Canada Lynx

Management Critique and Recommendations

With a Focus on The GYA and Y2UConn

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About This Report

The **Yellowstone to Uintas Connection** (Y2U) is a 501c3 non-profit entity working to restore fish and wildlife habitat in the Rocky Mountain West, including the Regionally Significant Wildlife Corridor connecting the Greater Yellowstone Area to the Uinta Mountains in Utah and Southern Rockies. This Corridor, which we named the Yellowstone to Uintas Connection (Y2UConn) passes through southeast Idaho and western Wyoming into northeastern Utah then to Colorado.

Y2U works to correct habitat fragmentation and degradation in the Y2UConn and the habitats with which it connects. Over the decades, we have documented the destruction and degradation of the natural character, water quality, and wildlife habitat integrity of the National Forests and BLM managed lands in this region. Major human impacts include energy development, mining, livestock grazing, motorized recreation, and logging on public and private land. These combined forces have contributed to an apparent loss of function of the historical habitat of Canada lynx. Our focus has been on restoring this corridor to function as habitat for Canada lynx which we identify as our umbrella species. Protecting and restoring this habitat for lynx would also provide habitat for the many other species such as wolverines and grizzly bears that historically occupied these lands.

Our Vision is a connected and thriving ecological corridor in the western United States where wildlife habitats are preserved, ecosystems are healthy, and communities are actively participating in conservation and restoration efforts.

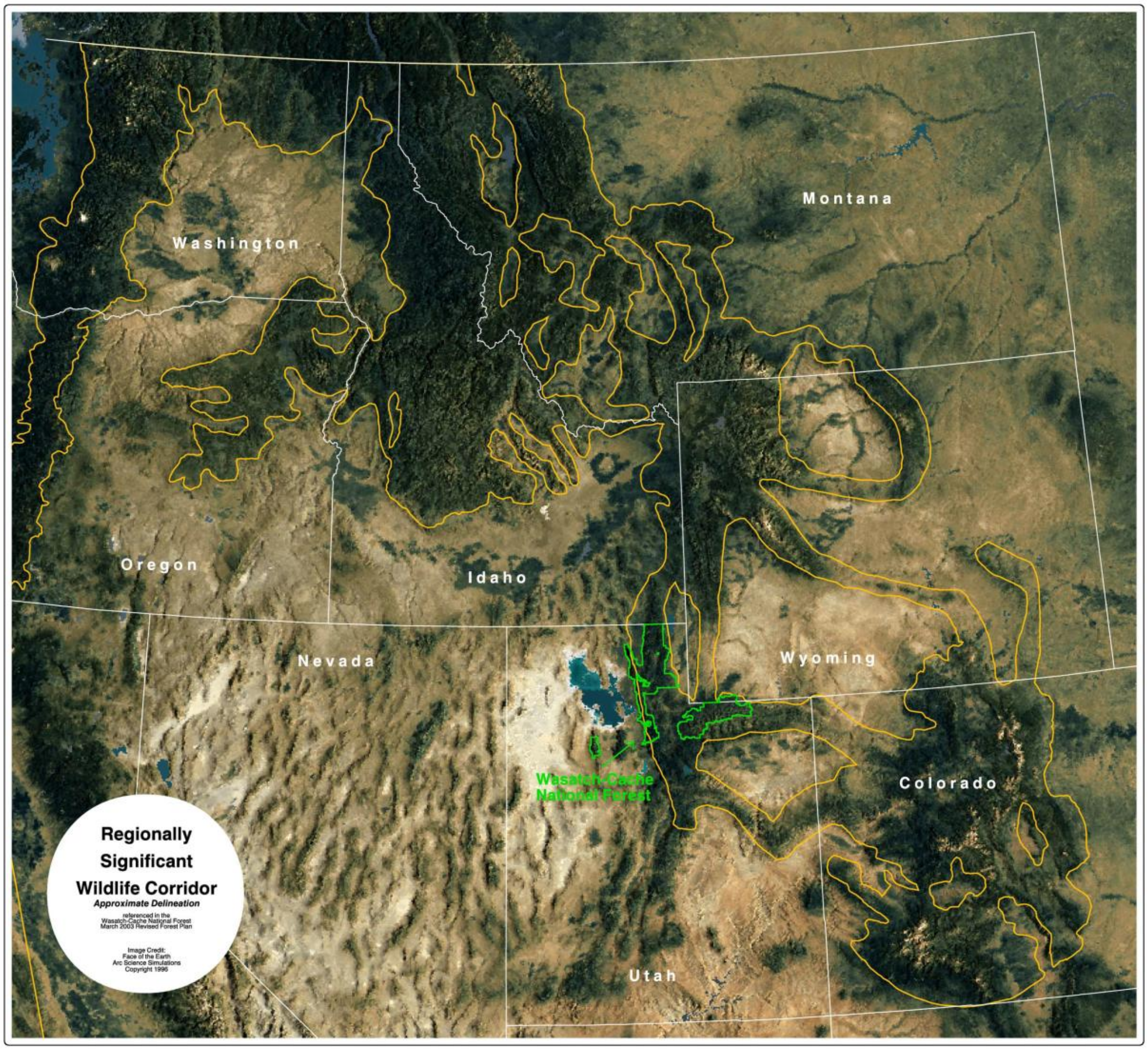
This report has extracted analysis from Y2U comments on the 2017 Canada Lynx Species Status Assessment (SSA), the 2023 SSA Addendum, the 2023 Draft Recovery Plan, the 2025 Revised Designation of Critical Habitat, and the 2025 Environmental Assessment for the Beaverhead-Deerlodge National Forest Plan Amendment for Canada Lynx Habitat. Throughout our comments the science was reviewed and detailed mapping analysis used to provide a visual interpretation of lynx habitat, connectivity, and evaluation of models.

Chapters are largely designed as standalone analyses, so some elements are duplicated across chapters to provide continuity of interpretation when reviewing a particular topic of interest. Some references are cited multiple times in order to provide ready access to the links provided and avoid scrolling back and forth to find them.

Dr. John Carter, Ecologist, and founder of the Yellowstone to Uintas Connection, prepared these comments and this report. Dr. Kirk Robinson, founder of the Western Wildlife Conservancy, who has worked on this Regional Corridor and carnivore ecology for many decades reviewed the manuscript.[1] Dr. Barrie Gilbert, (retired) Utah State University also reviewed the original

[1] Kirk Robinson, J.D., PhD Philosophy. Founder and current Executive Director of the Western Wildlife Conservancy. https://westernwildlifeconservancy.org/

comments.[2] Jonathan Ratner, Executive Director of Sage Steppe Wild, reviewed the manuscript. He is a biologist formerly employed by the Forest Service and BLM to work on forest carnivores during the late 1990's and early 2000's.



The Regionally Significant Wildlife Corridor encompassing and connecting the higher elevation forested areas in the Rockies and extending into Oregon and Washington as provided by the Wasatch-Cache National Forest for its 2003 Revised Forest Plan

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[2] Barrie K. Gilbert PhD, Department of Wildland Resources, (senior scientist retired), Utah State University, Logan Utah. Dr. Gilbert is a behavioral ecologist and recent author of ***One of Us: A Biologist's Walk Among Bears***.

Abbreviations and Terminology

BA - Biological Assessment
BHDL - Beaverhead Deerlodge NF
BTNF - Bridger Teton NF
BLM - Bureau of Land Management
CNF - Caribou NF
CPW - Colorado Parks and Wildlife
CTNF - Caribou Targhee NF
DFC - Desired Future Condition
ESA - Endangered Species Act
FSM - Forest Service Manual
FWS - Fish and Wildlife Service
FEIS - Final Environmental Impact Statement
FS - Forest Service
GIS - Geographic Information System -
GYA - Greater Yellowstone Area used interchangeably with Greater Yellowstone Ecosystem
HRV - Historic Range of Variation
IRA - Inventoried Roadless Area
MNHP - Montana Natural Heritage Program
Squires Model - Colorado habitat probability model from Squires et al (2024)
Science Report - Ecology and conservation of lynx in the United States. Ruggiero et al (2000)
Olson Model - Habitat model from Olson et al (2021) that is used by the U.S. Fish and Wildlife Service in the Northern Rockies
Olson GYA Model - Habitat Model for the southern portion of the Olson Model
LAU - Lynx Analysis Unit
CA - Lynx Conservation Agreement
LCAS - Lynx Conservation Assessment and Strategy
NPS - National Park Service
NRLMD - Northern Rockies Land Management Direction
RP - Recovery Plan
Corridor - Regionally Significant Wildlife Corridor
RFP - Revised Forest Plan
SSA - Species Status Assessment
SSA Focal Area, Focal Area, FA - Species Status Assessment Focal Area
SSA Focal Unit, Focal Unit, FU, Unit - Species Status Assessment Focal Unit
WGFD - Wyoming Game and Fish Department
Y2UConn - Yellowstone to Uintas Connection - that portion of the Corridor in western Wyoming, southeastern Idaho, and northeast Utah.

Contents with links

Executive Summary

This report provides a scientific and policy critique of federal management of the Canada lynx in the Northern and Southern Rockies, with emphasis on the Greater Yellowstone Area (GYA) and the Yellowstone to Uintas Connection (Y2UConn) corridor. It evaluates the adequacy of current regulatory mechanisms and land management policies under the Endangered Species Act (ESA), particularly following the 2017 Species Status Assessment (SSA), the 2023 SSA Addendum, the Recovery Plan, revised Critical Habitat designation, and related Forest Service plan amendments.

Purpose and Scope

The report examines whether federal land management agencies — principally the U.S. Fish and Wildlife Service and the U.S. Forest Service — have corrected the regulatory deficiencies identified when lynx were listed as Threatened in 2000. It focuses on habitat fragmentation, connectivity, and the cumulative impacts of human activities affecting Canada lynx.

Key Findings

- <u>Regulatory Mechanisms Remain Inadequate</u>
  Although agencies assert that land management plan amendments have addressed ESA deficiencies, the report concludes that regulatory protections for lynx habitat remain weak, inconsistently applied, or unenforced—particularly in unoccupied or linkage habitats.
- <u>Habitat Fragmentation Is Underestimated</u>
  The report argues that timber harvest, fuel treatments, road density, mining (including large-scale phosphate mining in southeast Idaho), livestock grazing, and expanding motorized recreation continue to fragment and degrade lynx habitat. Linkage areas essential for genetic exchange and dispersal receive minimal protection under current policy.
- <u>Motorized Recreation Has Intensified Beyond Original Assumptions</u>
  Since the publication of foundational scientific documents such as *Ecology and Conservation of Lynx in the United States* (Ruggiero et al. 2000), snowmobile and off-road vehicle use has expanded dramatically. The report contends that earlier conclusions minimizing road and recreation impacts are no longer valid under present-day use levels.
- <u>Misapplication of Scientific Uncertainty</u>
  The report asserts that agency reliance on lack of definitive evidence to dismiss impacts (e.g., snow-compacted trails, road densities, mineral development) contradicts the precautionary framework recommended in earlier science reports, which advised that uncertainty should favor conservation.
- <u>Failure to Address Southern Population Dynamics</u>
  The analysis challenges the hypothesis that southern lynx populations (e.g., Colorado) were historically sustained only by immigration from Canada, presenting evidence supporting the existence of historical, self-sustaining populations in the Southern Rockies.

- <u>Monitoring and Adaptive Management Are Insufficient</u>
  Required monitoring of lynx populations, snowshoe hare abundance, habitat conditions, and effectiveness of conservation measures is minimal or absent across much of the region.

Overall Conclusion

Despite formal amendments to forest plans and conservation agreements, habitat degradation and fragmentation continue across the Northern Rockies, particularly within the GYA and Y2UConn corridor. The report concludes that current management direction does not ensure functional connectivity, habitat integrity, or long-term persistence of lynx populations in the southern portion of the species' U.S. range.

Climate change compounds these risks but does not replace the need to address ongoing anthropogenic fragmentation and disturbance.

Recommendations

The report calls for:

- Stronger, enforceable regulatory standards for both occupied and unoccupied (linkage) habitats.
- Comprehensive mapping and quantitative analysis of habitat structure, connectivity, and fragmentation.
- Updated recreation management standards reflecting modern motorized use intensity.
- Enhanced monitoring of lynx and snowshoe hare populations.
- Reassessment of southern population viability and corridor functionality.
- Application of precautionary conservation principles consistent with the best available science.

CHAPTER 1 History

1.1 Background. In reviewing the 2017 Species Status Assessment for the Canada Lynx[3] it was important to consider the background within which the Assessment was developed. In the following, critical agency documents are addressed. These identify human activities impacting lynx which we find today are not being accounted for as agencies approve projects and fail to address impacts that fragment and degrade lynx habitat. These include timber and fuel treatment projects, excessive road densities, huge increases in motorized recreation in recent years, widespread livestock grazing that degrades habitat for snowshoe hares, mining, pipelines, and other extractive uses. Canada lynx was listed under the Endangered Species Act as threatened in 2000.[4] The Federal Register stated the problem as:

> *The contiguous U.S. Distinct Population Segment of the lynx is threatened by the inadequacy of existing regulatory mechanisms. Current U.S. Forest Service Land and Resource Management Plans include programs, practices, and activities within the authority and jurisdiction of Federal land management agencies that may threaten lynx or lynx habitat. The lack of protection for lynx in these Plans render them inadequate to protect the species.*

In this report, Y2U makes the case that the situation has not improved for lynx as they continue to decline in the Northern Rockies, particularly in the Greater Yellowstone Area.

1.2 Programmatic Lynx BA. In December 1999, the Forest Service and Bureau of Land Management completed their "Biological Assessment of The Effects of National Forest Land and Resource Management Plans and Bureau of Land Management Land Use Plans on Canada Lynx" (Programmatic Lynx BA).[5] The Programmatic Lynx BA concluded that the current programmatic land management plans *"may affect, and are likely to adversely affect, the subject population of Canada lynx."* The Lynx BA team recommended amending or revising Forest Plans to incorporate conservation measures that would reduce or eliminate the identified adverse effects on lynx. The Programmatic Lynx BA's determination meant that Forest Plan implementation at the time was a *"taking"* of lynx and makes Section 7 formal consultation on

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[3] USFWS. 2017. Species Status Assessment for the Canada Lynx (*Lynx Canadensis*) Contiguous United State Distinct Population Segment. October 2017. https://app.box.com/s/vpypn6bykl60bb98a1wtclqoc1lpjgcx

[4] 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. Federal Register Vol. 65 No. 58, March 4, 2000. https://app.box.com/s/7ul3razrd8atbwc2ky6js6ofudcqrvhc

[5] USDA Forest Service and DOI Bureau of Land Management.1999. Biological Assessment of the Effects of National Forest Land and Resource Management Plans and Bureau of Land Management Land Use Plans on Canada lynx. https://app.box.com/s/38434h2pejq9pv8w8ypzbcsyoffjfr94

the Land Management Plans (LMPs) mandatory, before actions are approved. The Lynx BA *"likely to adversely affect"* conclusion was based on the rationale that LMPs within the Northern Rockies have inadequacies, including that:

- Aggressive fire suppression may limit the availability of foraging habitat.
- Allow levels of human access via forest roads that may risk incidental trapping, shooting, or access by competing carnivores.
- Are weak in guidance for new or existing recreation developments.
- Allow mechanized and non-mechanized recreation that may pose a risk, by allowing compacted snow trails and plowed roads that facilitate competitors and predators.
- Are weak direction for maintaining habitat connectivity.
- Are weak in direction for coordinating management activities with adjacent ownerships to assure consistent management of lynx habitat across the landscape.
- They fail to provide monitoring of lynx, snowshoe hares, and their habitats, making the detection and assessment of adverse effects from other management activities difficult or impossible to attain.
- Forest management has resulted in a reduction in the area in which natural ecological processes were historically allowed to operate, thereby increasing the area potentially affected by known risk factors to lynx. The LMPs have continued this trend.
- The LMPs have also continued the process of fragmenting habitat and reducing its quality and quantity. Consequently, plans may risk adversely affecting lynx by potentially contributing to a reduction in the geographic range of the species.
- Plan revisions are needed to incorporate conservation measures included in the Canada Lynx Conservation Assessment and Strategy.[6]

The analysis provided in this report challenges the idea that the Northern Rockies Land Management Direction (NRLMD)[7] and the subsequent amended land management plans have corrected this situation.

1.3 Lynx Conservation Assessment and Strategy. The LCAS *"was developed to provide a consistent and effective approach to conserve Canada lynx on federal lands in the conterminous United States. The USDA Forest Service, USDI Bureau of Land Management, and USDI Fish and Wildlife Service initiated the Lynx Conservation Strategy Action Plan in spring of 1998."* The LCAS was published shortly after the Canada lynx was listed as Threatened under the ESA. Risk Factors from the LCAS (2000) include:

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[6]Ruediger et al. 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. https://app.box.com/s/peo080gkyfhea9a3v7r5ej5uaizw06c6

[7] USDA Forest Service. 2007. National Forests in Montana, and parts of Idaho, Wyoming, and Utah. Northern Rockies Lynx Management Direction Record of Decision. https://app.box.com/s/mnibk1r04lr7cpcgbvdsxxdgyhqzv52r

- Timber harvest and pre-commercial thinning that reduces denning or foraging habitat or converts habitat into less desirable tree species.
- Fire exclusion changing the vegetation mosaic maintained by natural disturbance processes.
- Grazing by livestock reducing forage for prey.
- Roads and winter recreation trails that facilitate access to historical lynx habitat by competitors.
- Incidental trapping and shooting.
- Predation.
- Being hit by vehicles.
- Obstructions to movement such as highways and private land developments.

All these factors continue to operate within the National Forests and BLM lands within and surrounding the Y2UConn. They are not effectively addressed while degradation and fragmentation of habitat continue. Monitoring of these activities is minimal to non-existent.

1.4 Northern Rockies Lynx Management Direction. The NRLMD direction *"applies to mapped lynx habitat on National Forest System land presently occupied by lynx, as defined by the Amended Lynx Conservation Agreement (CA)[8] between the Forest Service and FWS…<u>When National Forests are designing management actions in unoccupied mapped lynx habitat they should consider the lynx direction, especially the direction regarding linkage habitat."</u>* (NRMLD p1). [Emphasis added].

The FEIS[9] for the NRLMD provided a map for the Northern Rockies Lynx Planning Area which is inserted as Figure 1.1 The CA provided this, *"As recommended in the LCAS, appropriate actions, including research, administrative studies, or monitoring, will be taken to verify the effectiveness of the lynx conservation measures."* (CA p7). We have seen none of these monitoring or other studies that have addressed effectiveness of lynx conservation measures, while ongoing monitoring of lynx and snowshoe hare occurrence and populations are lacking.

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[8] USDA Forest Service and USDOI Fish and Wildlife Service. 2006. Canada Lynx Conservation Agreement. USFS Agreement #OO-MU-11015600-0 13. https://app.box.com/s/4vbmlix6p4r9zo42a7kplb2jfkv8ro6n

[9] USDA Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. https://app.box.com/s/qc1t0eocq7ntiyepuhk7daffaypis8yo

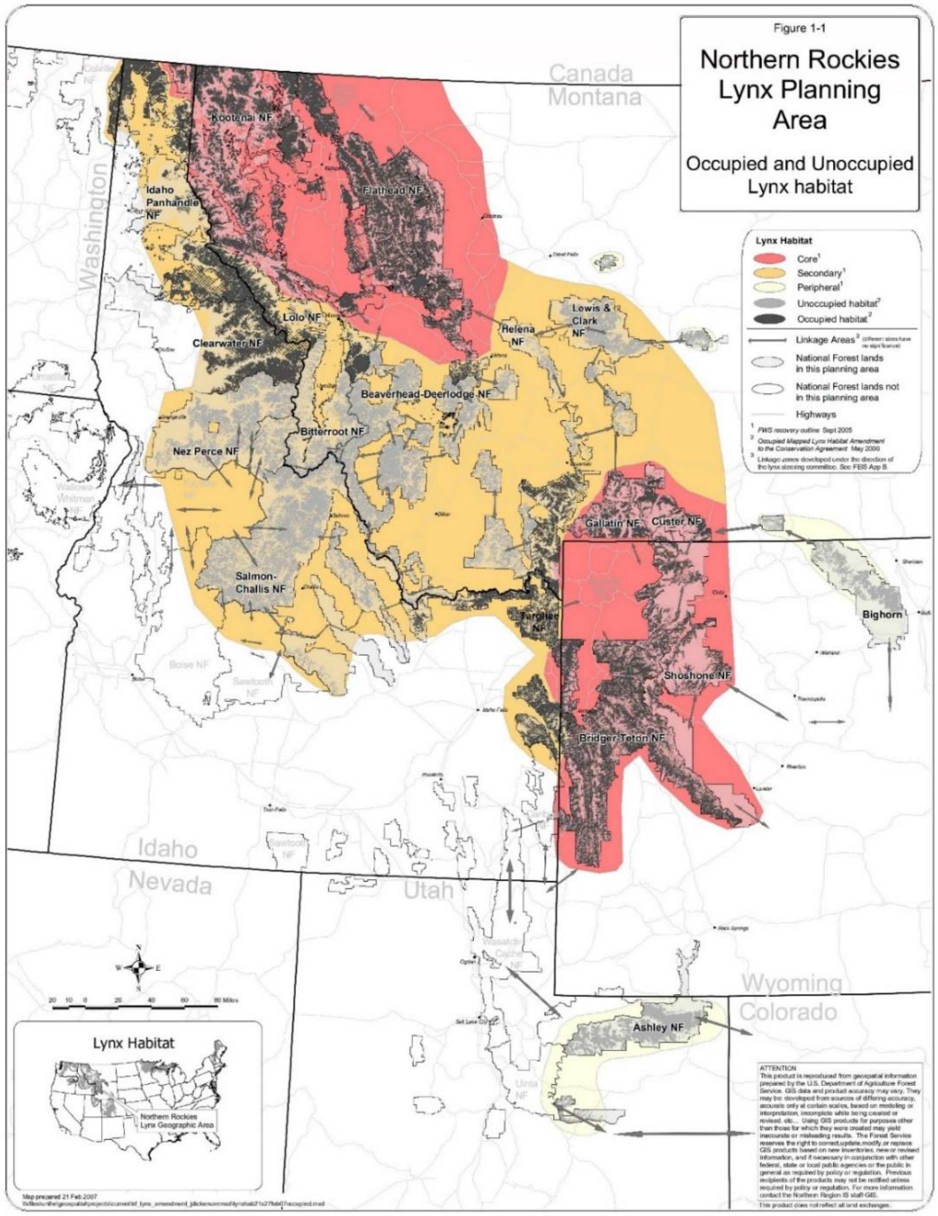

Figure 1.1 Northern Rockies Lynx Planning Area

In the NRMLD (p3) there is reference to a FWS *"Clarification of Findings"* in a Remand Notice which basically explains away most forest activities as impacting lynx or lynx habitat, i.e. a *"threat"* to lynx. The NRMLD puts it this way:

> *After the LCAS was issued the FWS published a Clarification of Findings in the Federal Register (FEIS, Vol. 1, Appendix P), commonly referred to as the Remand Notice. In the Remand Notice the FWS states, "We found no evidence that some activities, such as forest roads, pose a threat to lynx. Some of the activities suggested, such as mining and grazing, were not specifically addressed [in the Remand Notice] because we have no information to indicate they pose threats to lynx" (p. 40083).*[10]
>
> *Further on in the Remand Notice they state, "Because no evidence has been provided that packed snowtrails facilitate competition to a level that negatively affects lynx, we do not consider packed snowtrails to be a threat to lynx at this time" (p. 40098).*
>
> *In regards to timber harvest the FWS states, "Timber harvesting can be beneficial, benign, or detrimental to lynx depending on harvest methods, spatial and temporal specifications, and the inherent vegetation potential of the site. Forest practices in lynx habitat that result in or retain a dense understory provide good snowshoe hare habitat that in turn provides good foraging habitat for lynx" (p. 40083).*
>
> *These findings by FWS narrow the focus from the concerns first published in the LCAS (discussed above) about what management direction is needed to maintain or improve Canada lynx habitat. We considered this information in the development of the selected alternative, and in our decision.*

Thus, the agencies use the NRLMD *"clarifications"* that remove most agency actions or permitted activities from consideration as impacting lynx and their habitat. The FWS uses the rationale that lack of evidence means these activities have no impact on lynx or their habitat. The scientists who published the LCAS and Science Report[11] had determined these activities that fragment or degrade lynx habitat are a detriment to lynx.

For example, absence of lynx in SE Idaho is a foregone conclusion if you deny impacts from logging, snowmobiles across the landscape, large numbers of off road vehicles speeding thru forest roads, and that *"mining and grazing, because they were not specifically addressed … because we have no information to indicate they pose threats to lynx"* are not a threat. Meanwhile, in SE Idaho,

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[10] USDA Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. Appendix P. https://app.box.com/s/jc4kp7oaomqjlgo7w49sldxsacbu6cx7

[11] 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://app.box.com/s/zty51i19f78lhj8fwel7w3gjnzevvg5k

open pit phosphate mines and haul roads, along with excessive road densities and heavy recreation use are either destroying habitat or limiting its functionality. By eliminating these factors from consideration, the agencies have relieved themselves of most responsibility to maintain or restore lynx, its habitat, and connectivity. The LCAS and Science Report do not say roads, snowmobiles, timber harvest, mines and grazing are <u>not</u> impacting lynx or lynx habitat.

Further in the NRLMD there are clarifying statements such as that standards and guidelines only apply to occupied habitat, while they can be considered for unoccupied habitats. (NRLMD p6). Regarding vegetation management direction, it *"conserves the most important component of lynx habitat: a mosaic of early, mature, and late successional stage forests, with high levels of horizontal cover and structure."* (NRLMD p21). The objectives, standards and guidelines do not *"apply to linkage areas"*. (NRLMD Att 1 p2). Livestock grazing *"may reduce or eliminate foraging habitat in areas that grow quaking aspen and willow in riparian areas….These localized changes in habitat may affect individual lynx; however, no information indicates grazing poses a threat to overall lynx populations…"* (NRLMD p21). Livestock management objectives and guidelines do not apply to linkage areas. (NRLMD Att 1 p5). Over snow recreation *"Emphasizes not expanding snow compacting human uses into non-compacted areas."* Guideline G11 *"discourages the expansion of designated over-the-snow routes and play areas into uncompacted areas." "An alternative to drop all direction limiting snow compaction was not developed in detail because there is evidence competing predators use packed trails, suggesting a potential effect on individual lynx."* (NRLMD p23). The Mineral and Energy Standard does not apply to linkage habitat. (NRMLD Att1 p5).

The NRLMD segmented its effects analysis and did not consider cumulative impacts from these activities in combination. The statements above indicate that the NRLMD does acknowledge that lynx habitat, including linkage areas, can be compromised by these activities. It did acknowledge that there is evidence of lynx competitors using packed snow trails which it earlier denied due to lack of evidence. It did not address landscape level snow machine access, the increase in motorized recreation with fast, high-powered machines, and landscape-level use such as occurs in 97% of the Caribou NF.[12] A recent paper by Olson et al (2018)[13] acknowledged that lynx avoided areas of ski resort development, altered their behavior to spend less time in areas of motorized recreation, or used them at night when there was less use. The Forest Service Rocky Mountain Research Station has said, *"Lynx appear to have an upper threshold of recreation intensity which they can tolerate, and above this level, lynx may be less able to coexist. Managers, then, should keep in mind that developed or dispersed areas with very high use may displace lynx from habitat."*[14] We note that the phosphate mines in SE Idaho operate 24 hours per day, 7

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[12] USDA Forest Service Caribou National Forest. 2003. Final Environmental Impact Statement for the Caribou National Forest Revised Forest Plan. Volume IV. https://app.box.com/s/3xa174voc62mvw8vin7p714te2rw187o

[13] Olson, L.E.; Squires, J.R.; Roberts, E.K.; Ivan, J.S.; & Hebblewhite, M. 2018. Sharing the same slope: Behavioral responses of Canada lynx to winter recreation. Ecology and Evolution. 1-18. https://app.box.com/s/b3k76qwzide4rzims1572vvswejghsa5

[14] USDA RMRS. 2023. Winter Sports and wildlife: Can Canada lynx and winter recreation share the same slope? https://app.box.com/s/ihnjws0md8l92w5ef1fo2gyl7wslm88m

days per week for up to 30 years at an individual mine with some 400 blasts of explosives each week at each mine.[15] Haul roads further fragment the habitat, operating continuously. Recreational use is not monitored, and illegal motorized roads and trails are not mapped or reclaimed, making environmental analyses inadequate.

