June 17, 2025

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Via Email To: allison.landro@usda.gov and online to the comments-northern-beaverhead-deerlodge@usda.gov
Re: Beaverhead-Deerlodge Forest Plan Amendment for Canada Lynx Habitat – Comments on Environmental Assessment

Supervisor Lewellen:

These comments and analysis are submitted on behalf of the Alliance for the Wild Rockies, Center for Biological Diversity, Bold Visions Conservation, Conservation Congress, Council on Wildlife and Fish, Gallatin Wildlife Association, Inland Empire Task Force, Native Ecosystems Council, Sage Steppe Wild, Swan View Coalition, Western Wildlife Conservancy, WildEarth Guardians, Wilderness Watch, and the Yellowstone to Uintas Connection. These organizations are public interest organizations that engage on public land issues affecting wildlife.

We have reviewed the Environmental Assessment and its supporting documents and find that our detailed analysis and comment during scoping has not been addressed. These were substantive comments and directly challenged the modeling and analysis provided in the Biological Assessment (BA) for Canada lynx Effects of the 2009 Revised Forest Plan and the Northern Rockies Lynx Management Direction. The mapping in the current EA reflects little change, if any.

The EA is insufficient for such a sweeping change because:

- The EA is Forest-wide, not an amendment for a small area such as a mine, or other project that needs a land exchange or some small change. It is clearly a Forest Plan Revision that applies to the entire BHDL, resulting in large areas being excluded from lynx habitat. The EA cites 36CFR219.9(b)(5) to limit the scope of the amendment, yet paragraph (b)(3) notes that *"Except for an amendment that applies only to one project or activity, a proposed amendment that may create a significant environmental effect and thus requires preparation of an environmental impact statement is considered a significant change in the plan for the purposes of the NFMA and therefore requires a 90-day comment period for the proposed plan and draft environmental impact statement (§ 219.16(a)(2)), in addition to meeting the requirements of this section."*

  Clearly, the scope of this amendment and its implications to Canada lynx habitat and survival needs an EIS. Therefore, the full Plan Revision requirements need to be addressed, including additional standards and guidelines as outlined in 36CFR219.8 and as we describe herein. The Plan Amendment process must include an alternative to ensure restoration of functionality of lynx

habitat and connections, not limit the choice to the 2020 Model and NRLMD. As the following analysis shows, the BHDL 2001 Model habitat most closely addresses the identified gaps in the 2020 model and should be used.

- The EA defines lynx habitat in a procedure that minimizes that habitat and considers it as a static, not dynamic state as experienced by lynx.
- The EA does not identify or protect linkage areas to connect the habitat that it does claim exists.
- It omits inclusion of habitat that the Olson et al (2021) Model and the Montana Natural Heritage Program Inductive Model include. We analyzed these in our scoping comments. These are critical to fill in gaps from the BHDL 2020 Model and provide discrete linkage pathways on the Forest that connects more suitable habitat.
- The BHDL LAUs and habitat model eliminates a large swath of the landscape that contains historical lynx observations and omits habitat in the Dillon and Butte Ranger Districts that was included in the 2001 Model.
- Based on the following maps and analysis, the BHDL 2001 Model best represents the habitat for lynx, including connectivity and incorporating the Olson et al (2021) Model and the Montana Natural Heritage Program Inductive Model, which the BHDL 2020 Model lacks.

Figures A – G below show the BHDL 2020 modeled habitat, the Olson et al (2021) modeled habitat, and the Montana Natural Heritage Program modeled habitat. By overlaying these along with the linkages developed for the NRLMD, the areas within the BHDL can be identified where linkages need to be provided.[1] Figures A – E center on the Ranger Districts. Figures F and G overlay the BHDL model over the MNHP model showing additional modeled habitat that should be included and provide linkages not covered by the BHDL model. Figures H and I show aerial imagery for the Butte and Dillon Ranger Districts illustrating that higher elevation, mountainous areas excluded from the BHDL 2020 model, but included in the BHDL 2001 Model, can function as linkage and therefore should have standards for protection as linkage and that Model should be the basis for the Plan Amendment, if any. From the EA Appendices:4 *"Note: Once identified as "lynx habitat," there is no longer a distinction between primary and secondary vegetation. Conservation measures of the Lynx Conservation Assessment and Strategy (LCAS) apply to lynx habitat."*

[1] USDA Forest Service - Northern Region. November 13, 2003. Canada Lynx Linkage Areas for Northern Rockies Lynx Amendment Area (USA). USDA Forest Service - Northern Region. http://www.fs.fed.us/r1/gis/thematic_data/lynx_linkage_n_rockies_1m.zip

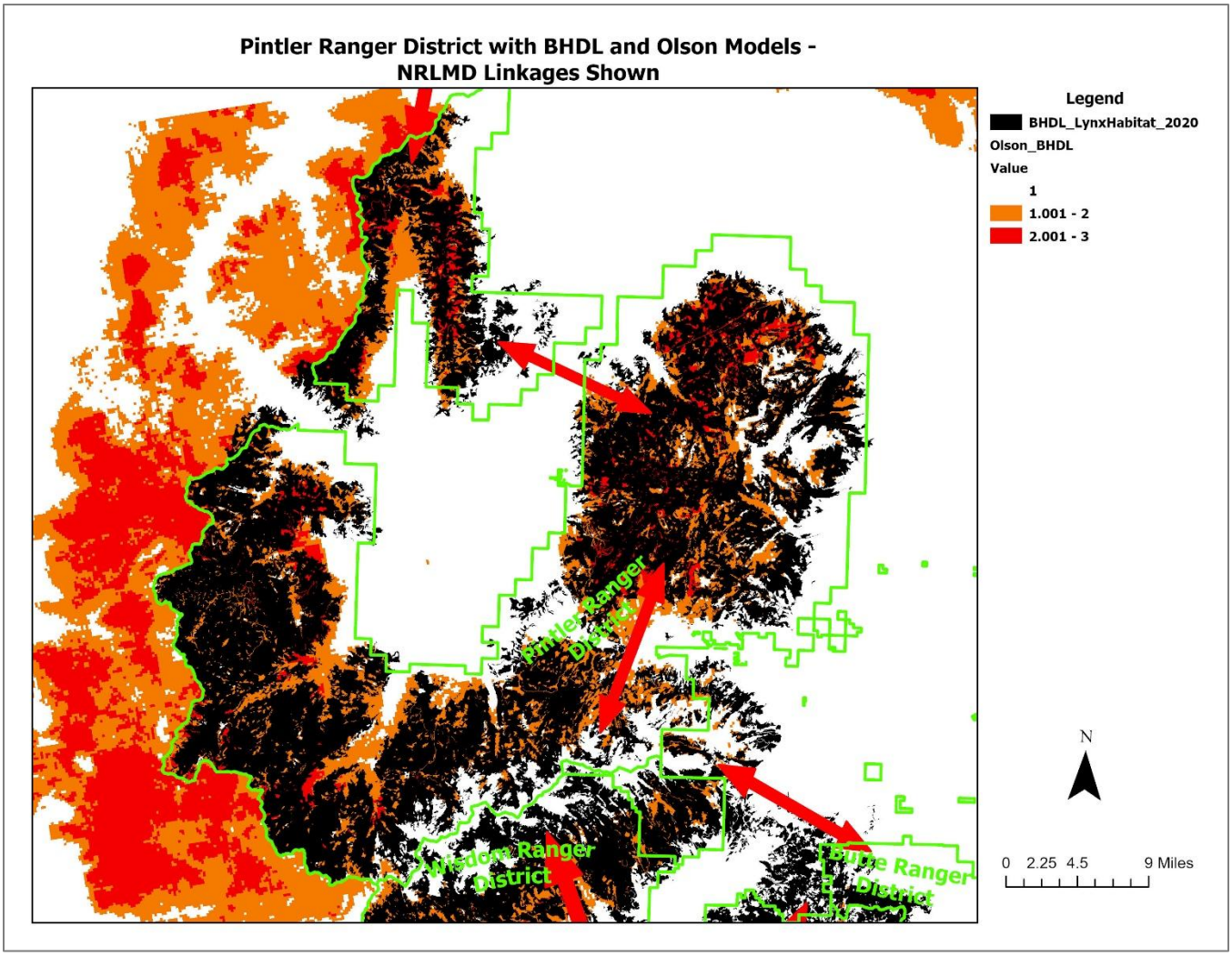


Figure A. The higher probability habitat by Olson appears between and surrounding the BHDL 2020 modeled areas, indicating the need to expand the lynx habitat to include the Olson modeled areas. Inclusion of these areas provides linkage and reduces habitat fragmentation in the BHDL model.

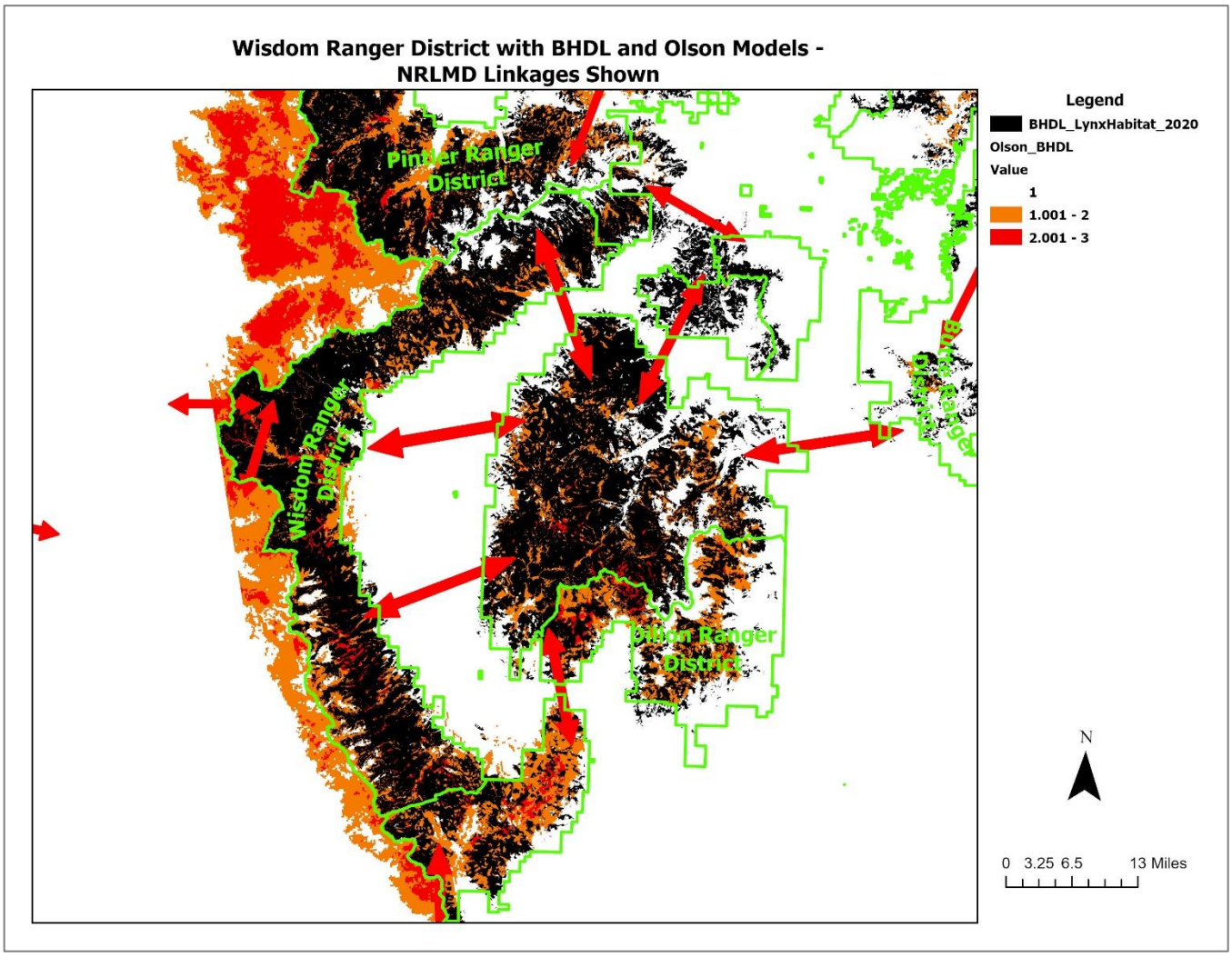


Figure B. The higher probability habitats by Olson appears between and surrounding the 2020 BHDL modeled areas, indicating the need to expand the lynx habitat to include the Olson modeled areas. Inclusion of these areas reduces habitat fragmentation in the BHDL model.

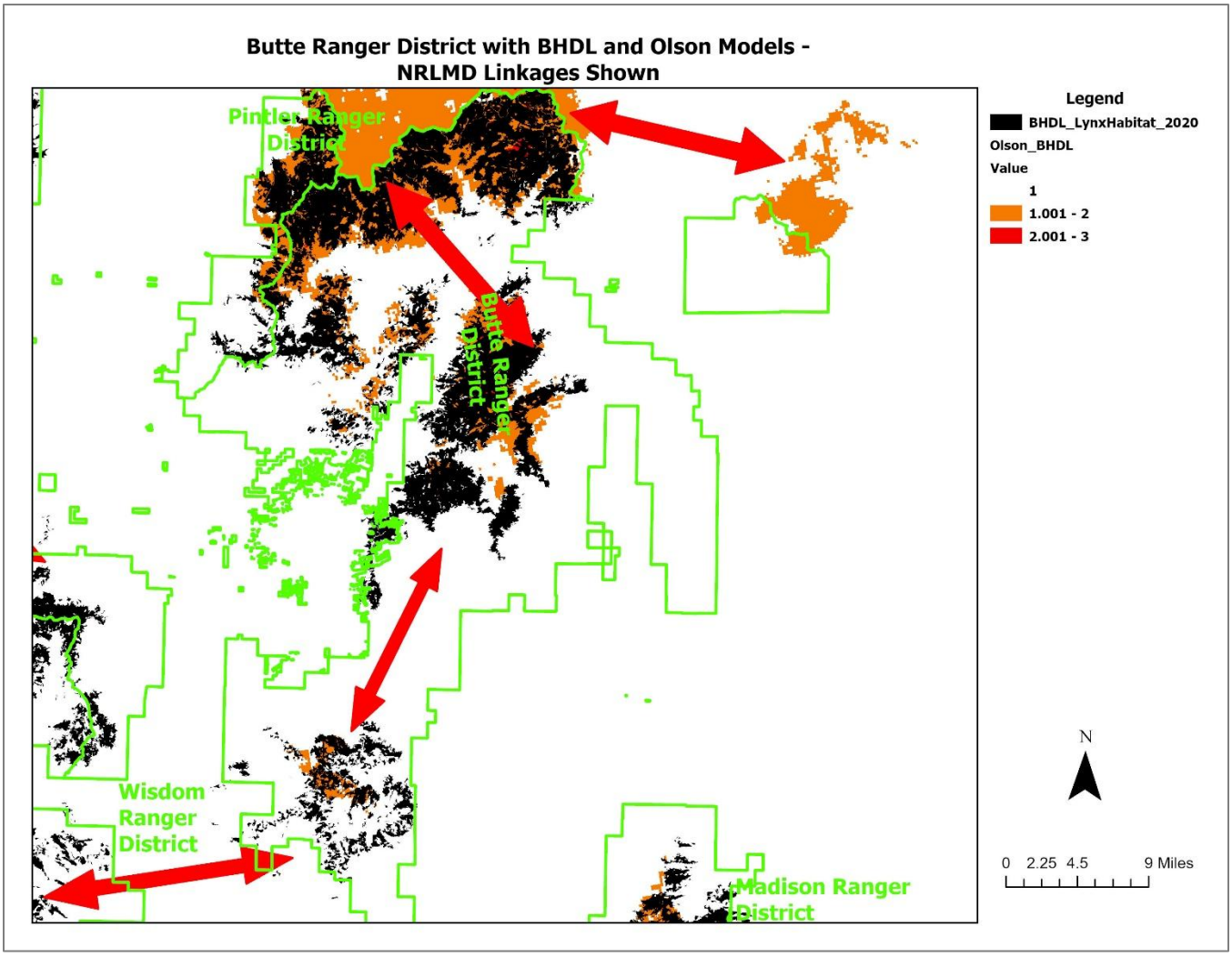


Figure C. The higher probability habitats by Olson appears between and surrounding the BHDL 2020 modeled areas, indicating the need to expand the lynx habitat to include the Olson modeled areas. Inclusion of these areas reduces habitat fragmentation in the BHDL model. This area was included in the BHDL 2001 Model.

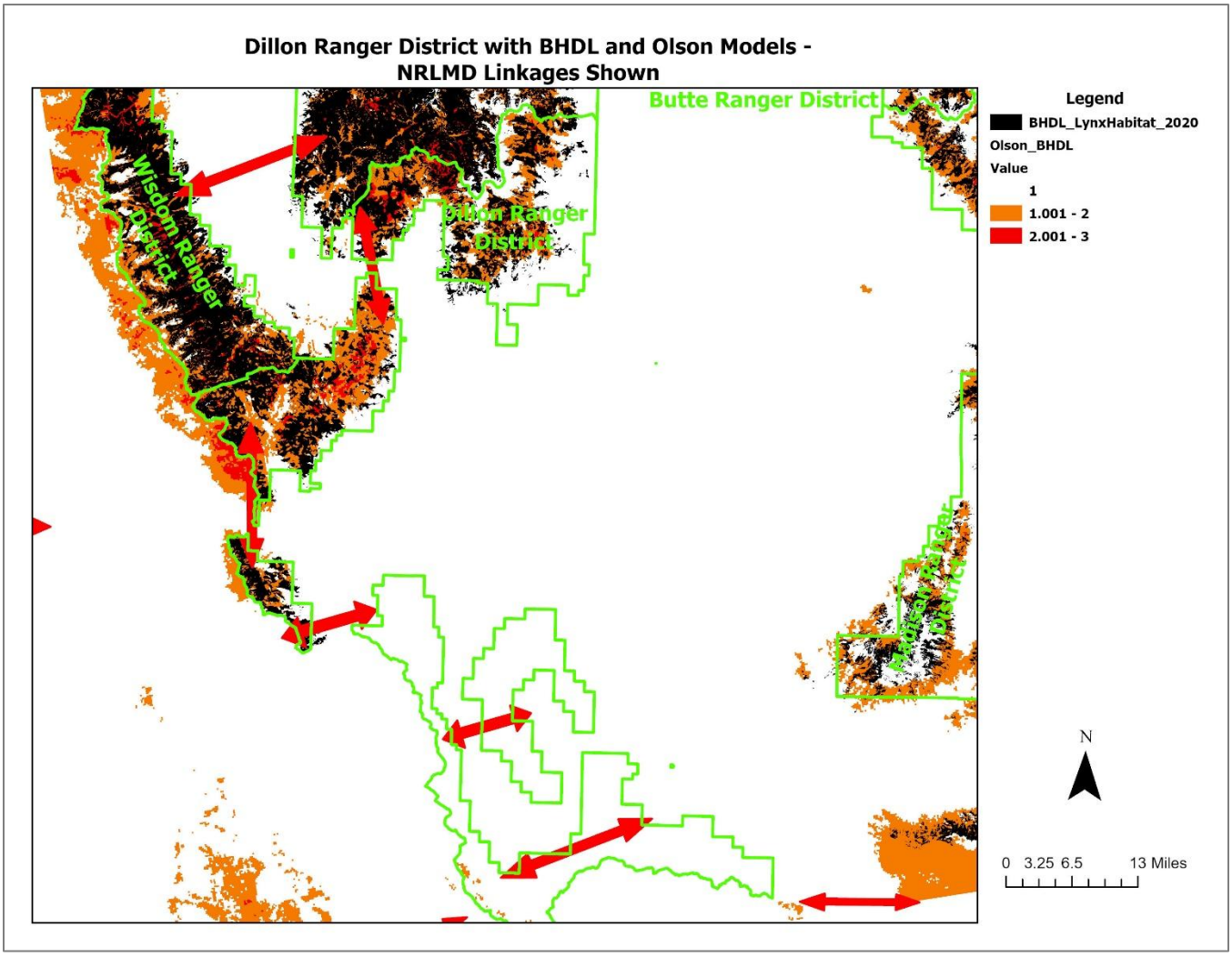


Figure D. The higher probability habitats by Olson appears between and surrounding the BHDL 2020 modeled areas, indicating the need to expand the lynx habitat to include the Olson modeled areas. Inclusion of these areas reduces habitat fragmentation in the BHDL model. Note the southern area, which is excluded from the BHDL 2020 model is important for linkage. This area was included in the BHDL 2001 Model.

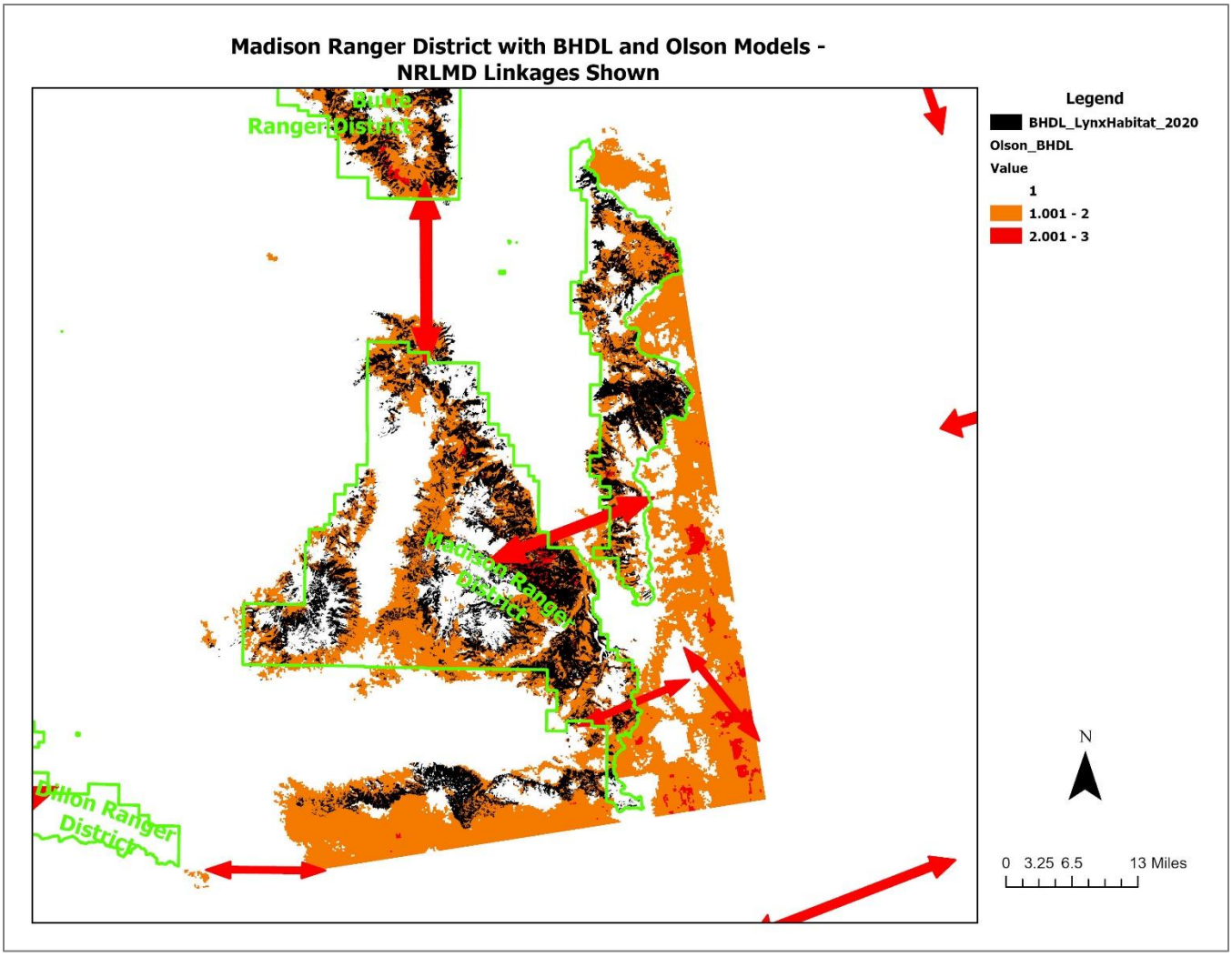


Figure E. The higher probability habitats by Olson appears between and surrounding the BHDL 2020 modeled areas, indicating the need to expand the lynx habitat to include the Olson modeled areas. Inclusion of these areas reduces habitat fragmentation in the BHDL model. Much of the area was included in the BHDL 2001 Model.

