on Trail 7 between Napa Point and points north, and snowmobiling in the Six Mile area. However, we think the FNF should very closely consider not allowing mountain biking on Trail 7. This area harbors one of the densest populations of grizzly bears on the FNF. MT FWP's officials have explained to us that they are concerned about conflicts with mountain bikers and grizzlies (and other wildlife) based on similar conflicts in Alaska (Jessy Coltrane, MFWP, personal communication).
- GA-HH-DC 12 mentions wildlife connectivity. We think an additional DC needs to recognize and maintain the north-south terrestrial wildlife corridor embodied by the Swan Mountains themselves that connects between the Bob Marshall Wilderness and the Whitefish Range. This is very rich wildlife area that currently - and in the future - will receive a lot of human recreational use because of its proximity to the Flathead Vally proper. A DC statement that recognizes the importance of maintaining this corridor needs to be part of the revised forest plan in order to provide the management flexibility to protect the function of this corridor over the life of the plan and beyond.

North Fork GA - We appreciate the FNF planning team's consideration and careful adoption of the Whitefish Range Partnership's recommendations. We understood that the Partnership's comments would be considered with those of others. We continue to support the recommendations of the Whitefish Range Partnership. The Partnership has submitted a letter of comment on the Proposed Action, and we endorse those comments as well.

We think the MA map incorrectly categorizes some lands in this GA. Specifically, the MA 6a areas at the head of Hay Creek, Red Meadow Creek, Whitefish Mountain, Diamond Peak, and Section 18 to the west of Hallowat Creek, and that fall largely within the Tally Lake Ranger District are mapped as "Unsuitable" for timber production on the timber suitability map. This is correct. But these areas are also largely high, elevation and de facto roadless areas. Please re-examine. We think these areas should be mapped mostly as Backcountry MA 5a, and some as MA 5c.

Middle Fork GA - We generally agree with the overview presented for this GA.

Mapped Management Areas within the Middle Fork GA: We think that cherry stems and odd MA6a areas can be consolidated into MA5 (preferably non-motorized). It makes little economic or ecologic sense to maintain these corridors, particularly up the North and South Forks of Dickey Creek, and Paola Creek. Some of this area should be reconsidered for recommended wilderness.

Salish Mountain GA - This part of the forest is apparently provide a significant percentage of the commercial timber and fiber anticipated from the FNF. We would like to see wildlife security maintained at as high a level as possible through road and access management. Standard GA-SM-STD 01 speaks about no net increase in road densities. We'd like to see a maximum numerical road density standard that addresses habitat security for wildlife in general. We appreciate and support DC GA-SM-DC 01 regarding movement of grizzly bears between ecosystems.

South Fork GA - We generally agree with the overview presented for this GA. However, Bunker Creek's potential as an addition to the National Wilderness Preservation System is not fully considered.

Mapped Management Areas within the South Fork GA:

- Bunker Creek should be recommended as eligible for Wild and Scenic River designation for its cultural importance as an E-W travel route for Native Americans, it's outstanding wildlife habitat, and bull and west slope trout refugia.
- All of Bunker Creek from the Swan Divide to Bruce Ridge should be recommended for wilderness. It makes no sense to maintain a timber program up Bunker Creek (proposed MA 6b). We have already submitted our recommendation to you in our "*Swan Mountain Range, Flathead National Forest Recommendations*" of November 2014. The FS Handbook, Chapter 70, may not be the 'gold standard' of wilderness (e.g. a Bob Marshall Wilderness) but it does establish a **regulated standard** that Bunker Creek clearly meets. We challenge the FNF to document that wilderness management is more expensive than the roaded and developed parts of the forest. Both the expense and the 'insufficient wilderness purity' of Bunker Creek have been used to explain its not being recommended for wilderness. These rationales defy the regulations. In addition, current FS managers should consider the historic record of FS bias against wilderness that deliberately worked to reduce eligible wilderness-quality lands around the Bob Marshall Wilderness. Historic records document FS decisions to road and log Bunker Creek in order to preclude its incorporation into the Bob Marshall Wilderness. Time has largely healed the scars of this decision. The new forest plan provides the opportunity to complete the healing.
- Former Hungry Horse District Ranger John L. Hall explained that the trans Swan road was part of internal agency plans to build major roads from Spotted Bear into the Middle Fork Flathead, now the Great Bear Wilderness. Ranger Hall testified in Congress: "This was the deliberate intent to ring the area with roads so it could not be added to the Bob Marshall Wilderness." The historic FNF bias against wilderness is perhaps best demonstrated by the roading and logging of Bunker Creek. The FNF now 'blames' the watershed itself for its 'imperfect' wilderness character, rather than on the FNF own actions.