Since the studies used in the Science Report, almost three decades have passed with ever increasing snowmobile and off-road vehicle use. A report by Winter Wildlands Alliance for USDA noted that snowmobile use more than doubled between the early 1980s and 2004.[16] Cross-country skiing and snowshoeing experienced a similar increase. In the 1990s more powerful snow machines made access available to *"dominate terrain only accessible by backcountry skis or snowshoes."* High-marking and acrobatics are common in areas previously inaccessible. High-marking is the "*recreational maneuver of attempting to reach the highest point of a snow-covered feature such as a mountain, on a snowmobile.*"[17] Groomed trails now are over 20,000 miles in the 11 Western Snow Belt States. Today, there are 1.3 million registered snowmobiles in the US and 601,000 in Canada.[18] As acknowledged above, this increased access allows trapping and hound hunting to occur across the landscape. In Idaho there were 1,830 trapping licenses issued for the 2017 - 2018 season[19], up from 638 in the 1995-1996 season.[20]

A brief history of ATVs and UTVs comes from industry websites. The first four-wheeled ATV was produced in 1982 by Suzuki.[21] This quickly turned to an emphasis on speed in 1987 with a model that could attain almost 80 mph. *"Naturally, as high-performance ATVs gained popularity, Quad Racing and ATV Motocross enjoyed massive growth and exposure in the late 1980s."* The first UTV, the Kawasaki Mule, was introduced in the late 1980s.[22] A racing emphasis came about with the introduction of the Polaris RZR in 2007. Today, sales of these vehicles are around 800,000 annually with about half in the US. This is an estimate, since in many states they are not registered.[23]

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[15] USDA and DOI. 2019. Final Environmental Impact Statement Proposed Dairy Syncline Mine and Reclamation Plan. https://app.box.com/s/jmod5pcq1txhv4wmply3oxuazlm16tau. Accessed on January 16, 2023.
[16] Winter Wildlands Alliance. 2006. Winter Recreation on Western National Forest Lands. https://app.box.com/s/bjdsaf2j0b9oiqp2p01wicdxmp28hjby
[17] High Marking. Wikipedia. 2026. https://app.box.com/s/6etr8xymrgcqrty3cv4h6n32i6bde6ak
[18] ISMA. 2022. Snowmobiling Fact Book. International Snowmobile Manufacturers Association (ISMA). https://app.box.com/s/bslnri2mcg2wvfk31t1j2462xa5nmzxk
[19] IDFG. 2018. Idaho Department of Fish and Game Furbearer Report. https://app.box.com/s/nh6lccdn5bsks5o148gtqueabn7p8wea
[20] Melquist, W.E. 1997. Idaho Department of Fish and Game Furbearers Study III, Job 1. https://app.box.com/s/pwm02mo0536nl6x3lrvn733ng3v79z3s
[21] HQPowerSports.com. 2018. History of the modern atvs and utvs. https://app.box.com/s/y9o9jymte357fxhdwd4kzv8p4judfdkt
[22] Shocktherapist.com. undated. A brief history of utvs. https://app.box.com/s/85p45ltnvo7c5zj7tmsubrvbx5bh79ea
[23] Motorcycles Data (https://www.motorcyclesdata.com/) and https://app.box.com/s/g19riyqlk74y5d526qpauq48gz6o9hvc

The point of this is that there are millions of snowmobiles, ATVs, UTVs, and dirt bikes in the US today. Add to this the pickup truck and SUV market with their TV commercials emphasizing conquering the backcountry and off-roading. These were present only minimally during the time of most of the studies in the Science Report. The implication of this is that conclusions about forest roads and snow trails are out the window today since these are loud, fast, and powerful machines capable of accessing most terrain and are present in large numbers. For instance, in SE Idaho in 2017, we conducted research to determine traffic levels on a Caribou NF access road. Over 300 vehicles per day were using the road with many traveling at high rates of speed.[24] Sound levels ranged up 100 db. In winter, snowmobiles were creating similar noise levels. These roads today are not quiet or low use. They have become an analog to a motocross track where speed and noise are part of the game, but on the National Forest there is no enforcement of speed, noise or even checking registrations. How are lynx able to occupy an area with this level of year-round disturbance?

1.5 Interagency Conservation Agreement.[25]. The CA addresses its scientific basis:

> *In March of 1998, an interagency lynx coordination effort was initiated in response to the emerging awareness of the uncertain status of lynx populations and habitat in the conterminous United States and the onset of the listing process. The U.S. Fish and Wildlife Service (FWS), USDA Forest Service (FS), Bureau of Land Management (BLM), and the National Park Service (NPS) have participated in this effort. Three products important to the conservation of lynx on federally managed lands have been produced through this effort: (1) "The Scientific Basis for Lynx Conservation" (Ruggiero et. al. 2000, hereafter referred to as the "Science Report"[26]; the Lynx Conservation Assessment and Strategy (LCAS); and this Lynx Conservation Agreement (CA). Several States within the range of the lynx have contributed to this effort through interactions with participants and review of draft products.*
>
> *The Science Report, prepared by an international team of experts in lynx biology and ecology, is a compendium and interpretation of current scientific knowledge about the Canada lynx, its primary prey and habitat relationships. This document serves as an important scientific reference for the various lynx activities of the cooperating Federal Agencies.*

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[24] Unpublished data. 2017. Utah State University.

[25] USDA Forest Service and USDOI Fish and Wildlife Service. 2006. Canada Lynx Conservation Agreement. USFS Agreement #OO-MU-11015600-0 13. https://app.box.com/s/4vbmlix6p4r9zo42a7kplb2jfkv8ro6n

[26] 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://app.box.com/s/zty51i19f78lhj8fwel7w3gjnzevvg5k

The LCAS builds upon this scientific base and identifies the risks to the species that may occur as a result of federal land management. It recommends conservation measures that could be taken to remove or minimize the identified risks. It was developed to provide a consistent and effective approach to conservation of Canada lynx on federal lands in the conterminous United States.

The LCAS and Science Report constituted the best available knowledge and were incorporated into the CA. The Science Report (p12) addressed uncertainty by suggesting that *"the burden of proof be shifted so that uncertainty favors, or at least is not destructive to conservation…"*. As pointed out above, the LCAS identified risk factors, which are now excluded by the NRLMD and Remand Notice. These exclusions have arbitrarily discounted nearly all activities as affecting lynx and lynx habitat. Lack of regulatory mechanisms was identified as a cause in the listing notice (FR Vol 65 No 58 p16052) stated as,

The contiguous U.S. Distinct Population Segment of the lynx is threatened by the inadequacy of existing regulatory mechanisms. Current U.S. Forest Service Land and Resource Management Plans include programs, practices, and activities within the authority and jurisdiction of Federal land management agencies that may threaten lynx or lynx habitat. The lack of protection for lynx in these Plans render them inadequate to protect the species.

The Science Report (SR) addresses fragmentation as *"reduction of total area, increased isolation of patches, and reduced connectedness among patches or natural vegetation…"* (SR p84). *"habitat fragmentation is the most serious threat to biological diversity and is the primary cause of the present extinction crisis."* (SR p85). *"rare species associated with wilderness, such as the lynx, generally are considered most susceptible to fragmentation."* (SR p86). *"generalist predators tend to dominate the predator guild in fragmented landscapes."* (SR p86). Coyotes and lynxes are separated by snow conditions, but *"this separation may break down where human modifications to the environment increase access by coyotes to deep snow areas. Such modifications include expanded forest openings throughout the range of lynx in which snow may be drifted, and increased snowmobile use in western mountains. Recreational snowmobile use has expanded dramatically in the United States in the past 25 years, with hundreds of thousands of km of trails (>19,000 km of groomed trails in Maine alone) within the pre-settlement range of the lynx…"* (SR p94). *"Fragmentation of habitats occupied by lynx (including increased openings, higher road densities, exurban residential development, and wider use of snowmobiles and devices that compact snow in areas with deep, soft snow) is a plausible mechanism for the questionable conservation status of the lynx in the contiguous United States."* (SR p95).

The data and information included in the Science Report had mostly been generated by the early 1990s, much in the 1970s and 1980s. The studies describing road density and snowmobile effects were very limited. The single study in the Science Report (p308) was based on data from the 1980s and stated that *"Road densities had no significant effect on habitat selection, and lynx crossed roads at frequencies that did not differ from expectation."* There was no data on use of these roads by vehicles in summer or snowmobiles in winter. Road density averaged 1.28 miles/sq.mi. As noted above, snowmobile use was expanding. The Science Report (p391) noted that *"Roads in the study area were of primitive standards that received little use in summer but were frequently used by snowmobilers in winter."* The Science Report (p295) said, *"Snowmobiles became readily available in the late 1950s and early 1960s, likely influencing trapper coverage, access, and attitudes."* Science Report (p391*), "Although legal harvest is no longer a conservation concern, human-caused mortality is believed to be additive in the low-density lynx populations characteristic of southern boreal forests (Koehler 1990; Table 13.3). If so, illegal or incidental harvest could significantly reduce population numbers of lynx in southern regions."* Here, the Science Report refutes the claim that forest roads "*had no significant effect*" and raises serious questions about the deflections around human activities in the Remand Notice and NRLMD.

1.6 2017 Species Status Assessment. The FWS published a species status assessment for Canada lynx in 2017.[27] The SSA recognized the lack of regulatory mechanisms was the reason for listing. (SSA p1). It stated:

> Factors affecting lynx that were evaluated in the SSA *"include the adequacy of existing regulatory mechanisms (the factor for which the DPS was listed); climate change, vegetation management, wildland fire management, and habitat loss and fragmentation (the factors considered by the Interagency Lynx Biology Team [ILBT] to have the potential to exert population-level effects on the DPS); and other factors that could influence the continued ability of particular geographic units to support resident lynx."* (SSA p3).
>
> *"The lack of regulations protecting lynx habitat from potential threats on Federal lands at the time of listing has been largely addressed by formal and binding amendments or revisions to most Federal land management plans within the DPS range. Although uncertainty remains about the efficacy of this improved regulatory framework, Federal lands are now being managed specifically to protect and restore lynx habitats, with the goal of supporting continued lynx presence on these lands."* (SSA p231).

This last statement is incredibly dismissive of the main cause of lynx habitat degradation, lack of adequate regulation, and instead, dismisses almost all actions that the Science Report acknowledged adversely affect lynx and lynx habitat. The author sent a letter to Mel Bolling,

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[27] U.S. Fish and Wildlife Service. 2017. Species Status Assessment for the Canada lynx (Lynx canadensis) Contiguous United States Distinct Population Segment. Version 1.0, October, 2017. Lakewood, Colorado. https://app.box.com/s/vpypn6bykl60bb98a1wtclqoc1lpjgcx

Forest Supervisor of the Caribou Targhee NF (CTNF). The letter requested an updated analysis of lynx status in the CTNF, including its historical occurrence, migration corridors and connections between habitats. The letter outlined desired analysis and mapping to include human fragmentation and historical lynx habitat use.[28]

Mr. Bolling explained some of the history of the lynx listing, the Science Report, LCAS and the 2013 revision of the LCAS, which is now considered the primary guidance for land management agencies.[29] His letter pointed out that the Targhee NF Revised Forest Plan was amended by the NRLMD in 2007. A National Lynx Survey was conducted on both Forests in 1999 and determined that the Targhee NF met criteria for management as an occupied forest, but the Caribou National Forest (CNF) did not. Therefore, the CNF was not subject to the NRLMD and *"No LAU's or lynx habitat is mapped on the Caribou due to the designation of the Caribou NF as an unoccupied forest in 2002."* (p2). The conservation measures in the CNF Revised Forest Plan (RFP) were *"deemed sufficient: by the USFWS through consultation on the RFP Biological Assessment to address threats to Canada lynx and provide regulatory mechanisms to ensure the continued persistence of Canada lynx on the Caribou National Forest."* Under this arrangement the provisions of the CNF RFP would be central to analysis of lynx habitat because other protections are dismissed due to what appears to be an arbitrarily determined occupancy status that ignored historical lynx observations and only relied on absence determined by the National Lynx Survey in 1999 which occurred long after the explosion in use described earlier.

Mr. Bolling's response included reference to a paper by Olson et al (2021)[30] which used lynx observations in the west, climate, and human induced factors to model lynx habitat. Using lynx Global Positioning System (GPS) and tracking data from Idaho, Wyoming, Montana, Washington, and British Columbia, the study found that lynx habitat is made up of a complex array of environmental conditions, not primarily vegetation type and elevations as currently mapped. Olson et al (2021) included an index of summer vegetation production, percentage of tree cover, road density and night light intensity as indices of anthropogenic influences. One confounding issue is their assumption of boreal forest soil pH as a factor due to the wetter conditions in boreal forests. However, lynx use a variety of forest types, and this factor might disqualify habitats unnecessarily. The model provides insight and a basis for more detailed analysis of lynx habitat and its fragmentation. By this model, lynx habitat is present in SE Idaho. The FWS and FS have failed to address why lynx are absent here.

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[28] Carter, J., Garrity, M., Johnson, S., & Fite, K. 2021. Request for Response on Lynx Analysis in the CTNF. Letter on behalf of Yellowstone to Uintas Connection, Native Ecosystems Council, Alliance for the Wild Rockies, and Wildlands Defense. Dated August 15, 2021. https://app.box.com/s/pr4bri1abote1vonfkjttzpks6ph0nbx

[29] Bolling, M. 2021. Response to letter requesting information on Canada lynx. Dated September 13, 2021. https://app.box.com/s/12pa2owno7in04up1orl18wgoaitmkzp

[30] Olson, L. E., Bjornlie, N., Hanvey, G, Holbrook, J.D., Ivan, J.S., Jackson, S., Kertson, B., King, T., Lucid, M., Murray, D., Naney, R., Rohrer, J., Scully, A., Thornton, D., Walker, Z. & Squires, J.R. 2021. Improved prediction of Canada lynx distribution through regional model transferability and data efficiency. Ecology and Evolution 11:1667 – 1690. https://app.box.com/s/oxx5l336vf2uag7awew2cbies6vgkxg5

Review of the 2017 SSA revealed a tenor of continued habitat fragmentation and degradation as being unimportant to persistence of lynx, while only implicating climate change as problematic. But climate change is superimposed on all the existing human impacts to habitat and heightens the importance of these effects to the decline of lynx and lynx habitat. For example, the SSA (p227) contends that lynx only occurred in Colorado during *"irruptions from Canada…in the early 1960s and 1970s"* concluding that there is doubt that the population in Colorado *"will receive the demographic and genetic support from the north that is thought to be important to the DPS populations."*

There appears to be two competing hypotheses regarding lynx presence in Colorado.

> H1. Lynx had been present in the Southern Rockies (south of Idaho-Wyoming) in a self-sustaining population for millennia but were slowly extirpated because of human activities, including trapping and livestock grazing, from the early 19th century through the mid-20th century.
>
> H2. The presence of lynx in the Southern Rockies in the 19th and 20th centuries prior to lynx reintroduction into the San Juan Mountains, was due mostly or entirely to periodic influxes of lynx from Canada.

Two bodies of evidence (I & II) support H1 as the correct hypothesis.

> I. There is a general lack of evidence of lynx population cycles in Canada being correlated with lynx population dynamics in the U.S., let alone in Colorado. The Science Report (p242) comments on the immigration hypothesis.
>
> *"In the Canadian provinces, Alaska, Montana, and Washington, we know that there are local reproductive populations, knowledge that invalidates a pure immigration hypothesis. For these areas, we can only state that they appear to be a part of a population in which lagged synchronous dynamics occur. Because we do not know why these dynamics occur, we cannot say to what extent they are affected by changes in local dynamics and the role that immigration might play.*
>
> *. . . the lack of lynx occurrence records associated with a large population peak occurring in the central provinces during the early 1980s. This population peak was higher than any recorded in the 20th century prior to 1959, but there was no evidence from museum specimens, verified mortality records, or anecdotal observations that unusual numbers of lynx occurred in any portion of its range in the contiguous United States."*
>
> II. Since lynx reintroductions in Colorado, lynx have reproduced and become established there. Prognostications of the eventual disappearance of lynx from Colorado are speculative and have nothing to do with whether Colorado was, or is capable of supporting a self-sustaining population of lynx.

The Science Report in describing the population cycles made this observation regarding the Minnesota population: *"a three-year lag with data from the south-central Canadian provinces resulted in a strong correlation for the most recent period (r = 0.73, 1960-1983) but the pattern is out of phase in the previous 26 years… ."* (SR p238). Later in this report, observation and trapping records show lynx were present in the DPS during large blocks of time other than in the 1960s and 1970s.

1.7 2013 Lynx Conservation Assessment and Strategy. The 2013 LCAS[31] (p2) emphasizes protection of core areas which support persistent lynx populations and *"less stringent protection and greater flexibility in secondary/peripheral areas…".* The only conservation measure provided for these peripheral areas was vegetation management. These are general and unenforceable statements such as *"Vegetation treatments should be designed with consideration of historical landscape patterns and disturbance processes. Design timber harvest, planting, and thinning to include some representation of young densely stocked regenerating stands in the mosaic for snowshoe hare production areas"* (p95).

The 2013 LCAS (p89) provided conservation measures for core areas and stated that projects *"must be consistent with the management direction contained in the forest plan.".* Conservation measures for core areas included (only examples cited, for the full list see the 2013 LCAS):

- Delineate LAUs (p89)
- Vegetation management (includes several measures including landscape evaluation to identify opportunities for adaptation to climate change). (p89)
- Wildland fire management (p93)
- Habitat fragmentation (promote or retain large contiguous blocks of lynx habitat, identify linkage areas to maintain connectivity, minimize large scale development, and others (p93)
- Recreation management (direct recreational activities away from identified linkage areas (p94).
- Minerals and energy (locate facilities and roads outside of lynx habitat and linkage areas where possible) (p95)
- Backcountry roads and trails (Avoid Road reconstruction and upgrades that substantially increase speeds) (p95).
- Livestock grazing (manage in riparian areas to maintain snowshoe hares) (p95).

In the past few years, federal public lands agencies throughout the Northern Rockies have proposed and implemented fuel treatments, logging, and other forest manipulations across

[31] Interagency Lynx Biology Team. 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp. https://app.box.com/s/ymii5asfgx2z99io0nx9sjo6sbij188d

large areas. The failure of the Forest Service to address the intent of the 2013 LCAS regarding habitat fragmentation is leading to widespread litigation.[32]

Figure 3.1 from the 2013 LCAS is included here as Figure 1.2. Note that this map shows the GYA as a core area for lynx.   It does not show any linkage habitat. While it refers to the FWS Recovery Outline[33], there is no analysis of how to recover lynx. The 2013 LCAS (p68) does address factors that compromise lynx habitat and movement under the umbrella of *"anthropogenic influences".*   It admits that not every human activity has been examined, but groups the activities into two tiers that can negatively affect lynx populations and habitat. The specialization of lynx on snowshoe hares and lynx *"low densities and in small populations throughout their range in the contiguous United States .. increase their susceptibility to local extirpations."*. First tier factors include climate change, vegetation management, wildland fire and habitat fragmentation that *"can directly effect (sic) both snowshoe hare and lynx population dynamics."* (p68).

"Federal agencies have amended or revised land management plans across much of the range of the lynx to provide direction to conserve lynx and lynx habitat. Thus, the impacts of anthropogenic influences have been substantially reduced." (p68). Forest Service mining, timber, pipeline and other projects from Utah to Montana have not demonstrated that their Forest Plans have resulted in *"conserved lynx and lynx habitat"* or reduced *"anthropogenic influences".* In general, there is a lack of analysis of habitat and linkage structural and functional attributes and the FWS has signed off on these projects. FWS must do a better review of these projects and their implications to lynx habitat, including requiring that land management agencies conduct the proper monitoring, quantitative habitat descriptions and analysis of habitat structure and function prior to approving future projects.

The 2013 LCAS describes how these first-tier factors affect lynx and lynx habitat. Climate change is overriding other impacts and can cause shifts in distribution, changes in snowshoe hare cycles, reduction in lynx habitat and population, among other outcomes. (p69). Vegetation management alters stand structure, composition and arrangement and occurs across the range of the lynx. (p71). Wildland fire management can result in similar alterations. (p76). Habitat fragmentation, *"accentuates the viability risk inherent in a small population and increases its vulnerability to local extirpation."* (p76). Examples of fragmentation include, *"removal of forest cover, development of highways and associated infrastructure, and intensive minerals or energy development…"* (p77). Vehicle collisions are a factor in mortality.   Here, the LCAS admits these activities have inherent risk to viability for small populations. In a direct contradiction to the Remand Notice, here *"intensive minerals development"* is a factor fragmenting habitats, yet this is excluded from any standards in the NRLMD for linkage habitats.

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[32] For examples of legal filings, visit https://app.box.com/s/gogzndd9za6jzcjsa082rdnae3qcums4

[33] U.S. Fish and Wildlife Service. 2005. Recovery outline: contiguous United States Distinct Population Segment of Canada lynx. U.S. Fish and Wildlife Service Region 6, Montana Field Office, Helena, Montana, USA. https://app.box.com/s/sgprmbv617i1d5xyv1r9hjmk4bx9sgds

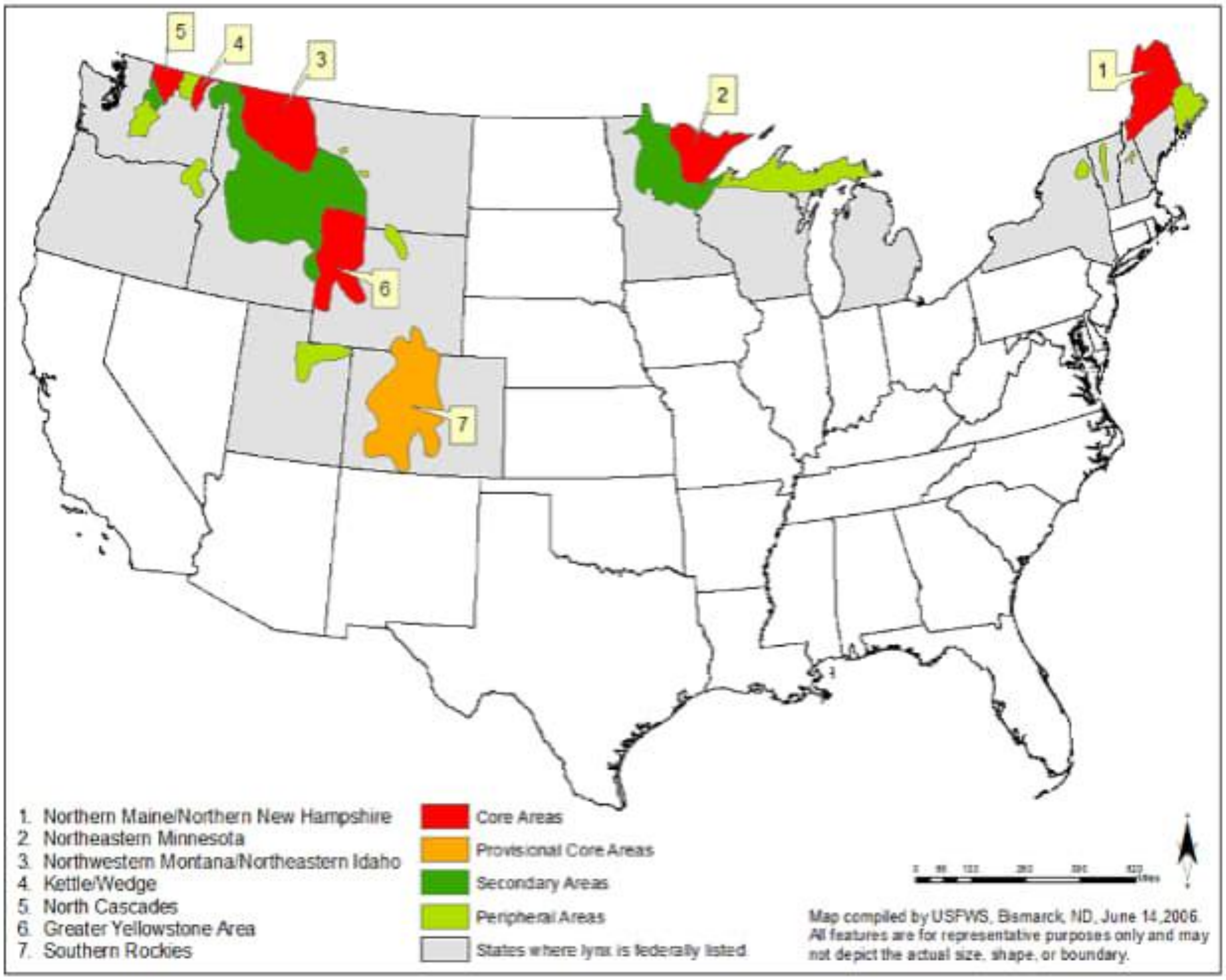

Figure 1.2. Taken from the 2013 LCAS Figure 3.1. Areas identified as core, secondary, and peripheral as depicted in the Canada Lynx Recovery Outline across the states where the lynx is listed (U.S. Fish and Wildlife Service 2005)

The second tier of anthropogenic influences include incidental trapping with rates of trapping *"positively related to average pelt value and appeared additive to nontrapping mortality."* (p79). It *"can occur in areas where regulated trapping for other species…overlaps with lynx habitats."* (p79). *"No conservation measures to address incidental trapping are included … because trapping is regulated by the states."* (p80). Idaho, Montana, Wyoming and other Rocky Mountain states allow trapping of numerous species, hound pursuit, and with snowmobile access and groomed trails, winter access is available throughout many of the National Forests.

Recreation is noted to be increasing with millions of participants. (p80). The data reported in the LCAS is pre-2009. Recreation effects include habitat loss from construction of developed areas, disturbance from human presence with examples of den abandonment and use of compacted trails in the snow by competitors. (p80). Minerals and energy development *"could* *affect lynx habitat by changing or eliminating the native vegetation and contributing to habitat fragmentation. … development of associated roads, powerlines, and pipelines.. could also result in a loss of lynx habitat and contribute to fragmentation."* (p83).

An illegal shooting example from Colorado is provided, showing over 14% of reintroduced lynx were shot in the first 10 years. (p84). Forest/backcountry roads and trails with low vehicular or snowmobile traffic *"had little effect on lynx seasonal resource-selection patterns" and lynx traveled on roads "unplowed during winter". "Squires et al (2008) reported that lynx denned farther from all roads compared to random expectation. … occupy dens in early May when many forest roads are still impassable… snowmobiles no longer use the roads because of intermittent and unpredictable availability of sufficient snow."* Finally, *"fewer roads were located in denning habitat and higher road density occurred along forest edges and in managed stands, which lynx avoided…."* (p84). But these factors are all dismissed as affecting lynx in the NRLMD and Remand Notice with no resulting and meaningful regulatory standards regarding these activities relating to lynx and lynx habitat.

Regarding livestock grazing, LCAS (p85) notes the summer diet of snowshoe hares is dominated by herbaceous food including *"forbs, grasses, and shrubs"*. Then claims that *"The habitats used by snowshoe hare that are most likely to be affected by livestock grazing are riparian willow and aspen communities."* The conclusion is that grazing by domestic livestock is *"unlikely to reduce the snowshoe hare prey base…"* This statement can only be produced by those who have never studied the impacts of livestock grazing on ecosystems in the Rocky Mountains. The author has engaged in extensive monitoring of the effects of livestock grazing in Idaho, Utah, and Wyoming, finding extensive habitat degradation, over-utilization of forage, loss of productivity, due to overstocking and lack of management of livestock. Riparian areas are denuded each summer along with nearby aspen and other forest understories which could provide snowshoe hare foraging habitat. See Chapter 6 for a brief review with photographs showing some of the degraded conditions in the Y2UConn.

By laying out these first and second tier anthropogenic effects for core areas, the 2013 LCAS inadvertently explains why lynx may not be found today in southern areas where they existed in earlier times. Lynx have *"low densities and in small populations throughout their range in the contiguous United States .. increase their susceptibility to local extirpations."* (p68). Almost every anthropogenic activity does have an adverse effect on lynx and lynx habitat as the science provided by the Forest Service and FWS has described. It is the omission of current monitoring and analysis along with the absence of adequate regulatory standards for specific habitat conditions that logic dictates are responsible for the absence of lynx in places where it was observed in years gone by. The absence of recent monitoring and studies on Canada lynx and snowshoe hare habitat across these southern Forests, makes it incumbent on the agencies to address this lack of information. There must be meaningful, ecological based standards, defined linkages and corridors, and requirements they be addressed with detailed habitat, lynx, and snowshoe hare studies. Models such as discussed later in these comments must be consolidated, evaluated, and applied to define and update core and linkage areas and set standards.

1.8 Historical Lynx Observations. The 2013 LCAS briefly describes lynx occurrences in the Northern Rockies. In Wyoming, lynx is a species of *"greatest conservation concern"* and *"has been documented historically and currently in western Wyoming…"* In Idaho, lynx *"are classified as an S1 species of greatest conservation need."* Most of the 35 verified records in Idaho came from north of the Snake River with 2 from Caribou and Bonneville Counties along the Wyoming border. Recent snow tracking surveys have detected no lynx. (p57). Two lynxes were captured in traps in 2012 and 2013, one was released alive, and the other was shot due to being misidentified as a bobcat. In Utah, the LCAS reports only a few historical records from the early 1900s with later records all from northeastern Utah near the borders with Wyoming and Idaho. (p58).

Lynx observations were summarized in the Science Report[34] and relied upon *"written accounts, trapping records, and spatially referenced occurrence data…"* (SR p207). Consideration of trapping records was discounted due to lack of constant effort and confusion with bobcats and where high reliability is needed, *"we used a subset of these data we call 'verified records"*. Verified records were those *"only if it was represented by a museum specimen, or a written account in which a lynx was either in someone's possession or observed closely….neither tracks nor sighting reports were considered to be a verified record."* (SR p209).