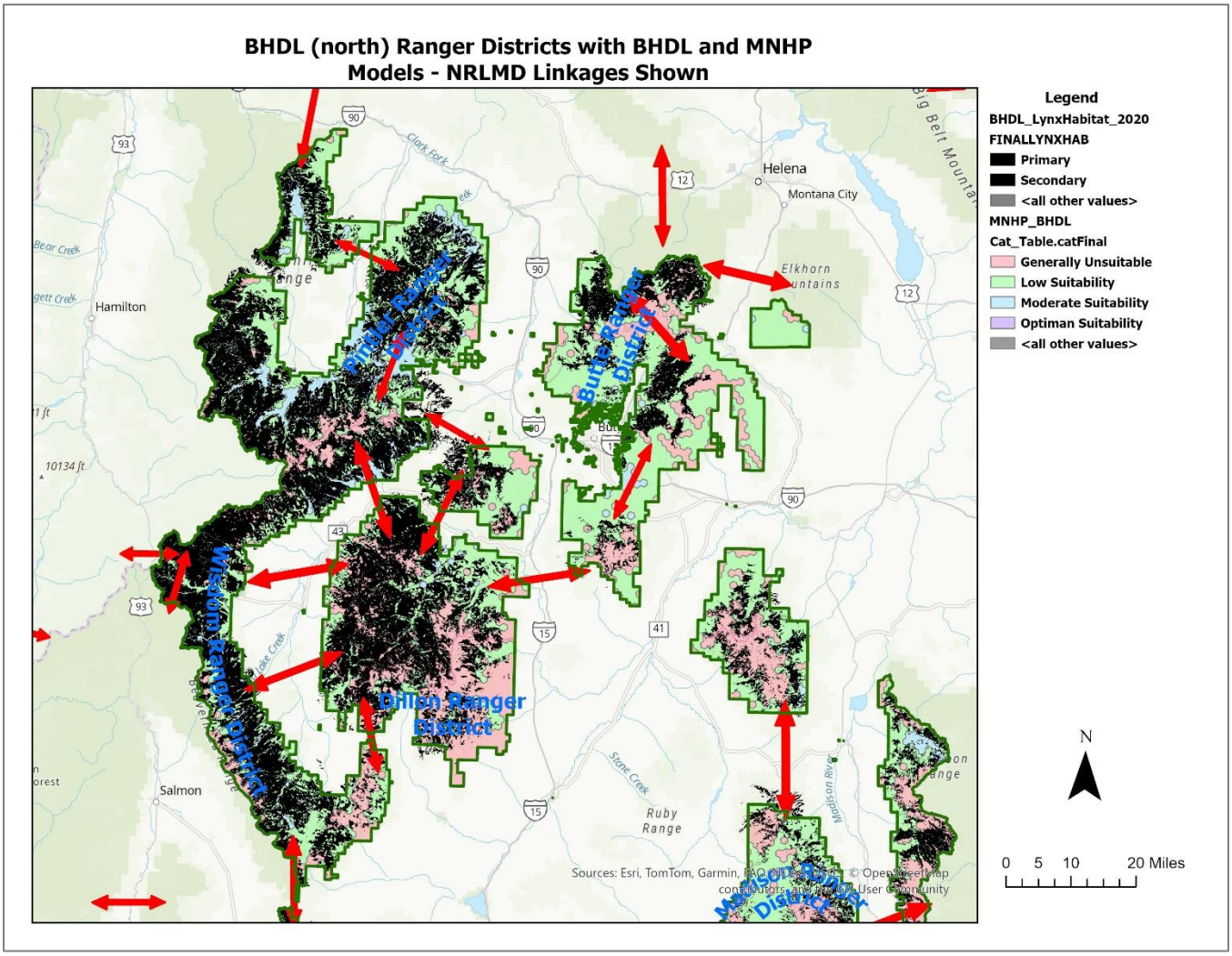


Figure F. The MNHP low and moderate suitability habitat shown underlying the BHDL 2020 model fill in gaps needed for linkages. Inclusion of these also reduces fragmentation of lynx habitat in the BHDL model.

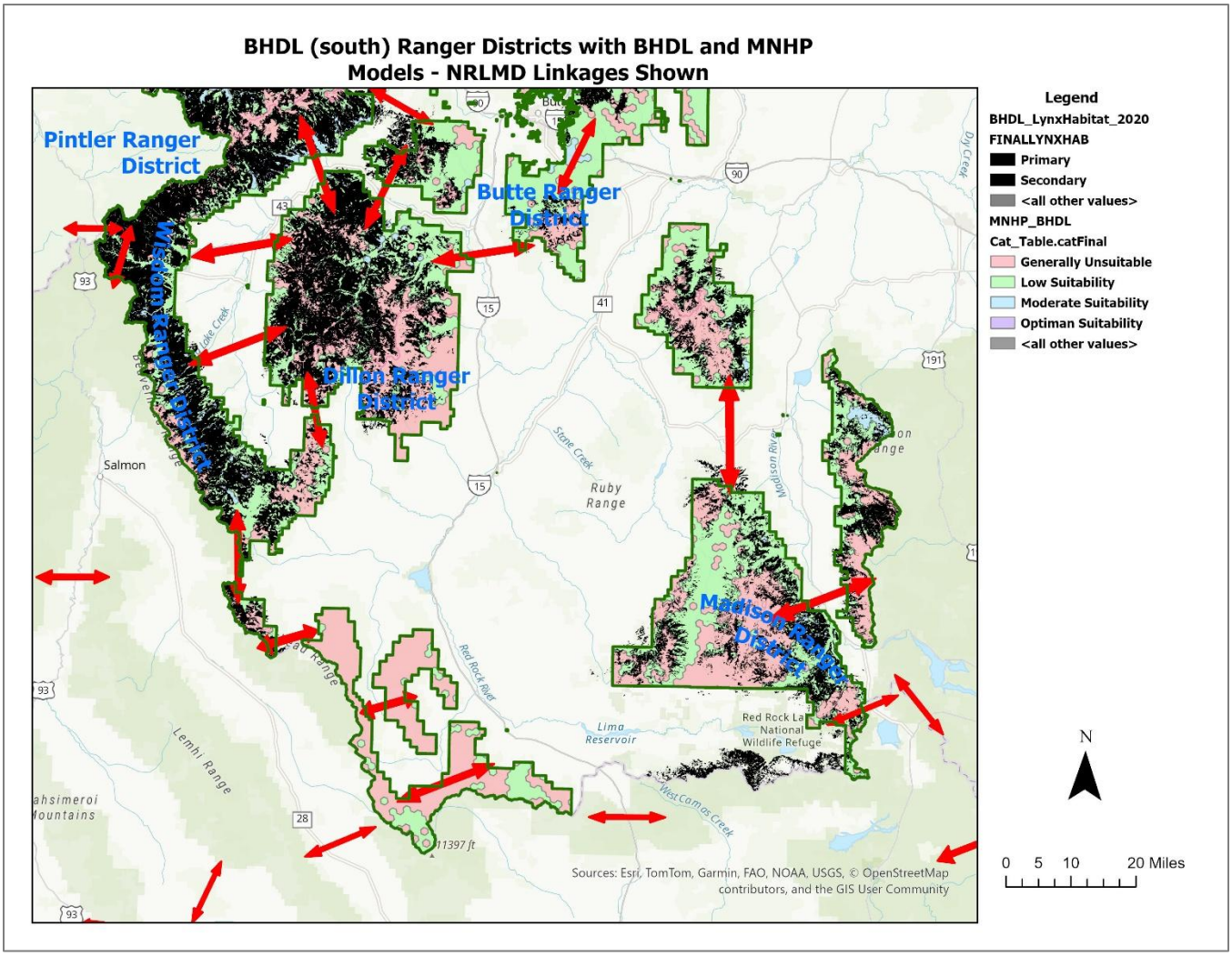


Figure G. The MNHP low and moderate suitability habitat shown underlying the BHDL 2020 model fill in gaps needed for linkages. Inclusion of these also reduces fragmentation of lynx habitat in the BHDL model.

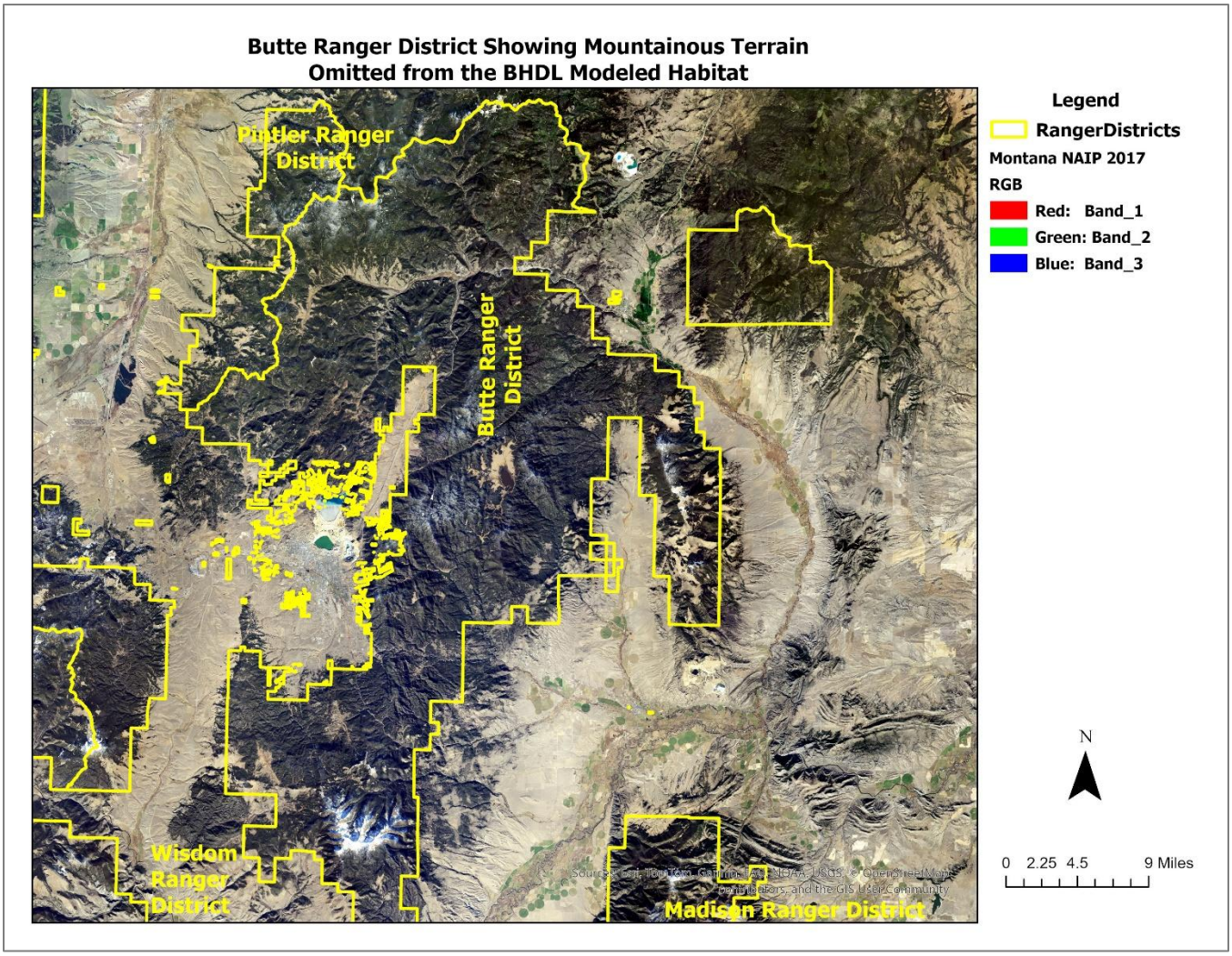


Figure H. Here we see the entire Ranger District is mountainous terrain yet included minimal habitat in the BHDL 2020 model. It needs standards to protect it as linkage and expanded lynx habitat as depicted in the MNHP model. This was determined to be habitat in the BHDL 2001 Model.

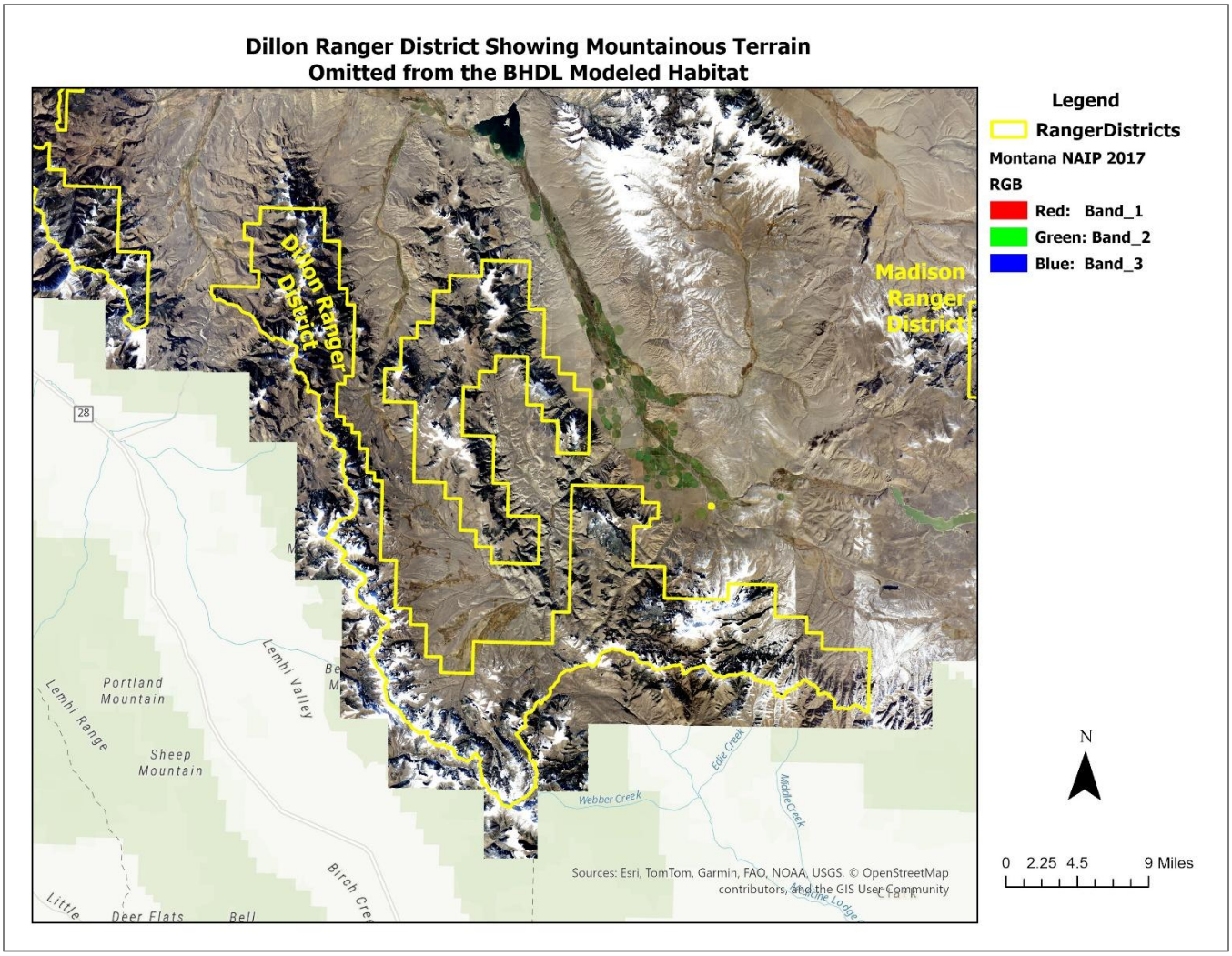


Figure I. Here we see the high elevation mountain chains that could provide secure linkage habitat for lynx have been excluded as habitat in the three models. This area in the Dillon RD needs standards to protect it as linkage. It was included as lynx habitat in the BHDL 2001 Model.

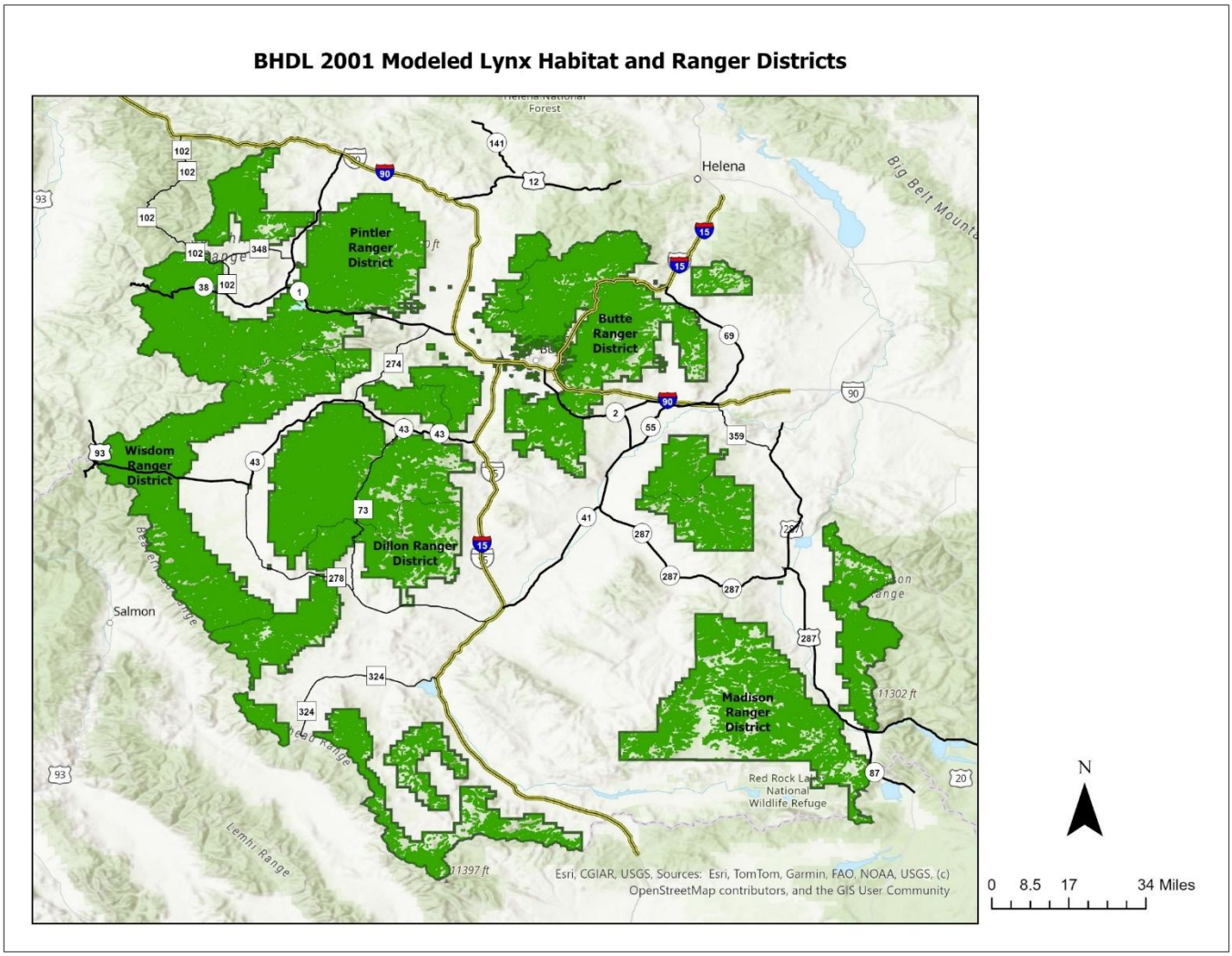


Figure J. The BHDL 2001 Model provides the best match to fill the habitat and linkage gaps described in Figures A – I.

In Attachment 1 we have summarized points of rebuttal to the BHDL 2020 Model.

- The Modeling is arbitrary and a matter of convenience because it has omitted consideration of lynx habitat where historical observations revealed lynx presence.
- The absence of lynx from the BHDL following listing in 2000 has not been explained in relation to the massive deforestation occurring here in the last half of the past century and the explosion of motorized recreation.
- The BHDL analysis must address why, with its claimed 1,625,805 acres of lynx habitat and intensive surveys, there were no lynx found for nearly 20 years following its listing as threatened.
- A view of the regional national forests using the Olson et al (2021) model shows that the BHDL is an important connection between the GYA and Northern Rockies.
- Forest Plan Standards must be established to identify, restore and maintain linkages and connecting habitats.
- The 2020 BHDL BA Model
    - The Model is flawed in that it uses the current modified forest structure to define "surrogate" habitat as opposed to the historical habitats used by lynx.
    - The Model relied on modeled snow depths for an arbitrary period of December - May as criteria, and constrained habitat by aspect and elevation. Lynx denning occurs during late spring.[2] The use of this arbitrary period ignores the variability in seasonal snow patterns from year to year in a dynamic, not static system. The Model paints a black and white picture and does not reflect reality on the ground as experienced by Canada lynx.
    - Our analysis of 29 SNOTEL station data in and around the BHDL shows that snow depth is not a constraint for lynx in the BHDL.
    - Analysis of historical lynx observations in the BHDL show that slope, aspect and elevation are not constraints for lynx in the BHDL.
    - The Model used surrogates for habitat such as structural classes, e.g. stem exclusion rather than the actual habitat types where lynx were historically observed. It only focused on subalpine fir, spruce, and cool-moist Douglas-fir, yet both our analysis and the Montana Natural Heritage Program found that lodgepole pine forest was the dominant forest type.
    - The Model relied on VMAP and did a crosswalk with structural stages that includes major modifications from the historical forest vegetation types. This is an attempt to accept the modified forest as a baseline, rather than the habitats lynx have relied upon through the historical record. VMAP has a significant error rate which we illustrated using an aerial image showing the stem exclusion category is misrepresented.
    - The Model relies on the Wildland Urban Interface exemptions to NRLMD to request an exemption of 88,910 acres. Our analysis of WUI for the BHDL shows that instead of 1,644,663 acres of WUI, it should only be 34,663 acres. The Forest Plan amendment must correct this huge disparity with an analysis that accounts for building density.
- We compared the Montana Natural Heritage Program Inductive and Deductive models that relied on historical lynx observations, the Olson et al (2021) model that relied on tracking studies, and the

[2] Olson, L.E., Squires, J.R., DeCesare, N.J., and Kolbe, J.A. 2011. Den use and activity patterns in female Canada lynx (Lynx Canadensis) in the Northern Rocky Mountains. Northwest Science, Vol. 85:3. https://www.fs.usda.gov/rm/pubs_other/rmrs_2011_olson_l001.pdf

2020 BHDL Model. The BHDL Model was the only one that did not take into account historical observations or tracking data. Here, we repeat our Table 6 showing the differences.