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Swan Valley GA - We generally agree with the overview presented for this GA.

Focused Recreation Area (MA7) in the Krause Basin Area: The 1988 Noisy Face Recreation Plan apparently intended to phase out ORV use of Krause Basin by prohibiting ORV races, reducing ORV routes by half, and requiring that remaining ORV routes would not be marked on the ground. An ORV area produces an inevitable conflict with providing securing for grizzlies, lynx and other wildlife. The foothills of the Swan Range provide an essential movement corridor (N to S). Much of the west face of the Swan Mountains is proposed for year round motorized access. We think less motorized use of the Swan Range would help maintain linkage between the Swan and Whitefish ranges. Please consider removing this MA7 area, reducing the ORV trail network, and making this area more compatible with adjoining neighborhoods.

Mapped Management Areas within the Swan Valley GA: Our report titled “*Mission Mountain Wilderness Inclusions*” details our concerns and recommendations for additions to the Mission Mountain Wilderness. Our recommendations capture the highest value roadless lands that have outstanding wilderness attributes. Please look again at our recommendations for the Lindbergh Lake area and Sunset Ridge.

Our Lindbergh Lake recommendations surround the east end of the lake where terrain is steep, and timber management is inappropriate. The Lindbergh Lake Homeowners Association supports expansion of the wilderness here.

We recognize that the FNF is currently developing a Beaver Creek project. This area has some of the highest road densities in the FNF in this GA. In addition, the Forest Jobs and Recreation Act provides for a new wilderness area on the Lolo National Forest side of Sunset Ridge. It would make good management sense for the FNF to recommend a complementary wilderness area on the north side of the ridge to protect the wildlife character and the historic Native American travel route that traverses this area.

Stressors and Drivers: The Assessment and Climate Change

The proposed action (PA) presents an interesting mix of forward-looking (stressors and drivers) and historic guideposts (Historic Range of Variation, HRV). Appendix D provides a column that directs the reader to the appropriate sections of the PA to learn how the future plan might address the various stressors and drivers. The Desired Conditions, Standards and Guidelines make numerous statement about maintaining and restoring plant and animal populations and communities with a strong current or historic reference points. For example:

- FW-DC-WTR-01 states: “*Watershed and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbances without long-term, adverse changes to their physical or biological integrity. Watersheds are in fully functioning conditions as defined by the Watershed Condition Framework.*” (Emphasis added)
- When one juxtaposes this DC statement against the stressor and driver statement found in Appendix D at Table D-1, we are uncertain whether the above DC statement is achievable: “*Climate change may result in a warming climate that elevates water temperatures, changes*

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the timing of rain events and spring run-off and alters flow regimes. Elevated temperatures favor non-native rainbow and brook trout.”

- Comment: Climate change is already increasing water temperatures, decreasing seasonal snow pack and flow regimes in northwest Montana. Native and non-native fish are already ‘competing’ for habitat under this changing regime (FWP fish sampling data). Thus, when we read the Desired Condition language that speaks of retaining existing characteristics without the expectation that significant ecological shifts are not only likely, but are already underway, we lose confidence in the Desired Conditions statements. Decreases or changes in water quantity, quality, or timing can generally mean a loss of ecosystem richness. This is already occurring.
- Comment: A “Desired Condition” is, of course, not a standard. The PA states (p. 15) that: “Desired Conditions must be described in terms that are specific enough to allow progress toward their achievement to be determined, but not include completion dates (36 CFR 219.7(e)(1)(i).” However, as the effects of climate change progress, managers will find that the environment has moved away from the revised plan’s Desired Conditions, Objectives, Standards and Guidelines statements.