Data from the Science Report Table 8.1 chapter was used to summarize the percent of observations that are *"verified"* and *"reliable"*. An extremely low percentage of total spatially referenced occurrences were *"verified".* (Table 1.1). Hundreds to thousands of reliable observations are not counted when determining lynx historical occupancy. Observations by reliable people are omitted from consideration. For example, Harold Wadley was a Forester working for the U.S. Forest Service in Idaho and in the Uinta Mountains in Utah in the 1950's.[35] He used dogs and traveled by snowshoe to track and tree lynx. He treed 20 Canada lynx in 1957 and 1958. Harold encountered Canada lynx along the entire north slope of the Uinta Mountains. He estimated that there were 15 Canada lynx on the north slope of the Uinta Mountains between the West Fork of the Bear River and the Little East Fork of the Black Fork River. This essentially was the area within his ranger district. Was his report even considered? It is hard to tell. Do we just discount this as unreliable? After all, Harold worked for the U.S. Forest Service and knew lynx as most trappers are likely to be able to do. His observations in the 1950s indicate a resident population occurred on a portion of the north slope of the Uinta Mountains at that time. This was prior to the irruptions from Canada in the 60s and 70s. Discounting reliable observations from experienced people, including trappers, appears to be convenient.

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[34] McKelvey, K.S., K.B. Aubry, & Y.K. Ortega. 1999. History and distribution of lynx in the contiguous United States. Pages 207-264. Chapter 8. In Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, & J.R. Squires (Tech Eds). Ecology and conservation of lynx in the United States. Univ. Press of Colorado. Boulder, CO. 480 p. https://app.box.com/s/zty51i19f78lhj8fwel7w3gjnzevvg5k

[35] Lewis, L. & Wenger, C.R. 1998. Idaho's Canada Lynx: Pieces of the Puzzle. Idaho Bureau of Land Management Technical Bulletin No. 98 - 11 in cooperation with the U.S. Forest Service. https://app.box.com/s/jmeg44mqiabyirkdm8gs67i5l7stxl3a

Table 1.1 Spatially Referenced Occurrence Data from McElvey et al 2000.

State and time span	Total Spatially Referenced Occurrences	Verified Records	Verified as Percent of Total/Reliable
Colorado 1878 - 1974	196 Total 84 Reliable	17	8.7/20.2
Idaho 1874 - 1991	234 Total 228 Reliable	74	31.6/32.4
Utah 1916 - 1991	27 Total 17 Reliable	10	37.0/58.8
Montana 1887 - 1999	1,542 Total 1,169 Reliable*	84	5.5/7.1
Washington 1896 - 1999	765 Total 571 Reliable**	134	17.5/23.4
Wyoming 1856 - 1991	361 Total 288 Reliable	30	8.3/10.4

*Note that trapping records showed 3,012 reported between 1950 – 1997
**Trapping records show 215 between 1960 - 1989

An example of the logic of using historical observations surrounding whether lynx ever resided in the Uinta Mountains goes like this.[36]

> *There may have only been 10 verified records of lynx occurrence in the Uintas in the 20th century, but there have been an additional 17 reliable reports of lynx in Utah in the 20th century, based on physical remains (including photographs), visual sightings and track identifications. Most of these lynx occurrences were on the north slope of the Uintas, in or near the West Fork of Blacks Fork. The historical evidence indicates a minimum of 10-27 lynxes in the Uinta Mountains over the last 103 years (not counting dispersers from Colorado). Thus, there can be little doubt that the actual number of "sightings" was greater than 10.*
>
> *Why arbitrarily exclude the "reliable" sightings? What does "reliable" mean if you can't rely on what is reliable? Yet the FS chooses not to rely on them for the purpose of the DEIS—a decision that would seem to be based not so much on a desire for accuracy as a desire to minimize the presence of lynx in Utah in order to make room for Alternative 2.*
>
> *At this point we should ask ourselves how many records—verified records, if you like—it would take to establish that there was a resident population of lynxes in the Uintas*

[36] Dr. Kirk Robinson comments in the Coalition comments on the High Uintas Domestic Sheep Analysis Project. 2019. Provided to the Uinta Wasatch Cache National Forest. August 5, 2019. https://app.box.com/s/797x21rggtx1t6yayr0gi9kpbouis4sr

> *during some part of the 20th century. Does anyone have even the slightest clue? Of course not. And the reason is that there are no empirical data for establishing a baseline on which to base a prediction. Surely all we can reliably say is that the more records (verified + reliable), the higher the probability. Thus, this premise commits the fallacy of begging the question by presupposing what is to be proved.*

Inspecting Table 8.1 from the Science Report, it is apparent that most historical observations and accounts are dismissed out of hand and have become the basis of today's claims by FWS and the Forest Service that there are not (and perhaps never were) resident lynx in Utah, or Colorado for that matter, even though the reintroduced population survives there.

The Science Report also provided a narrative describing lynx records in Idaho, totaling 73 records. Some records such as reported in Lewis and Wenger (1998), are apparently not included.[37] The SR noted that from 1874 – 1917, there are 22 museum specimens from areas north of the Snake River Plain. In 1939 and 1940 specimens were collected in central Idaho in Valley County and Idaho County. In 1954 and 1955 specimens were located from Bonner and Shoshone Counties. Other verified records include one from Shoshone County in 1901, one from Boundary County in 1919, one from Idaho County in 1936, one from northwest Idaho in 1939, one from Clearwater County in1942, five from Caribou County in 1947, two from Bonneville County in 1955. (SR p225 - 226). (Note these latter two counties are in southeast Idaho and are currently considered unoccupied habitat).

The Lewis and Wenger (1998) report provided numerous accounts of lynx and lynx tracks in Idaho. They noted that little is known about Canada lynx in Idaho and that *"the lack of Canada lynx studies…only adds to the puzzling nature of the species"*. It was based on interviews with individuals *"familiar with Canada lynx habitat and local fauna in general."* (pi). These were individuals documented by Idaho Fish and Game as *"having harvested Canada lynx"*. While the report covers several areas of Idaho, it also includes southeast Idaho accounts from 18 individuals that were residents in Island Park, St. Anthony, Rexburg, Georgetown, Ashton, Preston, Swan Valley, Paris, Montpelier, Idaho and Alta, Wy. The reports included those who observed lynx in southeast Idaho in Georgetown Canyon, Tincup Creek, and Henry's Fork, many of whom killed lynx or observed their tracks. The report paints a broad picture of lynx across much of Eastern Idaho as well as other areas of the state. Here is one from Oliver Peterson of Montpelier who was trapping prior to the 70s when lynx sightings were claimed to be due to movement from Canada due to hare cycle lows. It appears very convenient today to claim there were never resident lynx in these areas.

> *Oliver Peterson, Montpelier, ID —Oliver began trapping in 1945 and did most of his trapping in the 1950s and 1960s. During a one-week period in 1947 or 1948, he caught*

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[37] Lewis, L. & Wenger, C.R. 1998. Idaho's Canada Lynx: Pieces of the Puzzle. Idaho Bureau of Land Management Technical Bulletin No. 98 – 11. U.S. Department of Interior, Bureau of Land Management and USDA Forest Service. https://app.box.com/s/jmeg44mqiabyirkdm8gs67i5l7stxl3a

> *five Canada lynx ten miles northeast of Soda Springs. He trapped four Canada lynx in the 1950s and 1960s, one in the same area where he caught the five Canada lynx. He caught three Canada lynx farther east near Georgetown. Except for one Canada lynx trapped near timberline, the remaining Canada lynx were caught in areas with a mosaic of aspen, conifer, and mountain brush. (p8). He speculated that during those years there were no snowmobiles and atvs and that the demise of lynx was due to increased access and by snowmobiles, atvs, and the lack of snowshoe hares. Traplines were accessed by snowshoe or skis and now (the 1990s) there is "intensive snowmobile and atv use". He believed this was a primary factor in the demise of lynx since the 1970s.* (p17).

The interviews provided information on lynx prey including jackrabbits, grouse, red squirrels, and voles in addition to snowshoe hares indicating the use of alternate prey greater than in Canada and Alaska. The authors suggest scenarios relating lynx behavior to jackrabbit populations by lynx following jackrabbits into shrub steppe far from typical coniferous forest habitats and end up near other habitats occupied by snowshoe hares and/or may exploit jackrabbit population highs without leaving traditional habitats resulting from jackrabbits dispersing into those habitats.

They also discuss livestock grazing, noting that livestock grazing reduces forage availability, that elk and livestock eat many of the same species as do black-tailed jackrabbits and reduce forage to the point limits jackrabbit densities. *"Grazing of the same areas by both species may have cumulative effects on both snowshoe hare and jackrabbit habitats."* (p17). *"Utilization of forage by both elk and livestock may thus have a significant impact on hare habitats. This may be particularly true in the southern-most portions of the Canada lynx range where grazing becomes a more dominant use."* (p18).

In conclusion, Lewis and Wenger (p19) state, *"there is no 'smoking gun' factor in the decline of Canada lynx in Idaho. Many variables appear to limit Canada lynx numbers in this state. The most important of these appear to be timber harvest practices; high numbers of coyotes, mountain lions, and elk; increasing motorized and nonmotorized recreational use; incidental trapping; and reduced numbers of alternate prey, including species that are not documented as Canada lynx prey in existing research. These include jackrabbits, beavers, and porcupines."*

1.9 The ESA and Forest Service Manual. The ESA promulgated regulations at 50 CFR § 402.12 delineate the purpose of a Biological Assessment is 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. Here, we use the Caribou National Forest as an example.

In the CNF Decision for the Husky 1 North Dry Ridge (H1NBR) mine, the BA[38] only based its brief analysis on the proposed action, not the suite of alternatives contained in the FEIS.[39] It included minimal analysis. The intent of the ESA was avoided and if one applied the NEPA standard for a hard look or cumulative effects to this aspect of the analysis, the analysis would fail. *"Discretionary"* cannot be used to avoid taking a hard look in the analysis. This project, combined with other projects that are listed in the FEIS for H1NBR in addition to roads, timber harvest, and recreation, occurs within a linkage area connecting to critical habitat for lynx immediately east of the project. Figure 1.3 illustrates this and shows some of the phosphate leases in the CNF lynx linkage for illustration. The loss of this connection due to habitat fragmentation means the loss of the genetic connection between the critical habitat and other peripheral habitat such as in the Uinta Mountains which then connect to the current Colorado population. How can regulations or land use plans be effective when they are *"discretionary"* for the project proponents? This must be addressed.

The Forest Service Manual (FSM)[40] 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'"*.

The Caribou NF provided guidance in its RFP FEIS to address this connectivity but has ignored this guidance in approving the H1NDR and other projects. How can the CNF dismiss impacts to Canada lynx without conducting an analysis of habitat connectivity and quality? The current analysis for H1NDR and other projects does not *"ensure"* that actions do not further endanger or adversely modify habitat. Phosphate mines destroy lynx habitat by completely removing minerals, soils, and overlying vegetation. How degrading and fragmenting this linkage not be considered an *"adverse"* impact, particularly considering the cumulative effects of roads, recreation, timber harvest, livestock grazing, pipelines, and other extractive uses that compound the damage? This loss of connectivity to adjacent critical habitat and the southern population then leads to the extinction of isolated populations such as likely occurred in the Uinta Mountains, which suffers its own degradation by these factors.

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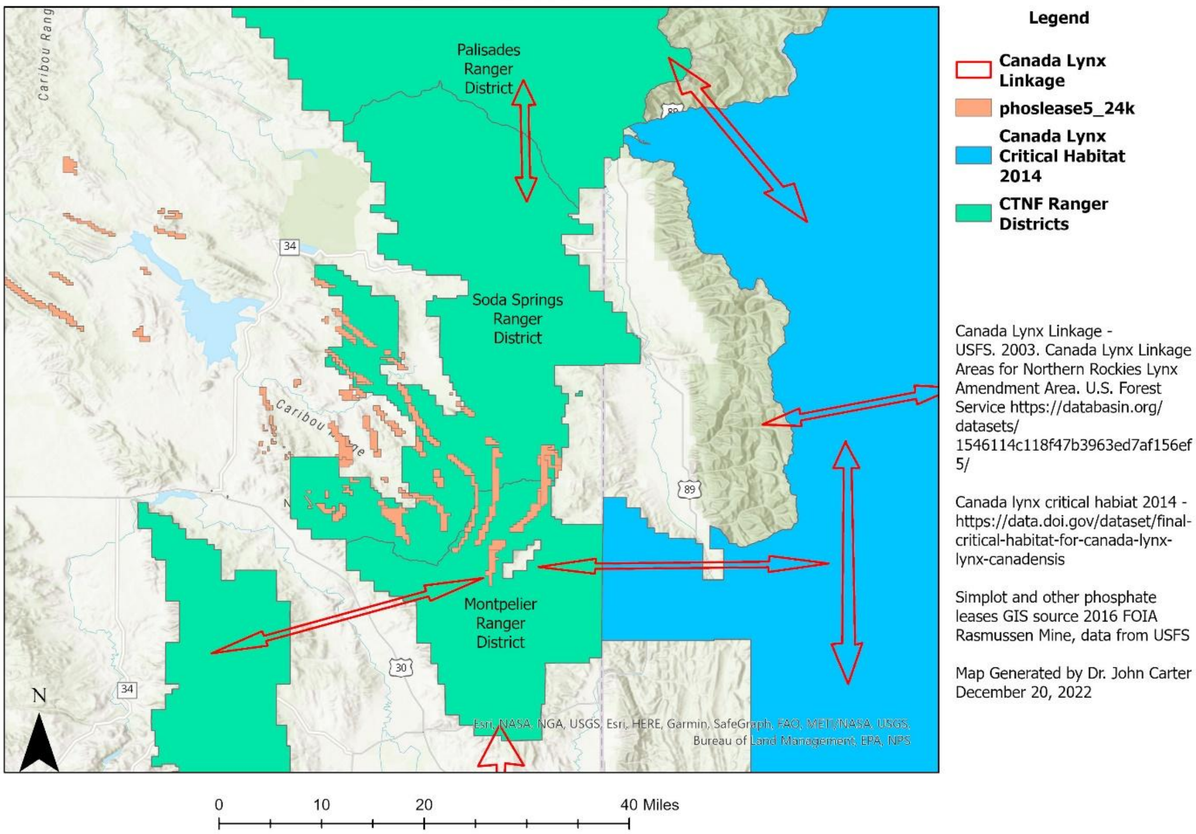
[38] Tetra Tech, Inc. 2022. Biological Assessment Husky 1 North Dry Ridge. https://app.box.com/s/czxjyal8zwtiw8g7ahbj5vj4cfjxihj7

[39] Bureau of Land Management. 2022. Final Environmental impact Statement for the Husky 1 North Dry Ridge Phosphate Mine. https://app.box.com/s/ayq3dt6vqfx6bmla6qp0lmb04tw2egr6

[40] 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). https://app.box.com/s/tu1thpbphbpl62u8qb5v9ahlo1uf40m6

Figure 1.3 Canada lynx critical habitat, linkages, and phosphate leases



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 CNF has not placed top priority on conservation and recovery, has not established meaningful objectives with enforceable standards for lynx habitat, has not designated LAUs with standards to protect preferred habitats and linkages, has ignored the effect of this linkage area on the adjacent critical habitat, thus compromising the integrity of that critical habitat and what remains of the core population in the DPS. The CNF by allowing snowmobile use on 97% of the Forest is not preventing harm or harassment of lynx, wolverines or other species which are affected by snowmobile use and associated trapping, hound pursuit, shooting, and harassment. When it comes to lynx, the CNF is not protecting individuals or populations.

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 CNF has not designated Essential Habitat, but it has designated linkages for lynx.[41] It has not identified recovery objectives or evaluated how a project leads to recovery of lynx. Actions by the Forest Service have had an *"adverse effect"* as demonstrated by the lack of lynx observations and presence in southeast Idaho. Given the lack of lynx observations in recent decades, it is apparent that human activity is occurring in such a manner that lynx populations are being affected. Otherwise, why are lynx not being found here today? This example is illustrative of failures by both the Forest Service to comply with the intent of its RFP and the FWS failure to require detailed analysis and protection in its role of consultation.

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."* CNF analysis of the linkages, or *"suitable unoccupied habitat"* is missing from project NEPA documents and specialists' reports. The FWS is not addressing failures such as these.

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[41] USDA Caribou Targhee National Forest. 2003. Final Environmental Impact Statement for the Caribou National Forest Revised Forest Plan. Volume IV Appendix D-7.
https://app.box.com/s/pqa6bwpxznxwh7mx7g4i370jbzerlnne

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.[42] (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 and the FWS should ensure that not only the CNF, but all Forests and BLM land management plans are quantitatively addressing lynx habitat and connectivity needs.

1.10 Caribou NF Direction for Canada Lynx. The Caribou National Forest RFP FEIS[43] laid out a process for addressing connectivity.[44] in the CNF.

1. *Assess historic patterns in vegetation and relative connectivity.*
2. *Assess current patterns in vegetation and relative connectivity including the impacts of human disturbance or physical barriers (highways, croplands, etc.).*
3. *Compare historic and current patterns and relative connectivity to determine if animal movement opportunities have been significantly interrupted.*
4. *Consider measures to restore historic animal movements using the following steps: review each of five corridor types when raised as an issue; consider the need for each type of corridor based on its ecological function as outlined; recommend application of the concept where an ecological function served by the corridor type can be clearly documented with minimal negative ecological consequences; and provide a consistent and well documented justification for the concept.*

Table 1. Types of Corridors Identified by Samson, *et al*, 1996.

Type of Corridor	Number of Species	Spatial Scale	Function of Corridor
Biogeographic	Many and often unrelated taxa	Continental, transcontinental	Evolution and distribution
Seasonal migration (linkage zone)	Groups of related species, single sp.	Continental, transcontinental to local and elevational	Behavioral and Physiological for ecological survival
Dispersal and emigration	Population	Varies by species	Use unoccupied habitat, maintain current habitat
Travel	Individual	Within a home range	Daily life history requirements
Invasive	Exotic and alien species	All scales	Extend ranges of non-native species

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[42] 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. https://app.box.com/s/7ul3razrd8atbwc2ky6js6ofudcqrvhc

[43] USDA Caribou Targhee National Forest. 2003. Revised Forest Plan and FEIS Caribou National Forest. https://app.box.com/s/seeaqtwqfyzlqcu64th3byuga9e0c5vb

[44] USDA Caribou Targhee National Forest. 2003. Final Environmental Impact Statement for the Caribou National Forest Revised Forest Plan. Volume IV Appendix D-4. https://app.box.com/s/pqa6bwpxznxwh7mx7g4i370jbzerlnne

The CNF RFP standards or objectives relating to lynx and its habitat are quite generic and not specific to the habitat of lynx. The direction to maintain linkages for Canada lynx is found in (1) Vegetation Desired Future Conditions, (2) Vegetation Goals 1 – 4, (3) Vegetation Standard 2, (4) Wildlife Goals 2, 3, and 5, (5) Vegetation Goal 7, (6) Lands Objective 1, and (7) Lands Standard 1. (RFP 3-28) We reviewed each of these specifically regarding lynx habitat. They are summarized below:

- **Vegetation DFC** (RFP 3-17) to retain diversity of structure and composition, 30 – 40% of conifers in mature and old classes (FEIS notes this will not be attained), functional corridors are present, aspen managed to 20 – 30% mature and old, non-forested vegetation within site potential and within HRV, restoration of native shrub communities accomplished, woodland types are multi aged with balanced shrub/herbaceous understory and within HRV.

- **Vegetation Goals 1 – 4, 7** (RFP p3-17 – 3-18) to have diverse forested and non-forested ecosystems within HRV and/or restored through time, aspen managed to reduce or halt decline, forested ecosystems moving towards a balance of age and size classes in each forested type on a watershed or landscape scale, sage-steppe and mountain brush moving towards a balance of age, canopy cover, and size class on a watershed or landscape scale and within HRV, biodiversity maintained or enhanced.

- **Vegetation Standard 2** (RFP 3- 19*) "In each 5th code HUC which has the ecological capability to produce forested vegetation, the combination of mature and old age classes (including old growth) shall be at least 20 percent of the forested acres. At least 15 percent of all the forested acres in the HUC are to meet or be actively managed to attain old growth characteristics."*

- **Wildlife Objective** (RFP 3-24) *"The Forest provides habitat that contributes to state wildlife management plans; Forest management contributes to the recovery of federally listed threatened, endangered, and proposed species and provides for conditions, which help preclude sensitive species from being proposed for federal listing."*

- **Wildlife Goals 2, 3, and 5** (RFP 3-24) states that wildlife biodiversity is maintained or enhanced by managing for vegetation and plant communities within their HRV, maintain multiple vegetation layers in woody riparian habitats, maintain, and *"where necessary and feasible, provide for habitat connectivity across forested and non-forested landscapes."*

- **Lands Objective 1** (RFP 3-8) *"Identify land adjustments and rights-of-way to improve management, public access, and/or wildlife connectivity annually."*

- **Lands Standard 1** (RFP 3-9) *"Priority shall be given to acquiring lands having special importance or unique characteristics such as riparian areas, historic sites, habitat for federally listed species, recreation sites, etc."*

These criteria contain no specific directions or enforceable standards regarding lynx habitat and linkage even though the RFP FEIS provided a map of the linkages. These RFP DFCs, Goals, Objectives and Standards appear to have little relation to research characterizing lynx or hare habitat. The absence of lynx today offers evidence that they have had no beneficial impact on lynx or snowshoe hare habitat.

In the example of the Husky 1 North Dry Ridge NEPA process the government and the consultant did not analyze these provisions or reveal how they have been applied across the affected watersheds and landscape where lynx formerly have been found, or in the linkage shown in the CNF RFP FEIS. That analysis did not use the guidance in the CNF RFP FEIS on connectivity and how to analyze it. It did not analyze the risk factors described in the LCAS and the combined impact of all the various uses and projects on this linkage area.

A review of Inventoried Roadless Areas (IRA) in the CNF found they are rarely different in management than other forest lands, with many user-created roads and trails, past timber harvest, mining, and livestock grazing. For example, in our comments on the Dairy Syncline Mine DEIS (p43)[45] we cited the Idaho Roadless Area Conservation FEIS description of the Huckelberry Basin IRA which was to be fragmented for a tailings pond. *"Remoteness and solitude rate as low, because of development." … "Manageability of the area is considered poor, due to road intrusions and timber harvest activities."* (Idaho roadless rule FEIS Appendix C 5-46).[46] This is typical of the characterization of IRAs under the Idaho Roadless Rule. So, if IRAs are fragmented by all these activities, where are the intact habitats and connections for lynx and other special status species? A thorough review of the science on lynx habitat characteristics needed for recovery and connectivity should be completed and used to compare current conditions in the CNF to those needed for lynx as well as snowshoe hare with quantitative standards ensuring recovery.

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[45] Yellowstone to Uintas Connection. 2019. Comments on DEIS for Simplot Company's Proposed Dairy Syncline Mine https://app.box.com/s/ggnfbsamjrwcg4jz70wl15ft9oi7rqth

[46] USDA. 2008. Roadless Area Conservation National Forest System Lands in Idaho Final Environmental Impact Statement Appendix C. https://app.box.com/s/lzpkchrq8ri22rleb3qvatvv3mmopqgi

1.11 Summary. This chapter provides a detailed historical and regulatory overview of federal lynx management, arguing that the original basis for listing the Canada lynx as Threatened under the Endangered Species Act - the inadequacy of regulatory mechanisms - has not been meaningfully corrected. The chapter reviews key policy documents, including the 1999 Programmatic Lynx Biological Assessment, the 2000 and 2013 Lynx Conservation Assessment and Strategy, the Northern Rockies Lynx Management Direction, the Interagency Conservation Agreement, and the 2017 Species Status Assessment, and contends that agencies have progressively narrowed the scope of recognized threats. This included cancellation of thousands of historical lynx observations. Coupled with lynx surveys that occurred long after lynx habitat had been progressively fragmented and destroyed by human activities has allowed claims to be made that areas previously occupied were now classified as unoccupied, thus escaping any useful regulation under the NRLMD or LMP amendments. As a result, the Y2UConn became unoccupied linkage or peripheral habitat with no protections.

While early scientific reports identified habitat fragmentation, road density, timber harvest, grazing, mining, trapping, and expanding motorized recreation as risk factors, later agency interpretations often dismissed these impacts due to *"lack of evidence"*, effectively weakening habitat protections - especially in unoccupied or linkage areas. The chapter further argues that dramatic growth in snowmobile and off-road vehicle use, mineral development, and continued unsustainable livestock grazing has intensified landscape-level fragmentation. Current levels of fragmentation are greater than conditions studied in earlier research, while monitoring of lynx and snowshoe hare populations remains inadequate. It also challenges the assumption that southern lynx populations such as the Southern Rockies were sustained only by immigration from Canada, presenting evidence for historical self-sustaining populations. Overall, Chapter 1 concludes that despite formal plan amendments habitat degradation and connectivity loss continue across the Northern Rockies, particularly in the Greater Yellowstone Area and Yellowstone-to-Uintas Connection, undermining long-term lynx persistence.

CHAPTER 2 Recovery Plan

2.1 Background. The overall impression of the Draft Recovery Plan (DRP)[47], Recovery Plan (RP)[48] and SSA Addendum[49] is one of failing to provide adequate habitat criteria for all classes of habitat, reliance on a model to define suitability without analysis of the factors relating to habitat structure and connectivity that Kosterman et al (2018), Holbrook et al (2017, 2018, 2019), and others have delineated along with failure to identify and map corridors or connections between Focal Units or populations. The SSA Addendum uses the term GYA (Greater Yellowstone Area) to characterize the location of SSA Unit 5. In this report the terms GYA and GYE (Greater Yellowstone Ecosystem) are used interchangeably.

2.2 Boreal Forest. One issue with the RP is the reference to lynx habitat being constrained to *"boreal forest"*. A recent paper has analyzed the extent of the North American boreal zone.[50] This is shown in Figure 2.1.[51] Boreal forests occur almost exclusively in Canada with limited occurrence in the northern states of Maine, Michigan, and Minnesota. It does not occur in the western US. As shown in Chapter 1, 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 such as aspen, shrub, and riparian zones that are intermixed therein. The characteristics of these forest types constitute what should be used for habitat evaluations for the Greater Yellowstone Area and other potential lynx habitat areas in the Rocky Mountain States.