Table 6. Area (acres) of Modeled Lynx Habitat on the Beaverhead-Deerlodge NF

BHDL		116,806 Secondary vegetation	1,509,146 Primary vegetation
MNHP	1,287,428 Generally Unsuitable	2,069,426 Low Suitability	257,089 Moderate Suitability
Olson	1,862,477 Low Probability	1,507,773 Moderate Probability	244,016 High Probability
Comparing the Model Acreage			
Beaverhead Deerlodge Models		2,711,422 acres (2001) 1,625,952 acres (2020) 2,134,741 acres* *Y2U 2001 BHDL model clipped to Forest Boundary	
Montana Natural Heritage Program Inductive Model		2,326,515 acres	
Olson et al (2021) Model		1,751,789 acres	

- To sum up, the BHDL 2020 model is too limited in its interpretation, leaving out much potential lynx habitat. It further did not consider historical observation locations and the historical vegetation types where those occurred. Instead, it used surrogates with cascading errors to eliminate major lynx habitats such as lodgepole pine and Douglas fir. The MNHP model used lynx observations combined with environmental variables to arrive at a habitat area of 2,326,515 acres, compared to the BHDL 2020 modeled 1,625,952 acres. This is less than the BHDL 2001 model, but that model would include the habitat in the Dillon Ranger District that was omitted from the 2020 model.

  The MNHP Deductive model shows that the BHDL 2020 model eliminates major categories of vegetation types in its mapping. In the end, the BHDL 2001 model with 2,134,741 acres within the BHDL seems to capture the habitat better than the 2020 model and does include that habitat in the Dillon Ranger District. However, that said, the determination of lynx habitat must go back to the historical vegetation types where observations were made and map the potential extent of those across the BHDL. Since we have determined that snow depth, slope, aspect and elevation are not significant barriers within the constraint of the BHDL, these should not be part of the determination.

- We reviewed 2012 Planning Rule sections cited in the Scoping Notice, the ESA, and Forest Service Manual provisions that should apply.
  - While the Scoping Notice invites public comment, by including the 2020 lynx habitat map, it presupposes this is the lynx habitat that will be the basis for the plan amendment, thus pre-empting public input.

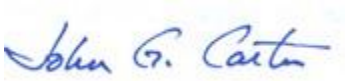
- The Planning Rule expects the restoration of ecological integrity, diversity of plant and animal communities and species viability, multiple use, and listed timber requirements. All the elements listed in those sections will need specific standards in the plan amendment.
- The ESA makes biological assessments "discretionary". These should be required in the plan amendment for all future projects.
- The FSM cites the ESA to maintain species viability, and conduct activities to assist in the recovery of T&E species.
- The FSM defines "Essential Habitat" to include areas needed for recovery of T&E species.

- Reflecting these Planning Rule, ESA and FSM provisions, we conclude, "The BHDL must now designate lynx habitat as Essential for recovery of lynx and maintaining connections within the BHDL and to adjacent public lands. It must determine the potential occupancy extent and home ranges and set population goals for a viable population within the BHDL to be established by a combination of habitat protection and introducing lynx as done in Colorado."

  We are not seeing National Forests conducting any analysis of linkages, or "suitable unoccupied habitat" or any effort to address its current vs historical condition. The Plan Amendment must correct this. The lack of adequate regulatory mechanisms to protect lynx habitat and connectivity has been implicated as a central issue for lynx being able to maintain populations. (FR p16052). The FSM described above makes the point that the Forest Service should establish through planning, objectives for habitat management and/or recovery of populations and prescribe measures to prevent adverse modification of habitat essential to the conservation of T&E species. This remains to be done with assurance that the BHDL land management plans are quantitatively addressing lynx habitat and connectivity needs with adequate standards.

- The Biological Assessment (BA) for Canada lynx Effects of the 2009 Revised Forest Plan and the Northern Rockies Lynx Management Direction, Appendix H, does a comprehensive review of NRLMD goals, objectives, standards, and guidelines and how existing Forest Plan provisions apply to each. We have seen no evaluation that the NRLMD has been effective, or for that matter, the 2009 BHDL RFP. Standards are missing for most of the NRLMD goals, objectives, and guidelines in the 2009 RFP. Goals, objectives and guidelines are without enforcement and need quantitative, not general, standards. The Forest Plan Amendment must now go through each of these NRLMD provisions and provide standards for each NRLMD Direction.

Sincerely,



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Attachment 1
EA Analysis of Models and Background for the Beaverhead Deerlodge Plan Amendment for Canada Lynx
Y2U Et Al

The map of proposed lynx analysis units (LAUs) provided in the Scoping Letter (March 4, 2025) reflects the 2020 BHDL mapping analysis (BA).[3] That map remains identical in the EA. This work was undertaken because of the Western Lynx Biology Team conclusion that the number of lynx detections on the forest met provisions for changing the BHDL from unoccupied to occupied, thereby triggering the Northern Rockies Lynx Management Direction Standard S1 for changing LAU boundaries based on site-specific habitat information. A problem emerges in that in 2001 the BHDL modeled lynx habitat and found habitat of 2,711,422 acres. The 2020 model reduced that to 1,625,952 acres.

The Occupied Habitat Problem

We have been analyzing lynx habitat for many years and are dismayed at the deflection around human impacts on lynx and lynx habitat. When one looks at the historical records there have been thousands of lynx observations in the Rocky Mountains from Montana, Idaho, Wyoming, Utah and Colorado. Those are being discounted as unverified because there is no DNA evidence under a protocol that has only been in existence in recent years. The BA:11 declares that "Detections prior to 2018 are considered 'unverified' as eDNA or photographs do not exist."

Occupied habitat is described in the BA Attachment 1 as:

> In order to implement this agreement, the FWS and FS will jointly identify 'occupied lynx habitat' as a subset of mapped lynx habitat. The identification of occupied lynx habitat will include consideration, as appropriate, of the Science Report, the LCAS, FWS's final listing decision documents, any information used to designate critical habitat, and new scientific information regarding the ecology and distribution of lynx, and population data. (BA:85).
>
> The Lynx Conservation Assessment and Strategy identities 17 lynx risk factors in 4 different categories - factors affecting lynx productivity, lynx mortality, lynx movements, and other large-scale risk factors. Risk factors identified activities or existing conditions that could adversely affect either individual or groups of lynx. (BA:85).
>
> Factors identified include timber management; wildland fire management; recreation; forest/backcountry roads and trails; livestock grazing; other human developments; trapping; predator control; incidental or illegal shooting; competition and predation as influenced by human activities; highways (vehicular collisions); highway, railroad and

[3] Gatlin, J. 2021. Biological Assessment for Canada lynx Effects of the 2009 Revised Forest Plan and the Northern Rockies Lynx Management Direction. Beaverhead-Deerlodge National Forest. January 4,2021.

> utility corridors; land ownership patterns; ski areas and large resorts; fragmentation and degradation of lynx refugia; lynx movement and dispersal across shrub steppe habitats; and habitat degradation by non-native invasive plant species. (BA:85).

The Final Rule listing Canada lynx as threatened was enacted in 2000.[4] The National Lynx Survey took place in that same time frame.[5] Despite evidence that lynx persisted over historical times, the "unoccupied" status results from failing to find current evidence of lynx long after habitats have been fragmented by mines, high road density, an explosion in motorized recreation, timber and fuel reduction projects, and including habitat alteration by livestock grazing.

The problem with this concept of "occupied habitat" is that it makes optional the application of the Northern Rockies Lynx Management Direction in "unoccupied habitat". The direction only says it "should be 'considered''. In our experience in such places as the Caribou Targhee NF, the Uinta Wasatch Cache NF, the Ashley NF, in linkage and peripheral habitat, but habitat historically used by lynx, it is met with deflection and no analysis. Meanwhile the practices listed above as detrimental to lynx proceed apace.

We have prepared multiple sets of mapping and analysis comments for Canada lynx. These include comments on the 2017 Species Status Assessment, the Draft Recovery Plan, and the recent 2024 Revised Designation of Critical Habitat. In those comments we have addressed the deflection around human activities as the cause of lynx abandoning habitats and the resultant negative effects on habitat that result from both the "unoccupied" status and the weakness of the NRLMD which provides inadequate standards. For example, the explosion in motorized recreation, and deforestation by timber related projects in the latter half of the 1900s.

As an example, we provide Figure 1 which illustrates the history of timber harvest in the National Forest System and Region One. Note that it only came down to today's levels after a huge amount of deforestation between about 1950 and 2000. A time when lynx observations were declining across much of the Rocky Mountains, and they were no longer being observed in some areas. We are unsure as to whether the Region One harvest data includes fuel reductions, silviculture treatments, and other manipulations that may not fall under the umbrella of timber sales. These historically logged areas take decades to return to lynx and snowshoe hare habitat, which have affected large areas of historical lynx habitat. This is a cumulative impact.

The BA, with its stand structure analysis reveals to some extent the scope of this altered forest ecosystem and relies on this altered structure to define a new baseline rather than address the actual habitat (vegetation) types where lynx were historically observed. We address this later in these comments showing these forest types where historical observations occurred. We used the Landfire

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[4] DOI Fish and Wildlife Service. 2000. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx and Related Rule. Federal Register Vol. 65, No. 58:16052 – 16086.

[5] McElvey, K.S., Claar, J.J., McDaniel, G.W., and Hanvey, G. 1999. National Lynx Detection Protocol.

database, where the Montana Natural Heritage Program used the Montana Land Use/Land Cover Dataset.

In the recent FWS Revised Designation of Critical Habitat, we saw Colorado go from "unoccupied" to "occupied" habitat. We saw critical habitat in the northern Rockies diminished by 12%, and in the Greater Yellowstone Area by 88%.[6] Yet, these last two areas were widely inhabited by lynx when you look at historical observations. (Figure 2). In the comments we cited above we have looked back at historical accounts and obtained the McElvey (1998) data, Montana, and Wyoming data for historical observations. There are thousands of these, for example, the Montana Natural Heritage data contains 2,414 records up to the present. The McElvey data contained over 3,000 records, and the Wyoming database contained 315 records. Some are duplicates, and there are missing records we know of. But, overall, thousands of records exist across the Rockies.

With this as background, the BA:77 acknowledges that there were 109 observations on the BHDL "that McKelvey and others (Ibid) considered 'reliable', but unverifiable". This is the unfortunate consequence of inventing a criterion (DNA) that didn't exist at the time. If "reliable" is not reliable to be used, can we infer anything other than the abandonment of the precautionary principle is at work? Is it the need to accommodate logging, off-road vehicles, snowmobiles, trapping, and mining? This is a legitimate question. It also leads to the question as to why lynx were not observed in the BHDL until recently if these factors were not at play? In the meantime, did the BHDL modify its projects or recreational use to accommodate lynx? How much lynx habitat was lost due to human activities during the period before listing? After listing? These are all questions needing an analysis and answer in the plan amendment process.

[6] Department of the Interior, Fish and Wildlife Service. 2024. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous U.S. Distinct Population Segment of the Canada Lynx. Federal Register 89 No. 230 (pp 94656 – 94680) dated November 29, 2024.

Figure 1.

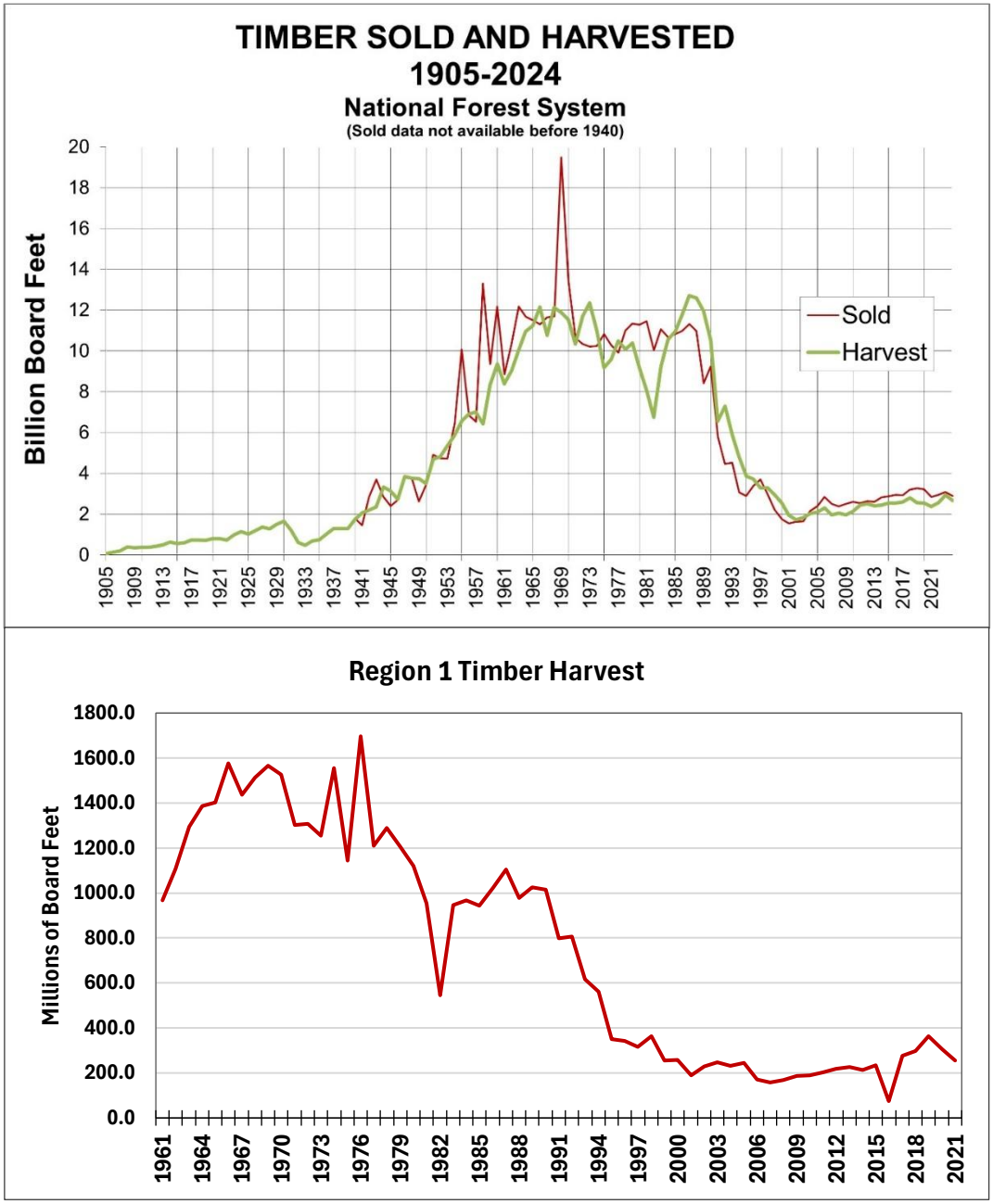
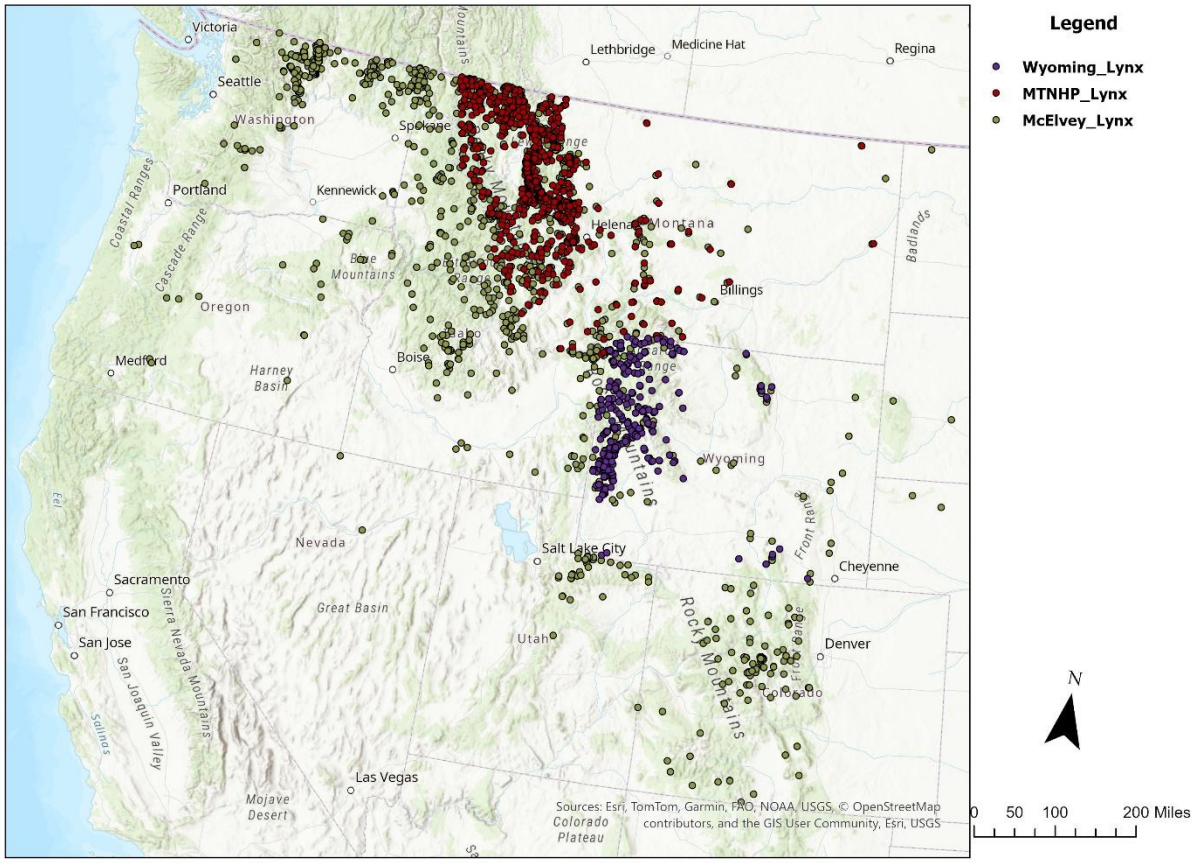

TIMBER SOLD AND HARVESTED
1905-2024
National Forest System
(Sold data not available before 1940)
Billion Board Feet
Sold
Harvest
Region 1 Timber Harvest
Millions of Board Feet

Figure 2. Lynx Observations in the Rocky Mountains



The Federal Register Notice to revise lynx critical habitat addressed the Colorado critical habitat being added, when in the 2014 critical habitat designation, that Federal Register Notice[7] did not designate critical habitat. The reasons for not designating included: "the last lynx verified record was from 1974 (no verified records from 1875 to 1999) despite large-scale snow tracking efforts… .". "We concluded at the time that there were 'few if any' native lynx in Colorado at the time of listing… .". The 2024 Federal Register Notice stated the rational for designating critical habitat as: "At the time of listing, this unit was occupied by lynx translocated from Canada and Alaska and it is currently occupied by the descendants of those released lynx. It is uncertain whether this unit historically supported a resident population or if lynx presence was naturally ephemeral and intermittent." But millions of acres of critical habitat were proposed for designation in Colorado.

Occupied habitat appears to be an arbitrary construct used as a matter of convenience to include or exclude areas with habitat that could support, or historically supported lynx, rather than addressing lynx habitat in a holistic manner across its historical range.

[7] Department of the Interior, Fish and Wildlife Service. 2014. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx and Revised Distinct Population Segment Boundary; Final Rule. Federal Register 79 No. 177 (pp 54782 - 54846) dated September 2, 2014.

The BA:107 – 108 describes a very large effort in the BHDL that failed to detect lynx between 1999 and 2019. Passive, but "unverified" observations were made in 2016, 2018, and camera trap observations in 2017 and 2019 by MFWP were verified. "A single lynx was observed in the Thompson Park area in June of 2019 and a pair of lynx were observed in the same area again in August. The Thompson Park observations have not been verified but are considered to be reliable by Montana Fish, Wildlife, and Parks."

So, here "reliable" observations are okay while historical "reliable" observations are dismissed. Table 1 of the BA:110 summarizes these efforts, finding no verified observations between 1999 – 2017, with 5 verified observations between 2018 – 2020. The BA:11 Table 5 states there are 1,625,805 acres of lynx habitat on the BHDL. If this is the case, then why were lynx not detected during the nearly 20 years of intensive surveys from 1999 forward?

The BHDL analysis must address why, with its claimed 1,625,805 acres of lynx habitat, there were no lynx found for nearly 20 years following its listing as threatened.

Comments Specific to the BA

Connections. We appreciate the effort of the BHDL and Gatlin to arrive at some approximation of lynx habitat. However, we find issues with the analysis and its seeming intent to eliminate potential or historical lynx habitat by setting a baseline of lynx habitat using forest structure modified by logging and other manipulations rather than the historical habitats where lynx were observed. It failed to include analysis of local and regional connectivity, or linkages. In our recent comments on the USFWS 2024 Proposed Critical Habitat, we mapped National Forests, Ranger Districts, Wilderness Areas, National Parks, and Inventoried Roadless Areas using the Olson et al (2021) model that the Fish and Wildlife Service uses.[8] These illustrate that management should be at the Forest and Ranger District level, not isolated modeled areas. They link together to provide a picture of connected habitat.

While we have issues with that model, it provides information we can use to relate or compare areas across the Rockies for lynx habitat and link those areas together to provide paths for connectivity. The color scheme goes from yellow (low probability habitat) to red (high probability habitat) (Figure 3). This shows the entire BHDL is in the middle range of habitat probability for these National Forests. It is accepted that lynx habitat becomes less suitable as you move south, but it still can support resident lynx, albeit at lower densities than more northern populations (overlooking human habitat alterations).