A second example: Table D2 states: “Climate change may result in reduced acreage with persistent spring snow—there is a high level of uncertainty associated with expected winter changes to climate in northwest Montana. Loss of persistent spring snow may reduce habitat available for associated species such as the wolverine, White-tailed Ptarmigan, Grey-crowned Rosy-finch, and Hoary marmot.”

The PA states:

“Desired Conditions (FW-DC-SOPI-WL) 01: Key ecosystem characteristics support wildlife SOPI and are resilient and adaptable to stressors and likely future environments. Special habitat features such as caves, boulder fields, persistent snow fields, and waterfalls provide habitat for associated species (see table 15).”

Comment: The Assessment reveals that climate models predict a reduction in spring snow cover. The DC statement seems to assert that spring snow fields will persist. What if they don’t? How will the FNF respond to this change? We do not see that the PA provides much flexibility to adapt to this kind of predicted change.

The PA’s goals are admirable, but we foresee a conflict with an emerging, climate-driven reality that will move FNF management progressively away from its planned, stated goals and into a reactive mode where management decisions could be challenged for undertaking activities that further stress natural systems. Or conversely, the FNF could be challenged for sticking to the plan’s DC’s and objectives as climate-driven changes alter underlying ecological conditions.

Another example: If the revised plan states (p.21) that, “*FW-DC-WET-01 Wetland water levels fluctuate from year-to-year but persist in the long-term*”, it seems highly unlikely to us that the FNF will be able to reasonably assure the public that it will meet this Condition. And this is just one statement. The PA contains other statements that appear to us to claim an ability to maintain or improve current ecosystem functions and productivity.

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When we looked for the impact of climate change on the timber program, we found no reference to the effect climate change would have on this important economic resource, the SYL, PWSQ, or PTSQ. Climate change impact on the “sustained yield limit” (SYL) is not reference in Appendix D, even though climate change will clearly “directly or indirectly affect [the] ecological integrity” upon which the timber program depends.

The Assessment does a decent job of describing the issues related to forest management under a changing climate (Assessment, Chapter 2, starting at page 93). However, it does not appear to us that the uncertainties or constraints discussed in the Assessment have been carried forward in the PA. We have added citations from the Assessment that speak to climate change as an endnote to this letter. *Can the Plan Revision Team go back over these statements and double check that the revised plan accurately captures these concerns and constraints?*

In summary, with respect to climate change and the PA’s vision of the future of the FNF, we think that the public’s expectation will not be met by the PA’s current language and direction, specifically with respect to water quality and quantity, SOSC, and SOPI. Climate change will adversely affect these elements - to a degree not anticipated by the language presented in the PA. So will the timber program. In our view, looking at the PA with a climate change lens, the revised plan should adopt language in constructing its desired condition, standard and guideline statements that explain the shift predicted in the Assessment.

An example of this might be: FW-DC-WTR-01: *“Watershed and associated aquatic ecosystems may lose ecologic resilience as climate-driven conditions change the regional hydrologic regime. Maintain ecologic resilience to the degree possible, but anticipate water stress within physical and biologic systems. Adjust management expectations and outputs to compensate for lower biodiversity and primary productivity. Maintain watersheds functionality as defined by the Watershed Condition Framework.”*

The Assessment states: *“While the Forest Service cannot control climate change, general measures, as well as some species-specific measures, have been identified to help reduce species vulnerability to climate change (Shoo et al. 2013). General measures include: 1) secure and restore “refugia” that are within the species current range, 2) secure and restore “refugia” that are outside the species current range, 3) secure and restore movement paths so that species can migrate and/or interbreed, 4) develop assisted colonization plans.”* (Chapter 1, p. 161)

While we read the PA carefully, we did not find any reference to “refugia” in the context used in the Assessment (above). The PA does not make explicit reference to *refugia* as a tactic to address the adverse effects of climate change, or to retain biodiversity in plant or animal communities, in any DC, OBJ, GDL, or STD. Tools to address this issue include: recommending wilderness, blocking up backcountry areas, providing for clearly defined terrestrial wildlife movement corridors, limiting conflicts with wildlife and motorized recreation. This lack could be remedied with FW-DC statement(s) that directly address climate change and the need for *refugia*, and corridors specifically.