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[47] USFWS. 2023. Draft Recovery Plan for the Contiguous United States Distinct Population Segment of Canada Lynx (*Lynx Canadensis*). U.S. Fish and Wildlife Service Mountain Prairie Region. Denver, Colorado. November 2023. https://app.box.com/s/0zgs45ttutbavyc2lq6gaeqwfg2zaqdz

[48] USFWS. 2024. Recovery Plan for the Contiguous United States Distinct Population Segment of Canada Lynx (Lynx Canadensis). U.S. Fish and Wildlife Service Mountain Prairie Region. Denver, Colorado. November 2024. https://app.box.com/s/lk5jr02hd6mt2asjvceb7c49xotnqyf8

[49] USFWS. 2023. Species Status Assessment Addendum for the Canada Lynx (*Lynx Canadensis*) Contiguous United States Distinct Population Segment. December 2023. https://app.box.com/s/myz6ydg39so6iufk40yxjb4z70n9qyy8

[50] 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. https://app.box.com/s/cmebtivwl186bw1pdrnh7ypogwwqvw9o

[51] Geography Realm. 2024. Boreal Forests of North America are Shrinking. https://app.box.com/s/3pl3v0ocqtbuv9gm4wbfvt6q2zr3t50g

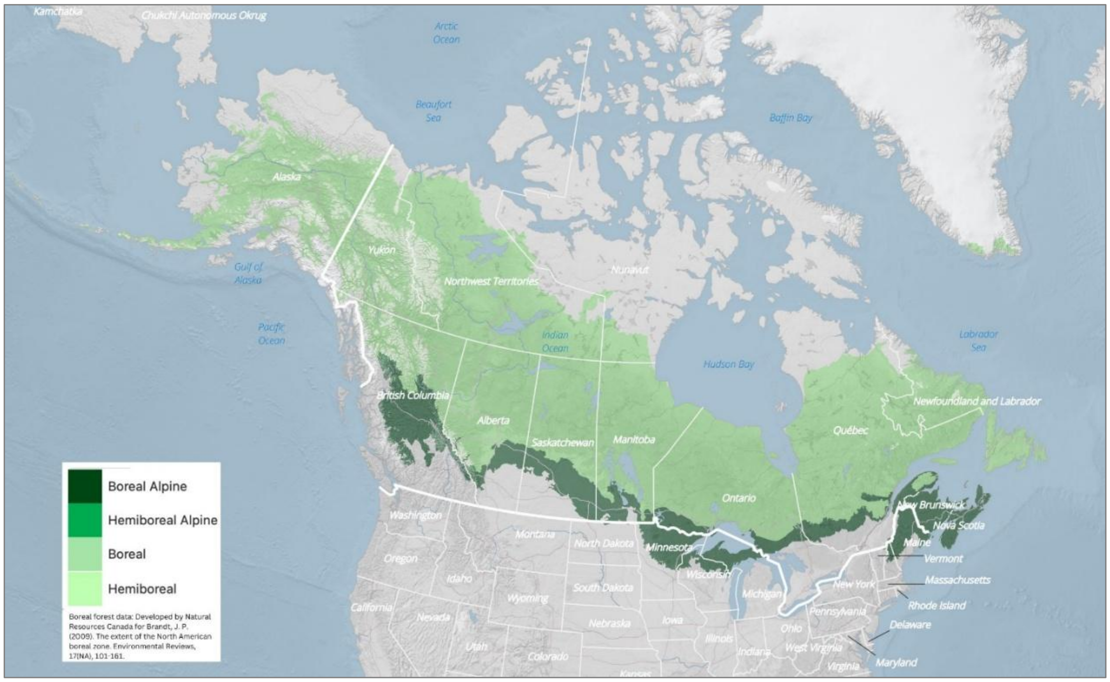


Figure 2.1. Map of the North American boreal zone

2.3 Greater Yellowstone Area (GYA) includes several National Forests, Grand Teton and Yellowstone National Parks, BLM and State Lands, National Wildlife Refuges, Tribal, and private lands. A recent Wyoming Law Review article described the Greater Yellowstone Ecosystem as one of the world's largest, nearly intact temperate-zone ecosystems and a globally significant model for natural resource management.[52] Figure 2.2 is a map from the National Park Service showing the Greater Yellowstone Ecosystem ranging in area up to 22 million acres. That website indicates that YNP is mostly above 7,500 feet in elevation and is covered by snow for much of the year.[53]

[52] Middleton, Arthur; Stoellinger, Temple; Bennett, Drew E.; Brammer, Travis; Gigliotti, Laura; Byerly Flint, Hilary; Maher, Sam; & Leonard, Bryan. 2022. The Role of Private Lands in Conserving Yellowstone's Wildlife in the Twenty-First Century. Wyoming Law Review: Vol. 22: No. 2, Article 4. https://app.box.com/s/423mwy7p332d1mrnrge4jre35kwt10j9

[53] National Park Service. 2026. Greater Yellowstone Ecosystem. https://app.box.com/s/wx7ys9cnbf871i7jq4wx0zlu4pi5seey

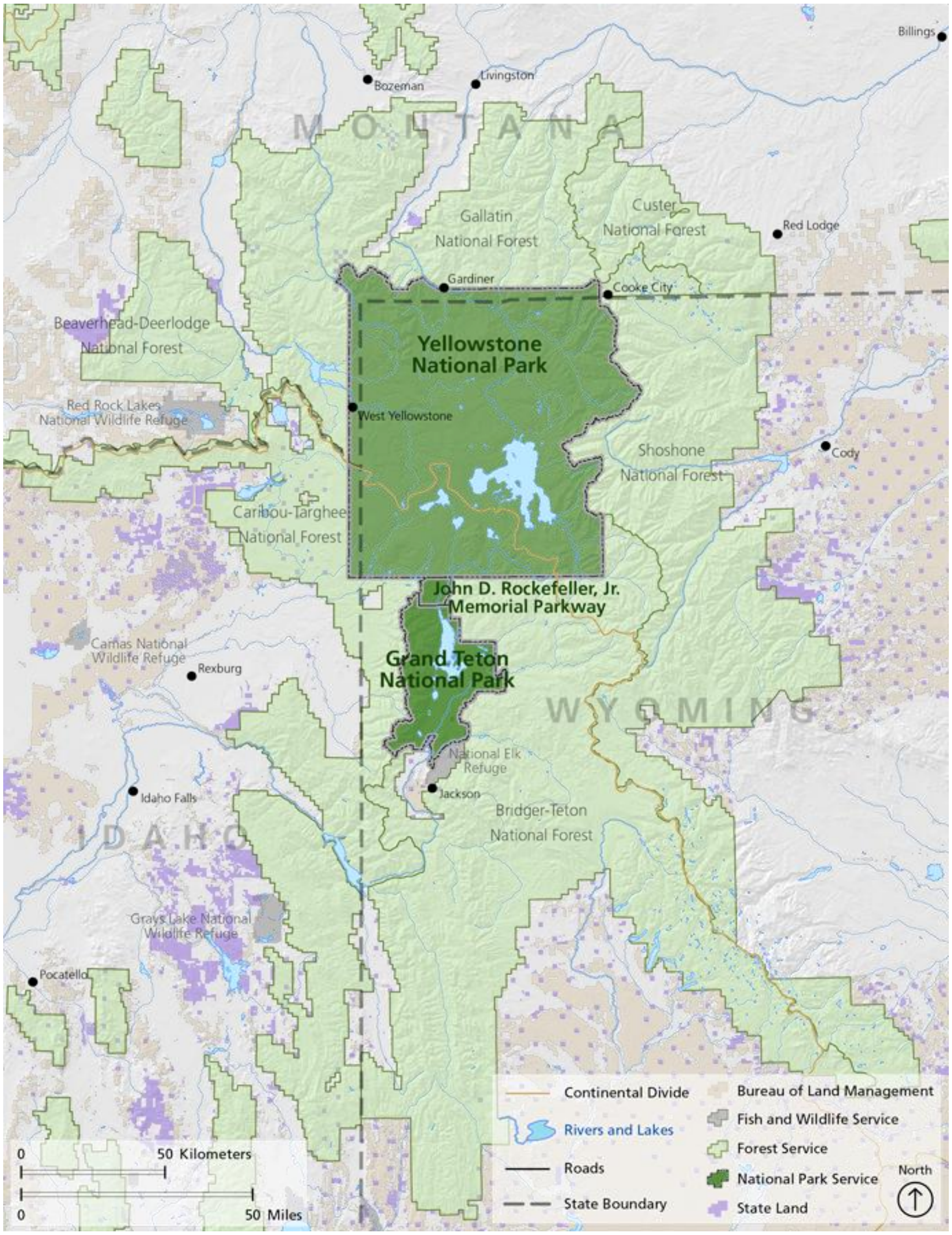


Figure 2.2 National Park Service map of the Greater Yellowstone Ecosystem

Table 2.1 provides some general characteristics of the GYA National Forest and National Park acreage and forest cover. These figures show the GYA is more than 57% forested with over 16 million acres of which over 9.1 million are forested by conifer types. These figures do not include data for BLM lands, private lands, Tribal lands, wildlife refuges, and state lands. Forest Service estimates can also be limited to "suitable" timber areas which omits forested areas not suitable for timber, but that lynx might inhabit. The GYA includes more forested habitats than shown in Table 2.1. This is an analysis that the FWS should have done before mapping its GYA Unit SSA 5 boundary, or its SSA 5 Focal Unit.

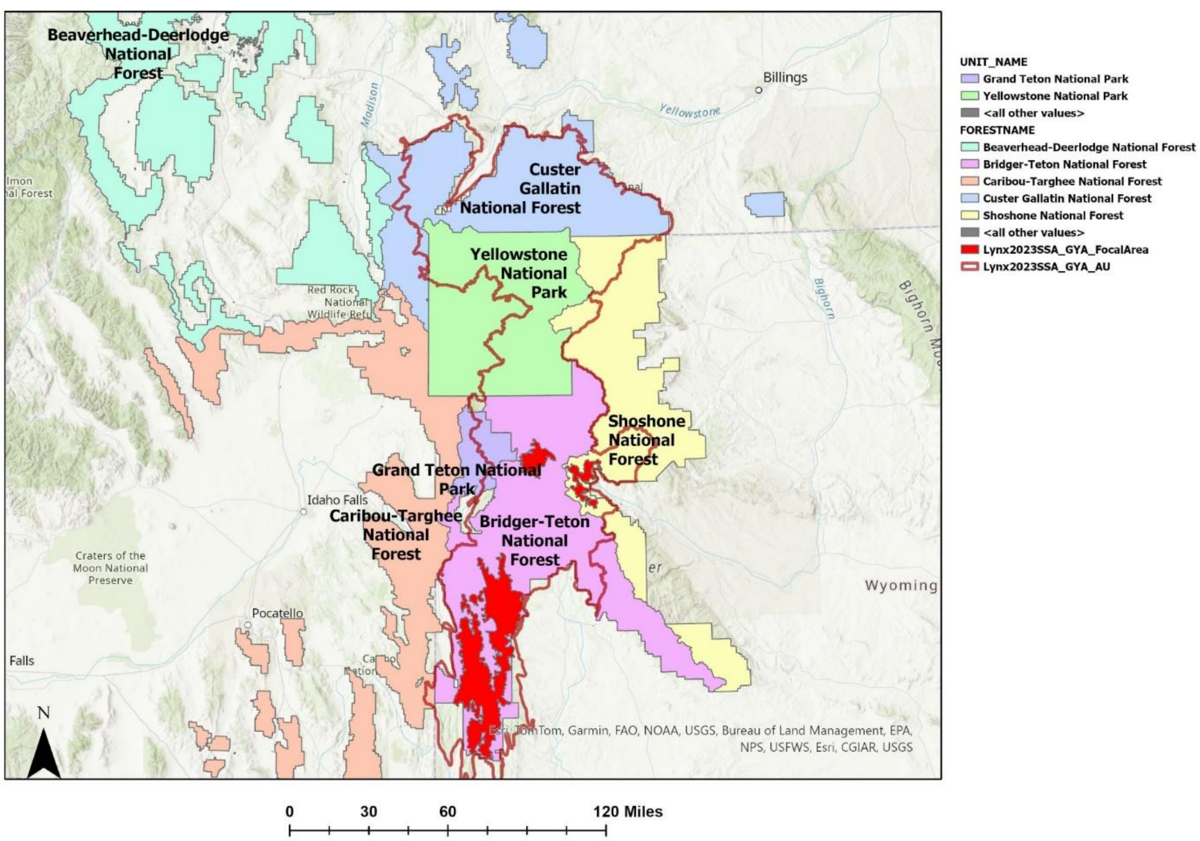
Table 2.1. National Parks and Forests of the Greater Yellowstone Area

Park or Forest	Area millions of acres	Forested Area millions of acres
Beaverhead Deerlodge NF[54]	3.4	1.6
Bridger Teton NF[55]	3.4	1.3[56]
Caribou NF[57]	1.1	0.6
Custer NF	na	na
Gallatin NF[58]	1.7	1.3
Shoshone NF[59]	2.4	1.3
Targhee NF[60]	1.8	1.2
Grand Teton NP	Na	na
Yellowstone NP[61]	2.2	1.8
Total	**16 million acres**	**9.1 million acres (57%)**

[54] USDA Forest Service. 2009. Corrected FEIS for the Beaverhead-Deerlodge National Forest Land and Resources Management Plan. https://app.box.com/s/c87doqs69272eurxoidi49wzwv9t7mg9
[55] USDA Bridger-Teton NF. 1990. Bridger-Teton National Forest Final Environmental Impact Statement. P146. https://app.box.com/s/6e3xrappum7p7gs0l28kcd3sw15hesj3
[56] Only includes lands evaluated for timber suitability and is likely an underestimate.
[57] USDA Caribou Targhee NF. 2003. Final Environmental Impact Statement for the Caribou National Forest Revised Forest Plan. Volume 1 Table 3.28 (p3-86). https://app.box.com/s/48gcwy76dfw6c6up0njvuk6ysht2bo2f
[58] USDA Forest Service. 1987. Final Environmental Impact Statement for the Gallatin National Forest Land and Resource Management Plan. https://app.box.com/s/lvi7070eq5ujbg01eydrt8ke9ye7csxh
[59] USDA Forest Service. 2015. Final Environmental Impact Statement for the Shoshone National Forest. https://app.box.com/s/axu2puvoemmuj5ak8gkbeiviigxvzpcv
[60] USDA Targhee NF. 1997. Final Environmental Impact Statement, 1997 Revised Forest Plan Targhee NF. pIII-39 https://app.box.com/s/1tmtzk75rjj6ac1haqsndhlndxz7gous
[61] NPS. Yellowstone Forests. https://app.box.com/s/szpw90s2vk8wfdpc3ed0z81v3fg7bdad

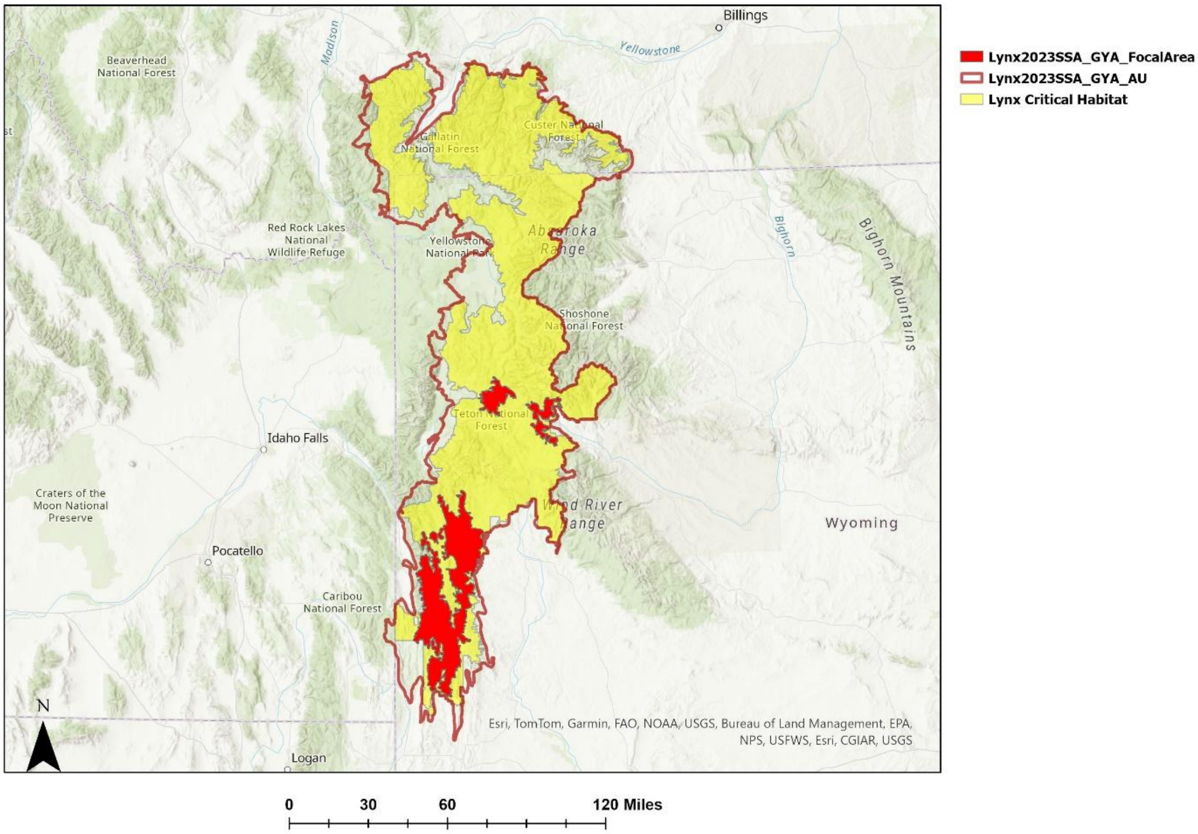
2.4 SSA Unit 5 and Focal Area. Geospatial data defining the boundaries of the six Fish and Wildlife Service Species Status Assessment Analysis Units and Focal Areas used in the Draft and Final Recovery Plans were obtained from the FWS and used to map these and compare them to the GYA. The SSA Addendum Table 2 gives the size of the Focal Units and Focal Areas. GYA SSA Focal Unit 5 is 30,518 km² or 7,537,946 acres. The GYA SSA Unit 5 Focal Area is 2,902 km² or 716,794 acres. Figure 2.3 shows the extent of SSA Unit 5 and its Focal Area. SSA Unit 5 covers only a portion of the GYA. It overlays lynx critical habitat closely. (Figure 2.4). The SSA Unit 5 Focal Area is mostly contained within the Bridger Teton NF (BTNF) with a small area in the Shoshone NF. The vegetation types within the BTNF and the SSA Unit 5 Focal Area contain the same cover types which included conifer, deciduous, herb land, non-vegetated, riparian and shrubland.[62] There did not appear to be anything that distinguished the Focal Unit and Focal Area from the BTNF overall when vegetation structure was the basis for comparison.

Figure 2.3 SSA Focal Unit 5 and Focal Area in the GYA



[62] Geospatial data from BTNF. 2018. BTNFVeg2018.gdb

Figure 2.4 SSA Focal Unit 5, Focal Area, and Critical Habitat



2.5 Habitat Models According to the 2017 SSA Addendum (p5), the Olson Model found that winter temperature and precipitation covariates were most important in predicting the occurrence of resident lynx in the western US.[63] Modeling by FWS for the Focal Areas of each SSA Unit found that prevailing temperatures would persist longest in the GYA SSA Unit 5 and Southern Rockies SSA Unit 6.

The Olson et al (2021) 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, and that 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, and vegetation along with GPS collared lynx locations to

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[63] Olson, L. E., Bjornlie, N., Hanvey, G, Holbrook, J.D., Ivan, J.S., Jackson, S., Kertson, B., King, T., Lucid, M., Murray, D., Naney, R., Rohrer, J., Scully, A., Thornton, D., Walker, Z. & Squires, J.R. 2021. Improved prediction of Canada lynx distribution through regional model transferability and data efficiency. Ecology and Evolution 11(4): 1667–1690. https://doi.org/10.1002/ece3.7157. https://app.box.com/s/oxx5l336vf2uag7awew2cbies6vgkxg5

define habitat suitability or probability. The vegetative component was represented by the Normalized Difference Vegetation Index (NDVI) during the growing season to characterize vegetation presence rather than vegetation types.

Olson et al (2021) analyzed the data to see if their general model outcome was predictive of habitat across Montana, Washington, and Wyoming. The Olson Model considers 90% of lynx tracked GPS locations as high probability and 85% as medium probability lynx habitat. This seems a distinction without a difference (90% v 85%). By this criterion, Wyoming contained only 2,424 km^2, or 598,728 acres of this high probability habitat. (Figure 2.5)

When SSA Focal Unit 5 and its Focal Area were compared to the actual Olson Model output, the Focal Area covered some high probability areas, but not others, within the GYA. The Focal Unit omitted large areas of high and medium probability habitat. (Figure 2.6). These higher quality habitat areas also occur within the Yellowstone to Uinta Connection in the Regionally Significant Wildlife Corridor. Timber project areas (clearcuts) in the BTNF overlaid with the SSA 5 Focal Unit and Focal Area showed that many of these habitat modifications occurred within both. In particular, the northern Focal Area almost completely overlays a clear cut. (Figure 2.7). This raises uncertainty in that the Olson Model apparently did not distinguish these clearcuts from other vegetation types.

The mapped area of the 2014 Lynx Critical Habitat is much like the SSA Unit 5 area. (Figure 4). This indicates that the critical habitat boundary may have been used to determine the Focal Unit SSA 5 boundary rather than the Olson Model. The Bureau of Land Management used the Beauvais et al (2001) habitat index to map suitable lynx habitat in Wyoming. The habitat index was taken from GAP landcover types.[64] Suitable habitat determined from this landcover is shown in Figure 2.8. This shows that Yellowstone NP, the Bridger Teton NF, and Shoshone NF are suitable habitats, which begs the question as to why there are few or no lynx observed today.

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[64] Beauvais, G., D. Keinath, & Ratner, J. 2001. Habitat mapping and field surveys for lynx (Lynx canadensis) on lands administered by the USDI - Bureau of Land Management in Wyoming. Report prepared for the USDI Bureau of Land Management-Wyoming State Office by the Wyoming Natural Diversity Database-University of Wyoming, Laramie, Wyoming. https://app.box.com/s/8mmrshcf2yv5dd1rwcldmg15z5gvvgtr

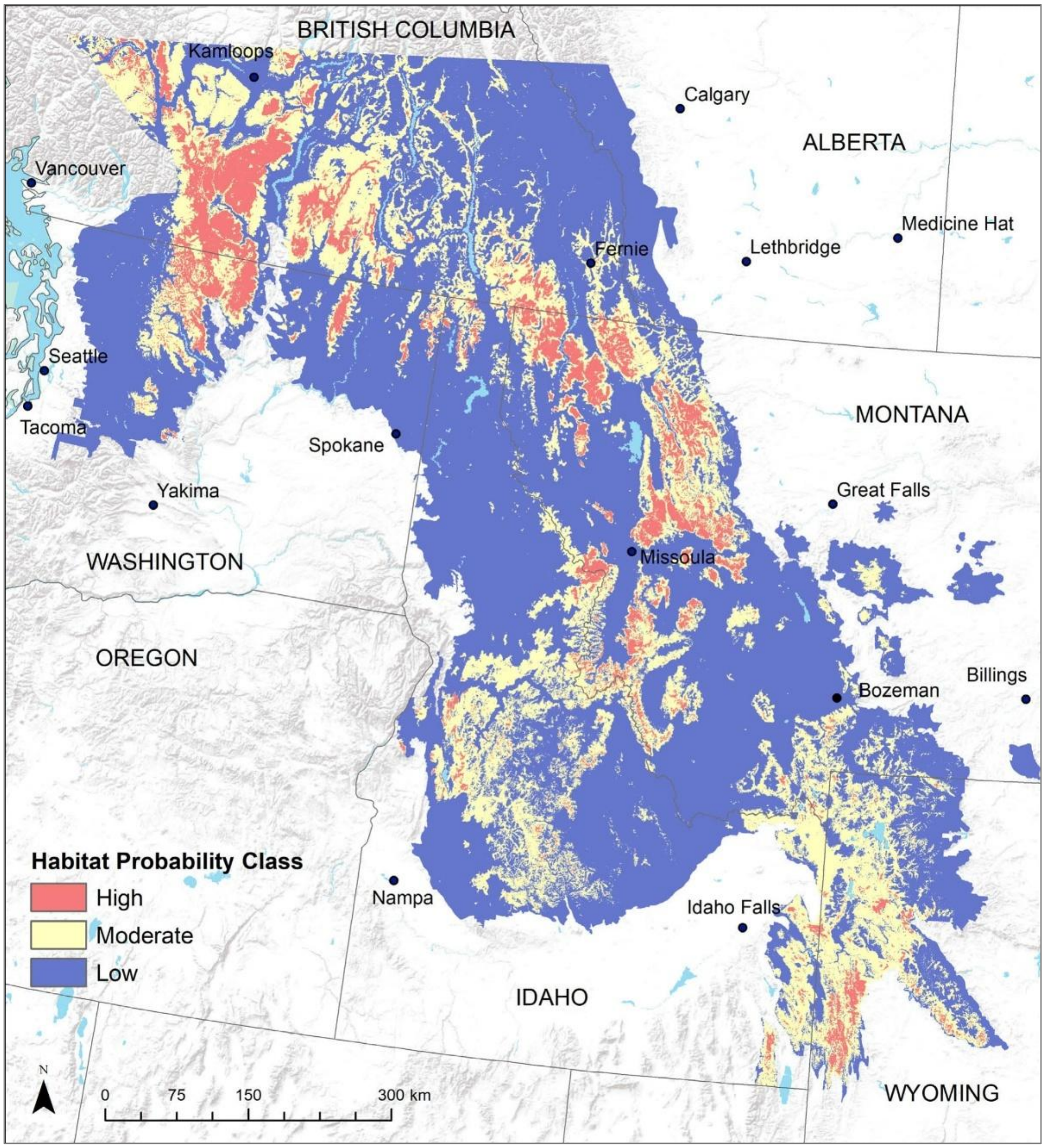


Figure 2.5. Olson Model Habitat Probability

Figure 2.6 SSA Focal Unit 5 and Focal Area with Olson Model

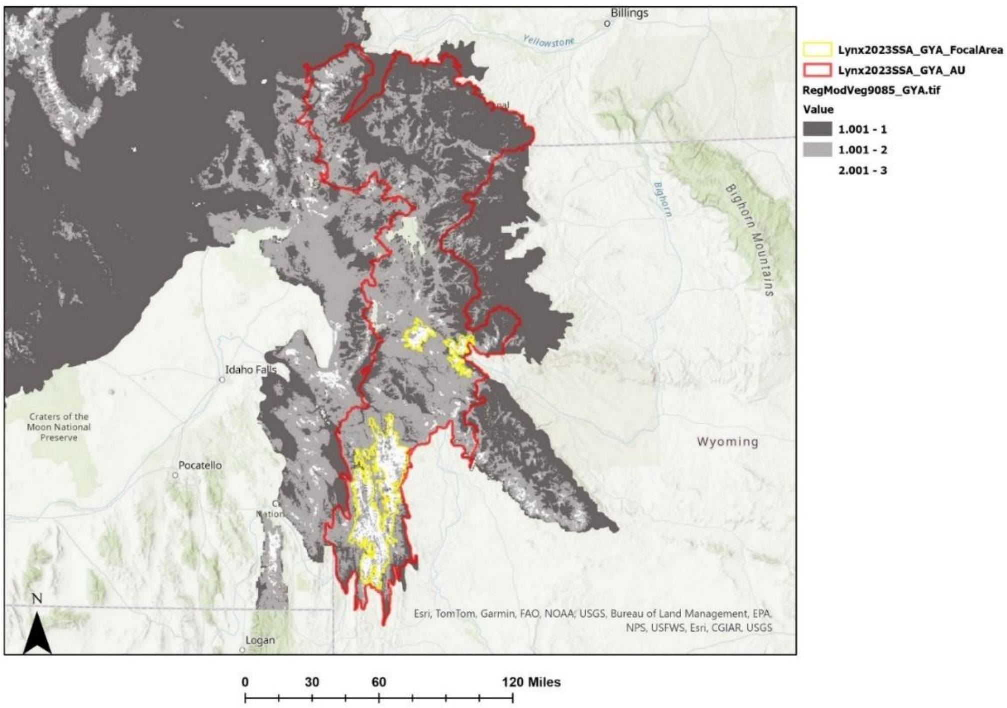


Figure 2.7 SSA Focal Unit 5 and Focal Area with Olson Model and Bridger -Teton NF Logged Units

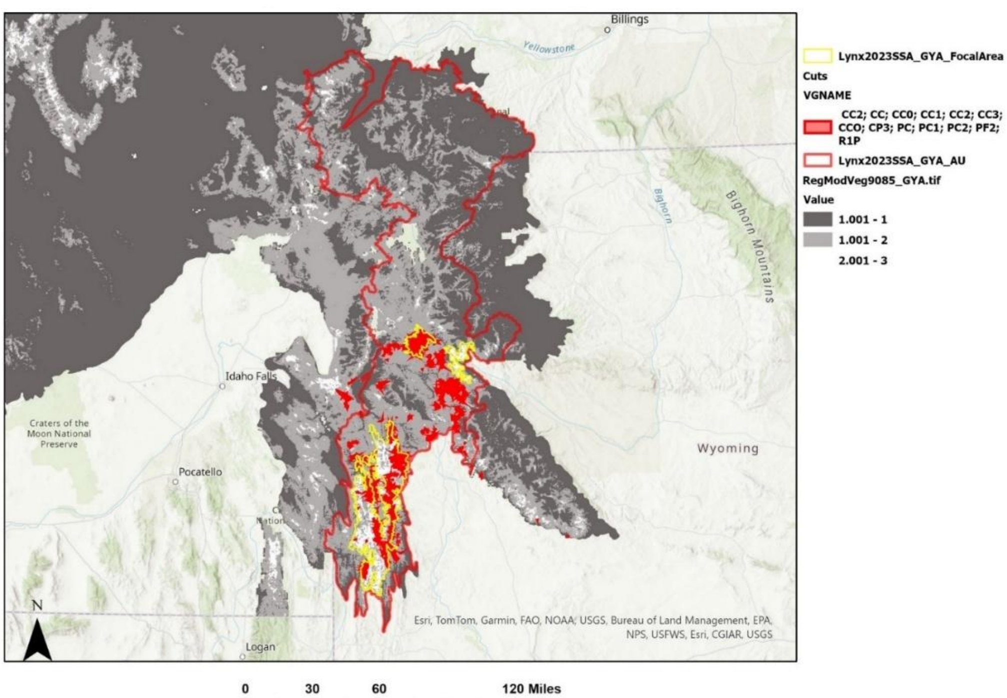
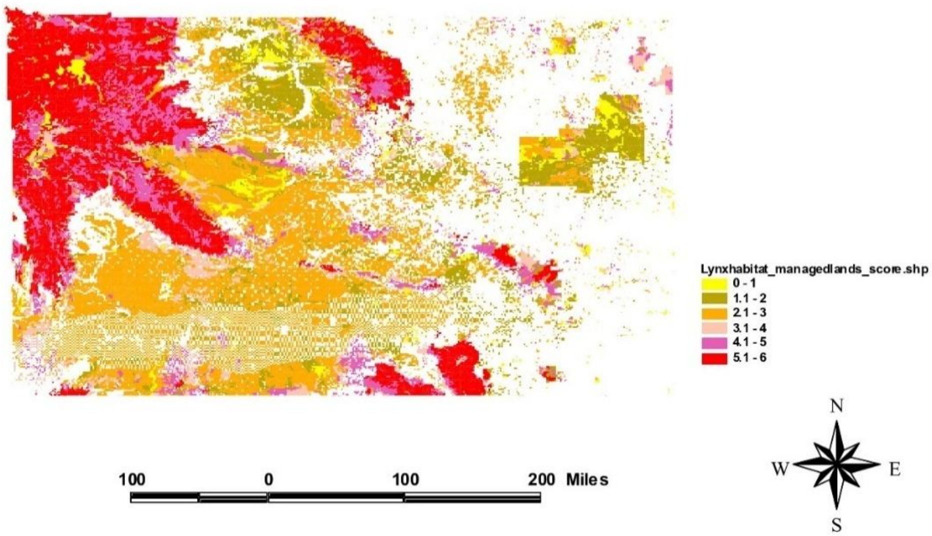


Figure 2.8 Index of lynx habitat suitability for managed lands in Wyoming, adapted from Beauvais et al. (2001). Higher numbers indicate higher habitat suitability.