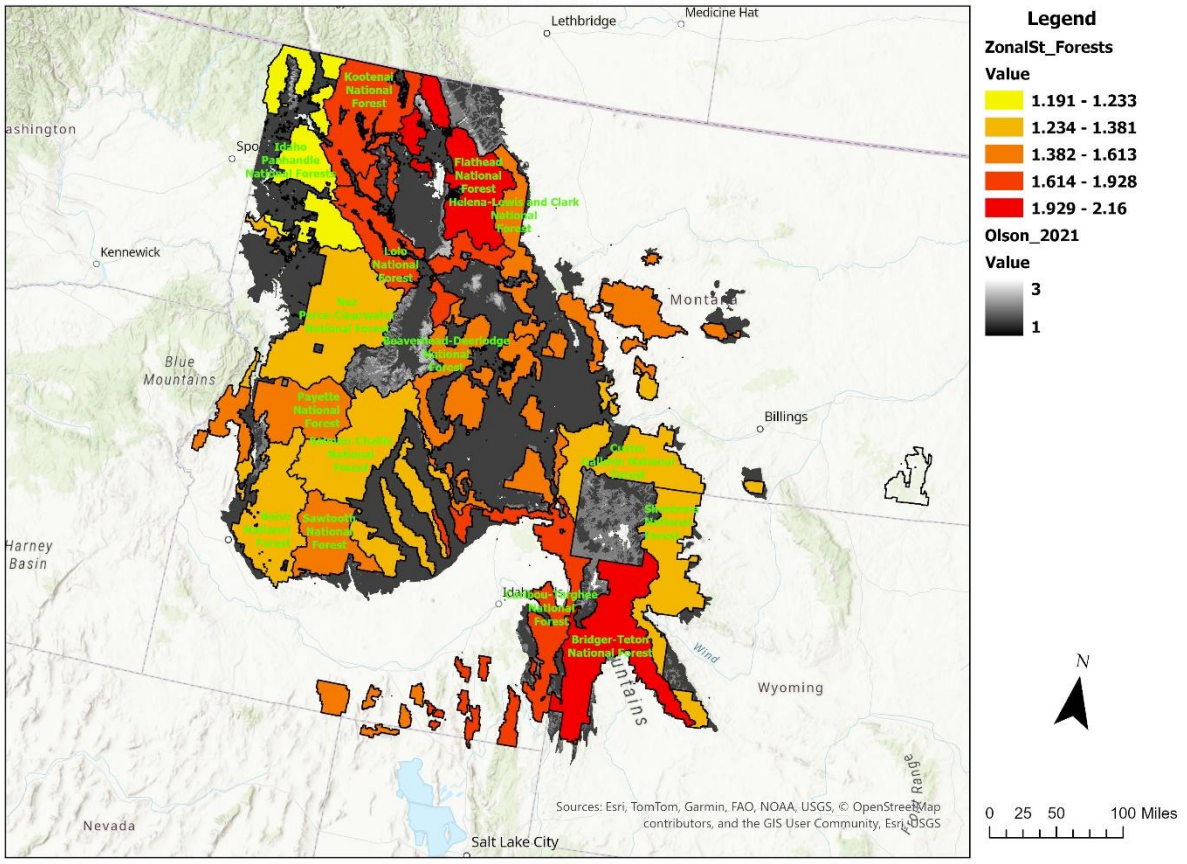
The analysis also shows the BHDL is extremely important to regional connectivity and emphasizes that the areas excluded as lynx habitat in the BA, such as the area in the Dillon Ranger District in (BA:30:Figure 2) are important for connectivity. This area is shown as linkage but eliminated as

[8] Olson, L.E., Squires, J.R., DeCesare, N.J., and Kolbe, J.A. 2011. Den Use and Activity Patterns in Female Canada Lynx (Lynx canadensis) in the Northern Rocky Mountains. Northwest Science, Vol. 85, No. 3, 2011. https://research.fs.usda.gov/treesearch/44989

habitat south of Hwy 324 and Interstate 15 (BA:95). If linkages are not mapped with defined corridors as lynx habitat, and given standards, then they have no protection against fragmentation.

Connectivity and linkage must be identified locally within the BHDL and regionally in the Northern Rockies and Greater Yellowstone Area National Forests. Habitat, linkages and regional connections must be given strict Forest Plan standards to ensure lynx persistence and connectivity. In addition, highway crossings should be identified so that planning for crossing structures will be an element of the Plan Amendment.

Figure 3. National Forests Olson Probability Northern Rockies and Greater Yellowstone Area



Snow Depth. "In 2020, the BDNF updated the lynx habitat model and associated LAUs based on improved vegetation and snow-depth datasets (Appendix C)." (BA:11). "Denning habitat is generally abundant across the coniferous forest landscape of northwest Montana and is not likely to be limiting for lynx (Squires et al. 2008;2010)." (BA:10). "Preferred forests have a multistory structure with dense horizontal cover provided by the young trees in the understory and conifer boughs touching the snow surface, which could support snowshoe hare populations at varying snow depths throughout the winter." (BA:10).

A search of the BA did not turn up any definition of, or criteria for, denning habitat. Nor was it mapped to determine its extent or vulnerability. What does "generally abundant" mean? The logic of habitat with snow touching the lower boughs fails to recognize that hares are present before it snows, during snow cover, and after snowmelt. Other prey such as red squirrels, grouse, and small mammals are present. Squires et al (2010) also tracked habitat use by lynx in summer, noting they "broadened" their habitat use during summer.[9] So, if there is less snow as occurs in the transition to and from spring or summer, lynx are still using that habitat. It is not a black and white proposition of habitat vs no habitat, it's a gradation, like an ecotone. In fact, the paragraph above shows the BHDL knows that snow depth varies throughout the winter and snowshoe hares are supported.

The BA:AppC:7 described the process for updating LAUs for the BHDL. Using Squires et al (2010) it was determined that lynx selected habitats with a minimum snow depth of 50 cm (20 inches) in winter. To determine the lower threshold elevation for habitat based on snow depth, the BA used model data from SNODAS to determine this threshold based on **average** snow depth greater than 50 cm for the December to May periods for the years 2009 – 2019. This reduced habitat in nine HUC10 watersheds. (Figure 4). SNODAS is a modeling and data assimilation system developed by NOHRSC to "provide the best possible estimates of snow cover and associated parameters to support hydrologic modeling and analysis." Note that the output data are estimates and the data is for hydrologic modeling, not defining lynx habitat. The selection of the December to May period of six months and average snow depth is arbitrary. The BA acknowledged above that snowshoe hares occupy their habitat as snow levels vary.

We analyzed actual, not estimated, snow depths at snow monitoring stations (SNOTEL) over a 21-year period ending in March 2024. (Table 1, Figure 5). There were 29 monitoring stations covering all elevations and areas within and adjacent to the BHDL. This analysis illustrates that in most years, at all elevations, sufficient snow depth is available to accommodate lynx if the Squires et al (2010) minimum snow depth is used. While the onset and end of the 20-inch depth varies, there are long time periods in nearly all cases where it is exceeded. Even at the lowest elevations, there is sufficient snow in nearly half to 100% of the years. Charts of these SNOTEL stations are provided in Appendix I. It must also be remembered that Squires et al (2010) tracked use during summer as well. What about snow depths then?

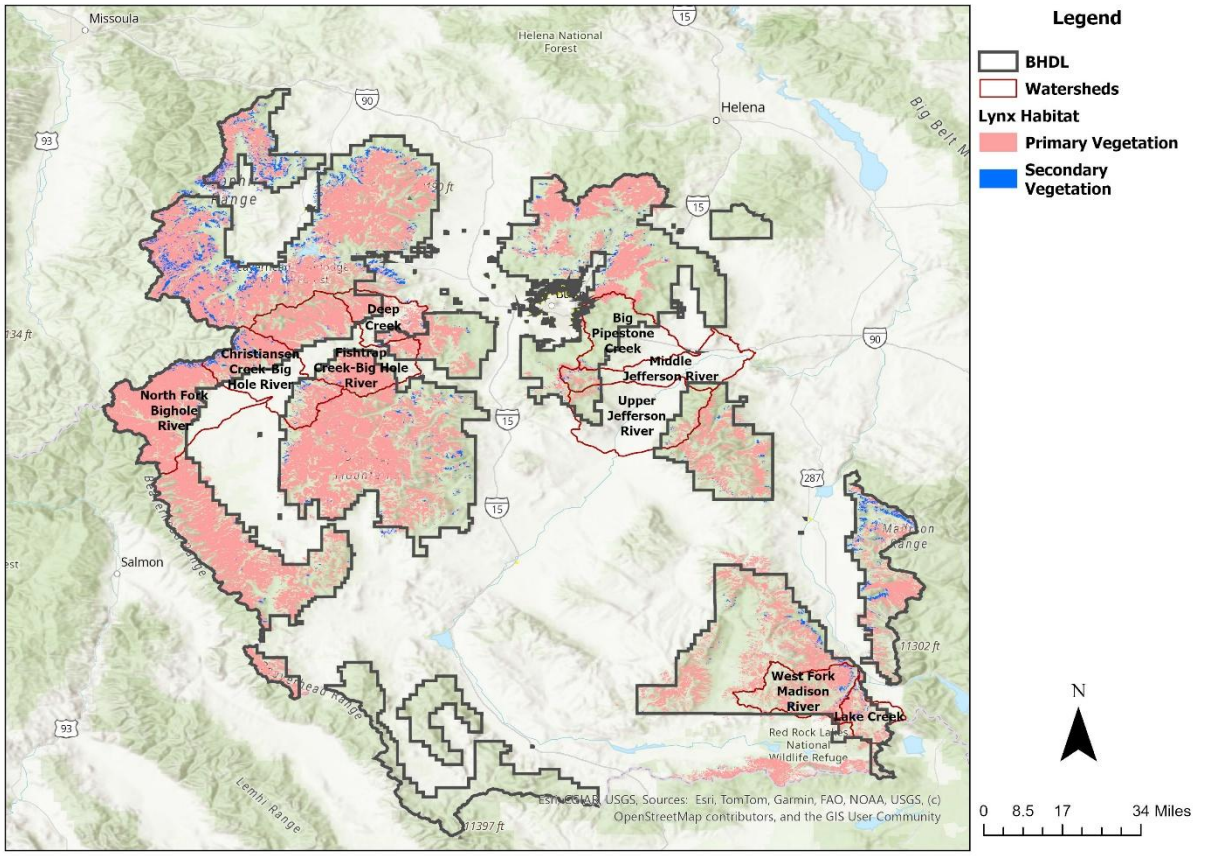
Olson et al (2011) identified three seasons of female reproduction.[10] Pre-denning occurred in February – April, denning occurs in May to July, and post-denning in August – October. The pre-denning period is the breeding period. Denning is during parturition/lactation period. Post-denning is when kittens can travel. We remain to be convinced that the December – May (6 months) period average snow depth

[9] Squires, John R.; DeCesare, Nicholas J.; Kolbe, Jay A.; Ruggiero, Leonard F. 2010. Seasonal resource selection of Canada lynx in managed forests of the northern Rocky Mountains. Journal of Wildlife Management. 74(8): 1648-1660. https://research.fs.usda.gov/treesearch/50160

[10] Olson, L.E., Squires, J.R., DeCesare, N.J., and Kolbe, J.A. 2011. Den Use and Activity Patterns in Female Canada Lynx (Lynx canadensis) in the Northern Rocky Mountains. Northwest Science, Vol. 85, No. 3, 2011. https://research.fs.usda.gov/treesearch/44989

is meaningful. How is this applicable when denning can last until July? These denning seasons or others don't line up with a static December - May period.

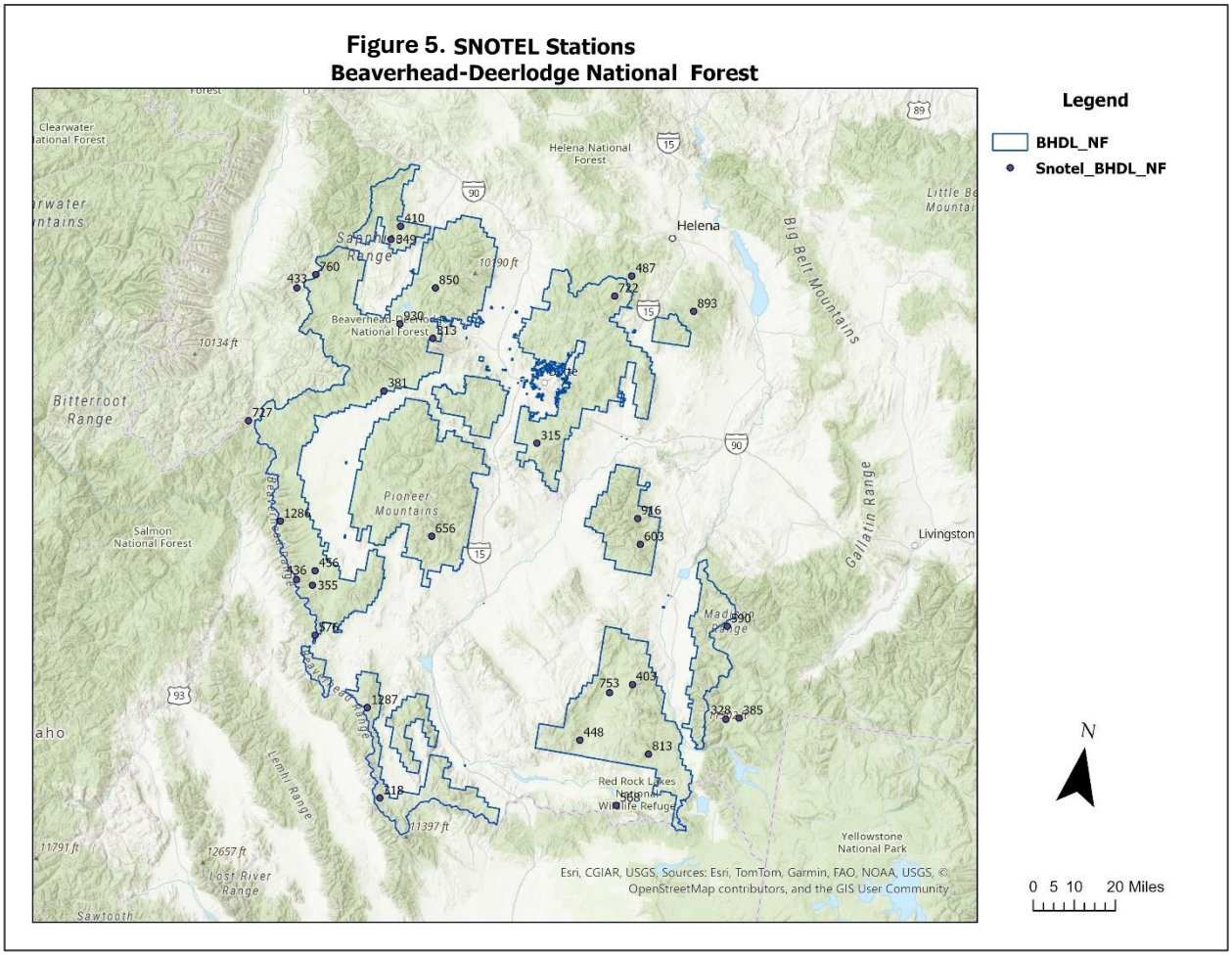
Figure 4. Watersheds with Lower Elevations Omitted from Lynx Habitat



Since hares and other prey are available year-round as snow levels rise, recede, and disappear at all elevations, the agencies are stuck on static habitat parameters, not dynamic conditions as experienced throughout the year. Snow levels should not be used to discount habitat in the BHDL.

Table 1. Years at or Above Minimum Snow Depth of 20 Inches in or near the BHDL

Station	Elevation, ft	Count of Years/percent of 21-year record
Combination 410	5600	9/43%
Daly Creek 433	5780	21/100%
Calvert Creek 381	6430	18/85%
Frohner Meadow 487	6480	21/100%
Tizer Basin 893	6880	21/100%
11 Stations	7000 - 8000	21/100%
13 Stations	8000 – 9000	21/100%



Slope, Aspect, and Elevation: The BA Appendix C: Updated Lynx Habitat Mapping Process Paper describes aspect being used for structural stage classification and the use of aspect and elevation being used in the "modeling process to classify lynx habitat". (AppC:5 – 6). The BA:8 describes lynx habitat elevations as, "In the northern Rockies, this habitat generally occurs between 3,500 and 8,000 feet in elevation (USDA 2007b)." "In winter, lynx forage primarily in mid- to high-elevation forests (4,134 – 7,726 feet)… and in summer they use slightly higher elevations composed of mature, large diameter (greater than 11 inches DBH) trees and select forests with relatively dense horizontal cover, more abundant hares, and deeper snow (Squires et al. 2010)." (BA:10). These elevation ranges argue against the snow depth limitations used for the BHDL. Note here the BA acknowledges use by lynx down to 4,134 feet.

The BA Appendix C (Table 3) describes model parameters for the disturbed and non-disturbed habitat stands for regeneration harvest. These were applied to the Early Stand Initiation and Stand Initiation stages and used more northerly aspects for the more recent time periods and more southerly aspects for the longer-term regeneration harvests. Appendix A:Table A -1 then described the modified stand structure for Mature; Multi-Storied, and Other modified structures constrained by aspect. We are

concerned that the BHDL is artificially reducing lynx habitat by placing these limiting criteria into an already uncertain modeling exercise. We will address the VMAP concerns in the following section.

We obtained McKelvey lynx observation data from the BHDL through FOIA (February 21, 2024). We also obtained historical lynx observation data from the Montana Natural Heritage Program in April 2024. There were 3,493 records of observations in the McKelvey database provided by the BHDL and 2,414 records of observations in the MNHP database. There were 158 occurrences of the McKelvey observations within the BHDL. There were 35 locations within the BHDL in the MNHP database. The MNHP data included 81 observations between 1977 and 2023. The MNHP data includes a location uncertainty value. The MNHP Predictable Suitable Habitat Modeling incorporated records with ≤1600 meters of locational uncertainty.[11]

We used the MNHP location uncertainty <100 meters and a digital elevation map to determine slope, aspect and elevation ranges and means for Montana and then for the BHDL. There were 1,817 records for Montana that met this criterion. (Table 2). The aspect included all directions with an average nearly at true South (192°). Elevations ranged from 1,876 to 7,716 feet with an average of 5,320 feet. Slopes averaged 19 degrees and ranged from flat to 74 degrees. The mean elevation value reflects numerous locations during tracking studies in and around the Seeley Lake area and may not represent the BHDL.

Table 2 . MNHP Observation Locations (location uncertainty <100m)

	Mean	Minimum	Maximum
Elevation, ft.	5,320	1,876	7,716
Slope, %	19.0	0	74
Aspect, degrees	192	0	360

When we used the 35 MNHP locations within the BHDL we found a mean elevation of 7,304 feet, an aspect of 160 degrees, and a slope of 20 percent. (Table 3). Finally, we analyzed the McElvey observation locations within the BHDL. The distribution of aspect, slope and elevations are shown in Figures 6 – 8. Aspect is relatively evenly divided, slopes less than 22% are dominant, and elevations used are mostly in the 6,000 to 8,000 feet range.

[11] Burkholder, B. 2022. Canada Lynx (Lynx Canadensis) Predicted Suitable Habitat Modeling. Montana Natural Heritage Program, Montana State Library.
https://mtnhp.org/models/files/Canada_Lynx_AMAJH03010_20220519.pdf

Table 3. MNHP Records for the Beaverhead Deerlodge NF

Records Included	Elevation, ft	Aspect, degrees	Slope, Percent
35	Mean 7304 Range 5672 – 10317	Mean 160 Range 2 - 356	Mean 20 Range 0 - 54
7 < 1000-meter uncertainty	Mean 7174 Range 6461 - 8070	Mean 187 Range 54 - 323	Mean 19 Range 9 - 47

Figure 6. Aspect of McElvey Obs Locations in BHDL NF

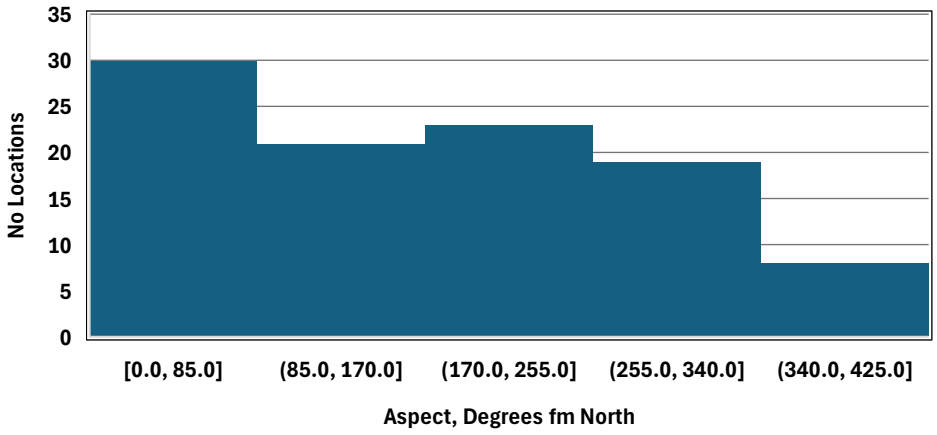
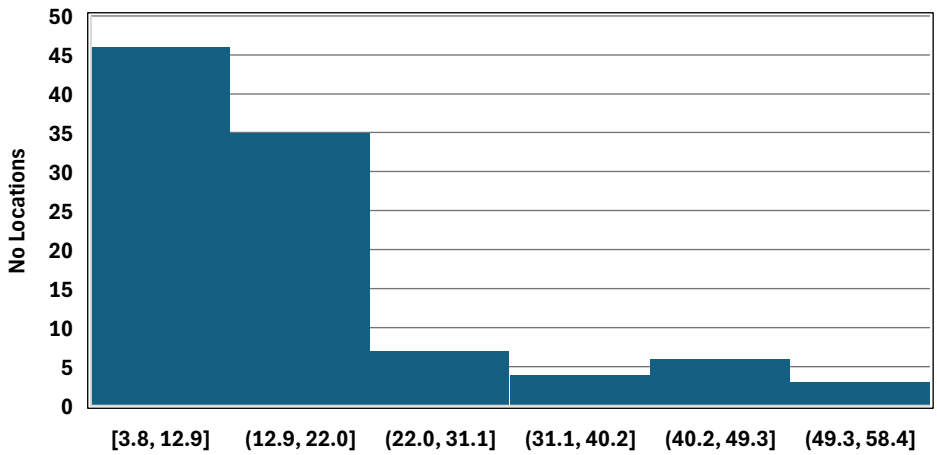
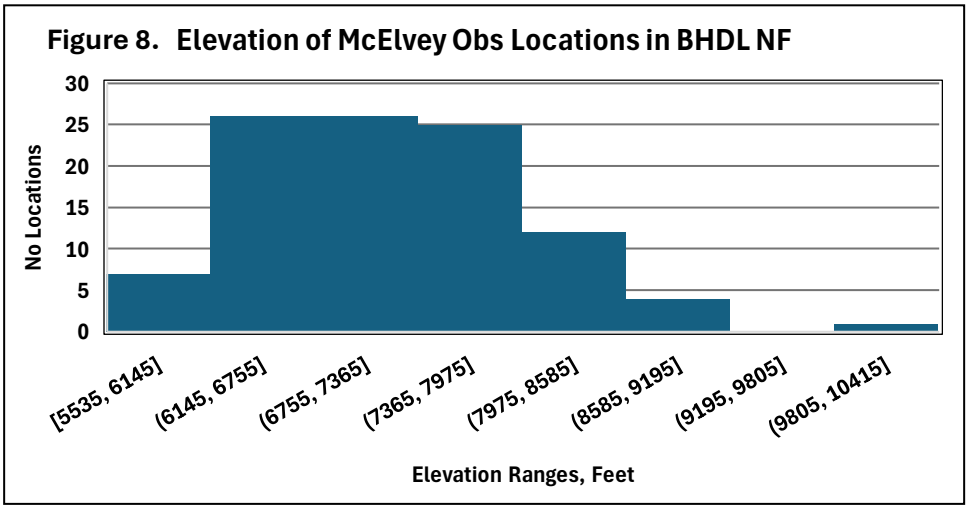


Figure 7. Slope of McElvey Obs Locations in BHDL NF





What is being lost in the BHDL modeling process is any description of the habitats historically used by lynx. The BA analysis is divorced from historical observations. What is needed is to use locations where lynx have been observed and describe those vegetation or forest types. These should be used to map the habitat across the BHDL. Areas that have been logged or burned should not count in the mapping of habitat. Only potential or historical forest or vegetation types need to be included. Disturbance should only be included later when analyzing project proposals and compliance with the NRLMD and this Plan Amendment.