Carbon Emissions

How much carbon will FNF management release under the revised forest plan? How much carbon will planned ignitions and wildfires release in the first decade? How much carbon will be released by various recreational activities on FNF lands? What strategies will the FNF to reduce

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carbon emissions from all sources in the first decade of the plan? We could find no information in the PA that answered or appeared to address these questions.

“Does the Unit have a baseline assessment of carbon stocks and an assessment of the influence of disturbance and management activities on these stocks? Is the Unit integrating carbon stewardship with the management of other benefits being provided by the Unit?” (From: Performance Scorecard: 9- Carbon Assessment and Stewardship)

“Actual climate impacts have consistently outpaced the worst-case forecasts issued by the UN’s International Panel on Climate Change (IPCC) for the past two decades.”¹

Summer Motorized Trails in the Swan Range

Some of the best hiking, close to the core of the Flathead Valley, may be found along the many trails leading into the Swan Range. The vast majority of visitors to the FNF employ their legs to access these trails. Yet the PA perpetuates summer motorized access on these trails (with the exception of west side, Jewel Basin trails) from Columbia Mountain to Thunderbolt Mountain. For example, the steep, long climb to Columbia Mountain has become trenched by the excavating effect of spinning tires making it difficult for hikers to walk comfortably. Ridge top wet meadows continue to be damaged by the occasional, but inevitable motorcycle rider. The Thunderbolt Mountain area contains important mountain goat habitat. Meanwhile, the Blacktail Mountain area has become a national sacrifice zone to OHV interests. With a growing human population that is also growing in affluence, user conflicts are bound to increase over the life of the revised plan. The new forest plan would seem a good place to begin to restore and provide close-to-town, summer non-motorized trails for everyone. We always are reminded that non-motorized trails are open to all, and that motorized trails tend to discourage hikers and horse back riders.

Recreation Opportunity Spectrum (Desired Summer and Winter) Maps:

It appears that the Chain Lakes, Lake Mountain, and Nasukoin Mountain area are mapped as summer motorized. This must be a mapping mistake. Nasukoin was recommended for Wilderness by the Whitefish Range Partnership as a key area specifically recommended for protection. The rest of the area provides no trail access, except Trail #372 to Lake and Nasukoin mountains, and should be non-motorized. Please correct.

The ROS summer map also shows large areas of the west face of the Swan Mountains as non-motorized (in blue as non-motorized) with corridors for semi-primitive motorized summer (in yellow). Yet the MA map for this area shows much of it as suitable for summer motorized (MA 5b,c, or d). The winter ROS map shows much of the west face of the Swan as available for over snow vehicles (OSV). Yet snowmobilers actually use just the few road corridors to access higher basins and not the steep, forested west slope of the Swan Range. They use Roads 5385, 5388, 5389, 5392, 9508, and 5206. Why not designate these roads as winter OSV trails, and designate the rest of the area as non-motorized in winter? This would reflect reality on the ground.

¹ ScientificAmerica.com/article/climate-science-predictions-prove-too-conservative

The Bunker Creek Road (#549) corridor past the Gorge Creek closure is currently closed to motorized recreational use, but is open to occasional administrative use. This road should not be mapped as part of the ROS summer. This road should be decommissioned and converted to a non-motorized trail.

Wild and Scenic River Eligibility

Appendix G states: “To be eligible for inclusion, a river segment must be free-flowing and, in combination with its adjacent land area, possess one or more outstandingly remarkable values.” (p. G3) The suitability study provides 4-tier ranking system that defines Rank 3 as “one of a few”, and “regionally significant”, and Rank 4 as “most significant”, and “nationally or regionally significant”.

Based on these criteria and other considerations, we would argue that Quintonkon, Sullivan, and Bunker (up to the forks) creeks should be ranked at least as “3” for fish because they are mapped critical habitat for bull trout and therefore support a nationally significant fish resource. All creeks are already ranked at “3” for wildlife. Quintonkon is also ranked “3” for “Prehistory/History”. Bunker should be listed as 3 for “Prehistory/History” because it served as an E-W travel route in prehistory. In addition, the FNF own historic actions to deliberately and cynically preempt future wilderness consideration by roading and logging the drainage in spite of contemporary, broad public support for preservation.