Colorado Parks and Wildlife mapped predicted use areas in Colorado.[65] They used location data from reintroduced lynx fitted with transmitters, filtered those data to remove locations for the first six months to account for habituation, considered elevations above 8,000 feet, and included factors for housing and road density, slope, distance to forest patches and vegetation types. Similarly, Bates and Jones, (2007) defined a least-cost path for lynx connectivity between the San Juan Mountains in Colorado and the Greater Yellowstone Ecosystem.[66] They reviewed the negative effects of habitat loss and fragmentation on wildlife populations and the resulting isolation of those populations. The role of landscape linkages in providing connections and gene flow was addressed. They used GIS and spatial data for habitats, human factors affecting lynx movement, and potential travel corridors between core patches of lynx habitat in the southern and northern Rockies to determine habitat suitability. Habitat suitability analysis then identified the best core areas for lynx based on vegetation type and road density. These two studies were similar in considering vegetation types, rather than broad assumptions based on

[65] Ivan, J., Rice, M., Shenk, T., Theobald, D., & Odell, E. Undated. Predictive Map of Canada Lynx Habitat Use in Colorado. Colorado Parks and Wildlife. https://app.box.com/s/hh1607p89cgcpptt4x8k2m0j3r1cyf9d

[66] Bates, W. & Jones, A. 2007. Least-Cost Corridor Analysis for Evaluation of Lynx Habitat Connectivity in the Middle Rockies. Report to the Nature Conservancy by the Wild Utah Project, Salt Lake City. https://app.box.com/s/mny5h2bm6mhxryquyw0ld56415pm1b0p

NDVI to identify habitats. Bates and Jones (2007) delineated core and corridor areas that overlay the Yellowstone to Uintas Connection and Regionally Significant Wildlife Corridor. These maps are provided in Chapter 4 addressing the Y2UConn

While the Olson Model is a good tool for a landscape scale overview, Kosterman et al (2018), Holbrook et al (2017, 2018, 2019) and others have described specific habitat parameters for lynx habitat that include vegetation types and stages of regeneration to quantify habitat. Kosterman (2014, 2018) looked at forest characteristics centered around lynx reproductive success to address habitat fragmentation and connectivity.[67] The relative amounts of mature and regenerating forests needed were addressed along with their patch size and connectivity. Holbrook et al (2018) found that while clear-cut and sparse forests may receive some lynx use, their suitability for lynx is reduced for a significant amount of time. It has been shown not only that those clear-cut and sparse forests are strongly avoided by lynx but that restoration of lynx habitat use in these logging areas to 50% of previous use takes 20 years in forest thinning, and 34-40 years for selection cuts and clear-cuts. Logging treatments are avoided by lynx for at least 10 years.[68]

This analysis of forest structure is what is lacking in the Recovery Plan. There are many questions. What are the ages of the logged areas and their utility for lynx? Wildfires? For example, the 1988 Yellowstone Fires affected 800,000 acres.[69] That has now been nearly 40 years and should be in a later stage of regeneration. These and other questions should be addressed in an updated analysis within the GYA, Y2UConn and Regionally Significant Wildlife Corridor. While Lynx Analysis Units have been defined for some areas in the GYA, other areas are omitted and there is no analysis of the current and potential habitat status in these.

Then there is the question of the NRLMD. What data has been collected to demonstrate that habitats remain functional, are not being degraded, or are being recovered for lynx because of the NRLMD? It is this more detailed look that is needed to identify current and potential habitat and connectivity for lynx.

2.6 Olson Model Applied to the Recovery Plan. The Recovery Plan and SSA Addendum designated SSA Focal Unit 5 and Focal Areas in the GYA while omitting large areas of modeled suitable habitat in central and southeast Idaho, southwestern Montana, and western Wyoming.

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[67] Kosterman, Megan K. 2014. Correlates of Canada Lynx Reproductive Success in Northwestern Montana. Theses, Dissertations, Professional Papers. Paper 4363. https://app.box.com/s/j1kfpjbznr88juzdazkhyhdqal5lw7in

[68] Holbrook, J.D., Squires, J.R., Bollenbacher, B., Graham, R., Olson, L.E., Hanvey, G., Jackson, S., & Lawrence, R.L., 2018. Spatiotemporal responses of Canada lynx to silvicultural treatments within the Northern Rockies, U.S. For. Ecol. Manage. 422, 114–124. https://app.box.com/s/qz9hh7g724y0o8qv5jb75y17u1perqyj

[69] National Park Service. 1988 Yellowstone Fires. https://app.box.com/s/otltsi1dhuw5i0f6zwxjgkvljaencga9

It appears that the boundaries for the Focal Unit and Focal Area are arbitrarily drawn and eliminate consideration of habitat and linkages (current and potential) occurring in these wider areas. The Olson GYA Model (a subset of the overall Olson Model) was used for this analysis. The Olson Model itself was relied upon for the FWS analysis and conclusions in the Recovery Plan (Figure 1). Olson et al (2021) described the model output as:

> *Our best-performing SDM generated predictions consistent with known lynx habitat use (Mckelvey, 2000), with Canada lynx patchily distributed in mountainous areas throughout the Pacific Northwest and the Greater Yellowstone Area (see Figure 8 for details). Categorical predictions created by 90% and 85% threshold values when applied to the "WA Equal" model delineated the location of habitat most likely to be selected by lynx in a reproductive population ("high" probability habitat) and habitat that was less favorable but potentially still used by lynx ("moderate" probability habitat), particularly for connectivity or as part of a matrix with "high" and "low"probability habitat (Figure 8).*

Figure 2.9 shows agency identified lynx linkages[70] superimposed on the Olson Model. As can be seen there are large areas of high and moderate probability habitat predicted in central and southeast Idaho, western Wyoming, and southwestern Montana. Figure 2.10 shows the National Forests and National Parks within the bounds of the Olson GYA Model. The lynx linkages in Figure 2.9 also illustrate the importance of addressing these with mapped corridors and habitat standards to maintain connectivity. Most of this entire region is omitted from analysis and discussion in the Recovery Plan and the SSA Addendum which have a narrow focus limited to their designated SSA Focal Units and Focal Areas.

The Olson GYA Model was used in ArcGIS Pro 3.2 for comparison to various land management units (National Parks, National Forests, Ranger Districts, Critical Habitat, the SSA Focal Unit and Focal Area for the GYA). The habitat probability levels (1, 2, or 3) from the Olson GYA Model contained within the bounds of each land management unit were summarized. Category 1 corresponds to the low habitat probability, Category 2 to the moderate habitat probability, and Category 3 to the high habitat probability. The Summarize Categorical Raster function in ArcGIS Pro was used to tabulate the area of each category within each land management unit. The Olson GYA Model image resolution was determined by ArcGIS Pro to be 250 meters x 250 meters, resulting in a pixel equating to 15.625 acres. Pixel counts for each Category were totaled and converted to acres.

[70] Linkages identified by cooperative agreement between U.S. Forest Service, Bureau of Land Management, and the U.S. Fish and Wildlife Service in August 2000. https://app.box.com/s/5nl35m6zyx9m8vm1d31we0zy812bv6uo

Figure 2.9 Olson GYA Model and Linkages

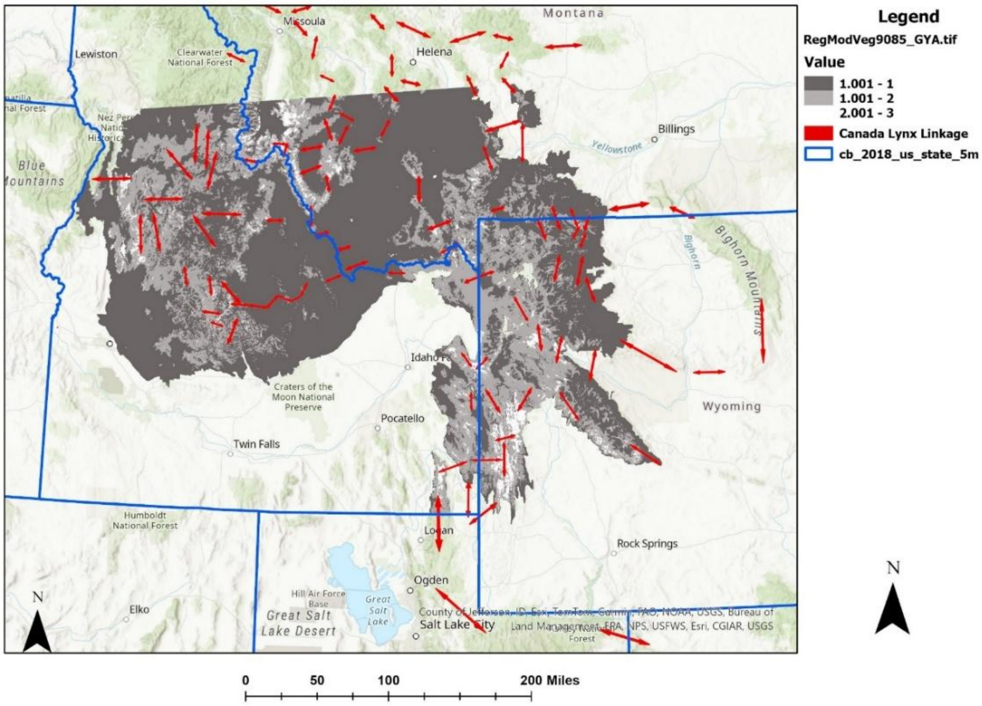
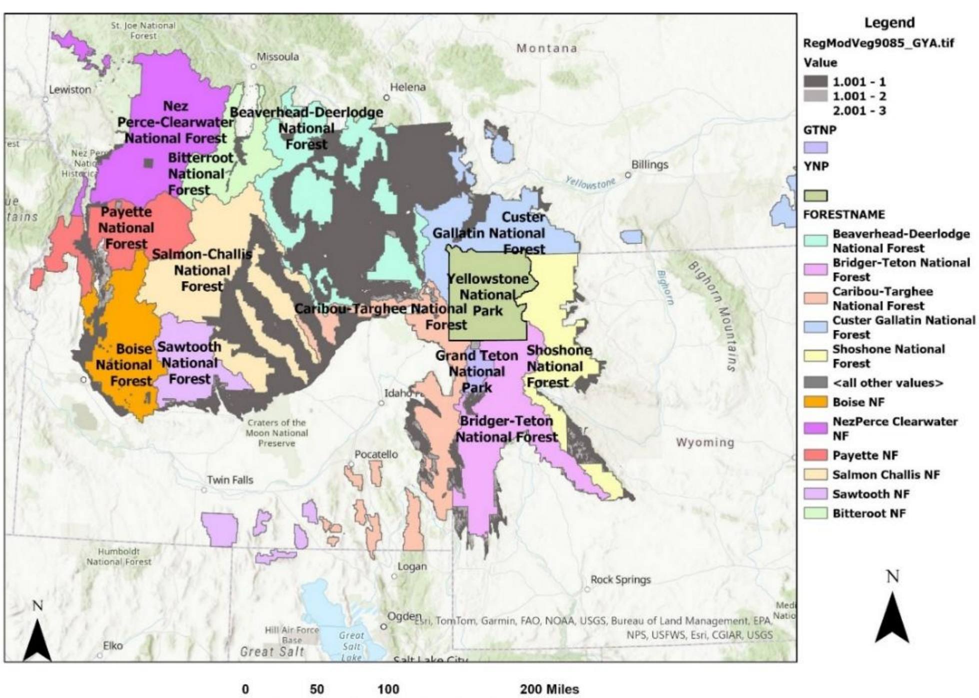


Figure 2.10 National Forests and National Parks within the Olson GYA Model



The analysis in Section 2.3 and Table 2.1 summarized the areas of the National Forests and National Parks in the GYA including Yellowstone National Park, Grand Teton National Park, Beaverhead-Deerlodge NF, Bridger-Teton NF, Caribou-Targhee NF, Custer-Gallatin National Forest, and the Shoshone NF. These comprised over 16 million acres with over 9.1 million forested acres.

The Olson GYA Model included those areas and all or parts of the Bitterroot NF, Boise NF, Nez Perce-Clearwater NF, Payette NF, Salmon-Challis NF, and Sawtooth NF. (Figure 2.10). The total area of these land management units within the Olson GYA Model is 30,888,094 acres of which the moderate and high habitat probability classes are 14,632,406 acres, or 47% of the total. (Table 2.2). Critical habitat is 19% of the total area of the included GYA National Forest and Park acreage, SSA 5 FU is 24% and SSA 5 FA is 2.3%. If the combined moderate and high probability habitats are compared, critical habitat represents only 25% of habitat in the National Forests, the Focal Unit represents 29%, and the Focal Area represents 5%. To visualize the relative importance of these land management units they are summarized in Table 2.2, 2.3, and Figure 2.11. Category 2 and 3, or moderate and high probability habitats are combined to represent available or potential habitat and connections.

Table 2.2 Olson Model GYA Probabilities by Management Unit Land Area

Management Unit	Total Acres	Category 1 Acres	Category 2 Acres	Category 3 Acres
Beaverhead Deerlodge NF	3,148,766	1,708,359	1,288,641	151,766
Bitterroot NF	1,334,359	482,906	661,375	190,078
Boise NF	2,553,813	1,752,781	755,891	45,141
Bridger Teton NF	3,498,328	758,578	2,233,422	506,328
Caribou Targhee NF	2,685,922	802,063	1,743,922	139,938
Custer Gallatin NF	2,678,234	1,731,563	909,641	37,031
Grand Teton NP	289,734	131,609	147,391	10,734
Nez Perce Clearwater NF	1,733,094	1,090,422	639,656	3,016
Payette NF	2,312,531	1,155,672	1,064,375	92,484
Salmon Challis NF	4,448,000	3,122,609	1,244,469	80,922
Sawtooth NF	1,574,391	684,594	856,969	32,828
Shoshone NF	2,493,781	1,959,000	483,703	51,078
Yellowstone NP	2,137,141	875,531	1,242,031	19,578
Total	**30,888,094**	**16,255,688**	**13,271,484**	**1,360,922**
GYA Critical Habitat, SSA 5 Focal Unit and Focal Area				
GYA Critical Habitat	5,915,688	2,285,781	3,118,094	511,813
SSA 5 Focal Area	725,141	8,750	290,344	426,047
SSA 5 Focal Unit	7,516,500	3,224,938	3,749,031	542,531

Figure 2.11. Olson GYA Model Land Management Units Ranked High + Moderate Habitat Probability

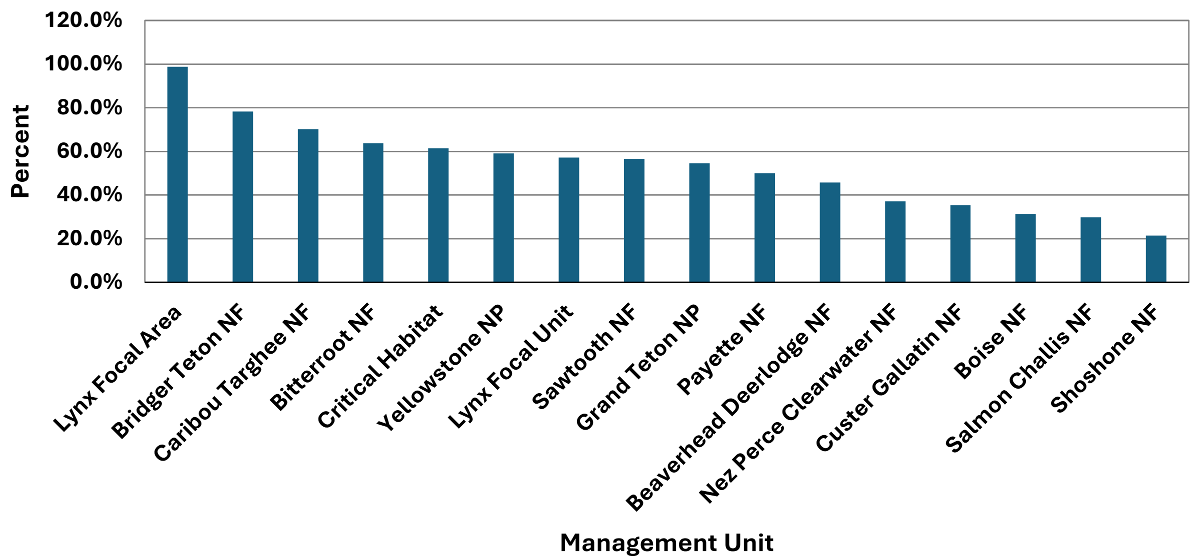


Table 2.3 Rank of Major GYA Land Management Units (Parks and NFs)

Unit	Rank	Category 2 + 3 Percent of Total
SSA Unit 5 Focal Area	1	98.8%
Bridger Teton NF	2	78.3%
Caribou Targhee NF	3	70.1%
Bitterroot NF	4	63.8%
GYA Critical Habitat	5	61.4%
Yellowstone NP	6	59.0%
SSA Unit 5 Focal Unit	7	57.1%
Sawtooth NF	8	56.5%
Grand Teton NP	9	54.6%
Payette NF	10	50.0%
Beaverhead Deerlodge NF	11	45.7%
Nez Perce Clearwater NF	12	37.1%
Custer Gallatin NF	13	35.3%
Boise NF	14	31.4%
Salmon Challis NF	15	29.8%
Shoshone NF	16	21.4%

National Forests exceeding the combined Category 2 and 3 probabilities of the SSA 5 Focal Unit include the Bridger-Teton, Caribou-Targhee, and Bitterroot, with the Sawtooth at a similar amount as the Focal Unit. Yellowstone National Park exceeded the Focal Unit value, while Grand Teton NP was similar. GYA Critical Habitat combined Category 2 and 3 probability was exceeded in the Bridger-Teton, Caribou-Targhee, and Bitterroot National Forests with the Sawtooth being similar. Yellowstone NP was slightly below the Critical Habitat value in combined probability. The Focal Area is very narrowly drawn, and no large land management unit (National Forest or Park) is at that level, although the entire Bridger-Teton NF and Caribou-Targhee NF exceed all others in approaching that high threshold.

Some of the NFs that were below the Focal Unit value still have large areas of the high and moderate habitat probability categories. An example is the Beaverhead-Deerlodge NF, which is 45.7% Moderate and High Probability, but contains 1.4 million acres of these higher probability habitats. These are large patches of habitat separated by the lower probability habitat, but which Olson et al (2021) also describe as potential connections, *"particularly for connectivity or as part of a matrix with 'high' and 'low' probability habitat"*

The Bridger-Teton and Caribou-Targhee NFs have combined probabilities higher than others at the major land management unit level. Smaller land management units (Ranger Districts) within those NFs were also evaluated. Figure 2.12 illustrates the Ranger Districts for these NFs and the SSA 5 Focal Unit and Focal Area. The BTNF contains most of the Focal Unit outside Yellowstone and Grand Teton NPs with a small area in the Shoshone NF. The areas of these Ranger Districts, Critical Habitat, Focal Unit, and Focal Area were compared. (Tables 2.4 and Figure 2.13). The total acreage in these RDs is 6.2 million acres while Category 2 and 3 within these RDs total 4,623,531 acres, or 74.8% moderate and high probability habitat. They are ranked in Table 2.5. Figure 2.14 provides a side-by-side comparison. None of the RDs reach the high values of the Focal Area, but 8 of them are at 80% or higher. Eleven RDs are higher than the Critical Habitat value, and 11 exceed the Focal Unit value.

Figure 2.12 Ranger Districts in the Bridger-Teton and Caribou-Targhee NFs

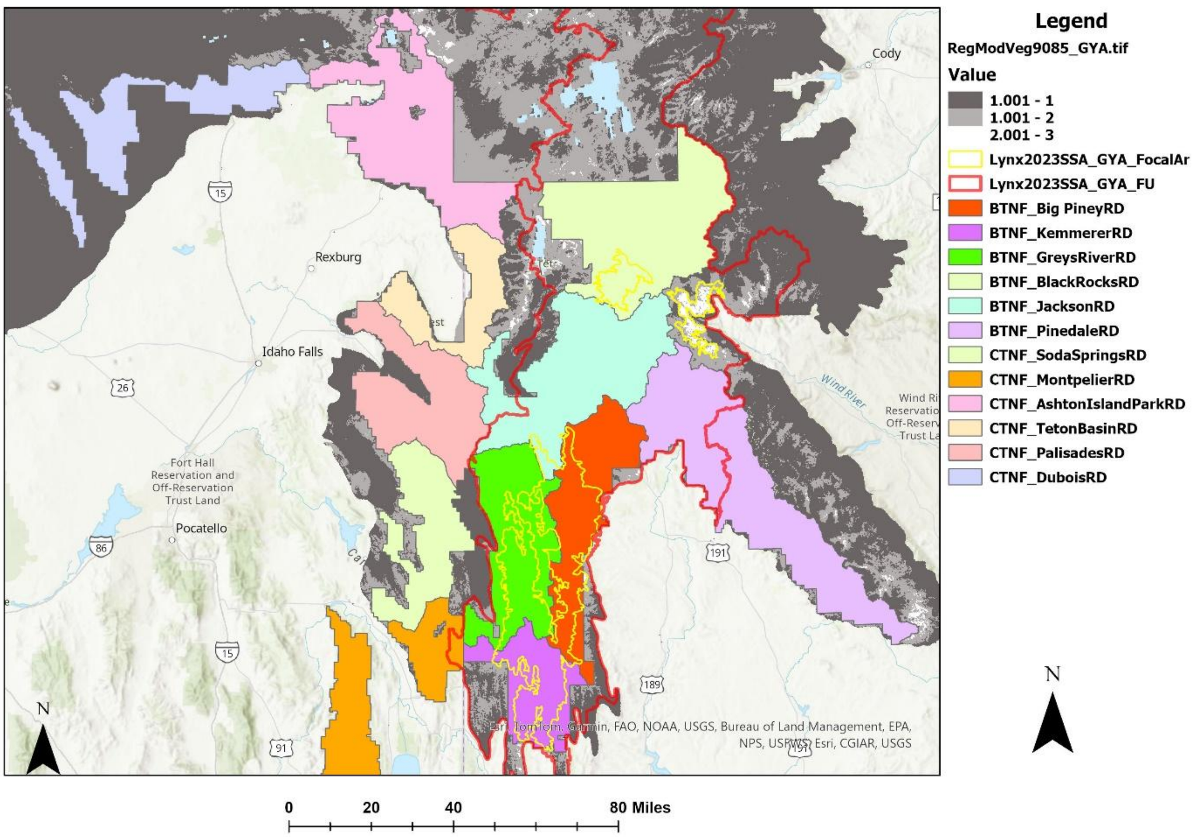


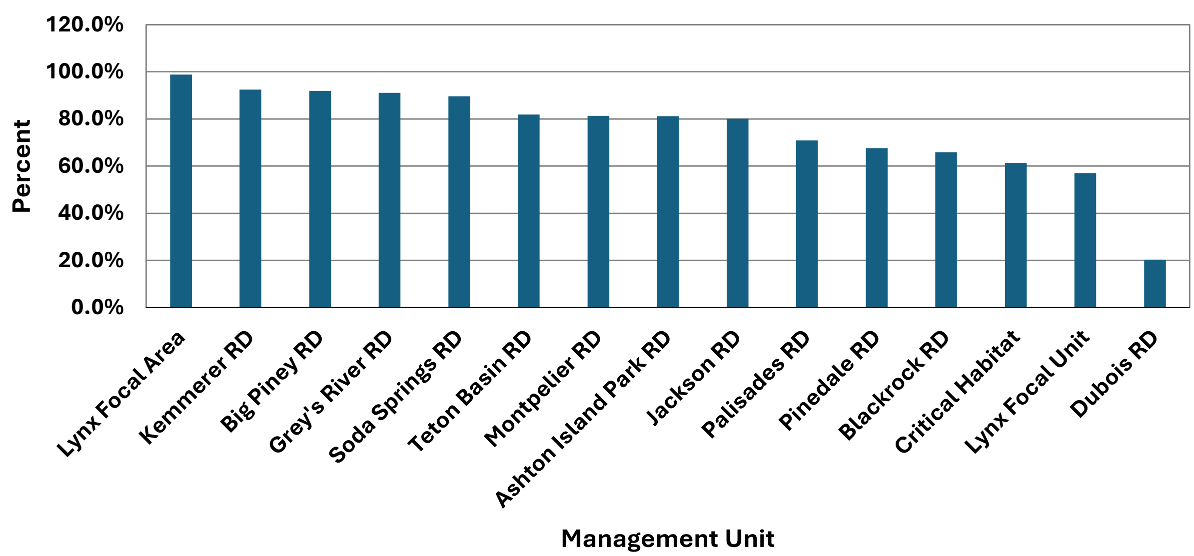
Table 2.4 Olson GYA Model Comparison of BTNF and CTNF Ranger Districts

Unit	Total Acres	Category 1 Acres	Category 2 Acres	Category 3 Acres
Kemmerer RD	289,344	21,609	150,313	117,422
Big Piney RD	455,234	36,859	275,578	142,797
Grey's River RD	490,797	43,422	333,313	114,063
Soda Springs RD	369,563	38,391	306,984	24,188
Teton Basin RD	271,047	49,203	199,094	22,750
Montpelier RD	433,094	80,609	305,953	46,531
Ashton Island Park RD	675,250	126,781	539,406	9,063
Jackson RD	703,250	139,359	543,938	19,953
Palisades RD	473,703	137,641	298,844	37,219
Pinedale RD	829,031	267,969	499,984	61,078
Blackrock RD	730,672	249,391	430,203	51,078
Dubois RD	463,781	370,000	93,563	219
Totals	6,184,766	1,561,234	3,977,172	646,359

Table 2.5 Olson GYA Model Rank of Ranger Districts in the BTNF and CTNF

Land Management Unit	Rank	Moderate and High Probability Habitat Percent of Total Area
SSA 5 Focal Area	1	98.8%
Kemmerer RD	2	92.5%
Big Piney RD	3	91.9%
Grey's River RD	4	91.2%
Soda Springs RD	5	89.6%
Teton Basin RD	6	81.8%
Montpelier RD	7	81.4%
Ashton Island Park RD	8	81.2%
Jackson RD	9	80.2%
Palisades RD	10	70.9%
Pinedale RD	11	67.7%
Blackrock RD	12	65.9%
GYA Critical Habitat	13	61.4%
SSA 5 Focal Unit	14	57.1%
Dubois RD	15	20.2%

Figure 2.13 Olson GYA Model Ranger Districts High + Moderate Habitat Probability (BTNF and CTNF)



The SSA Addendum summarized its major points in the Executive Summary. These included the following:

> *In this addendum, we evaluate the current and potential future resiliency of lynx populations in focal areas (areas of known or modeled high quality habitat capable of supporting resident lynx) within six SSA Units that have been modified based on recent verified occurrence data to represent the current distribution of lynx in the contiguous U.S.*
>
> *Our definition of a verified lynx record is based on McKelvey et al. (2000a, p. 209): (1) an animal (live or dead) in hand or observed closely by a person knowledgeable in lynx identification, (2) genetic (DNA) confirmation, (3) snow tracks only when confirmed by genetic analysis (e.g., McKelvey et al. 2006, entire), or (4) location data from radio or GPS-collared lynx (79 FR 54816).*
>
> *Focal areas support resident lynx populations and/or have habitat modeled as being capable of doing so.*

By drawing the Focal Units and Focal Areas within arbitrary boundaries, FWS has excluded large areas of high and moderate quality habitat. The lack of analysis of current and potential forest cover along with areas degraded by roads, recreation, timber and mining projects, and other activities has led to selection of Focal Units and Focal Areas that may not currently be high or even moderate quality habitat and in need of recovery or restoration to be functional lynx habitat. There are millions of acres at the National Forest and National Park level that contain high and moderate probability modeled habitat. The Recovery Plan and its SSA Appendix have claimed to use reliable observations while excluding thousands of reliable observations described in the Science Report and have ignored the potential if science-based habitat standards and restoration practices were implemented. The habitat model by Olson et al (2021) shows that much of the habitat that could be used by lynx has been excluded from the Recovery Plan and SSA Addendum.

Since the GYA and Colorado Focal Unit habitats have suitable predicted temperatures to persist longest, greater attention to the entire region surrounding each of these Units is needed. The SSA Unit 5 should be expanded to also include the National Forests we have identified here that are in SW Montana, Central and SE Idaho, and Western Wyoming. (Figure 2.10). These and other land management units contain millions of acres of potential lynx habitat that will remain without adequate analysis and regulatory protection under this Recovery Plan.