The BHDL Mapping Process.

Data Sources: The BA summarizes the background of its mapping analysis:

> Although the LCAS recommended specific habitat types most preferred by lynx for mapping lynx habitat on National Forests in Montana, habitat type data sets where not available on the BDNF when the Forest initially mapped habitat in 2000; thus, biologists and silviculturists on the Forest utilized SILC-3 cover type and aspect combinations as a proxy for mapping lynx habitat, which resulted in a very conservative approach that included many acres of non-boreal forest habitat types that do not support lynx. The BDNF's 2020 mapping update utilized the same habitat mapping direction provided in the 2000 LCAS for mapping lynx habitat on the forest, but incorporated improved vegetation data sets and refined Geographic Information System (GIS) mapping tools to more accurately identify and spatially delineate the boreal forest habitat types (subalpine fir, Engelmann spruce, and other mesic habitat types) that are capable of supporting lynx on the BDNF. (BA:113).
>
> At that time, the BDNF did not have a consistent habitat mapping method but determined the best data source combined two existing geospatial products: remotely-

> sensed satellite imagery (SILC-3) and aspect from 30-meter digital elevation models (DEMs). Satellite imagery land classification, version 3 (SILC-3) delineates existing vegetation attributes (cover type) across the entire landscape, and, when combined with aspect from the DEMs, created a surrogate for habitat types that represented potentially suitable habitat for Canada lynx. Using this guidance, the Forest used attributes from existing vegetation datasets, namely subalpine fir, spruce, and cool-moist Douglas-fir habitat types, to identify lynx habitat. (Appendix C:1).

The assumption that lynx habitat is only boreal forest types continues a long-standing error that boreal forests like those occupied by lynx in Canada occur in the continental US. These should not be compared to our western forests. A recent paper has analyzed the extent of the North American boreal zone.[12] This is shown in Figure 9.[13] It occurs in Maine, Michigan, and Minnesota. It does not occur in the western US. There have been thousands of verified and reliable lynx observations in Colorado, Idaho, Montana, Utah, Washington, and Wyoming beginning in the mid-1800s. These did not occur in boreal forest, but in the Kuchler forest types that would include Douglas fir, Englemann spruce, lodgepole pine, mixed conifer, whitebark pine, limber pine, and other associated types that are intermixed therein. The characteristics of these forest types constitute what should be used for habitat evaluations for the BHDL.

The BA:95 (Attachment 2) limits primary habitat types to subalpine fir and spruce and excludes the broader suite of habitats described above that lynx historically used. Secondary habitat is considered Grand Fir types. This is a major flaw. We mapped the MNHP observations against the Landfire database (LANDFIRE 2022 Existing Vegetation Type (EVT) CONUS). (Table 4 and Figure 10).

Table 4 . Landfire Cover Type for Montana Natural Heritage Program Lynx Locations

Cover Type	Locations	Percent
Lodgepole Pine Forest and Woodland	712	29%
Douglas-fir-Ponderosa Pine-Lodgepole Pine Forest and Woodland	499	21%
Spruce-Fir Forest and Woodland	320	13%
Douglas-fir Forest and Woodland	186	8%
Transitional Forest Vegetation - Conifer	174	7%
Western Riparian Woodland and Shrubland	133	6%
Deciduous Shrubland	104	4%
Douglas-fir-Grand Fir-White Fir Forest and Woodland	75	3%
Big Sagebrush Shrubland and Steppe	31	1%
Other	180	7%
Total	2414	

[12] Brandt, J.P. 2009. The extent of the North American boreal zone. Environ. Rev. 17: 101–161 (2009) doi:10.1139/A09-004 Published by Natural Resources Canada Research Press.

[13] Geography Realm. https://www.geographyrealm.com/boreal-forests-north-america-shrinking/ Accessed January 25, 2024.

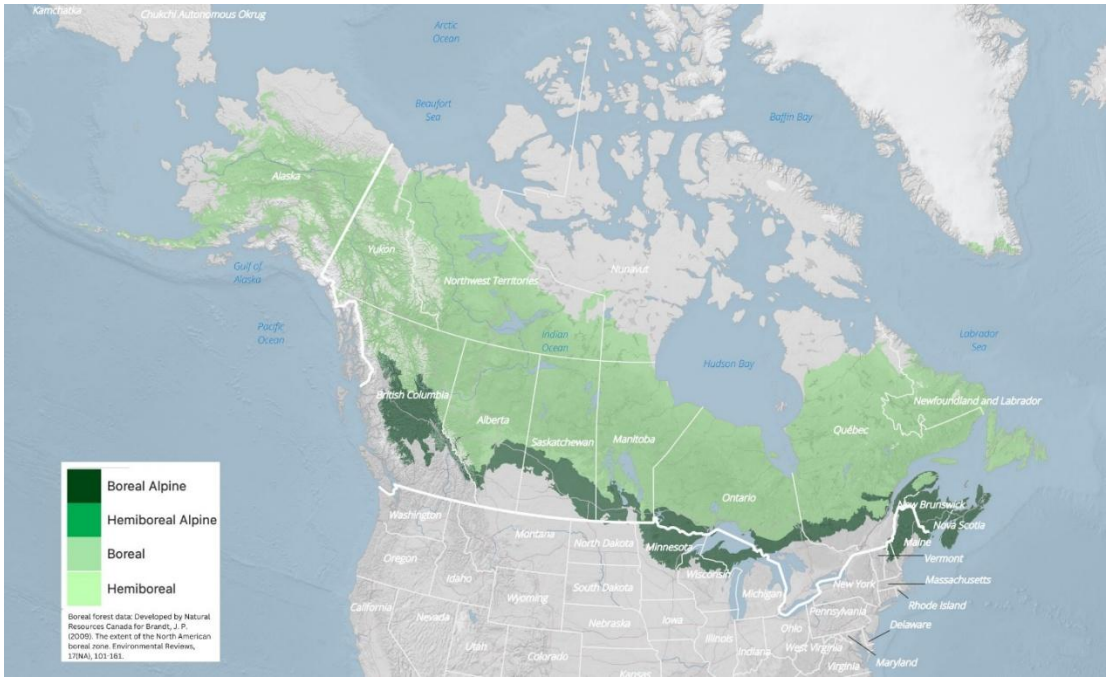
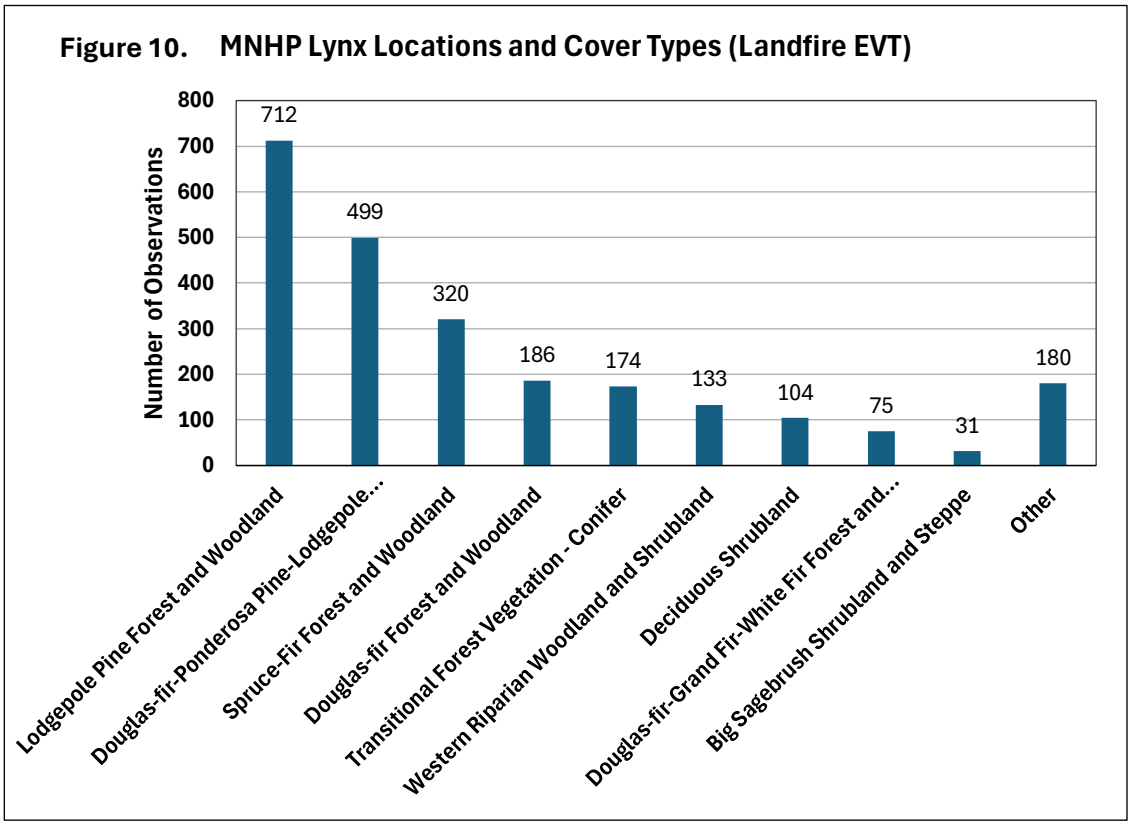


Figure 9. Map of the North American boreal zone



This Landfire comparison reveals a much broader habitat use by lynx dominated by lodgepole pine and Douglas fir with less use in spruce-fir and grand fir. We looked at the publication Ecology and Conservation of Lynx in the United States for more description of lynx habitat. Ruediger et al (2000).[14]

The BA:91, also relying on the Ruediger et al (2000), provided this narrative. "Mapped lynx habitat consists primarily of mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare. The vegetation types and elevations that provide lynx habitat vary somewhat across the U.S. The specific descriptions are listed on pages 4 and 5 of the Glossary in the LCAS, by geographic area (i.e. Northeastern U.S., Great Lakes states and Western U.S.)." In the Ecology and Conservation of Lynx in the United States (p380), lynx habitat associations in Montana were described.

> In Montana, Koehler et al. (1979) reported that 26 of 29 lynx locations for two radio-marked lynx were in densely stocked lodgepole pine stands where hares were abundant; the remainder were in Douglas-fir and western larch stands. Selection by lynx of dense lodgepole pine stands containing high numbers of snowshoe hares has also been demonstrated in north-central Washington (Koehler 1990). Lodgepole pine is a seral, fire-dependent species in boreal forests of the western mountains (Chapter 3) and appears to be preferred by lynx in northern portions of the Cascade Range and Rocky Mountains (Koehler et al. 1979; Koehler 1990; Chapter 10).

The LCAS describes lynx habitat for western forests.

> LCAS[15] Glossary pp4-5, "Western US: Most lynx occurrences (83%) were associated with Rocky Mountain Conifer Forest, and most (77%) were within the 1500 – 2000 m (4920 – 6,560 ft) elevation zone (McKelvey et al 2000b). There is a gradient in the elevational distribution of lynx habitat from the northern to the southern Rocky Mountains, with lynx habitat occurring at 2,330 – 3,500 m (8,000 – 11,500ft) in the southern Rockies. Primary vegetation that contributes to lynx habitat is lodgepole pine, subalpine fir, and Englemann spruce (Aubry et al. 2000).
>
> Primary vegetation is considered necessary to support lynx reproduction and survival. Secondary vegetation includes other vegetation types that, when intermingled with or immediately adjacent to primary habitat, may also contribute to lynx habitat. Mapping

[14] Ruggiero, Leonard F.; Aubry, Keith B.; Buskirk, Steven W.; Koehler, Gary M.; Krebs, Charles J.;McKelvey, Kevin S.; Squires, John R. 2000.. Ecology and conservation of lynx in the United States. General Technical Report RMRS-GTR-30WWW. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. https://www.fs.usda.gov/research/treesearch/50623 Accessed on January 21, 2023.

[15] Ruediger, Bill, Jim Claar, Steve Gniadek, Bryon Holt, Lyle Lewis, Steve Mighton, Bob Naney, Gary-Patton, Tony Rinaldi, Joel Trick, Anne Vandehey, Fred Wahl, Nancy Waren, Dick Wenger, and Al Williamson. 2000. Canada Lynx Conservation Assessment and Strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, Mt. 142 pp.

> of lynx habitat and delineation of LAUs involves consideration of the amount and arrangement of primary vegetation and secondary vegetation, land ownership pattern, lynx occurrence records and snow depth information. After lynx habitat is mapped, there is no distinction between primary and secondary vegetation. Conservation measures generally apply only to lynx habitat on federal lands within LAUs.

Note that BA:95 provides a map showing the primary and secondary habitat derived from their modeling process. It does not include the historical vegetation types used. In addition, the BA fails by distinguishing primary and secondary vegetation. It should be designated lynx habitat and include the historically used types described above.

The LCAS also states that "dry forest types (e.g., ponderosa pine, climax lodgepole pine) do not provide lynx habitat. We have no definition of these "dry forest types" nor any mapping information that delineates them. If the BHDL is eliminating climax lodgepole pine under this umbrella, it must show lynx observations never occurred in them.

The BHDL must analyze these forest types for all historic observations, how they have been altered by fire and management, rather than total reliance on modeling. While modeling can supplement these observations, it is not acceptable to avoid describing and using the actual forest or vegetation types where the observations were made.

VMAP Crosswalk: Gatlin et al (2020) provide a summary of the modeling process in the BA.[16] VMAP was used to derive the characterizations for lynx habitat as seen in Appendix A Table A-1 as BDNF modified structure. These categories include Stand Initiation, Early Stand Initiation, Other, Mature; Multi-storied, and Stem Exclusion. For the 2020 LAU modeling, these are shown in BA Figure B-4. This is flawed in that it includes disturbance in a baseline for mapping habitat. Disturbance should only be used to characterize impacts, whether historical, or later in the project evaluation stage. This is a planning effort. Perhaps this scheme could be used to explain the absence of lynx in the BHDL.

VMAP Region 1 Metadata describes the process of generating the map using satellite imagery to capture vegetation patterns and stand boundaries. "In 2018, an updated VMap database was produced for the Beaverhead-Deerlodge National Forest (B-D). The VMap database consists of four primary spatially explicit attributes that include descriptions of 1) lifeform, 2) tree canopy cover class, 3) tree size class, and 4) tree dominance type. These attributes can be mapped and used to support mid and base-level analysis and planning."

VMAP Accuracy was described in the metadata as, "After draft products were inspected and adjusted, an accuracy assessment was conducted to provide a quantitative validation of the database. Estimates of overall map accuracy and confidence measures of individual map classes can be inferred from the error matrix derived from the comparison of known reference sites to mapped data, for each attribute.

[16] Gatlin et al. 2020. Habitat Mapping Documentation for Canada Lynx (Lynx canadensis) on the Beaverhead-Deerlodge National Forest – 2020 Update.

The stated accuracy assessment results are applicable to the entire B-D, and ranged from 63-93%, depending on the attribute in question."

VMAP Use Limitations are described in the metadata as, "The USDA Forest Service manages resource information and derived data as a service to USDA Forest Service users of digital geographic data. The USDA Forest Service is in no way condoning or endorsing the application of these data for any given purpose. It is the sole responsibility of the user to determine whether or not the data are suitable for the intended purpose. It is also the obligation of the user to apply those data in an appropriate and conscientious manner. The USDA Forest Service provides no warranty, nor accepts any liability occurring from any incorrect, incomplete, or misleading data, or from any incorrect, incomplete, or misleading use of these data."

From the BA Habitat Modeling Documentation section of the metadata as, "Habitat or Structural Stage Errors": "In some cases, ground-verification reveals inaccurate habitat mapping or structural stage determinations. This generally occurs when field specialists verify the existing conditions within a project area prior to analysis. If mapped habitat or structural stage in the updated geospatial layer differs from existing on-the-ground conditions, updates will be made to the lynx habitat polygon or structural stage attributes to reflect the current conditions. Per guidance in the NRLMD, maps of lynx habitat would be reviewed and updated based on local information during site-specific project analysis (USDA Forest Service 2007)."

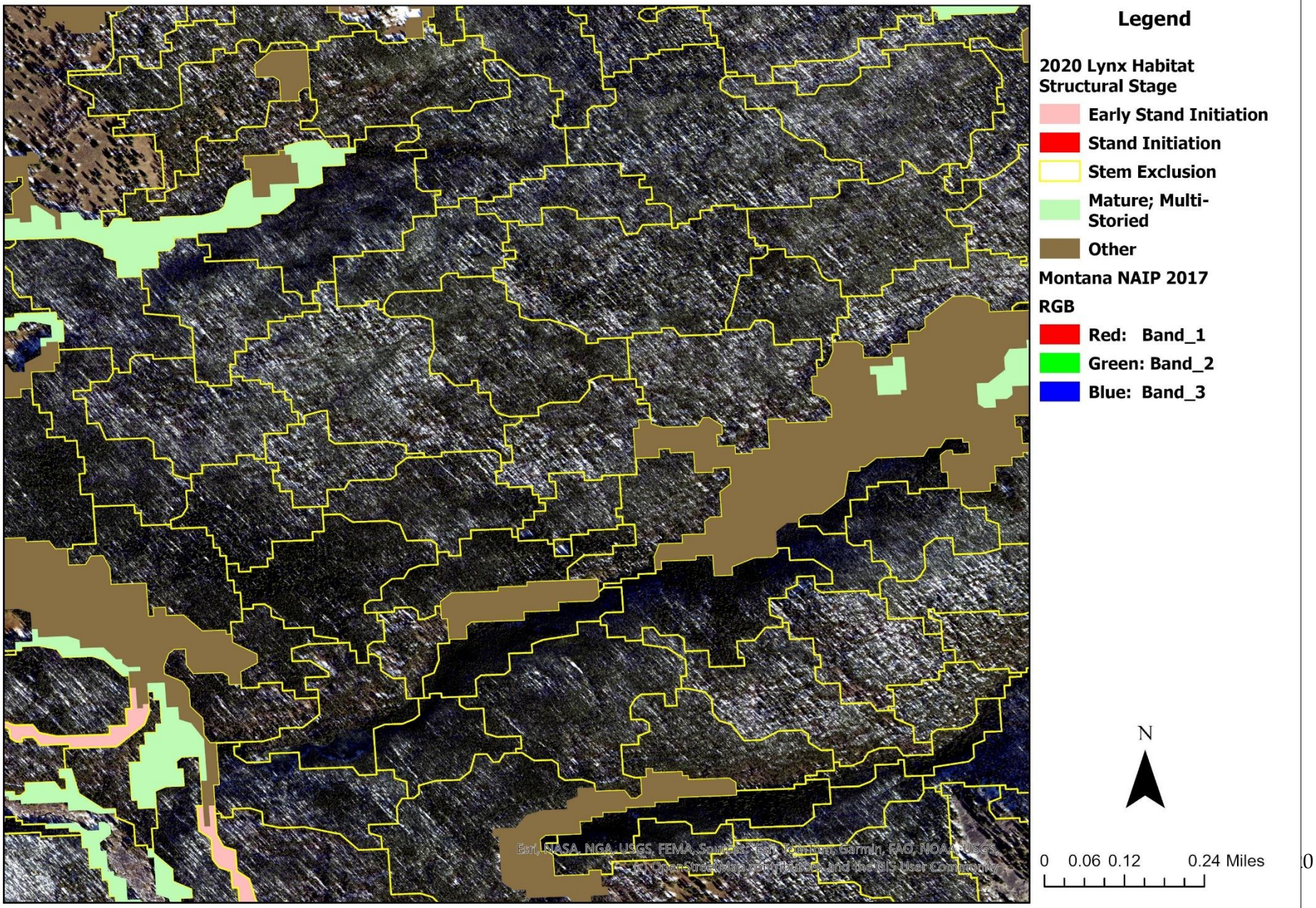
We obtained the model output from the BHDL and did an analysis of the occurrence of lynx observations in the BHDL to these VMAP-derived modified stand structures. (Table 5). Only 17 of 35 past observations in the MNHP database for the BHDL fell within the BHDL 2020 model. There were observations within every category which compels reconsideration of eliminating habitat based on the stem exclusion or other stand structure category and instead, focusing on the vegetation type in its unmodified state. Figure 10 is an example showing the VMAP stem exclusion category superimposed on the Montana 2017 NAIP image. It shows areas of sparse canopy throughout and a few areas of closed canopy. The closed canopy areas are a small portion of the whole. There is apparent solar exposure and openings between the trees over most of the image that should allow an understory of tree seedlings, shrubs, and herbaceous vegetation to develop. This should support snowshoe hares and lynx.

Table 5. MNHP Observations within BHDL 2020 Model

Habitats	Observations
Primary Habitat	17
Secondary Habitat	0
Early Stand Initiation	1
Mature, multi-storied	4
Other	9
Stand Initiation	1
Stem Exclusion	2

These qualifications to use of VMAP point out the risk of this modeling-only approach. The risk is of underestimating habitat by the cascading limitations included in the analysis. An overestimate of habitat would be protective, whereas an underestimate could lead to exclusion and loss of habitat that is critical to lynx. This is why reliance should be placed on the actual vegetation types historically used by lynx, not modified to different stand structures by logging, thinning, burning and so forth. Later field verification can take place at the project stage. It also precludes omitting areas that should be habitat but would then not be required to meet standards under the NRLMD.