With a ranking of “3” for fish, and prehistory/history, these creeks would contain at least two OHV’s ranked at “3”. Creeks with two or more rankings of “3” should be recommended as “eligible” as this signifies significant “regional” importance. For comparison, Strawberry Creek is judge “eligible” with a ranking of “4” for fish. All other OHV’s are ranked 1 or 2. Creeks with two or more OHV’s of “3” should be recommended “eligible”.

The following creeks have at two or three OHV’s ranked at “3”: Basin, Bunker, Gorge, Gordon, Granite, Morrison, Unnamed FK Lake Creek, Sullivan, Lower Twin, Grant. We have omitted creeks in the North Fork GA that meet this same criteria because the Whitefish Range Partnership did not endorse these creeks.

Non-Conforming Uses in Recommended Wilderness

We are concerned that the FNF will allow non-conforming uses – particularly recreational, non-conforming uses – in Recommended Wilderness areas. The FNF should manage recommended wilderness areas with the intent of maintaining wilderness character AND their ability to strongly support their own recommendations before Congress.

Motorized/ Mechanized Travel in Recommended Wilderness: We incorporate by reference the comments of the Montana Wilderness Association relating to this issue, including suggested desired conditions, standards and guidelines, suitability, and “case for wilderness “ language.

Closing

Thank you for the opportunity to comment on the Proposed Action. We look forward to participating in the rest of the forest plan revision process to advance appropriate, conservation-driven management of Montana’s “Flagship” forest.

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Sincerely,



Dave Hadden, Exec. Director
Headwaters Montana
406-837-0783 / info@headwatersmontana.org

End Note

Excerpts from the Assessment that address climate change. This is intended to consolidate climate related statements for easy reference. ***Emphasis is added*** to highlight each statement's issue of concern

*“The potential impacts of anthropogenic climate change on the **forest soil** resource are not well known at this time. Warmer, wetter winters may result in large areas of reduced traffic ability for winter harvest operations; a common soil protection practice on the Flathead NF. Increased frequency and severity of summer droughts could threaten effective vegetation cover through increased wildfire, and pathogen and insect activity.” (Chapter 1, p. 15)*

*“Since the establishment of **INFISH** and increasing evidence of climate change, there has been concern about the applicability of the temperature values. In other words, some streams may not be capable of maintaining temperatures below 15°C, particularly during low flows and warm weather.” (Chapter 1, p. 28)*

*“Maintenance of **cold water** for native salmonids is likely to be a challenge in the future as the climate continues to warm.” (Chapter 1, p. 29)*

*“Climate strongly influences **forest conditions, the timing and magnitude of water flows, fish and wildlife habitat conditions, recreation opportunities, and other ecosystem components** or services. Climate also plays a significant role in ecosystem processes, affecting such things as wildfires, insect populations and host tree conditions, vegetative succession, and the distribution of invasive species. Periodic variation in precipitation can initiate droughts and flooding. These events may alter forest conditions directly, such as through mortality of trees, or indirectly, such as by increasing the probability, frequency and/or severity of fire.” (Chapter 1, p. 55)*

*“The climate models are unanimous in projecting **increasing average annual temperatures** over the coming decades in the Pacific Northwest during all seasons, regardless of uncertainties in modeling or emissions (Nakicenovic 2000). These increases exceed observed 20th century year-to-year variability, generally by the 2040s.” (Chapter 1, p. 56)*

Table 15 (Chapter 1, p. 57) tabulates some of the predicted outcomes of climate change.
*“Table 15. Summary of past and expected **future trends** in climate variables for the Northern Rocky Mountains, USA”*

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*Because climate is such a strong driver of vegetation conditions, and by association wildlife communities, changes in climate have the potential to cause **substantial effects on wildlife populations, distribution, and patterns of use.*** (Chapter 1, p. 59)

*“These climate-induced changes in **fire regimes** could have substantial impacts on ecosystems, with associated effects to communities and economies (McKenzie et al. 2009). It is readily apparent that vegetation, fire, climate and weather are closely interconnected, and the relationship between the multiple aspects of each is extremely dynamic and complex.”* (Chapter 1, p. 73)