The linkages in Figure 2.9 align with the higher elevation areas and the least cost path between those LMUs. The Bates and Jones (2007) model described in Chapter 4 includes a detailed map of the connection between Yellowstone National Park and the Uinta Mountains in Utah. That effort needs to be expanded to identify connections within and from the Greater Yellowstone Area to both the northern and southern Rockies. This connection has already been mapped as the Regionally Significant Wildlife Corridor which includes the higher elevation areas.[71] This Corridor needs to be officially recognized, with an analysis of current and potential forest cover and lynx habitat. This needs to be accompanied by standards and quantitative criteria for maintaining and restoring these connections and core areas.

No evidence has been provided by the FWS that demonstrates the current Northern Rockies Lynx Management Direction and Forest Plan amendments have been effective. The statement from the SSA Addendum that, *"SSA Units that have been modified based on recent verified occurrence data to represent the current distribution of lynx in the contiguous U.S."* indicates continued shrinkage of lynx occupancy without an actual analysis of causes of this shrinkage.

2.7 Point by Point Critique of the Recovery Plan. The preceding discussion describes that the current SSA assessments and the resulting Recovery Plan have engaged in dismissing much of the history of lynx occupancy in the southern portion of its range, have used an experimental model as opposed to actual habitat parameters such as vegetation types, and have not assessed current and potential habitat conditions. There are no quantitative habitat criteria used to describe current habitat and connectivity. Best and most effective corridors are not mapped or described even though information on these has been available for decades. Most human activities such as recreation, road density, livestock grazing, mining, and trapping that affect lynx are dismissed due to *"lack of evidence".* Connections, or linkages between core populations, and peripheral areas are not addressed. The Recovery Plan does not lay out specific, quantitative habitat parameters and standards to evaluate lynx habitat and correct fragmentation. This leaves each agency without specific guidance and results in lack of consistency across the region. We provided point by point rebuttals to the Draft Recovery Plan assertions in our comments on that DRP. In the following, these are updated to respond to the Recovery Plan. We reference Recovery Plan (RP) page numbers. RP statements are paraphrased and highlighted.

RP:4 Lynx remain widespread and abundant in its historical range and no threats have been identified. This may be the case for Canadian populations, but lynx are absent in much of the GYA today where its presence was documented historically. There are many ongoing threats such as logging which is increasing due to wildfire concerns, recreation which has exploded in recent years, increases in surface disturbance from mining and roads, and trapping. Rather than claiming there is no evidence, the FWS and other agencies need to analyze the habitat fragmentation and other factors that have nearly extirpated lynx in the GYA.

RP:4 The boreal forest becomes patchy and suboptimal as it transitions to temperate forest types that do not support lynx. In the Rockies, the boreal forest ends at the Canadian border and the Science Report also noted that habitat in these southerly forests is patchier. However,

71 https://www.fs.usda.gov/detailfull/uwcnf/landmanagement/planning/?cid=stelprdb5076923&width=full

there are thousands of records of lynx occupying these temperate forests back to early records in the mid-1800s. Introduced lynx are surviving in Colorado today, so this point is misleading.

RP:7 Evaluation of verified, reliable information does not suggest broadscale breeding range contraction, substantial population declines, or the loss of resident breeding populations in the contiguous United States from historical conditions until the DPS was listed in 2000. The lack of monitoring since the National Lynx Survey is a problem. There should be a summary of monitoring studies in the GYA and its Parks, Forests and Public Lands. This is fundamental information that is needed.

RP:7 Cyclic irruptions have led to the misperception that lynx in the U.S. were more numerous and broadly distributed than we know is ecologically possible. As pointed out in Chapter 1, population observations in the southerly states were not correlated with population highs/lows in Canadian populations. Many observations such as those occurring in SE Idaho and NE Utah that occurred in the 40's and 50's are not considered. The Olson Model shows millions of acres of suitable habitat in the GYA. The FWS has relied on this model as valid in representing the habitat suitability for lynx, therefore by the Model it is ecologically possible for lynx to occupy those suitable habitats.

RP:8 Lynx are highly specialized hare predators and also use other prey. There are few studies in recent decades to document hare populations, red squirrels, grouse etc. in lynx habitats. Studies in Wyoming and Utah cited in Chapter 1 demonstrated there are adequate snowshoe hares and other prey to support resident lynx although at lower densities than occur in the boreal forest in Canada. These populations could be sustained at higher densities if the degradation of snowshoe hare habitat by livestock was reduced.

RP:9 DPS populations are relatively isolated from each other but are directly connected via dispersal to lynx populations in Canada. SSA Units 5 and 6 are not directly connected to Canada or each other. The FWS has not identified corridors to provide connections. In Chapter 4 , we provide maps showing the Regionally Significant Wildlife Corridor and its higher elevations that link SSA Focal Units 3, 5 and 6. Units 1, 2, 3 and 5 border Canadian populations and there is a direct connection there.

RP:10 Lynx have the highest level of gene flow among carnivores despite large separations between core and peripheral populations. This conflates all populations in the DPS with those bordering Canada. SSA Units 5 and 6 are not directly connected to Unit 3 and the Canadian populations, or to each other, and cannot be until a migration corridor is defined and habitat fragmentation in that corridor addressed with effective, quantitative standards and restoration where needed.

RP:11 The DRP described threats, or the lack thereof, noting that the 2017 SSA concluded that lynx conservation measures and habitat guidance by the USFS and BLM *"substantially"* addressed the regulatory threat. No evidence has been provided showing that the NRLMD, Forest and BLM land use plans have protected, restored, or maintained lynx habitats and connectivity.   There are large numbers of logging and fuel treatment projects using the Wildland Urban Interface as rationales but there is no analysis of these and other activities that are fragmenting habitat and describing the current and potential state of habitats, linkages, and peripheral areas. The RP is hugely lacking in the reporting of actual data to depict the current and potential states of lynx populations, prey populations, and habitats upon which an actual recovery effort depends.

RP:12 Lynx are a boreal forest and snow adapted specialist highly sensitive to the effects of climate warming and has limited capacity to adapt while prevailing temperatures persist longest in SSA 5 and 6. First, FWS should stop referencing lynx as only a boreal species. Second, the SSA Appendix and its climate model show the GYA as a reservoir for lynx during warming, indicating snowpack remains suitable over time.   This should focus great attention on doing everything possible to recover habitat and develop standards with quantitative habitat criteria (road density, forest cover, forest stand stage, other) that are applied through land use plan amendments to ensure the GYA, along with the Colorado population are the reservoir for future lynx population in the southern extent of its range.

RP:13 Aside from climate and regulatory mechanisms, other factors were identified that are "thought" to exert population level influences on DPS populations. These include vegetation management, wildland fire management, habitat loss and fragmentation. Other factors that may affect lynx include disease, predation, competition, and incidental take. The Recovery Plan should have included an analysis across the GYA and its National Forests to address the numerous prescribed fires, thinning, clear cutting, removal of hazard trees that create long swaths of forest openings.

Road densities and their effects on security habitat should be addressed. That would include all roads and trails, snowmobile groomed trails, and Forests that have snowmobile use across the entire landscape, such as the Caribou NF that is 97% open to over snow use. Incidental trapping is not so incidental as a quick look at the Game and Fish websites for Montana, Idaho, Wyoming, and Utah illustrate.   Yellowstone National Park is surrounded by areas open to trapping of bobcats and wolves.   A recent article reported two lynx were trapped during bobcat trapping in Montana and one died.[72]   A current report of bobcat trapping in Wyoming shows that over the past ten years, 12,349 bobcats were reported trapped.   The number of trap nights ranged between 653,882 and 251,852.[73]   This is an intensive, landscape scale effort with an unknown number of lynx lost. It needs constraints. The Forest Service could use its 36CFR261 Prohibition Authority to ban trapping in lynx habitat.

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[72] NBC Montana. 2024. Bobcat trappers catch 2 lynx in northwest Montana. January 7,2024. https://app.box.com/s/40vyzztdnpuquakdrp6ndgnh25usm2xc

[73] Wyoming Game and Fish Department. 2023. Bobcat License Summary Statewide 2022-2023. https://app.box.com/s/nh6lccdn5bsks5o148gtqueabn7p8wea

Current statistics on motorized recreation by snowmobiles and ohvs show explosion of their use in recent decades. The levels of use in many areas are high and likely comparable to the ski area which Olson et al 2018 acknowledge caused behavioral (avoidance) changes in lynx use of the landscape. How do lynx navigate these National Forests in the GYA with the proliferation of motorized play areas and groomed trails providing access for recreationists, trappers, and hound hunters? The Recovery Plan should have addressed these instead of dismissing them for no evidence when the evidence is plain, people and machines occur across the landscape while lynx have disappeared or are disappearing.

RP:13 In the 2017 SSA, the Service concluded that persistence of lynx in four of the six SSA units and the absence of reliable information indicating lynx distribution and abundance are *"substantially"* reduced from historical conditions **suggest** resiliency. SSA Unit 6 established by the 1999 – 2006 translocation of lynx from Alaska and Canada has demonstrated resilience so far. This "suggestion" of resiliency discounts the historical records that illustrated lynx presence in Unit 5. There is no presentation of lynx numbers obtained by surveys using a consistent protocol. On the one hand the RP claims SSA Unit 6 is resilient, but where are the tabulations of lynx numbers over time. RP Table 2 estimates the population at 75 – 150, but when this is compared to the over 200 lynx relocated there, it appears to have declined. Is the trend down continuing? Is it remaining the same? The tracking GPS collars no longer function, and no survey information is provided in the RP to compare to the original numbers or to define trends. In the GYA, Table 2 of the RP shows minimal habitat which is an order of magnitude lower than either Unit 3 or Unit 6. This makes no sense on its face as this is a higher latitude than Unit 6 and has millions of acres of suitable habitat based on the Olson Model. If no lynx are being found, and habitat is suitable, what are the factors driving the loss?

RP:14 Three SSA units (1,2, and 3) demonstrate high overall resiliency with two (4 and 6) moderately resilient and unit 5 not resilient. Units 1, 2 and 3 are directly connected to the Canadian populations, thus are part of those populations covering a large land area and can meet the construct given in Table 1 of the RP. The RP then describes the wildfires in Unit 4 as reducing resiliency due to effects on about half of the habitat. The rationale for lack of resiliency in Unit 5 (GYA) is due to lack of a resident population. If the RP had evaluated the reasons for the lack of a resilient population in Unit 5 as it did for Unit 4, and then proposed defined habitat criteria for recovery and connection (road density, habitat cover, a corridor(s) for connection to these other populations, and other limitations on habitat disturbance and fragmentation, then it would be a recovery plan. It fails in this regard.

RP:16 We found no evidence that former persistent populations have been lost from any large areas suggesting redundancy has not been diminished. The current population in Colorado has resulted in increased redundancy. Ignoring the probability of resident lynx occupying portions of the GYA in the past has made this claim possible, when the evidence of millions of acres of habitat (Olson Model, forest cover, snow) in the GYA argues that the current condition is reduced redundancy. This is painting with a broad brush that eliminates meta populations that occurred in areas like the Uinta Mountains or SE Idaho.

RP:16 In its 2017 SSA it was concluded that lynx across the DPS occupy a narrow and specialized ecological niche defined by specific vegetation structure, snow conditions, and abundance of a single prey species. A major failing of the RP and its SSA Appendix is the failure to define and analyze these vegetation conditions based on current and potential levels of habitat, snow, and prey abundance. The absence of actual data allows such an assumption to drive decisions when a requirement should be that Forests, Parks, and BLM should be engaged in monitoring lynx populations, prey populations, and accurately quantifying vegetation conditions and their potential. Then the DRP says, lynx is broadly distributed across the range of ecological settings that "seems" to have supported them historically. These ecological settings must be defined and compared to the "narrow" niche mentioned. Are they the same? If so, then why is one narrow and the other broad?

RP:16 We found no threats to genetic health in the DPS. This would seem clear for SSA Units 1, 2, 3, 4 and 6. After all these are either directly connected to the Canadian populations across the border or are direct translocations from those populations to Colorado. This is likely not a suitable criterion for representation. More important would be the re-establishment of a population in Unit 5 that would increase resiliency, redundancy, and representation.

RP:18 The Recovery Vision only addresses five SSA Units and omits GYA Unit 5 from consideration for identification and conservation of high-quality lynx habitat, refining regulatory mechanisms and incorporating the best available science. The Recovery Plan should have identified all vegetation types, their current and potential suitability for lynx along with factors reducing that suitability. Refining regulatory mechanisms is a generic statement that lacks specific, quantitative needs for analysis, restoration, and connectivity.

RP:18 Recovery includes conserving climate refugia in focal areas in SSA Units 2, 5, and 6. This addresses only a small area in the GYA representing the 90% confidence level in the Olson Model, when the Olson Model also mapped the 85% or moderate habitat suitability that includes a much wider area across the GYA. In this instance the RP is further isolating these small islands. This conservation effort should include all the National Forests, National Parks, and other public lands in the GYA. As to the effectiveness of regulatory mechanisms for the GYA there should have been an analysis of all the Forest timber and fuel manipulations, wildfire history, mines, road density and projects proposed and approved. As seen in the environmental documents for the phosphate mines in SE Idaho, the usual deflection is that lynx will travel around the "periphery" of the project area into other suitable habitat. The Forest Service and BLM never analyze this suitable habitat relative to lynx needs. This is a clear failure in the regulatory mechanism and needs correction with data, analysis and habitat standards.

RP:19 The recovery strategy includes maintaining or improving resiliency, redundancy, and representation of the lynx DPS. This is done by maintenance and improvement of connectivity, restore habitat within focal areas and any other areas capable of supporting resident populations, remove threats by maintaining or strengthening habitat protections with regulatory mechanisms, monitor lynx demography, distribution, connectivity, habitat quality, regulatory mechanisms and progress implementing recovery. These are all things that should have been prescribed with quantitative criteria following listing in 2000. Now 26 years later, there is another 20-year time frame under the RP without defining the criteria and laying out with specifics, the regulatory mechanisms needing implementation. Clearly the NRLMD has failed, otherwise lynx populations in the GYA would have rebounded because habitat would have been protected, barriers eliminated, constraints placed on recreation and road density, timber and mining projects would have had to operate under strict requirements for habitat and wildlife (hare, squirrel, lynx), monitoring and protecting the vegetation types and cover needed for these.

RP:22 Recovery Criterion 1 is based on minimum estimated population size despite the current lack of accurate, unbiased, and statistically robust population size estimates for most DPS populations . This criterion is to be the *"running average of the estimated population size"*. This is unfortunate that the RP has no defined monitoring plan. Table 4 of the RP fails to provide an estimated population size for the GYA even though the other SSA Units in the Table have estimated minimum population sizes. Those were estimated based on habitat in each unit capable of supporting lynx. A potential population size should have been estimated for the GYA (not just the Focal Unit SSA5, but the entire GYA and its millions of acres of suitable habitat. That population size could be estimated from the Olson Model and cover types so a recovery goal for the GYA could be set.

RP:24 Habitat modeling for the GYA SSA Unit 5 indicates it may support a population greater than 25 individuals. This is also a climate refugium. The SSA Unit 5 area is much smaller than the actual area of the GYA National Forests and Parks. The analysis and parameters used to provide this estimate should have been laid out for the public so we could know how this estimate considered various factors such as vegetation types, cover, patches, connections, and fragmentation. It should be expanded for the entire approximately 20-million-acre GYA to provide a clear basis for identifying problem areas, means of correcting or restoring those, and setting a population goal.

RP:27 Maintaining current high levels of connectivity between SSA units 1–4 and the northern range of the species in Canada and providing continued opportunities for dispersal between SSA units 3 and 5 and SSA units 5 and 6 will contribute to the resiliency of DPS populations and, therefore, maintenance of sufficient redundancy and representation to ensure the viability of the DPS. While monitoring of the extent that forested habitats remain conducive to lynx dispersal by physical connectivity and absence of significant barriers is suggested, it is to be demonstrated by high levels of gene flow. This was addressed above as more convenient than an actual means of measuring connectivity since all the existing populations are directly connected to the Canadian populations or were brought into the southern Rockies as reintroductions thus the same genetics. It is unclear how this parameter might vary with the years or decades it might take to show differences and is the final arbiter of success rather than well-defined corridors that are mapped, analyzed and given actual criteria to maintain or restore connectivity combined with population monitoring.

RP:29 We envision a two-tiered approach that focuses on identifying and protecting important lynx habitats and incorporates proactive forest management to retain or restore spatial and temporal mosaics of forest stand conditions conducive to lynx and hare persistence. For example, we emphasize forest management that minimizes wildfire extent and intensity to reduce the likelihood of forest type conversion following high-severity fires. This fails to recognize the extent that threat of wildfire is being used to greatly expand timber harvest and fuels treatments that themselves remove cover and understory that hares and lynx need. The analyses we have proposed would address the multiple threats, the extent of past wildfire and other habitat altering human uses. The RP should have presented an analysis of the extent of habitat alterations by these various threats.

RP:31 – 33 Describes levels of priority for actions and a 20-year timeframe. These are general and meaningless without the specific analyses and specific standards and criteria which FWS should identify. It leaves a fragmented and disconnected legacy that agencies will have to implement without consistent and quantitative guidance. It considers most actions as being not a threat and deflects back to the agencies that have been making decisions that have destroyed the function of lynx habitat for the past several decades. There needs to be a specific plan. To now call for research for "forest management strategies to conserve lynx habitat in each SSA" ignores what is already known that is sufficient to lay out these strategies. Not doing so is perpetuating the status quo.

2.8 Summary. Chapter 2 critiques the Draft Recovery Plan for the Canada lynx, focusing on how recovery goals and habitat modeling are applied in the Greater Yellowstone Area (GYA) and surrounding Southern Rockies. The chapter relies on analysis of the Olson GYA Model used by the FWS to evaluate the scientific foundation of the Recovery Plan. That model did not consider vegetation structure to define suitable habitat and focal areas. It argues that the Plan underestimates the extent and functional importance of southern habitats by narrowly interpreting occupancy, snow conditions, and vegetation structure, thereby minimizing the role of the GYA and adjacent linkage landscapes in long-term recovery. The chapter contends that recovery criteria lack measurable, enforceable standards for habitat quality, connectivity, and population monitoring, and that the Plan relies too heavily on uncertainty - particularly regarding southern population viability and immigration dynamics - to justify limited protections. Overall, Chapter 2 concludes that the Recovery Plan fails to provide a robust, landscape-scale strategy to restore functional connectivity and ensure the persistence of southern lynx populations, instead institutionalizing a constrained view of habitat and recovery potential.

CHAPTER 3 Revised Critical Habitat for Canada lynx

3.1 Background. The Federal Register Notice[74] cites the ESA definition of critical habitat as:

> *(i) the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protections; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary of the Interior (Secretary) that such areas are essential for the conservation of the species.*

The FR Notice made several points regarding designation of CH for Units 3, 5, and 6.

> *Unit 3 was occupied at the time of listing and is currently occupied and directly connected to the habitat and population in Canada. Unit 5 has small pockets of habitat on the Bridger-Teton NF and recent modeling (Olson et al 2021) shows this area does not contain the physical and biological features necessary to support lynx residency and is not directly connected to lynx habitats elsewhere. In Unit 6 it is uncertain whether this unit historically supported a resident population or if present, it was ephemeral. It is not connected to lynx habitats elsewhere. It now supports a resident population as the result of the State of Colorado reintroductions.*

This assertion regarding Unit 5 lacking habitat to support lynx occupancy is incorrect. The analysis in Chapter 2 shows there are millions of acres of habitat in the GYA and Unit 5 that the Olson GYA Model shows are suitable.

Records of historical lynx observations were obtained from the Beaverhead-Deerlodge NF (BHDL)[75], Montana Natural Heritage Program (MNHP)[76], and the Wyoming Game and Fish Department (WGFD)[77]. The records were mapped in ArcGIS Pro 3.2 to illustrate the areas historically used, some of which occurred up to the current time. (Figure 3.1). Data for Idaho has been requested but not received. The map shows historic lynx concentration areas in Units 3 and 5. Unit 5 has widespread observation records which argue for a broader critical habitat designation of Unit 5 in total.

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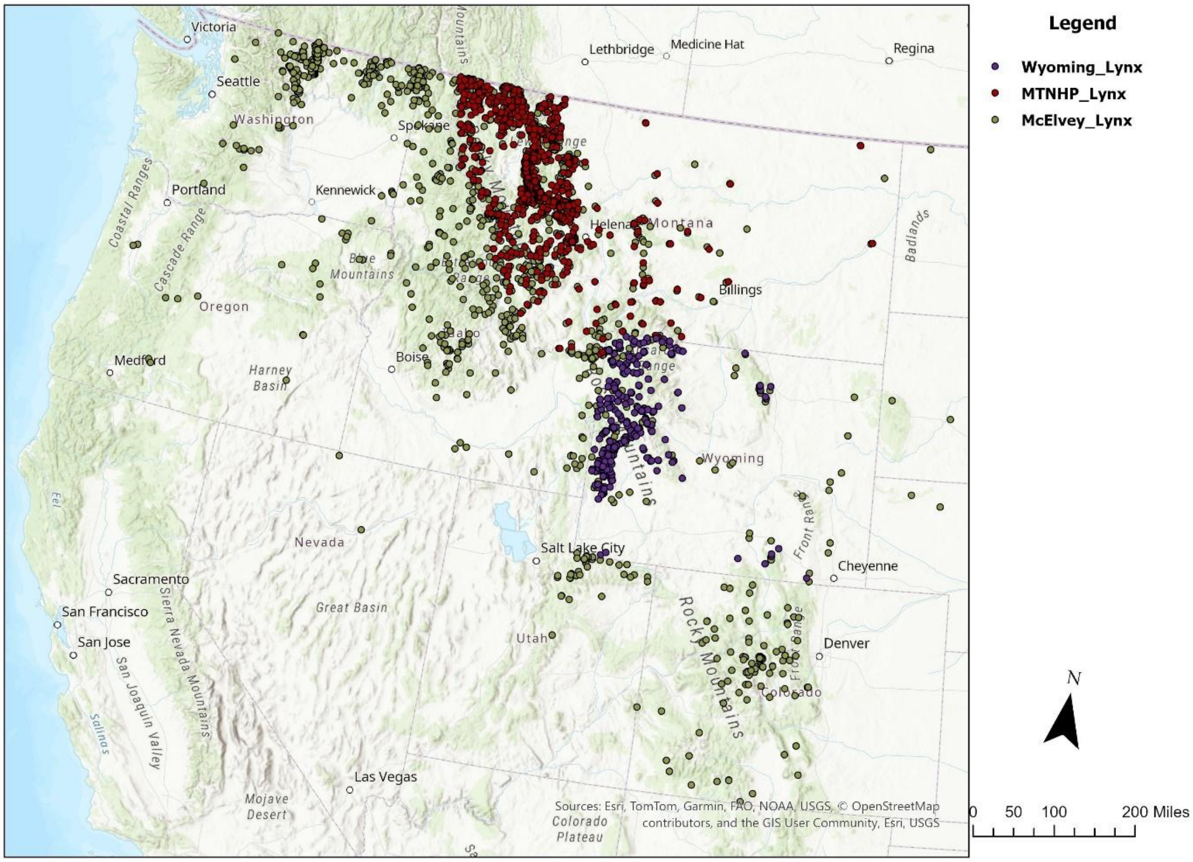
[74] UFWS. 2024. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous U.S. Distinct Population Segment of the Canada Lynx. Federal Register Vol. 89, No. 230. November 29, 2024. https://app.box.com/s/2k3k93pbtsnkf4pesxfavyxr36igzhtb

[75] Records obtained from the Beaverhead-Deerlodge NF in the form of a layer file: Historic Lynx Records (citing McKelvey et al, 1999). https://app.box.com/s/6bg8w6k5ru1axlv3zcm5ba2tt3gjz9hg

[76] Montana Natural Heritage Program, Montana Animal Observations. Accessed: April 24, 2024. https://nris.mt.gov/reqapp/userMain.asp

[77] Wyoming Game and Fish Department. Lynx_canadensis_observations_statewide. Received on January 10, 2025. Data cannot be shared due to an MOU with the State.

Figure 3.1 Lynx Observations in the Rocky Mountains



The FR Notice claiming there is a lack of habitat in Unit 5 doesn't match with the historical presence of lynx. While the lack of lynx in Unit 5 today might be used to argue there is no habitat, the FR Notice and FWS ignore that Colorado likely was not occupied at time of listing, while Unit 5 had observations during and following listing. Even as recently as February 2022, a Canada lynx was observed in the Bridger-Teton National Forest in the Gros Ventre Range.[78] The point is that lynx are present in the GYA Unit 5 and should be given the same consideration as Unit 6 which was considered not occupied at time of listing. The lynx population in Unit 5 could be supplemented by reintroductions as was done in Colorado and critical habitat increased to capture more suitable and high value habitat and connections.

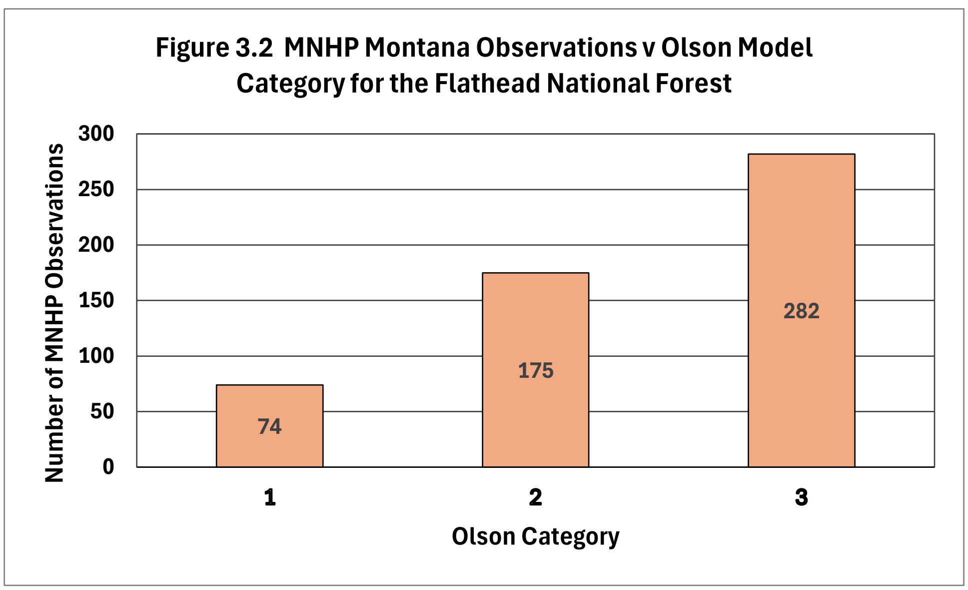
3.2 Lynx Observations and Models. An analysis of the SSA Focal Units, Focal Areas, and Critical Habitats captured the overall observations for the Wyoming and Montana Natural Heritage Program databases. The observations included periods pre- and post-listing of lynx. (Table 3.1). The Flathead NF was analyzed to see how the MNHP observations with low

[78] Kashmrl, M. 2024. Rare Wildcat Documented in the Yellowstone region for first time in a decade. Wyofile. June 7, 2024. https://app.box.com/s/dl1a1qo23kqxcvk3f20zu1aulcl0ehh5

location uncertainty (100 meters or less) compared to the Olson et al (2021) habitat probability. This showed that category 2 and 3 captured 86% of the MNHP observations. (Figure 3.2).

Table 3.1 Focal Units 3 and 5 Lynx Observation Comparisons

Rocky Mountain Management Areas	MNHP Observations Captured/Percent of Overall	Wyoming Observations Captured/Percent of Overall
Overall Observations	2414/100%	314/100%
Unit 3	2244/93%	
Unit 3 FA	1817/75%	
Unit 3 CH 2014	1973/82%	
Unit 3 CH 2024	1821/75%	
Unit 5		198/63%
Unit 5 FA		73/23%
Unit 5 CH 2014		175/56%
Unit 5 CH 2024		73/23%



Analysis of SSA Unit 3 showed that the 2024 proposed CH captured 75% of the MNHP observations which was less than the 2014 CH (82%) and much less than Unit 3 overall (93%). (Table 3.1). In Unit 5, the 2024 proposed CH captured 23% of the Wyoming observations which was less than the 2014 CH (56%) and Unit 5 overall (63%).

Critical Habitat should be expanded for Unit 3 to include all of Unit 3 which captures 93% of observations. Critical Habitat in Unit 5 should be expanded to also capture the habitat level of

Unit 3 (93%). In addition, defined connections to Units 3 and Unit 6 from Unit 5 are necessary to provide migratory habitat and security.

Squires et al (2010)[79] 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 3.3 for a map illustrating how studies or areas accessible to people can result in more observations compared to areas such as wilderness where human presence is low in winter. Does this mean, therefore, that the wilderness is not a suitable habitat? Or that more people with their associated impacts need to be present to document lynx? This speaks to the need for ongoing standardized surveys, a necessary element of any recovery effort.

MNHP observations in Glacier National Park (GNP) were also mapped. (Figure 3.4). This shows 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 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. When the Olson Model and its mean habitat probabilities are analyzed across management areas, 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 for protection with mean habitat probabilities at least at or higher than Glacier NP.