Figure 10. Example of Stem Exclusion Area in the BHDL



Wildland Urban Interface Exemptions. The BA:39 described NRLMD fuels treatment project exemptions. The NRLMD exempts fuels treatment projects from VEG S1, S2, S5,and S6 to no more than 6% of lynx habitat on a forest. There are 155,433 acres of foraging habitat and 417,638 acres of non-foraging habitat. "If all exemptions are used, 57% of foraging habitat within WUI in stand initiation and mature could be removed from the WUI area." Table 9 (BA:18) shows the area and percentage of modeled lynx habitat in WUI. Of 1,481,830 acres of modeled lynx habitat 573,071 acres (39%) are in the WUI. Table D-1 shows there are 154,400 identified exemption acres and the requested exemption is 88,910 acres. With this in mind, we used the BHDL WUI GIS data we received under our FOIA request to get a handle on the extent of WUI in the BHDL based on the actual criteria defining WUI.

Using ArcGIS Pro 3.4, we clipped the BHDL's WUI layer to the boundary of the BHDL and calculated the area, which was 1,644,663 acres of WUI in the 3,613,855 acres within the BHDL. This means that WUI designations cover 45.5% of the Forest. This is a striking amount, like this is an urban park, rather than a forest ecosystem with a full complement of fish, wildlife, and native vegetation attributes. A cynical person would interpret this as manipulating the meaning of WUI to ease restrictions on timber harvest and related forest manipulations. However, we have chosen to analyze the situation.

The Federal Register defines WUI thus[17]:

> Wildland Urban Interface, Intermix and Interface Communities as:
> The urban wildland interface community exists where humans and their development meet or intermix with wildland fuel.
>
> The **Intermix Community** exists where structures are scattered throughout a wildland area. There is no clear line of demarcation; wildland fuels are continuous outside of and within the developed area The development density in the intermix ranges from structures very close together to one structure per 40 acres. Fire protection districts funded by various taxing authorities normally provide life and property fire protection and may also have wildland fire protection responsibilities. An alternate definition of an intermix community emphasizes a population density of 28 - 250 people per square mile.
>
> The **Interface Community** exists where structures directly abut wildland fuels. There is a clear line of demarcation between residential, business, and public structures and wildland fuels. Wildland fuels do not generally continue into the developed area. The development density for an interface community is usually 3 or more structures per acre, with shared municipal services. Fire protection is generally provided by a local government fire department with the

[17] Federal Register. 2001. Urban Wildland Interface Communities Within the Vicinity of Federal Lands That Are at High Risk from Wildfire. Fed. Register Vol 66(3):751-777.

> responsibility to protect the structure from both an interior fire and an advancing wildland fire An alternative definition of the interface community emphasizes a population density of 250 or more people per square mile.

The Healthy Forest Restoration Act elucidates further in Section 101 by defining (1) At Risk Community as an area:

> (A) that is comprised of—
> (i) an interface community as defined in the notice entitled ''Wildland Urban Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire'' issued by the Secretary of Agriculture and the Secretary of the Interior in accordance with title IV of the Department of the Interior and Related Agencies Appropriations Act, 2001 (114 Stat.1009) (66 Fed. Reg. 753, January 4, 2001); or
> (ii) a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) within or adjacent to Federal land;
> (B) in which conditions are conducive to a large-scale wildland fire disturbance event; and
> (C) for which a significant threat to human life or property exists as a result of a wildland fire disturbance event.

The key in the HFRA definition above is that the focus is on Interface Communities. It does not address Intermix Communities. Carlson et al (2022) translates this for modeling the WUI. [18]

> WUI is where building density exceeds 6.17 units/km^2 and where land cover is either (1) at least 50% wildland vegetation (intermix) or (2) under 50% wildland vegetation but within 2.4 km (1.5 miles) of a patch of wildland vegetation at least 5 km^2 in area that contains at least 75% vegetation (interface).

The Carlson et al (2022) source for building density was The Microsoft data set (available at https://github.com/microsoft/USBuildingFootprints. The vegetation information was the 2016 National Land Cover Dataset (NLCD), a 30-m resolution satellite image classification (Yang, Jin, et al., 2018). [19] We took a closer look at building density relative to the WUI definition to analyze this on a site-specific basis for the BHDL.

---

[18] Carlson, Amanda R., David P. Helmers, Todd J. Hawbaker, Miranda H. Mockrin, and Volker C. Radeloff. 2022. "The Wildland–Urban Interface in the United States Based on 125 Million Building Locations." Ecological Applications e2597. https://esajournals.onlinelibrary.wiley.com/doi/10.1002/eap.2597

[19] Yang, L., S. Jin, P. Danielson, C. Homer, L. Gass, S. M. Bender, A. Case, et al. 2018. "A New Generation of the United States National Land Cover Database: Requirements, Research Priorities, Design, and

We applied the Carlson et al (2022) model output to arrive at the WUI for these communities. (Figure 11). Carlson et al (2022) recommends using the 500-meter WUI output "because changes in WUI area and number of WUI buildings were minimal, and because smaller neighborhoods offer greater precision around building locations. The maps based on the 500-m neighborhood therefore are most ideal for general purposes." The Value = 1 (green) areas are Intermix areas where structures are intermixed with forested areas. Figure 11 also shows these are not Interface communities.

We also mapped the USGS 500-meter building density. (Figure 12). This shows that the building density is concentrated outside the BHDL and that is where home hardening and defensible space should be the focus, not log and burn the forest. When we calculated the area of the Intermix and Interface communities, we found that there are 34,663 acres of intermix and 149 acres of interface within the BHDL. This exposes the WUI as a false proposition when the BHDL has imposed HFRA on 1,644,663 acres with no apparent justification based on actual building densities.

The Forest Plan amendment must correct this huge disparity in WUI acres with an analysis that accounts for these facts of building density.

Implementation Strategies." ISPRS Journal of Photogrammetry and Remote Sensing 146: 108–23. https://pubs.usgs.gov/publication/70227947

Figure 11. Beaverhead Deerlodge NF with Wildland Urban Interface and USGS Modeled WUI 500 Meter Neighborhood

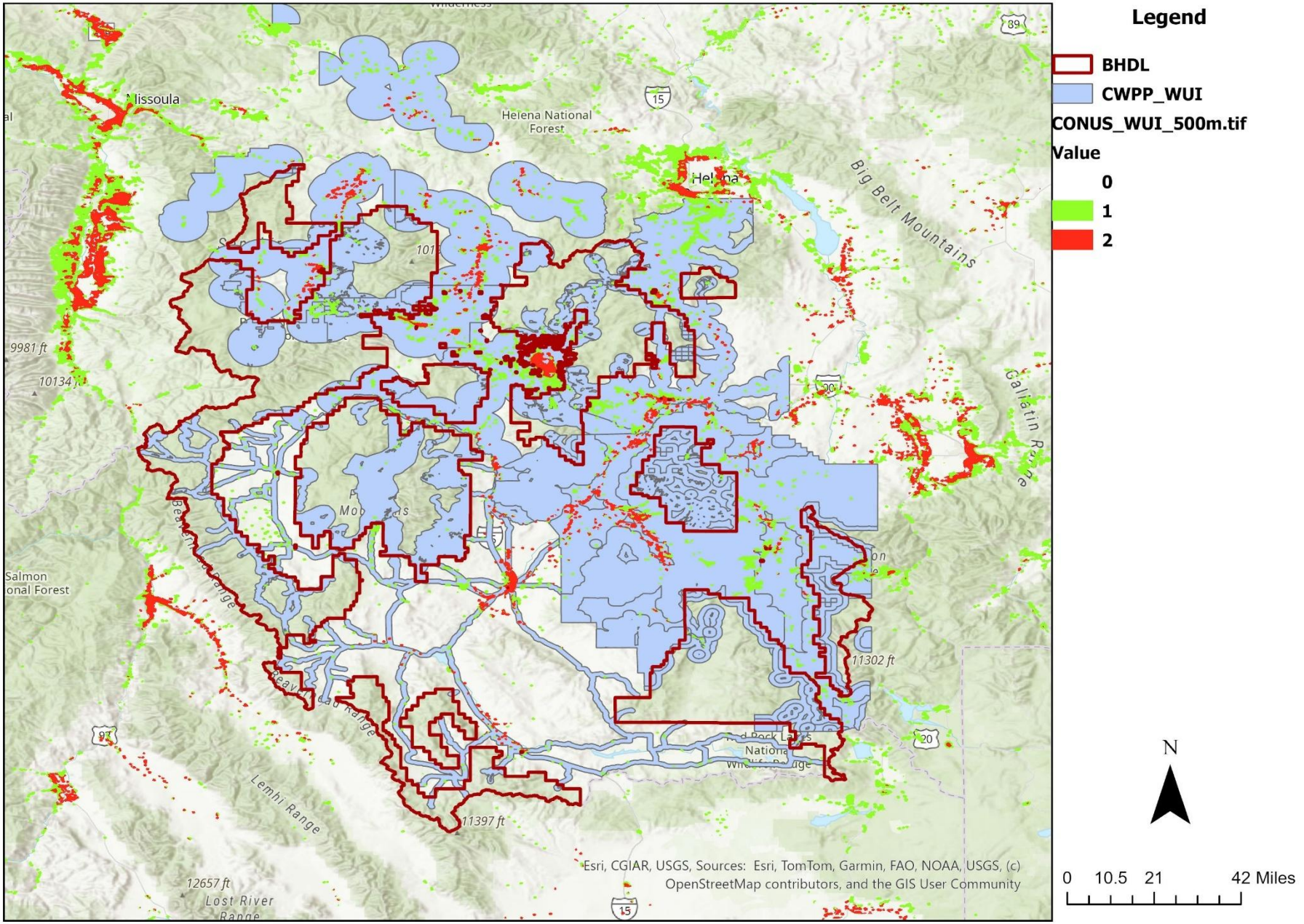
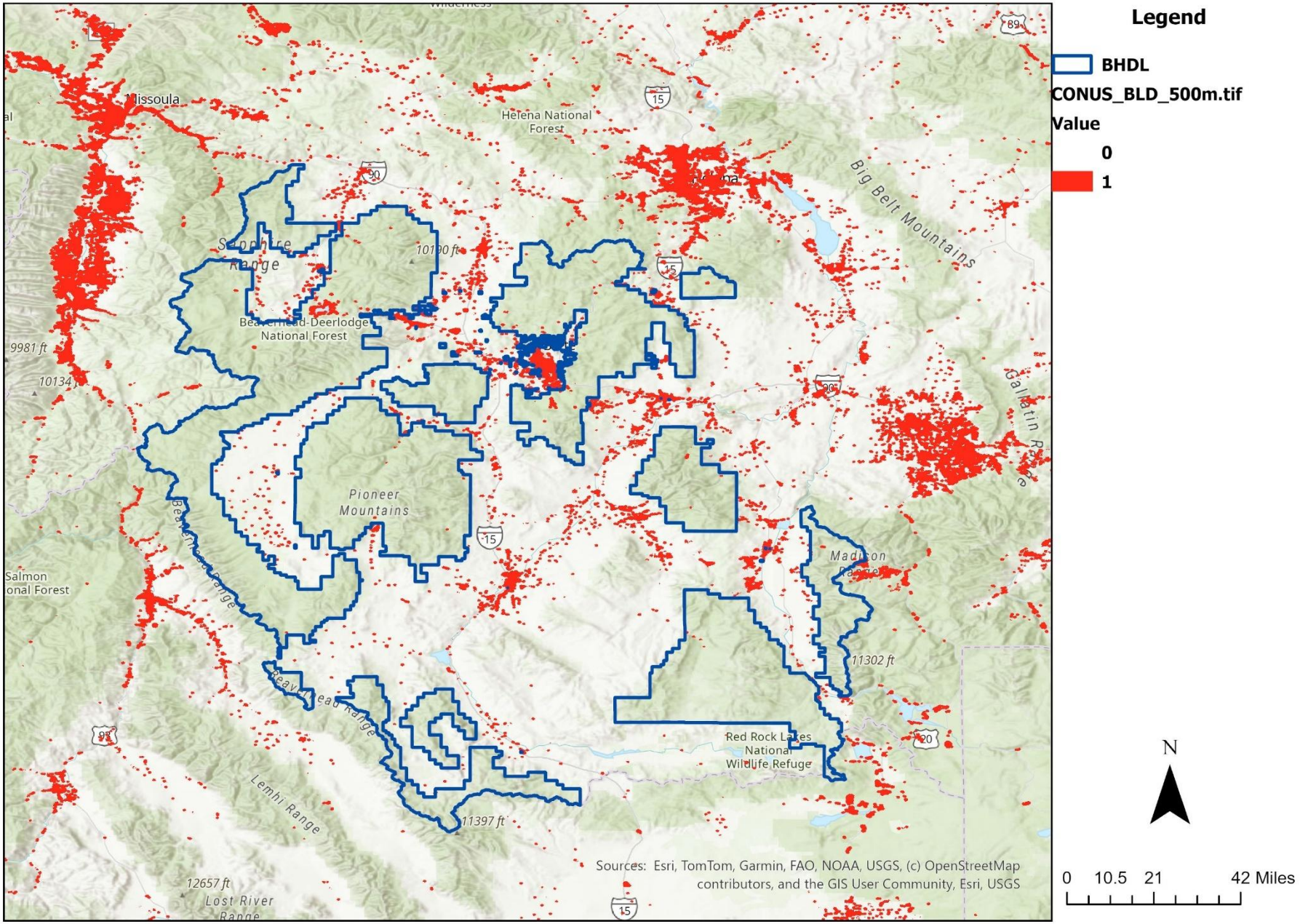


Figure 12. Beaverhead Deerlodge NF with USGS Modeled 500 Meter Building Density



Comparing Lynx Habitat Models for the BHDL

Montana Natural Heritage Program Models. The Montana Natural Heritage Program provided both Inductive and Deductive models. The Inductive Model used a combination of lynx observations in Montana with a suite of 44 environmental factors with a goal "To predict the current distribution and relative suitability of general year-round habitat for Canada Lynx at large spatial scales across its presumed current range in Montana." [20] (Figure 13). Their report is provided as Attachment 1. When we clipped this model to the BHDL we found a total lynx habitat of 2,326,515 acres consisting of the Low and Moderate suitability categories.

We also looked at their Deductive Model which used statewide land cover classifications and Level 3 Ecological Systems and determined the number of lynx observations associated with each ecological system. Their table is copied below. Interestingly, this data shows categories of forest that are downplayed or completely omitted in the BHDL model analysis in the BA but are aligned with what we found when comparing lynx observations to Landfire data.

Deductive Model Results

Table 6: Ecological Systems Associated with Canada Lynx

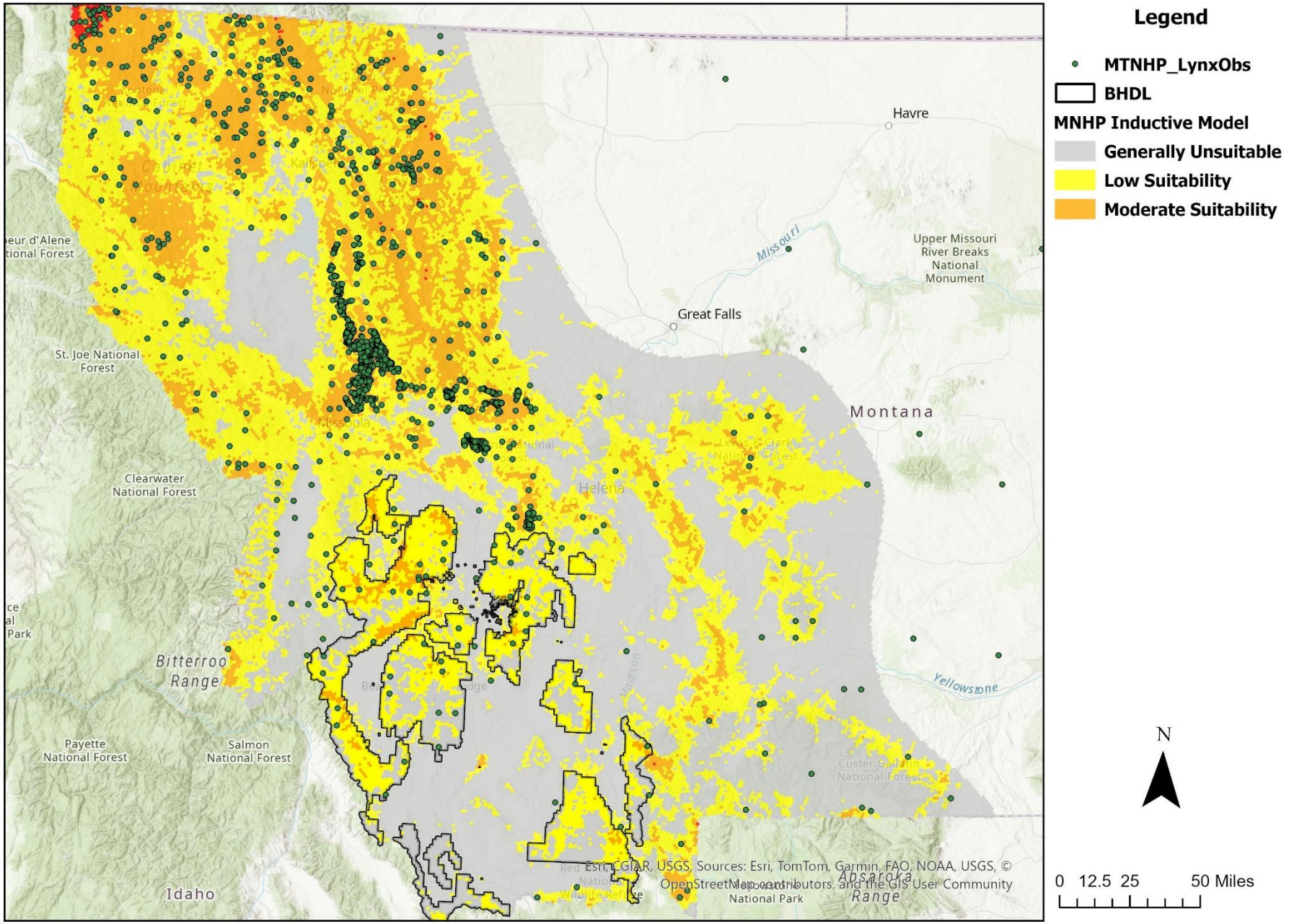
Ecological System	Code	Association	Count[a]
Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest	4232	Common	28
Rocky Mountain Lodgepole Pine Forest	4237	Common	28
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	4242	Common	24
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	4243	Common	21
Rocky Mountain Mesic Montane Mixed Conifer Forest	4234	Common	18
Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	9155	Common	18
Rocky Mountain Montane Douglas-fir Forest and Woodland	4266	Common	9
Rocky Mountain Subalpine Deciduous Shrubland	5326	Common	7
Insect-Killed Forest	8700	Common	4
Harvested forest-tree regeneration	8601	Common	3
Harvested forest-shrub regeneration	8602	Common	3
Rocky Mountain Poor Site Lodgepole Pine Forest	4267	Common	0
Rocky Mountain Subalpine-Montane Riparian Woodland	9171	Common	0
Rocky Mountain Subalpine-Montane Riparian Shrubland	9187	Common	0
Recently burned forest	8501	Occasional	15
Rocky Mountain Ponderosa Pine Woodland and Savanna	4240	Occasional	5
Post-Fire Recovery	8505	Occasional	5
Aspen Forest and Woodland	4104	Occasional	3
Rocky Mountain Montane-Foothill Deciduous Shrubland	5312	Occasional	2
Rocky Mountain Subalpine-Montane Mesic Meadow	7118	Occasional	2
Aspen and Mixed Conifer Forest	4302	Occasional	1
Rocky Mountain Subalpine Woodland and Parkland	4233	Occasional	0
Rocky Mountain Conifer Swamp	9111	Occasional	0
Rocky Mountain Wooded Vernal Pool	9162	Occasional	0

[a] A count of the observation records intersecting each ecological system, based on the 272 observation records used in the inductive model (see Table 1). This may be zero if the number of observations is low or if the ecological system is patchily distributed.

[20] Montana Natural Heritage Program. 2022. Canada Lynx (Lynx canadensis) predicted suitable habitat models created on May 19, 2022. Montana Natural Heritage Program, Helena, MT. 20 pp.

Figure 13.

Montana Natural Heritage Program Canada Lynx Inductive Model Output



The Olson et al (2021) Model. We received this model output from the USDA Forest Service Rocky Mountain Research Station.[21] It is mapped for the Northern Rockies and GYA in Figure 14. Lighter colors are higher habitat probability. The paper is included here in Attachment 2. The Olson paper described some of the limitations of species distribution modeling in terms of uncertainty, variations in geographically distinct populations in their responses to local conditions, complex models with "excessive environmental covariates" may be less generalized to novel areas and landscapes. The Olson model used 16 covariates, including climate, topographic, anthropogenic (road density), and vegetative covariates along with GPS collared lynx locations to define habitat suitability. The vegetative component used NDVI during the growing season to characterize vegetation presence. Thresholds applied to the Olson Model included 90% of GPS locations as high probability and 85% as medium probability lynx habitat. These are extremely restrictive criteria, eliminating consideration of anything but the most perfect habitat, at least by their model's apparent philosophy.

We clipped the Olson raster to the BHDL and determined the area of low, moderate, and high habitat probability. (Table 6) The area of moderate and high probability combined were 1,751,789 acres. Table 6 compares the three models and their total habitat acres. BA:Figure B-3 shows 1,509,146 acres of primary vegetation and 116,806 acres secondary vegetation for the 2020 BHDL model. This is a total of 1,625,952 acres of lynx habitat. Figure B-1 shows a total of 2,711,422 acres of lynx habitat for the 2001 BHDL model, however, some of that habitat is outside the BHDL. We clipped the modeled lynx habitat to the BHDL and found 2,134,741 acres within the BHDL.