*“Climate changes, specifically warming conditions and increased **water deficits**, also have the potential to increase vulnerability of forests to insects or disease.”* (Chapter 1, p. 79)

*“There is uncertainty in our predictions of how climate and other stressors may cause changes in vegetation, and how those changes may in turn change the extent, intensity, and pattern of disturbance processes, such as **fire and insect outbreaks**. What is certain is that the ecosystem is dynamic, interactions between components are complex, and change would most certainly occur as it always has. In some cases these changes may be within the natural range of variation and not negatively impact ecosystem integrity, though they may not be desirable from a social or economic perspective. In other cases, these changes can compromise ecosystem integrity and render it less resilient in the face of future disturbances.”* (Chapter 1, p. 79)

*“As the agency responds to climate change by new, different, or more land and vegetation management actions, those disturbances would provide suitable conditions for **invasive plants**.”* (Chapter 1, p. 85)

*“There is uncertainty about how future changes in climate may affect **riparian ecosystems**, particularly lentic (standing water) systems. In general, small water bodies and associated riparian areas are thought to be more vulnerable to loss than are larger ones (Hossack et al. 2013).”* (Chapter 1, p. 109)

*“...**tree growth and regeneration** may be affected more by extreme weather events and climatic conditions than by gradual changes in temperature or precipitation (USDA 2013), at least in the short term.”* (Chapter 1, p. 121)

*“MTFWP Region 1 completed a climate change **vulnerability assessment** for terrestrial and aquatic species in 2013–2014. Their assessment used an “ensemble” climate prediction model to project future trends. This model used the median of 16 major global circulation models and “downscaled” predictions based on elevational relief, oceanic influence, and other factors. This model predicts that the mean temperature departure for northwestern Montana may be 3.9–4.5°F warmer by the 2040–2069 time period, **while the mean moisture metric may decrease by 0.051–0.096** (MTFWP 2012). Models for the Northern Rockies predict that summers may be drier, with an increase in drought frequency and severity, while precipitation may increase in winter. Variation in weather conditions is also expected to increase. Extreme precipitation and warming events are likely to increase while extreme cold events are likely to decrease.”* (Chapter 1, p. 160)

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*“While the Forest Service cannot control climate change, **general measures, as well as some species-specific measures**, have been identified to help reduce species vulnerability to climate change (Shoo et al. 2013). General measures include: 1) secure and restore “refugia” that are within the species current range, 2) secure and restore “refugia” that are outside the species current range, 3) secure and restore movement paths so that species can migrate and/or interbreed, 4) develop assisted colonization plans.” (Chapter 1, p. 161)*

*“The LCAS recognized that federal land management agencies have limited ability to alter the trajectory or to compensate for the effects of climate change, but stated that there is a need for additional work to more accurately predict specific effects of climate change on **lynx**.” (Chapter 1, p. 178)*

*“The proposed listing rule for the **wolverine** states, “We have determined that habitat loss due to increasing temperatures and **reduced late spring snowpack** due to climate change is likely to have a significant negative population-level impact on wolverine populations in the contiguous United States. In the future, wolverine habitat is likely to be reduced to the point that the wolverine in the contiguous United States is in danger of extinction” (Federal Register/Vol. 78, No. 23 /Monday, February 4, 2013 / Proposed Rules)” (Chapter 1, p. 182)*

*“**Wildfire risk** – Warmer summer temperatures and reduced rainfall in the West are projected to extend the annual window of wildfire risk by 10 to 30 percent (Brown et al. 2004, Westerling 2006).” (Chapter 2, p. 97)*

*“**Insects and disease:** Climate change may likely result in more disturbance from insects, invasive species, and disease (Alig et al. 2004, Logan et al. 2003).” (Chapter 2, p. 97)*

*“Increases in **tree mortality** resulting from insect outbreaks further increase fire risk, decrease timber supply, and impact public safety, thereby increasing the impacts to the counties in the analysis area.” (Chapter 2, p. 97)*

*“A better understanding of the direct and indirect **water yield responses** to climate change is needed for potential mitigation and adaptation of the flood protection service provided by the Flathead National Forest. (Chapter 2, p.156)*

END