[79] Squires, J.R., DeCesare, N.J., Kolbe, J.A., & 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. https://app.box.com/s/305ebw63mqzteymwu3uq3qsj5fy08gbv

Figure 3.3 Lynx Observations Adjacent to Bob Marshall Wilderness

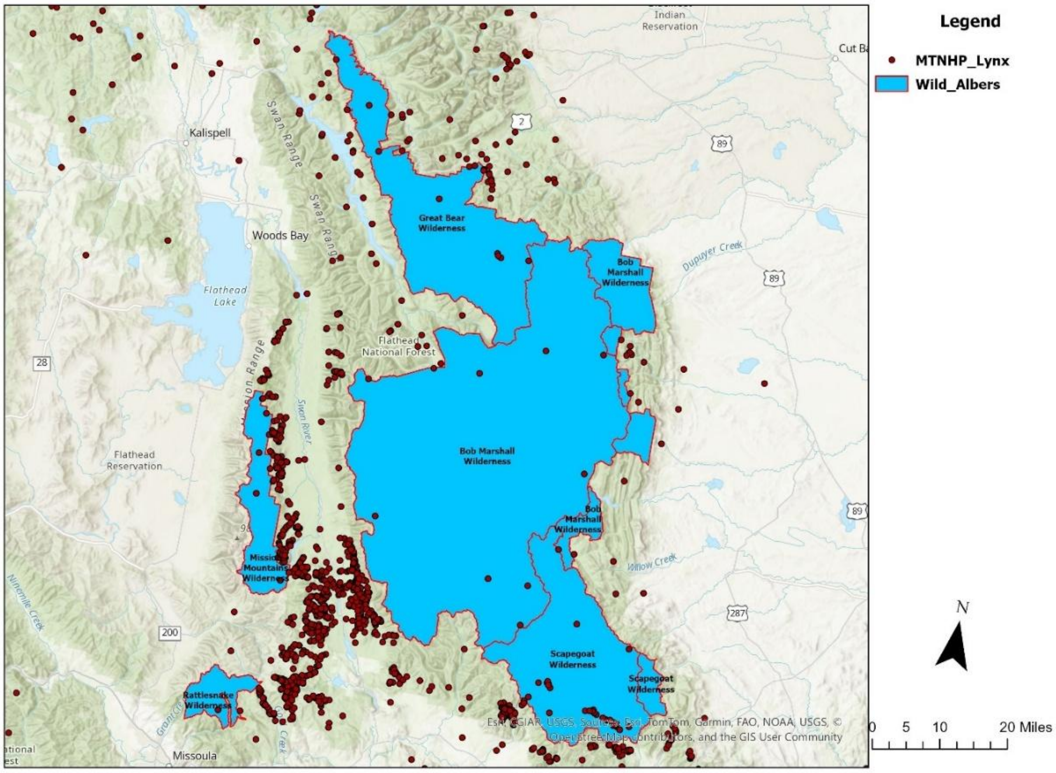
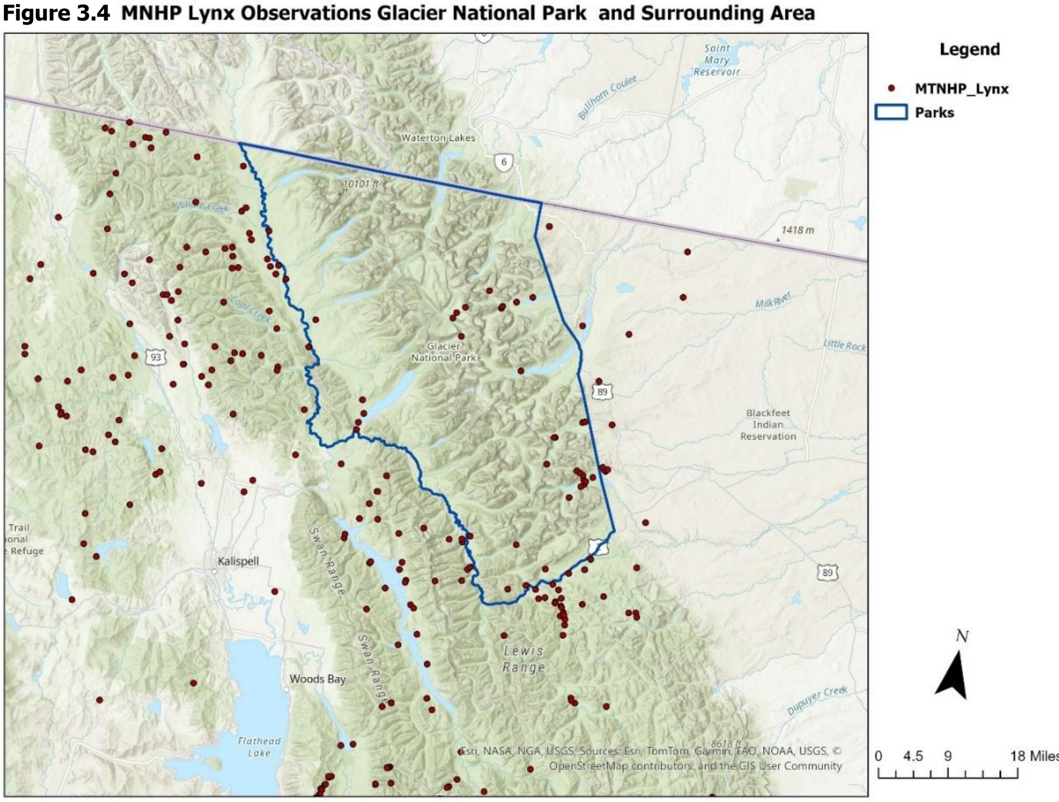


Figure 3.4 MNHP Lynx Observations Glacier National Park and Surrounding Area



3.3 GYA Pre- and Post-1990 Observations. In another example, the FEIS for the Dairy Syncline Mine in the Canada lynx linkage in the CNF in southeast Idaho shows 6 lynx observation locations (FEIS Figure 3.7.2), but no coordinates and dates for these are provided.[80] The FEIS notes that the Idaho Fish and Game Fish and Wildlife Information System records contain one observation of a female lynx with two cubs in August 2005, two miles southeast of the Blackfoot River Narrows and approximately 0.5 mile from the wildlife Study Area. (FEIS p3-169). These observations occurred in either or both the Soda Springs and Montpelier Ranger Districts of the Caribou National Forest. *" The Montpelier and Soda Springs Ranger Districts, including the Study Area, have been identified as potential linkage habitat between the 'core' Canada lynx habitat in Bridger-Teton National Forest and "'peripheral' habitat in the Ashley National Forest in Utah (USFS 2003b[81]; USFS 2007[82])".* See Figure 1.1 of this report.

A map was generated showing observations before and after 1990 for the Grand Teton and Yellowstone National Parks, Bridger-Teton NF, and Caribou-Targhee NF. This relates to the 2000 ESA listing period and what is considered occupied and unoccupied habitat. (Figure 3.5, Table 3.2). The observations noted with (_1990) are observations including 1990 forward. Where the Wyoming observations overlay the McKelvey observations, the Wyoming observations are used. Obtaining the current database for lynx observations in Idaho would fill in missing points such as the ones mentioned above in the Dairy Syncline discussion.

Referring again to the Federal Register Notice citation of the ESA definition of critical habitat:

> *(i) the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protections; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary of the Interior (Secretary) that such areas are essential for the conservation of the species*

What is needed is the determination by the Secretary of the Interior that Unit 5 and Unit 3 with expanded critical habitat and protected migration corridors is essential for the conservation and recovery of the species.

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[80] U.S. DOI. 2019. Final Environmental Impact Statement Proposed Dairy Syncline Mine and Reclamation Plan. https://app.box.com/s/jmod5pcq1txhv4wmply3oxuazlm16tau

[81] USFS. 2003b. Final Environmental Impact Statement for the Caribou National Forest Revised Forest Plan. Idaho Falls, Idaho. https://app.box.com/s/pqa6bwpxznxwh7mx7g4i370jbzerlnne

[82] USFS. 2007. Final Environmental Impact Statement, Northern Rockies Lynx Management Direction. National Forests in Montana, and parts of Idaho, Wyoming, and Utah. March 2007. https://app.box.com/s/smz8ucyfq4d07i27of3ot2tli89va9gx

Figure 3.5 Wyoming and McKelvey Observations Pre- and Post-1990

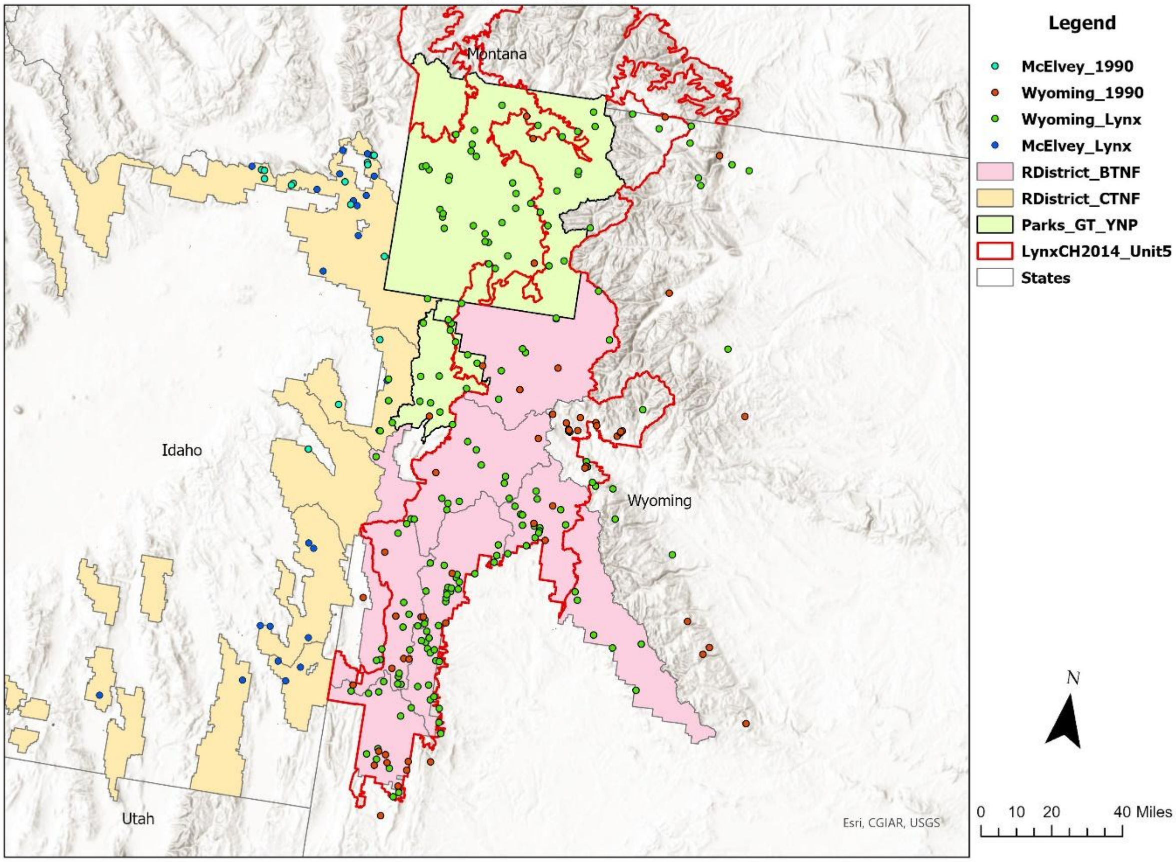


Table 3.2 Summary of Pre- and Post-1990 Observations by Area

Area	Observations Pre-1990 (Date Range)	Observations since 1990 to (Date)	Total Observations
Grand Teton and YNP	57	5 Most recent (2008)	62
Caribou-Targhee NF	32	14 Most recent (1998)*	46
Bridger-Teton NF	99	25 Most recent (2010)	124

*Female and 2 kittens in 2005 from the Dairy Syncline reference should be included.

3.4 Factors Affecting Occupancy. In Chapter 1, the FWS *"Clarification of Findings"* in its Remand Notice stated that *"no evidence"* was found that forest roads pose a threat. It also stated that mining and livestock grazing were not *"specifically addressed because we have no information to indicate they pose threats to lynx."* Then, over-snow recreation was explained away due to *"no evidence"*. Timber harvest was described as beneficial, benign, or detrimental depending on harvest, spatial and temporal conditions. The Olson et al (2021) paper noted that human activities can displace lynx. Recreation has exploded in these Rocky Mountain Forests in recent decades with high levels of use on forest roads while the claim that forest roads have little impact was based on roads in Washington with little or no use.

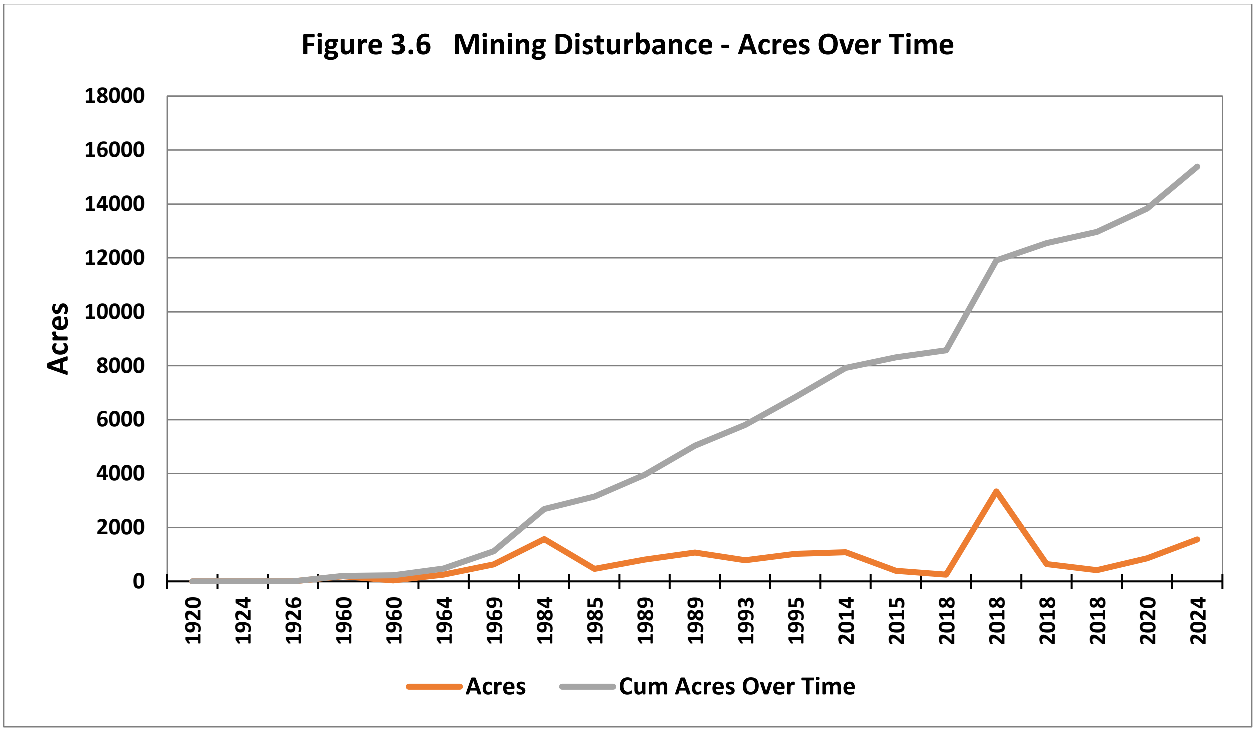
The 2013 Lynx Conservation Assessment and Strategy[83] refuted these broad assertions. An illegal shooting example from Colorado was provided, showing over 14% of reintroduced lynx were shot in the first 10 years. (2013 LCAS p84). Forest/backcountry roads and trails with low vehicular or snowmobile traffic *"had little effect on lynx seasonal resource-selection patterns"* and lynx traveled on roads *"unplowed during winter". "Squires et al (2008) reported that lynx denned farther from all roads compared to random expectation. … occupy dens in early May when many forest roads are still impassable… snowmobiles no longer use the roads because of intermittent and unpredictable availability of sufficient snow."* Finally, *"fewer roads were located in denning habitat and higher road density occurred along forest edges and in managed stands, which lynx avoided…."* (2013 LCAS p84). But these factors are all dismissed by FWS as affecting lynx in the Remand Notice and there are no regulatory standards regarding these activities.

Mining. Even the mining industry acknowledges that mines have detrimental impacts. For example, in the Dairy Syncline FEIS, it is stated, *"The year-round noise and human activity associated with the construction and active mining phases of the Proposed Action would likely influence Canada lynx to travel around the periphery of the disturbed area".* (Dairy Syncline FEIS p4-106). Note that these mines have about 400 blasts per week, with excavation and ore hauling going on 24/7 throughout the year.

Data indicates that the increased habitat destruction by mining in SE Idaho since the 1960's has been a factor in disrupted lynx habitat and occupancy. Figure 3.6 is a chart of mining disturbance over time in the Montpelier and Soda Springs Ranger Districts in the Caribou NF, identified as lynx linkages.[84] When haul roads and other infrastructure are added, the area of disturbance by mining is even larger. The high road densities and explosion of motorized recreation in the area have an additional cumulative impact.

[83] Interagency Lynx Biology Team. 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp. https://app.box.com/s/p80ykdfc41slqnm55j8f2qo5m7npb4aj

[84] Bureau of Land Management. 2024. Draft Environmental Impact Statement Caldwell Canyon Revised Mine and Reclamation Plan. (p40). https://app.box.com/s/kmkyjx2iuy84zbx5wjcawlktjs8198u2



Timber Harvest. In the Tally Lake Ranger District in the Flathead NF, lynx observations were compared to historical timber harvest.[85] McKelvey, MNHP, and lynx observation records obtained from the Flathead NF were used for the comparisons. Forest Service national databases were downloaded for this analysis.[86] The trends in lynx observations and forest timber activities are shown for the Tally Lake Ranger District in Figures 3.7 and 3.8. Timber harvest peaked prior to listing of lynx as threatened. Lynx observations were more regular and at higher levels prior to listing. This does not suggest that timber harvest was benefitting lynx, merely that the cumulative effect of historical logging peaked at about the time of listing while lynx observations declined.[87]

[85] Carter, J. 12/22/2024. Memo to Mike Garrity Re: Tally Lake Ranger District. John Carter 12/22/2024. https://app.box.com/s/oi1vwmt79qoxncftkfjeei1ogngzekq7
[86] https://data.fs.usda.gov/geodata/edw/datasets.php Accessed November 18, 2024.
[87] Carter, J. 02/08/2025. Memo to Mike Garrity Re: Preliminary Lynx Effects Analysis Round Star Project, Flathead NF. https://app.box.com/s/xnitxcggg1hogqntg6monhk06izc9eg2

Figure 3.7 Lynx Observations Tally Lake RD

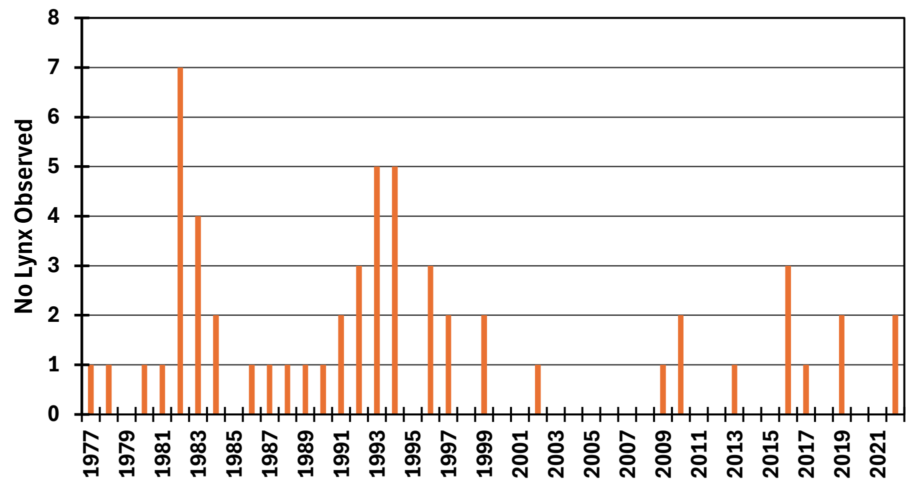
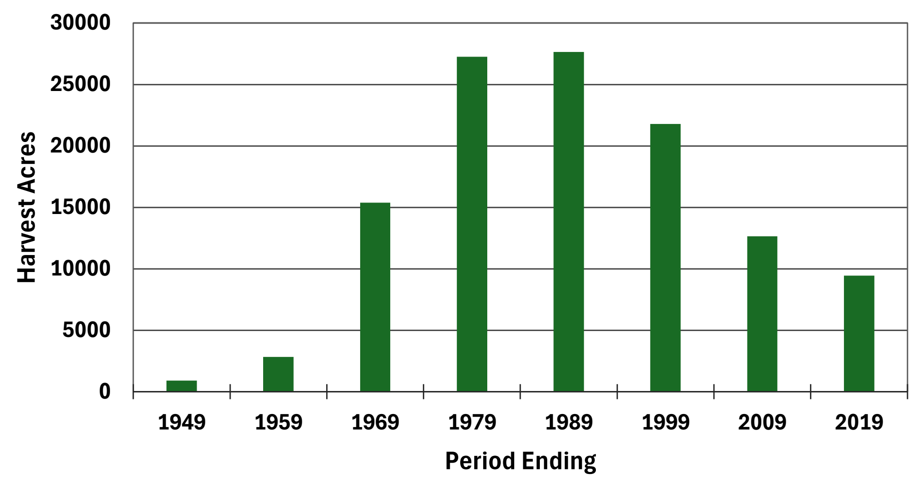


Figure 3.8 Harvest Tally Lake Ranger District



Road Density. Road mileages in the National Forests in SSA Units 3 and 5 were summarized. (Table 3.3). This was based on the Forest Service MVUM open roads and trails.[88] Road and trail density was calculated for the Forests overall and after removing the acreage of Inventoried Roadless Areas and Wilderness Areas to calculate an approximate density in unprotected areas. These mileages do not include many classes of roads and trails such as user-created, non-system, temporary, county, highway, and others. There is a wide variation and there is a need for a more detailed analysis to determine why lynx occupies some areas with higher road density and don't occupy some with low road density. Are the areas with lynx present made so by the extent of protected areas? Are connections more highly fragmented by roads than the overall Forest? This is the case in the Phosphate Mining Area in southeasts Idaho and in the Caribou NF where snowmobile access is open in 97% of the Forest

[88] https://data.fs.usda.gov/geodata/edw/datasets.php Accessed November 18, 2024.

and groomed trails proliferate. A further element in the analysis would be the level of use of these roads and determination of which constitute barriers to lynx due to intensive use in summer and winter.

Table 3.3 Summary of Road Miles/Square Mile - Protected v Unprotected

Forest Name	Miles per Square Mile Entire Forest	Miles per Square Mile Unprotected
Beaverhead-Deerlodge National Forest	0.83	1.92
Bitterroot National Forest	1.11	3.62
Boise National Forest	1.20	2.22
Bridger-Teton National Forest	0.41	1.89
Caribou-Targhee National Forest	0.58	1.31
Custer Gallatin National Forest	0.43	0.96
Flathead National Forest	0.86	2.08
Helena-Lewis and Clark National Forest	0.66	1.80
Idaho Panhandle National Forests	1.81	2.51
Kootenai National Forest	1.92	2.66
Lolo National Forest	1.59	2.44
Nez Perce-Clearwater National Forest	1.20	3.40
Payette National Forest	0.79	2.66
Salmon-Challis National Forest	0.58	3.32
Sawtooth National Forest	0.53	1.97
Shoshone National Forest	0.28	1.64

What is missing in the analyses for lynx critical habitat, recovery planning, and at the National Forest project level are the spatial and temporal effects of roads, timber, mining, livestock grazing, and recreation. Analyses for Forest projects in the Northern Rockies and GYA have lacked this analysis. While clear-cuts and sparse forests may receive some lynx use after many years, their suitability for lynx is significantly reduced for a significant amount of time. It has been shown not only that those clear-cuts and sparse forests are strongly avoided by lynx, but that restoration of lynx habitat use in these logging areas to 50% of previous use takes 20 years in forest thinning, and 34-40 years for selection cuts and clear-cuts. Also, all logging treatments are avoided by lynx for at least 10 years.[89] Predictors for lynx reproductive success within occupied female home ranges were the connectivity of mature forest, intermediate (10 - 15%) amounts of young regenerating forest, young regenerating forest patches with low perimeter - area ratios, and the adjacency of mature forest to young regenerating types. Female lynx home

[89] Holbrook, J.D., Squires, J.R., Bollenbacher, B., Graham, R., Olson, L.E., Hanvey, G., Jackson, S., & Lawrence, R.L., 2018. Spatio-temporal responses of Canada lynx to silvicultural treatments within the Northern Rockies, U.S. For. Ecol. Manage. 422, 114–124. https://app.box.com/s/hmpchp3j22gew0a1r54fjzsovqw0hvfg

ranges with greater than 50% mature forest and 10 - 15% young regenerating forest appear to be the optimum.[90]

Trapping. Another factor that is dismissed by FWS is trapping and the effects on lynx. For example, Wyoming has trapping for coyotes, bobcats, wolves and other fur bearers. A recent report from Wyoming Game and Fish Department for bobcat trapping summarized the trapping effort in Wyoming. Annual trapping licenses ranged up to 2,699 and annual trap days ranged from 251,852 – 653,682 over a ten-year period.[91] Trapping in Montana is widespread as it is in Idaho. Britell et al (1989) noted that hunting and trapping were the principal causes of mortality for lynx and that lynx are vulnerable to trapping.[92] They also noted that improved access encourages use of hound hunting and hound hunting is strongly influenced by road access. *"Overexploitation, particularly during the critical low (population) period, minimizes the potential recovery, reduces the expansion of dispersing lynx into vacated habitats and jeopardizes sub-populations in the more accessible areas. This emphasizes the need to secure lynx distribution and numbers of low prey abundance."* In the GYA and Southern Rockies Units 5 and 6 where habitat suitability is lower than in the Canadian and Unit 3 areas that are connected, it is even more critical to reduce stressors such as trapping on lynx habitat and prey.

Referring to the FR Notice regarding designation of Critical Habitat, in making decisions on occupancy, critical habitat, and recovery, the Olson Model needs to be supplemented by an analysis of these spatial and temporal factors across all National Forests in Units 3, 5, and 6 along with an expansion of the Model to cover the habitats and connections between these. In addition, the occupancy in Unit 6 was based on a barely begun reintroduction program with lynx dispersing north to the Uinta Mountains and GYA. These areas with suitable habitat such as in the Caribou-Targhee NF and the higher elevation corridor connecting Unit 6 to Unit 5 should be given the same consideration. If lynx were supplemented in Unit 5, the Uinta Mountains and elsewhere, these places might have also been considered for critical habitat. In Chapter 4 the Squires et al (2024) analysis and model which took disturbance factors into account is addressed. The Northern Rockies and Greater Yellowstone Area and the connections between these and the Southern Rockies (Model Gap) should be provided with the same modeling protocol to identify connections and priority habitat protections on the National Forests and other public lands.

3.5 Snow Depth as a Limitation. The Federal Register Notice indicates that snow conditions (consistency, depth and duration) are needed to allow lynx to outcompete competitors. Squires

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[90] Kosterman, M.K. 2014. Correlates of Canada Lynx Reproductive Success in Northwestern Montana. Graduate Student Theses, Dissertations, & Professional Papers. 4363. https://app.box.com/s/j1kfpjbznr88juzdazkhyhdqal5lw7in

[91] Wyoming Game and Fish Department. 2023. Bobcat License Data Summary Tables I and II. https://app.box.com/s/5jjp64tw16qy2inwclzd4gxb11rrw7ws

[92] Britell, J.D., Poelker, R.J., Sweeney, S.J. & Koehler, G.M. 1989. Native Cats of Washington. 49p. https://app.box.com/s/8ijb4b47bgp2xnhrhjuloi9joh4bex9j

et al (2010)[93] found that snow depth was deeper at 86 cm (34 inches, SD = 34cm) than generally available at 80 cm (31.5 inches, SD = 32cm) and not significantly different within home ranges but found no evidence that snow penetrability affected lynx travel routes. Gatlin (2020)[94] in updating LAUs for the Beaverhead-Deerlodge NF, determined from these data and watershed evaluations that lynx selected habitats with a minimum snow depth of 50 cm (20 inches).

For our comments on BHDL lynx amendment, snow depths were analyzed at 29 snow monitoring stations covering a 21-year period ending in March 2024. These were located within and adjacent to the Beaverhead-Deerlodge NF. (Table 3.4, Figure 3.9). These stations covered all elevations and were located within and adjacent to the BHDL. This analysis illustrated that in most years at all elevations sufficient snow depth is available to accommodate lynx. Even at the lowest elevations, there is sufficient snow in nearly half to 90% of the years.