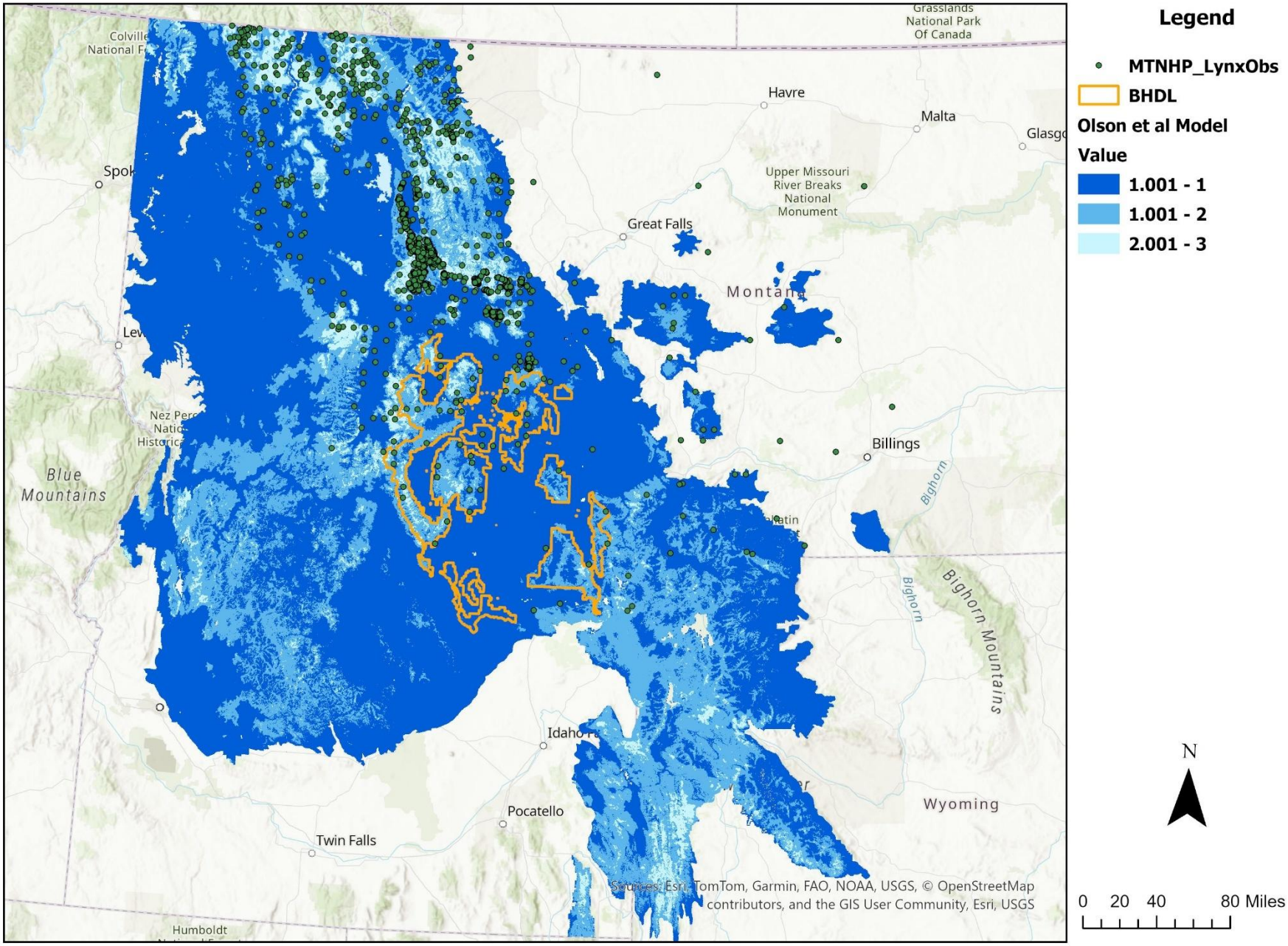
Table 6. Area (acres) of Modeled Lynx Habitat on the Beaverhead-Deerlodge NF

BHDL		116,806 Secondary vegetation	1,509,146 Primary vegetation
MNHP	1,287,428 Generally Unsuitable	2,069,426 Low Suitability	257,089 Moderate Suitability
Olson	1,862,477 Low Probability	1,507,773 Moderate Probability	244,016 High Probability
Comparing the Model Acreage			
Beaverhead Deerlodge Models		2,711,422 acres (2001) 1,625,952 acres (2020) 2,134,741 acres* *Y2U 2001 BHDL model clipped to Forest Boundary	
Montana Natural Heritage Program Inductive Model		2,326,515 acres	
Olson et al (2021) Model		1,751,789 acres	

[21] Olson et al. 2021. Improved prediction of Canada lynx distribution through regional model transferability and data efficiency. Ecology and Evolution 11:1667 – 1690.

Figure 14.

Olson et al (2021) Categorical Lynx Habitat Probability



From Table 6, we see that the BHDL 2020 version provides the least habitat of all the models. It was the only one that did not consider historical lynx observations or tracking data. A note on lynx observations is, however, in order. In our comments on the Federal Register Notice to revise lynx critical habitat, we analyzed the MNHP observations in Glacier National Park, and the Bob Marshall and Mission Mountain Wilderness in Montana relative to areas outside these special designations. To wit:

Squires et al (2010)[22] studied lynx in the Swan River drainage near Seeley Lake, Montana. The area was bordered by the Mission Mountain and Bob Marshall Wilderness areas. See Figure 15 for a map using MNHP observations to illustrate how studies or areas accessible to people, or used in tracking studies, can result in more observations compared to areas such as wilderness where human presence is low in winter and mechanized travel or trail cameras are not allowed. Does this mean, therefore, that the wilderness is not a suitable habitat?

We looked at MNHP observations in Glacier National Park (GNP). (Figure 15). Here we see scattered lynx observations that are lower in density than areas outside the park. Does this mean the park has little suitable lynx habitat? Note the observations are along valleys where people may have access in winter, but not across the wider area. A park-wide occupancy survey using motion activated cameras found a mean of 52 individual lynx and density of 1.28/100 km^2. Later, when we looked at the Olson et al (2021) Model and its mean habitat probabilities across management areas, we saw that Glacier NP is not rated high, yet it has a significant population. This argues for an expanded interpretation of Olson et al (2021) to include areas with lower modeled habitat probabilities or risk eliminating important lynx habitat from further consideration.

The Dillon Ranger District Issue: BA Figure B-3 shows an absence of lynx habitat in the Dillon Ranger District south of HWY 324. Yet, the 2001 modeled habitat area is significant there. When we clipped the 2001 BHDL model habitat to that area, we found 83,265 acres of lynx habitat south of HWY 324. The 2020 model omits this area in its entirety, yet Figure 16 shows it provides potential linkage to the western half of the BHDL without crossing Interstate 15. We have reproduced the map of 2001 modeled habitat as well for comparison. (Figure 17).

To sum up briefly, the BHDL 2020 model is too conservative in its interpretation, leaving out much potential or historical lynx habitat. It further did not consider historical observation locations and the actual vegetation types where those occurred. Instead, it used surrogates with cascading errors to eliminate major lynx habitats such as lodgepole pine and Douglas fir. The MNHP model used lynx observations combined with environmental variables to arrive at a habitat area of 2,326,515 acres, compared to the BHDL 2020 modeled 1,625,952 acres. This is

[22] Squires, J.R., Decesare, N.J., Kolbe,J.A., and Ruggiero, L.F. 2010. Seasonal Resource Selection of Canada Lynx in Managed Forests of the Northern Rocky Mountains. Journal of Wildlife Management, 74(8):1648-1660. 2010. Published By: The Wildlife Society DOI: 10.2193/2009-184 URL: http://www.bioone.org/doi/full/10.2193/2009-184

less than the BHDL 2001 model, but that model would include the habitat in the Dillon Ranger District that was omitted from the 2020 model. The MNHP Deductive model shows that the BHDL model eliminates major categories of vegetation types in its mapping. In the end, the BHDL 2001 model with 2,134,741 acres within the BHDL seems to capture the habitat better than the 2020 model and does include that habitat in the Dillon Ranger District. However, that said, the determination of lynx habitat must go back to the actual forest or vegetation types where observations were made and map the extent of those across the BHDL. Since we have determined that snow depth, slope, aspect and elevation are not significant barriers within BHDL, these should not be part of the determination.

Figure 15.

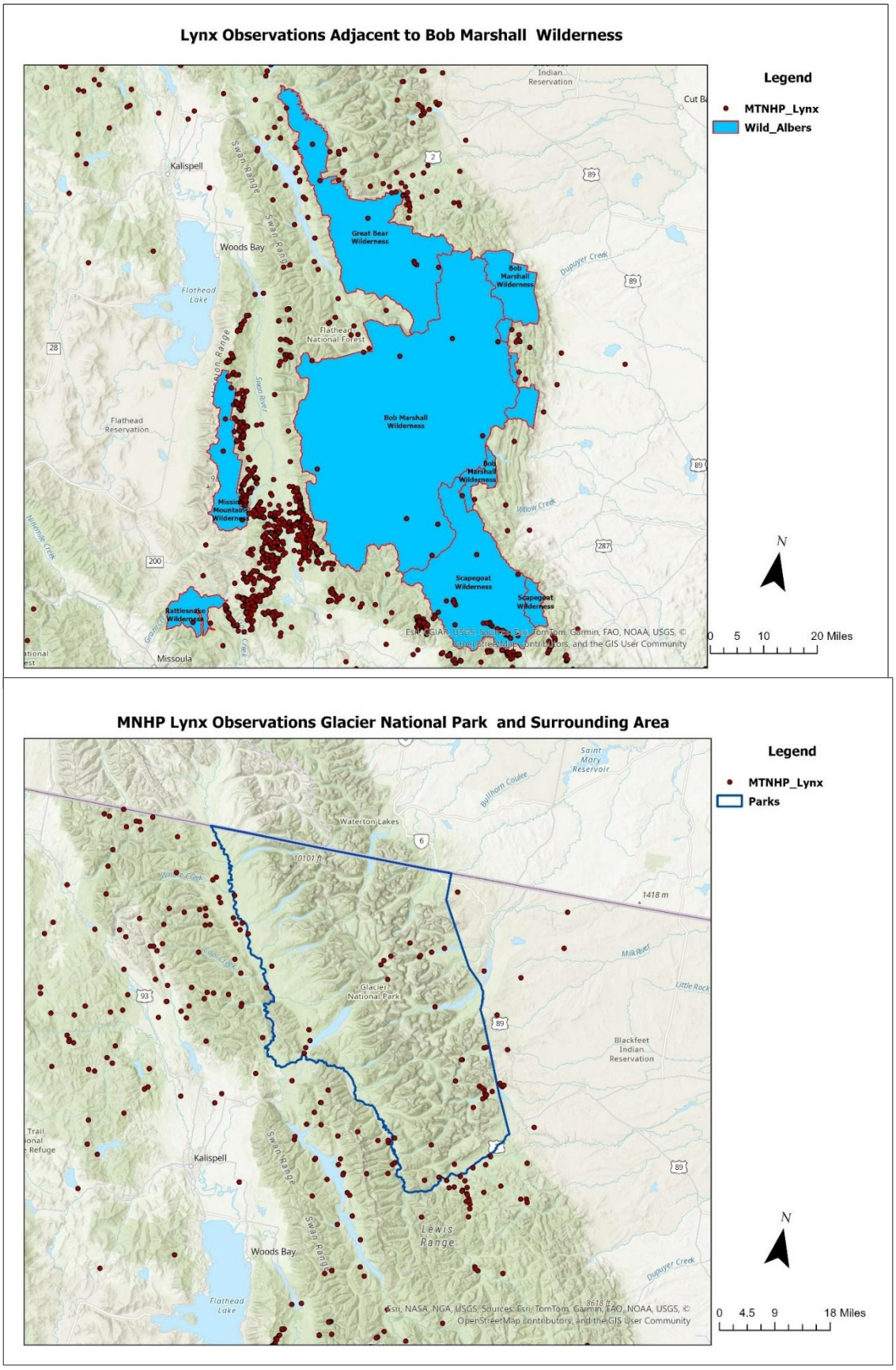

Lynx Observations Adjacent to Bob Marshall Wilderness
Legend
MTNHP_Lynx
Wild_Albers
Great Bear Wilderness
Bob Marshall Wilderness
Scapegoat Wilderness
Mission Mountains Wilderness
Rattlesnake Wilderness
Flathead National Forest
Flathead Reservation
Kalispell
Woods Bay
Flathead Lake
Swan Range
Swan River
Missoula
Dupuyer Creek
Willow Creek
Nineteenmile Creek
Granite Creek
N
0 5 10 20 Miles
MNHP Lynx Observations Glacier National Park and Surrounding Area
Legend
MTNHP_Lynx
Parks
Glacier National Park
Waterton Lakes
Saint Mary Reservoir
Belly River
Milk River
Little Rock
Blackfeet Indian Reservation
Lewis Range
Kalispell
Woods Bay
Flathead Lake
Swan Range
Dupuyer Creek
N
0 4.5 9 18 Miles

Figure 16.

BHDL 2001 Modeled Lynx Habitat and Ranger Districts

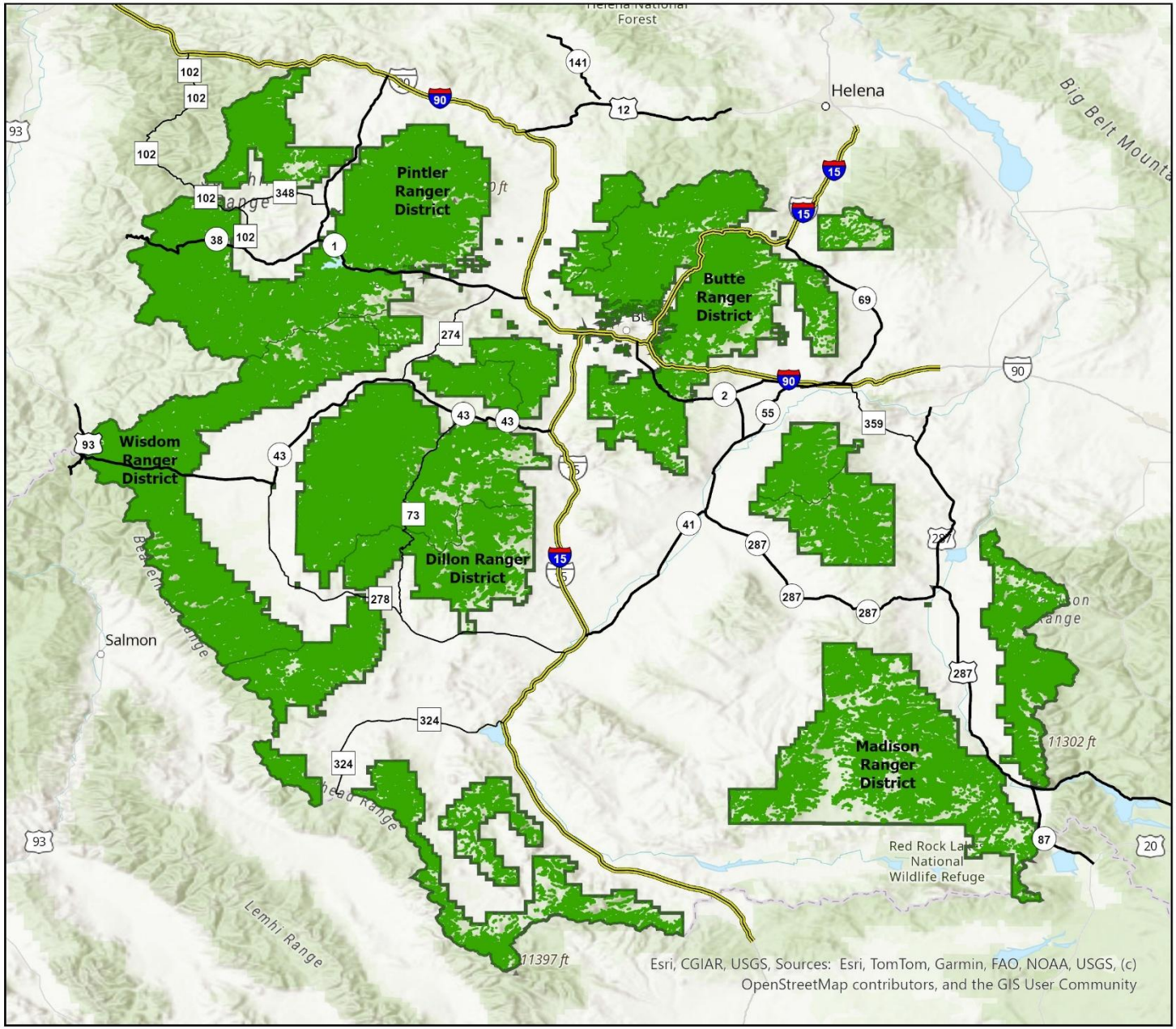
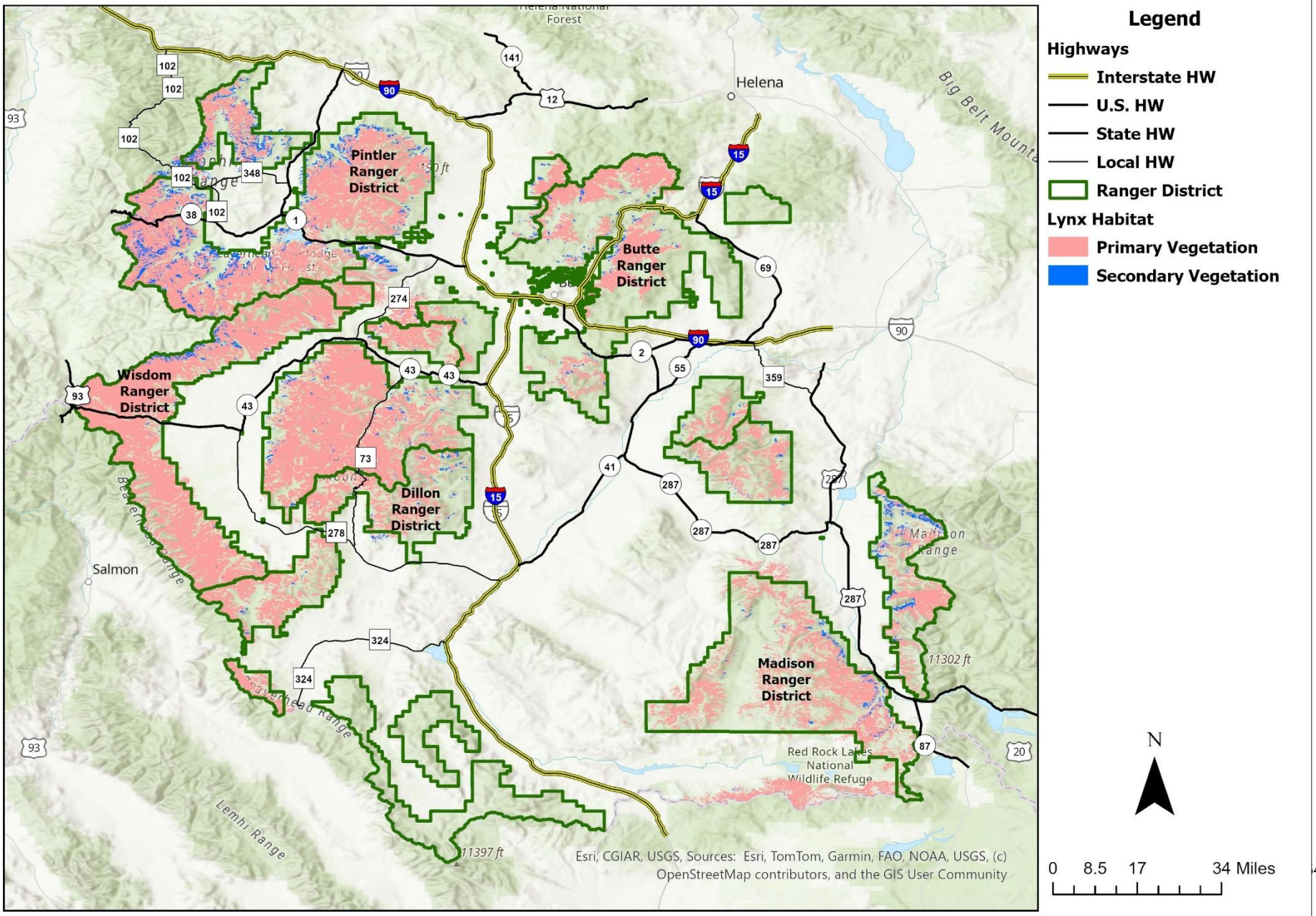


Figure 17.

BHDL 2020 Modeled Lynx Habitat and Ranger Districts



Forest Plan Standards

Purpose. The Scoping Notice states the Purpose for the proposed plan amendment is "to identify lands on the Forest that meet the criteria for Canada lynx habitat and to delineate where the Forest Plan standards will apply". It cites Figure 2 of the Scoping Notice. Inspection of that figure reveals that the BHDL has assumed the 2020 mapping of LAUs and lynx habitat constitute the lands that meet the criteria for Canada lynx habitat. The analysis we have provided above clearly shows that the 2020 BHDL model has many flaws and is not clearly identifying lynx habitat. A new analysis must be done that takes into account historical lynx observation locations and the vegetation types in which those occurred, not an altered forest baseline containing the outcomes of timber manipulations.

Rather than the BHDL claimed habitat of 1,625,952 acres stemming from that 2020 modeling exercise, the plan amendment must consider the 2,134,741 acres represented by the 2001 BHDL model that occur within the BHDL itself combined with the MNHP Inductive Model that found 2,326,515 acres of lynx habitat within the BHDL. The analysis must rely on the vegetation types represented in the MNHP Deductive Model in which lynx observations occurred. Taking this approach combines the strengths of these models and corrects the missing habitat in the Dillon Ranger District which is a critical linkage in the western half of the BHDL.

Need for the Project. The Scoping Notice expresses the need for a plan amendment to include new information on lynx habitat, the change in occupied status to identify where NRLMD standards and guidelines apply, and to respond to the public's desire for involvement in the habitat mapping effort. In these comments we have provided a detailed critique of the current (2020) habitat map. The Scoping Notice appears to preclude that involvement by using the flawed habitat map shown in the Notice Figure 2, an apparent decision already made.

The 2012 Planning Rule. The Scoping Notice references 36 CFR 219.8 through 36 CFR 219.11 as "directly related to the plan direction being added." These sections of the law address Sustainability (§ 219.8), Diversity of plan and animal communities (§ 219.9), Multiple Use (§ 219.10), and Timber Requirements based on NFMA (§ 219.11).

§ 219.8 Sustainability requires for ecosystem integrity, "The plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity…" It then describes the elements such as air, soil, water, and riparian areas that must be taken into account. Each of these elements must be fully addressed with analysis of monitoring data and other science that describes the current and potential conditions on the BHDL, and the factors driving those conditions. Along with timber manipulations, recreation, roads and trails, we are concerned about the existing conditions of the riparian areas, meadows, and forested communities that have been altered by livestock grazing. The degradation of these habitats deprives snowshoe hares of their forage and

cover, removes herbaceous vegetation and ground cover in aspen and conifer communities, subsequently altering forest structure and lynx habitat.

§ 219.9 Diversity of plant and animal communities has the same requirement for ecosystem integrity as § 219.8. In addition, it requires that ecosystem diversity be maintained or restored, a determination as to whether plan components, "provide the ecological conditions necessary to: contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area." Species viability must be addressed in the plan amendment analysis by presenting the trend of the special status species on the BHDL, their habitat requirements and the current and potential condition of those habitats as supported by monitoring data.

§ 219.10 Multiple use requires, "The plan must include plan components, including standards or guidelines, for integrated resource management to provide for ecosystem services and multiple uses in the plan area." Ten elements are listed which must be addressed under "Integrated resource management for multiple use." These must be addressed by analyzing BHDL monitoring data and science.

In the section "(b) Requirements for plan components for a new plan or plan revision." Six elements are outlined. It outlines "designated" areas such as wilderness, wild and scenic rivers, areas of tribal importance, cultural and historic resources, and sustainable recreation. While designated areas are certainly important, it is critical that the entire BHDL have standards and guidelines for Canada lynx that recognize the impact of human uses, including recreation, on their habitat and use of that habitat. Road density, habitat security, connectivity within the BHDL and adjacent National Forests must be analyzed. Special concerns are high motorized road and trail density that must also include non-system, illegal, or user created roads. Groomed snowmobile trails and play areas are of major concern and the analysis must identify lynx habitat with protection and security from these winter uses. The effectiveness of BMPs, standards and guidelines must be specifically addressed for each element.

§ 219.11 Timber requirements based on the NFMA. In section "(a) Lands not suited for timber production." Six elements are described. One of these is restocking within 5 years of harvest, another is timber harvest not compatible with DFCs. The analysis should provide data showing the restocking success and whether these harvest areas have become thickets of conifers or have not regenerated that may preclude use by snowshoe hares and Canada lynx. It should also show how any harvest, or vegetation treatment it has authorized has met the DFCs for lynx habitat and special status species habitat.

Another provision is described, "(c) Timber harvest for purposes other than timber production." In this section "Examples of using timber harvest to protect other multiple use values may include improving wildlife or fish habitat, thinning to reduce fire risk, or restoring meadow or savanna ecosystems where trees have invaded." We have described the massive exaggeration of WUI

above and that is the first thing to correct. The analysis should include monitoring data, reports and scientific studies demonstrating that these non-production values have been achieved on the BHDL by reviewing past projects and their outcomes. Maps, charts, and data all need to be presented to show whether project objectives were achieved or not.

(d) Limitations on timber harvest elements are described. This includes general requirements such as lands not suitable or with sensitive watershed conditions. We would add that timber harvest for any purpose should not be allowed in Canada lynx habitat until past harvests have regenerated and snowshoe hares have re-occupied disturbed areas. The current status of lynx habitat should be mapped by forest type (lodgepole, fir, spruce, aspen, riparian) and analyze departures from optimal or potential conditions. No exceptions to standards or guidelines should be allowed so the forest can complete its successional pathway. Lynx and snowshoe hare (and other species) have evolved to coexist with natural disturbance. Old growth forests should be protected and mature forests allowed to progress to old growth.

Lynx, the ESA and Forest Service Manual. The ESA promulgated regulations at 50 CFR § 402.12 delineate the purpose of a Biological Assessment (BA) as to *"evaluate the potential effects of the action on listed and proposed species and designated and proposed critical habitat…"*. It describes the contents as *"discretionary"* and depends on the nature of the federal action with consideration for including (1) results of on-site inspections; (2) views of recognized experts; (3) review of the literature; (4) analysis of the effects of the action on species and habitat, including cumulative effects and the results of related studies; and (5) analysis of alternate actions considered by the Federal agency. This Forest Plan Amendment should preclude making BA's "discretionary". They should be required of all future activities/projects affecting lynx habitat.

The Forest Service Manual[23] cites the ESA as *"the Act directs federal departments and agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats."* (FSM 2670.11). The FSM (2679.12) cites Departmental Regulation 9500-4 as (1*) "Manage 'habitats for all existing native and desired nonnative plants, fish and wildlife species in order to maintain at least viable populations of such species.'"* (2*) "Conduct activities and programs 'to assist in the identification and recovery of threatened and endangered plant and animal species.'"* (3) *"Avoid actions 'which may cause a species to become threatened or endangered'"*. We have seen for Canada lynx, as we described above, that "occupied habitat" has been arbitrarily applied and led to the exclusion of peripheral habitat, connections and linkages remaining without regulatory protection and are seldom addressed in project analyses. These connections and linkages are part of lynx habitat and should be identified, mapped and then designated as protected with appropriate standards.

[23] USDA Forest Service. 2005. Forest Service Manual National Headquarters (WO) Washington DC. FSM 2600 – Wildlife, Fish, and Sensitive Plan Habitat Management Chapter 2670 – Threatened, Endangered and Sensitive Plants and Animals (September 23,2005).

FSM 2670.31 provides additional guidance for T&E species.

> (1) *"Place top priority on conservation and recovery of endangered, threatened, and proposed species and their habitats."* (2) *"Establish, through the Forest planning process, objectives for habitat management and/or recovery of populations."* (4) *"Avoid all adverse impacts on threatened and endangered species and their habitats, except when it is possible to compensate adverse effects totally through alternatives identified in a biological opinion."* (6) *"Identify and prescribe measures to prevent adverse modification or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species. Protect individual organisms or populations from harm or harassment as appropriate."*

The FSM 2670.5 provides definitions of terms that are useful in interpreting the efficacy of the agency analysis. An **adverse effect** includes *"Any action that directly alters, modifies, or destroys, critical or essential habitats or renders occupied habitat unsuitable for use by a listed species, or that otherwise affects its productivity, survival, or mortality."* **Essential habitat** is defined as *"Those areas designated by a regional forester as possessing the same characteristics as critical habitat without having been declared as critical habitat by the Secretary of the Interior or Commerce. The term includes habitats necessary to meet recovery objectives for endangered, threatened, and proposed species and those necessary to maintain viable populations of sensitive species."* A **viable population** is defined as *"A population that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range (or range required to meet recovery for listed species) within the planning area."*

The BHDL must now designate lynx habitat as Essential for recovery of lynx and maintaining connections within the BHDL and to adjacent public lands. It must determine the potential occupancy extent and home ranges and set population goals and Plan standards for a viable population within the BHDL to be established by a combination of habitat protection and introducing lynx as done in Colorado.

FSM 2671.44 describes determination of the effects on listed species. Biological evaluations are to *"conduct and document the program and activities review necessary to ensure that any action … is not likely to jeopardize the continued existence of any listed or proposed species or to result in the destruction or adverse modification of critical or proposed critical habitat."* Internal *"biological expertise"* and *"informal consultation"* are to be used to reach *"supportable determinations of effect"*. Finally, *"Consider effects on suitable unoccupied habitat essential to recovery of the species when doing the biological evaluation."*

We are not seeing National Forests conducting any analysis of linkages, or "suitable unoccupied habitat" or any effort to address its current vs historical condition. The Plan Amendment must correct this. The lack of adequate regulatory mechanisms to protect lynx habitat and connectivity has been implicated as a central issue for lynx being able to maintain populations.[24]

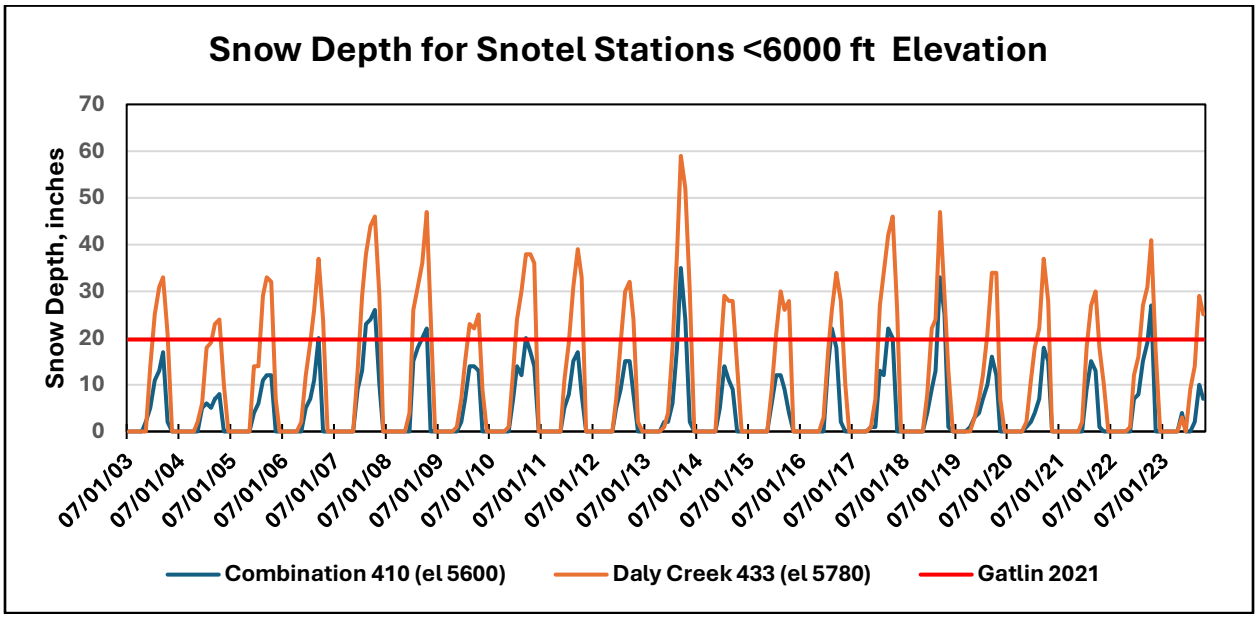
[24]DOI USFWS. 2000. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx and Related Rule. Fed. Register Vol. 65, No. 58.

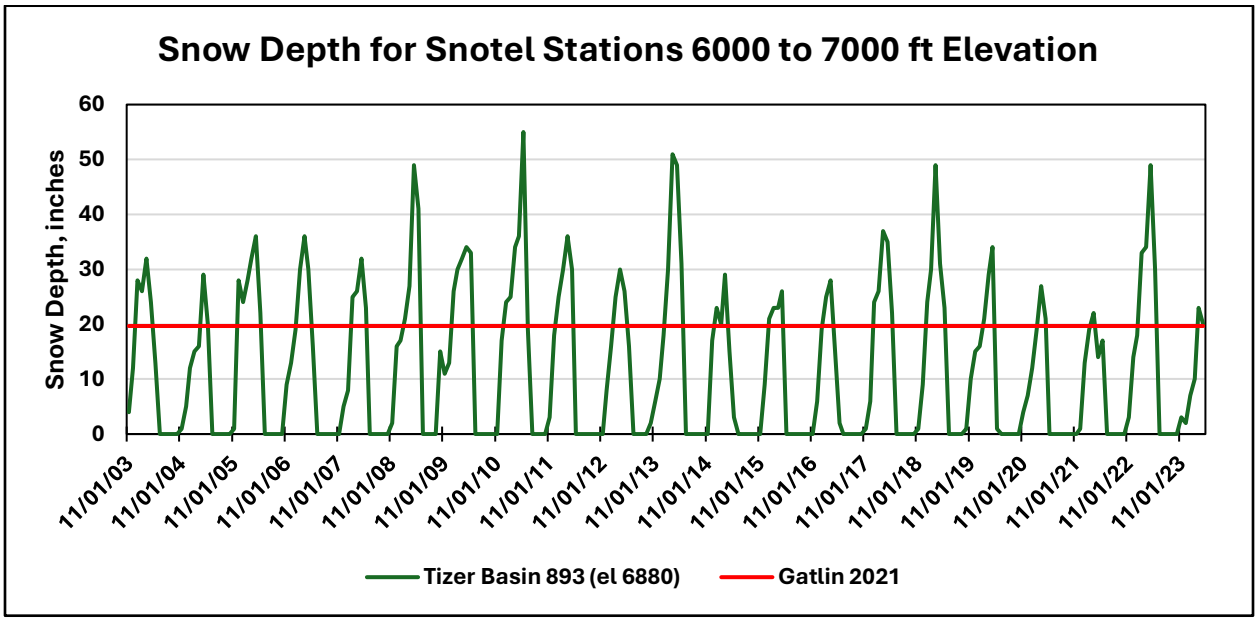
(FR p16052). The FSM described above makes the point that the Forest Service should establish through planning, objectives for habitat management and/or recovery of populations and prescribe measures to prevent adverse modification of habitat essential to the conservation of T&E species. This remains to be done with assurance that the BHDL land management plans are quantitatively addressing lynx habitat and connectivity needs.

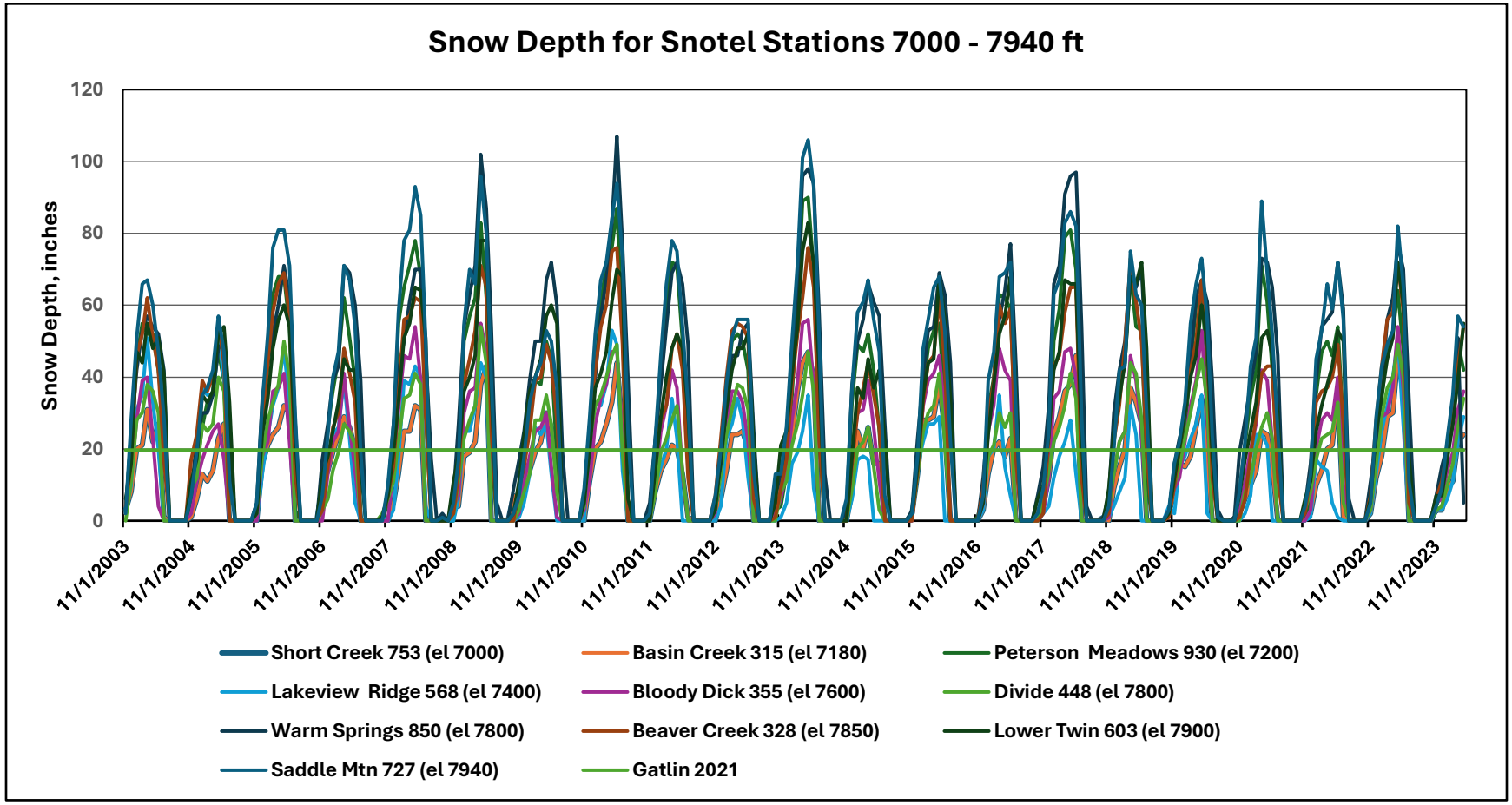
The BA:Appendix H provides a comprehensive review of the NRLMD goals, objectives, standards and guidelines with a comparison to the BHDL 2009 RFP provisions. Standards are missing for most of the NRLMD goals, objectives, and guidelines in the 2009 RFP. Goals, objectives and guidelines are without enforcement and need quantitative, not general, standards. The Forest Plan Amendment must now go through each of these NRLMD provisions and provide standards for each NRLMD Direction. As we pointed out in our comments on the lynx SSA, and draft Recovery Plan cited above, the listing of lynx as threatened was driven by the need for adequate regulatory mechanisms. To date there has been no analysis of the effectiveness of the NRLMD or any forest plans we are aware of. Lynx have disappeared across much of its previously occupied landscape. The NRLMD has not provided adequate protections for lynx and much of its direction is general and lacks enforceable standards.

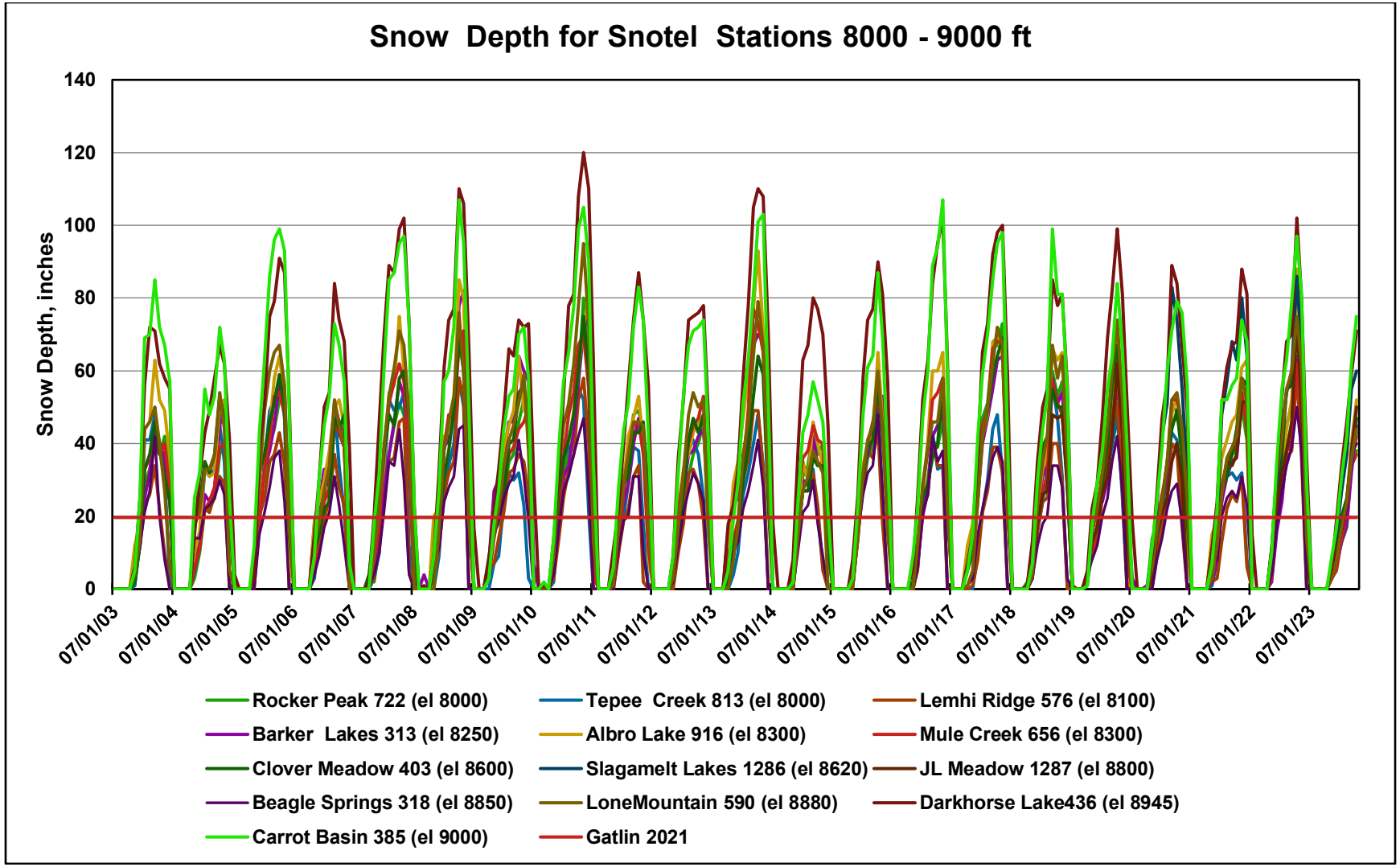
The BHDL must analyze its Forest Plan and the activities allowed therein and determine why no lynx were found following listing until nearly 20 years later. It has not determined that the handful of lynx found on the Forest the past few years are resident, have home ranges, denning habitat, or are reproducing and persisting. The process for the plan amendment must carry out this analysis. The BHDL must designate areas not included in critical habitat as Essential Habitat. This includes linkages, connections, and all lynx habitat. Existing and potential highway crossings must be analyzed and located with a goal of achieving their implementation.

Appendix I


Snow Depth for Snotel Stations <6000 ft Elevation
Snow Depth, inches
70
60
50
40
30
20
10
0
07/01/03
07/01/04
07/01/05
07/01/06
07/01/07
07/01/08
07/01/09
07/01/10
07/01/11
07/01/12
07/01/13
07/01/14
07/01/15
07/01/16
07/01/17
07/01/18
07/01/19
07/01/20
07/01/21
07/01/22
07/01/23
Combination 410 (el 5600)
Daly Creek 433 (el 5780)
Gatlin 2021


Snow Depth for Snotel Stations 6000 to 7000 ft Elevation
Snow Depth, inches
60
50
40
30
20
10
0
11/01/03
11/01/04
11/01/05
11/01/06
11/01/07
11/01/08
11/01/09
11/01/10
11/01/11
11/01/12
11/01/13
11/01/14
11/01/15
11/01/16
11/01/17
11/01/18
11/01/19
11/01/20
11/01/21
11/01/22
11/01/23
Tizer Basin 893 (el 6880)
Gatlin 2021


Snow Depth for Snotel Stations 7000 - 7940 ft
Snow Depth, inches
120
100
80
60
40
20
0
11/1/2003
11/1/2004
11/1/2005
11/1/2006
11/1/2007
11/1/2008
11/1/2009
11/1/2010
11/1/2011
11/1/2012
11/1/2013
11/1/2014
11/1/2015
11/1/2016
11/1/2017
11/1/2018
11/1/2019
11/1/2020
11/1/2021
11/1/2022
11/1/2023
Short Creek 753 (el 7000)
Basin Creek 315 (el 7180)
Peterson Meadows 930 (el 7200)
Lakeview Ridge 568 (el 7400)
Bloody Dick 355 (el 7600)
Divide 448 (el 7800)
Warm Springs 850 (el 7800)
Beaver Creek 328 (el 7850)
Lower Twin 603 (el 7900)
Saddle Mtn 727 (el 7940)
Gatlin 2021


Snow Depth for Snotel Stations 8000 - 9000 ft
Snow Depth, inches
140
120
100
80
60
40
20
0
07/01/03
07/01/04
07/01/05
07/01/06
07/01/07
07/01/08
07/01/09
07/01/10
07/01/11
07/01/12
07/01/13
07/01/14
07/01/15
07/01/16
07/01/17
07/01/18
07/01/19
07/01/20
07/01/21
07/01/22
07/01/23
Rocker Peak 722 (el 8000)
Tepee Creek 813 (el 8000)
Lemhi Ridge 576 (el 8100)
Barker Lakes 313 (el 8250)
Albro Lake 916 (el 8300)
Mule Creek 656 (el 8300)
Clover Meadow 403 (el 8600)
Slagamelt Lakes 1286 (el 8620)
JL Meadow 1287 (el 8800)
Beagle Springs 318 (el 8850)
LoneMountain 590 (el 8880)
Darkhorse Lake436 (el 8945)
Carrot Basin 385 (el 9000)
Gatlin 2021