Data from stations at lower and higher elevation stations in Wyoming, southeast Idaho, and northeast Utah in the Y2UConn were reviewed. (Figure 3.10). The Wyoming SNOTEL (East Rim 460) is in the lynx migration path in the GYA connecting the Wyoming and Wind River Ranges mapped by Squires and Oakleaf (2005)[95]. The Bondurant station is an ACIS station. Table 3.5 shows the number of days these stations exceed the 20-inch depth minimum suggested by Gatlin. The East Rim Divide Station was also evaluated relative to the 34-inch mean depth from Squires et al (2010). Both locations have significant numbers of days exceeding these snow depths.

Table 3.4 Years at or Above Minimum Snow Depth of 20 Inches (50cm) in Wisdom Ranger District, Beaverhead-Deerlodge NF

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%

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[93] Squires, J. R., Decesare, N. J., Kolbe, J. A., & Ruggiero, L. F. (2010). Seasonal resource selection of Canada lynx in managed forests of the northern rocky mountains. Journal of Wildlife Management, 74, 1648–1660. https://doi.org/10.2193/2009-184. https://app.box.com/s/fy8nll964ai9wzju67jcgygb84ce9l88

[94] Gatlin, J., & O.Neil, J. 2020. Habitat Mapping Documentation for Canada Lynx (*Lynx Canadensis*) on the Beaverhead-Deerlodge National Forest – 2020 Update. In: Gatlin (2021) Biological Assessment for Canada Lynx -Effects of the 2009 Revised Forest Plan and the Northern Rockies Lynx Management Direction. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd901415.pdf

[95] Squires, J.R. & Oakleaf, R. 2005. Movements of a male Canada Lynx crossing the Greater Yellowstone Area, Including Highways. Northwest Science 79(2&3):196 – 201. https://app.box.com/s/67s5soh1bi5stphx7mojstclqouxadz1

Figure 3.9 SNOTEL Stations BHDL

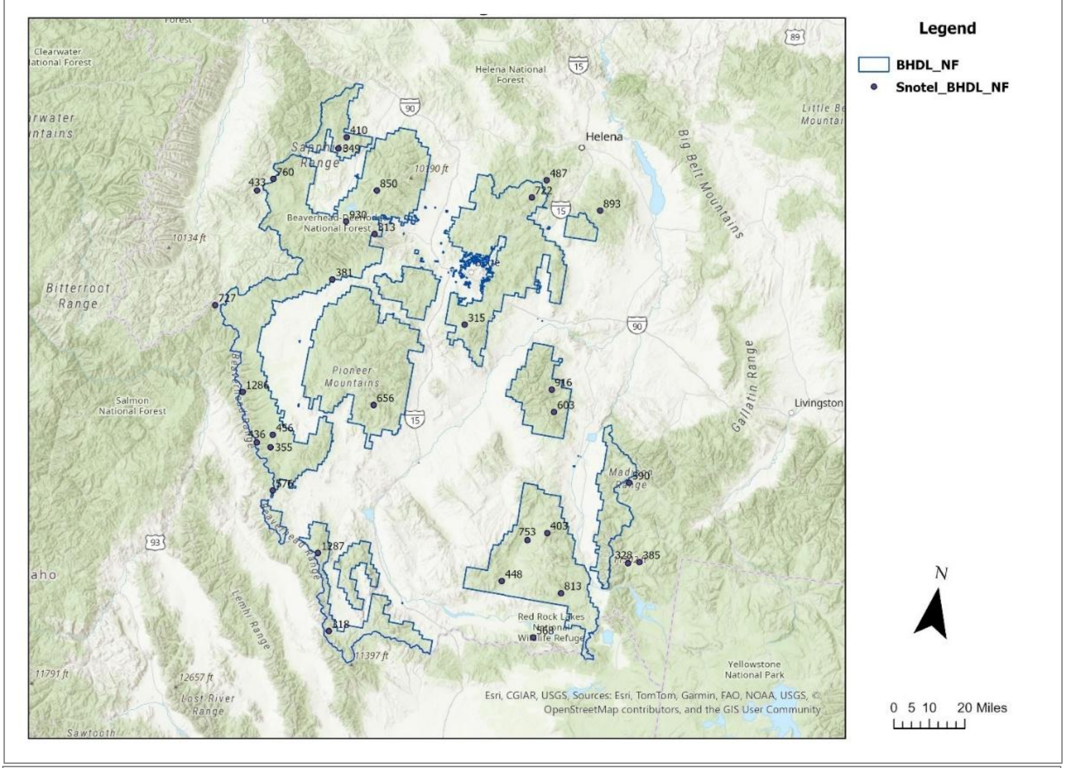


Figure 3.10 Snow Monitoring Stations Y2UConn

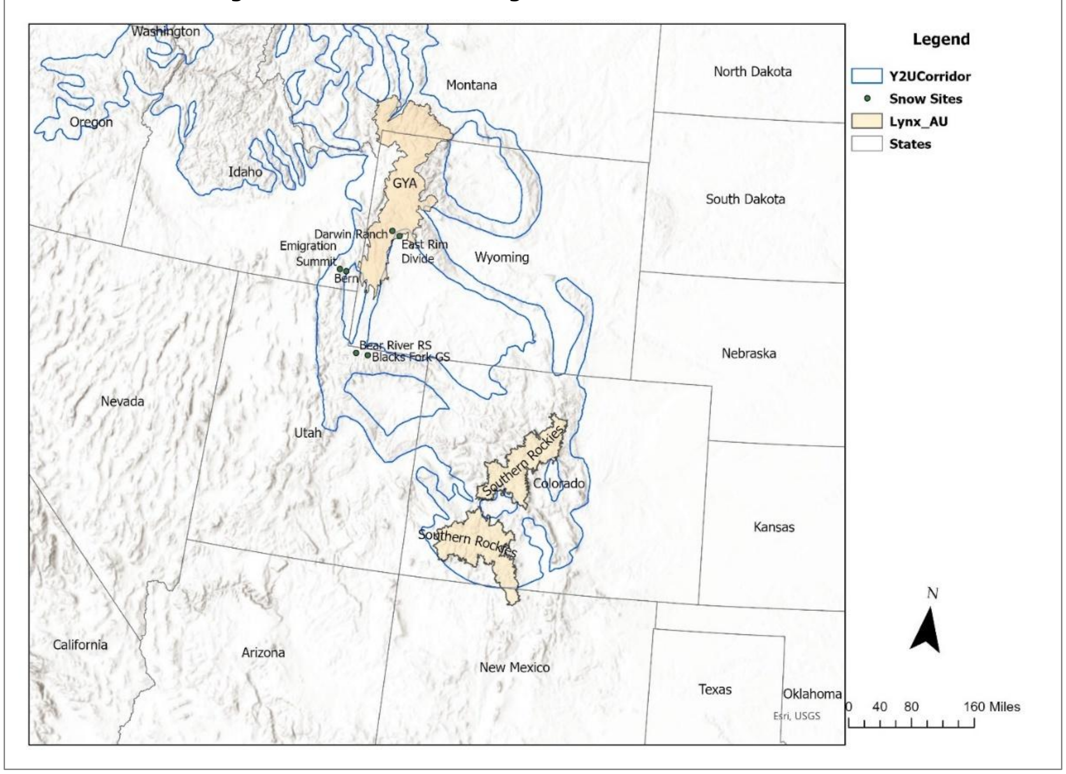


Table 3.5 Snow Depths for SNOTEL and ACIS Network Stations Wyoming 2011 - 2021

Station Name	Min/Mean/Max Days Above	Date Range for Onset of Depth Limit	Date Range for End of Depth Limit
Bondurant Darwin Ranch	0/68/128 > 20 in.	12/21 - 2/8	3/15 - 5/1
East Rim Divide	95/123/152 > 20 in.	11/26 - 1/4	4/9 - 5/4
East Rim Divide	1/49/94 > 34 in.	1/7 - 3/22	3/3 - 4/21

In southeast Idaho the higher elevation Emigration Summit SNOTEL (471) and the lower elevation Bern ACIS station were used. Note that these are in the Bear River Range and its foothills. This area is rated as high probability habitat in the Olson Model. SNOTEL stations were used for the Uinta Mountains where lynx was historically observed and had lynx occurrence from the Colorado reintroductions. These are summarized in Table 3.6 and charted below in Figures 3.11 – 3.16. These are provided as indicative of the adequacy of snow in these important areas in the GYA and the Y2UConn connecting the GYA to the Uinta Mountains. That corridor follows the Bear River Range in southeast Idaho through the higher elevation areas in Utah to the Uinta Mountains. Table 3.6 shows that at the higher elevation, snow depths are adequate in all years, while the lower elevations have snow exceeding the 20-inch minimum in over half the years. Having skied in and snowshoed in these areas, the author can attest to the great snow, and it is also important to recognize that the Y2UConn in Utah east of Salt Lake City contains historic ski areas that rely on deep snow. Snow in Units 3, 5 and 6 is not limiting for Canada lynx.

Table 3.6 Snow Depths at Stations in Wyoming, SE Idaho, and NE Utah

Station Name	Elevation	Years of Record Used	Years Above 20″ minimum	Percent of Years exceeding 20″ Minimum
Emigration Summit	7390	22	22	100%
Bern	5964	22	15	68%
East Rim Divide	8010	11	11	100%
Darwin Ranch	6620	13	11	85%
Bear River RS	8510	15	15	100%
Blacks Fork GS	9360	15	15	100%

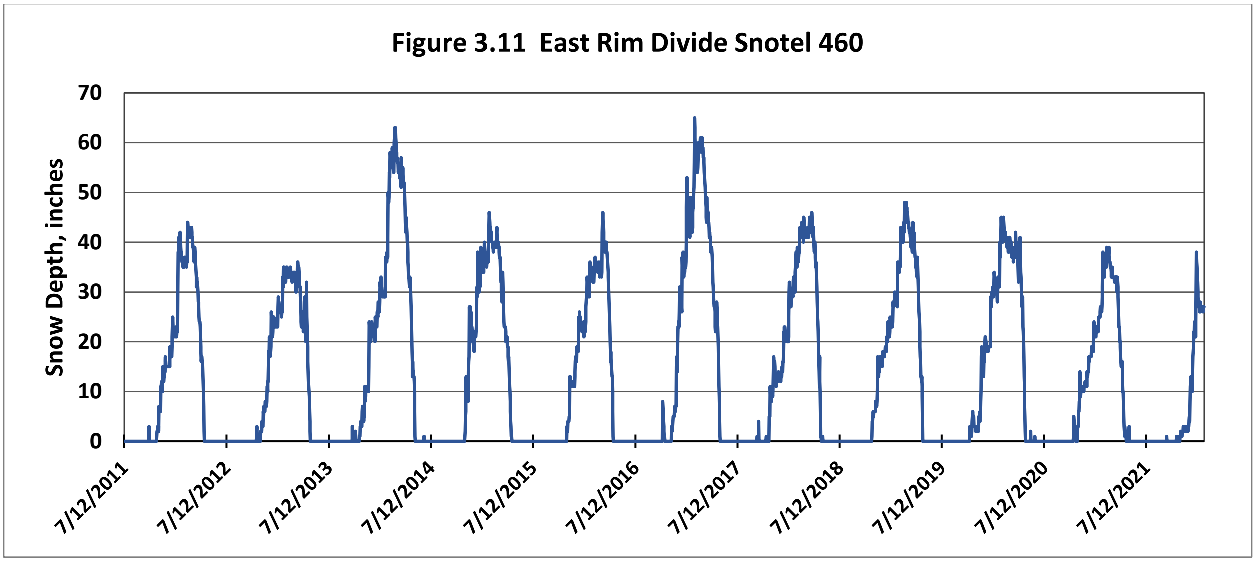


Figure 3.11 East Rim Divide Snotel 460
Snow Depth, inches
70
60
50
40
30
20
10
0
7/12/2011
7/12/2012
7/12/2013
7/12/2014
7/12/2015
7/12/2016
7/12/2017
7/12/2018
7/12/2019
7/12/2020
7/12/2021

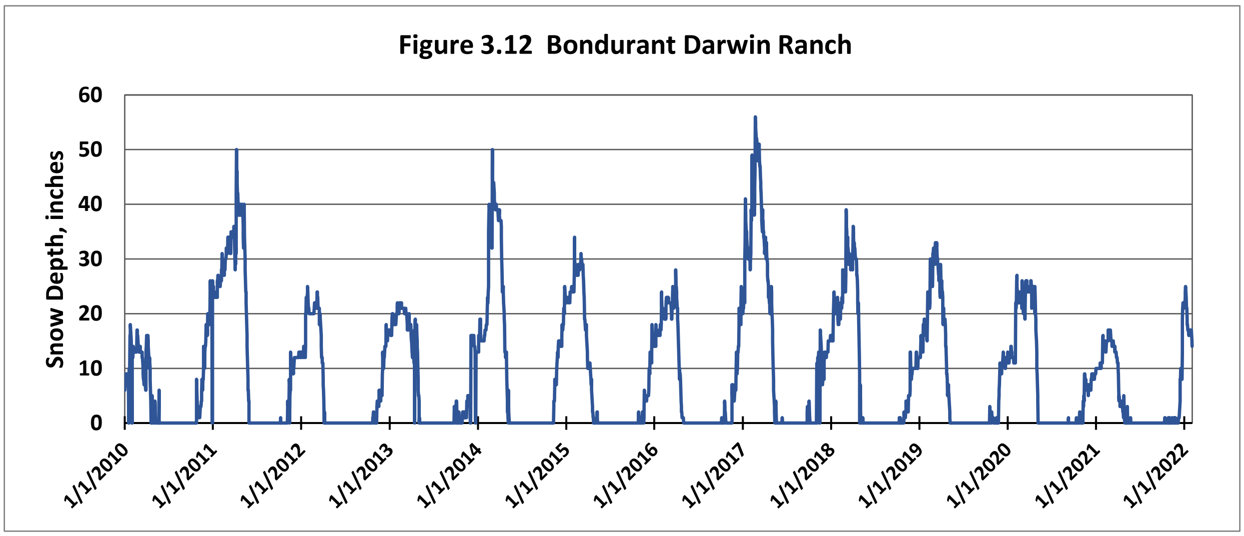


Figure 3.12 Bondurant Darwin Ranch
Snow Depth, inches
60
50
40
30
20
10
0
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
1/1/2015
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020
1/1/2021
1/1/2022

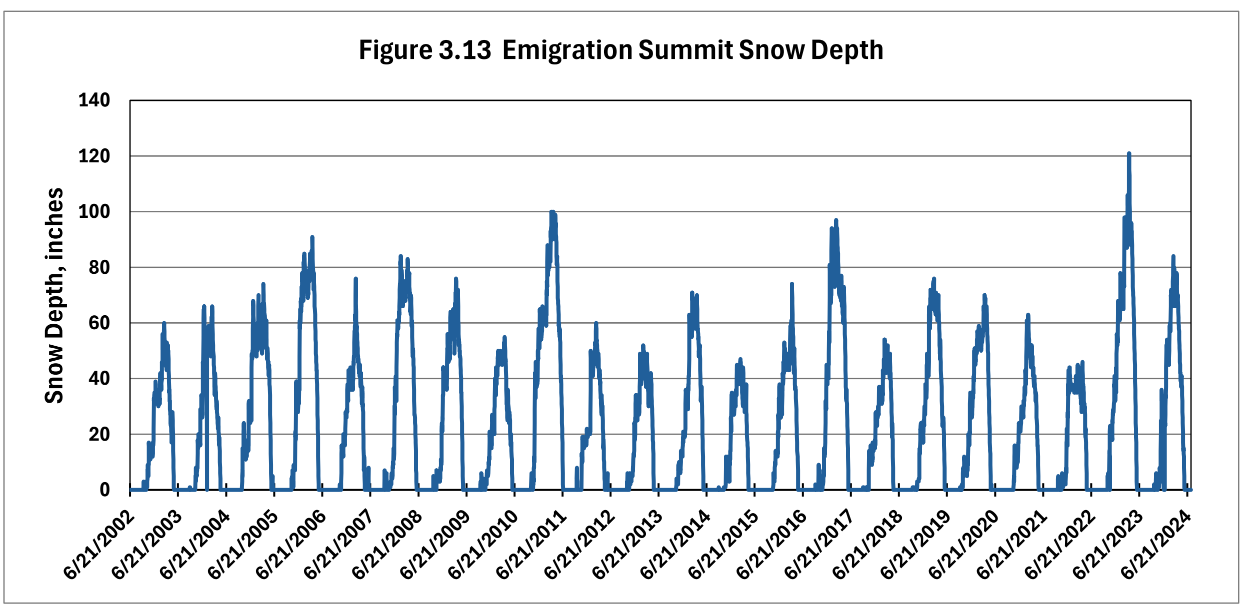


Figure 3.13 Emigration Summit Snow Depth
Snow Depth, inches
140
120
100
80
60
40
20
0
6/21/2002
6/21/2003
6/21/2004
6/21/2005
6/21/2006
6/21/2007
6/21/2008
6/21/2009
6/21/2010
6/21/2011
6/21/2012
6/21/2013
6/21/2014
6/21/2015
6/21/2016
6/21/2017
6/21/2018
6/21/2019
6/21/2020
6/21/2021
6/21/2022
6/21/2023
6/21/2024

Figure 3.14 Bern Station Snow Depth

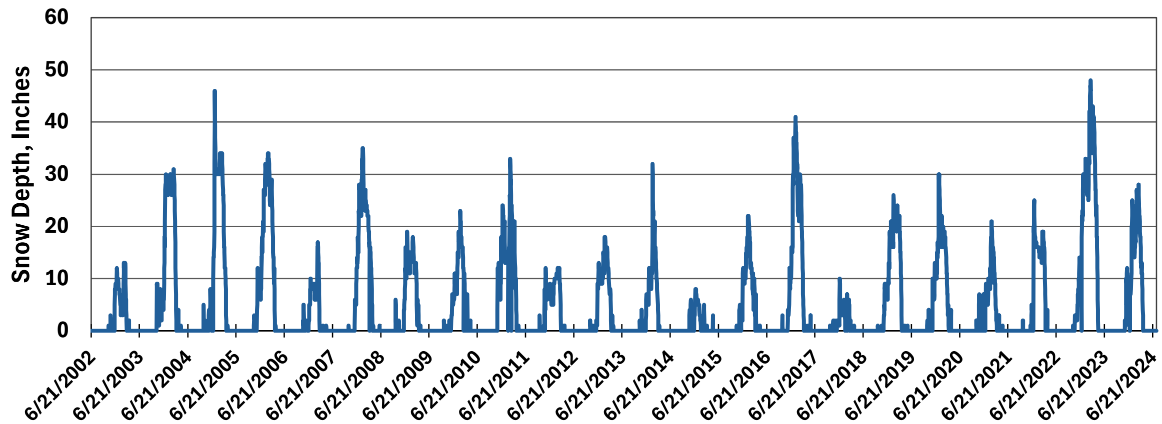


Figure 3.15 Bear River Ranger Station

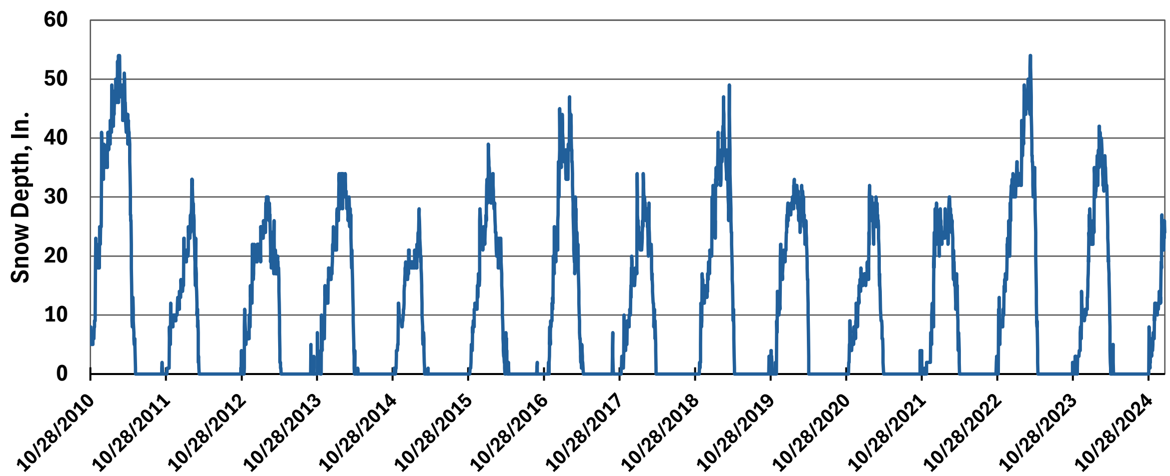
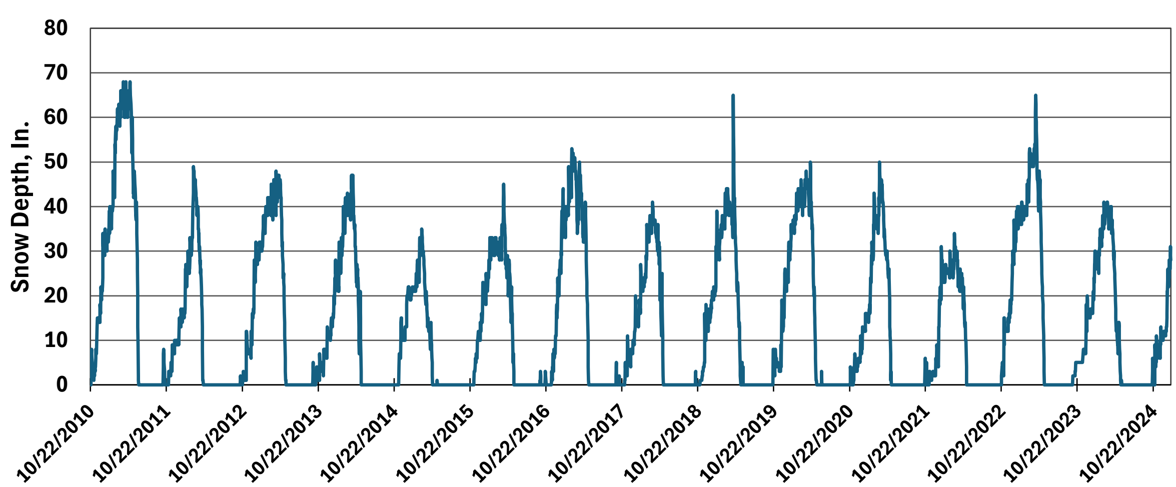


Figure 3.16 Blacks Fork Guard Station



3.6 Snowshoe Hare Populations. The Federal Register Notice also limits Unit 5 due to low snowshoe hare abundance, but monitoring is spotty and the Science Report indicates there should be sufficient snowshoe hares present. Snowshoe hare studies requested from the Forest Service provide few results. The Lynx BA[96] noted that land use plans have failed to provide monitoring of lynx, snowshoe hares, and their habitats.

The Science Report (SR) Chapter 13 reviewed the ecology of lynx in these southern areas and compared them to the taiga in Canada.[97] In both regions, lynx occurred where snowshoe hares were abundant. In the southern region, lynx was known to make exploratory movements prior to dispersal. The Colorado tracking data clearly illustrates these exploratory movements. Habitats in the southern region are patchier, and lynx make more use of alternate prey. For instance, lynx scats collected in north-central Washington contained 79% snowshoe hare and 24% red squirrel. (SR p376 - 377). [This adds to 103%, so it is assumed there was overlap with one or more scats containing both prey species] Snow tracking studies in the southern Canadian Rocky Mountains found prey consisted of 52% snowshoe hare, 30% red squirrels, and the rest were flying squirrels, martens, voles, and grouse, and unknowns. Snowshoe hare densities were estimated to range from 0.01 - 0.47 hares/ha. (SR p377). *"In southern boreal forests, limited data suggest that because snowshoe hares typically occur at low densities (Chapter 7), alternative prey may always be important components of lynx diets, especially in the western mountains."* (SR p378). This calls into question the agencies' total reliance on snowshoe hares that is used to discount occupancy and habitat by lynx in these southern regions.

Chapter 11 of the Science Report summarizes densities in Montana as well as the Wyoming Range. (SR p346). Hare densities from these studies ranged from 0.6/ha to 1.4/ha. Two studies cited from Utah gave densities ranging from lows in aspen with dense understory of 0.22/ha to 2.7/ha in spruce-fir habitat. Intermediate numbers occurred in Douglas-fir (0.57/ha and subalpine fir of 0.99/ha). Hare densities in Colorado ranged from 0.26/ha in aspen, to 0.46/ha in Engelmann spruce.

These southern hare densities compare to population lows in areas of Canada with persistent lynx populations. For example, from the Science Report (SR p362), *"Hare densities in the southwest Yukon declined from 8.0 to 10.7/ha to 0.2 to 0.5/ha during one cycle (Ward and Krebs 1985), and another population fell from 7.5/ha to 1.3/ha during the next cycle (Slough and Mowat 1996). Similarly, a population in the Northwest Territories fell from 7 to 9/ha to 0.4 to 1.0/ha during the early 1990s (Poole 1994), and a northern Alberta population declined drastically from about 17/ha to 0.34/ha during the early 1970s (Brand et al. 1976)."* Based on the Science Report, hare densities alone are

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[96]USDA Forest Service and DOI Bureau of Land Management.1999. Biological Assessment of the Effects of National Forest Land and Resource Management Plans and Bureau of Land Management Land Use Plans on Canada lynx. https://app.box.com/s/pc4oeefty80a9gd4sa0757tne6020hp4

[97] Ruggiero, L. F., Aubry, Keith B., Buskirk, S. W., Koehler, G. M., Krebs, C. J., McKelvey, K. 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://app.box.com/s/zty51i19f78lhj8fwel7w3gjnzevvg5k

sufficient to support resident populations in these southern regions . When alternate prey is considered, they should be able to persist in the absence of habitat degradation by human activities.

Berg and Gese (2010) used fecal pellets and live-trapping to estimate snowshoe hare density in the Bridger-Teton NF.[98] Snowshoe hare densities ranged between 0.07 – 4.82 hares/ha with a mean of 1.6 hares/ha. Data from the Ashley National Forest included numerous surveys.[99] The overall estimate from those sites averaged (0.26 – 0.5 hares/ha), with the highest reported site ranging from (0.92 – 1.74 hares/ha). These data show hare densities at or above the levels reported in the Science Report for Colorado and confirm those for Utah. When all prey is considered, it is clear that sufficient prey exists in these southern Forests to support lynx populations, but likely at lower lynx densities.

Forest structure and abundance of snowshoe hares were studied in western Wyoming.[100] Physiographic and forest structure characteristics were measured to see how this affected hare abundance. Hares were more abundant in late seral multi-storied forests than in regenerating even aged forests. *"Late seral multi-storied forests with a spruce–fir component and dense horizontal cover, as well as 30–70-year-old lodgepole pine with high stem density, were disproportionately influential in explaining snowshoe hare densities in western Wyoming."* Hare abundance for various forest types ranged from 0.48 – 1.69 hares/ha. These are within the range needed to support resident lynx populations.

A study to develop a relationship between snowshoe hare pellet counts and populations was performed in the Absaroka, Gros Ventre, Wind River, and Salt River ranges in the southern portion of the GYA in the BTNF during 2006 – 2008.[101] Pellet counts and trapping grids were located in forested areas including lodgepole pine, spruce-fir, and Douglas fir of different ages. It was noted that forests were often intermixed with riparian communities as well as sagebrush and wheatgrass communities. Hare population densities ranged from 0.16 to 4.82 hares/ha with an average of 1.51 hares/ha.

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[98] Berg, N.D., & Gese, E.M. 2010. Relationship between fecal pellet counts and snowshoe hare density in Western Wyoming. Journal of Wildlife Management 74(8):1745 – 1751. https://app.box.com/s/wej11h7xartsy5qe1vje80aw2wfam2y9

[99] Ashley National Forest. 2024. Response to April 4,2024 FOIA from Yellowstone to Uintas Connection.

[100] Berg, N.D., Gese, E.M., Squires, J.R., & Aubry, L.M. 2012. Influence of forest structure on the abundance of snowshoe hares in western Wyoming. Journal of Wildlife Management DOI: 10.1002/jwmg.385 https://app.box.com/s/42wjs3pcon4uclx18rd8vbq9ln9b86ju

[101] Berg, N.A. & Gese, E.M. 2010. Relationship between fecal pellet counts and snowshoe hare densities in western Wyoming. Journal of Wildlife Management 74(8):1745 – 1751. https://app.box.com/s/fy07dlcn06ivbtpoehva7nm7l0t27ixr

The presence of lynx in Yellowstone NP was studied.[102] There were 34 references to lynx dated 1895 - 1926 and 73 sightings by park visitors or employees. Detection surveys in the northern portion of YNP from 1992 – 1998 found no lynx. Note this was ten years or less since the 1988 fire that burned through YNP that resulted in the loss of hundreds of thousands of acres of forested habitat that lynx and hares could use. Hair and feces documented lynx presence in the park from 2001 – 2004. Hair samples documented lynx at three locations in the East sector, two females and one male. Hare and squirrel distribution and density along survey routes indicated significant presence of both. The presence of hares was positively correlated with horizontal cover. Improved habitat for hares was expected as the area burned in the 1988 fires recovered. Open areas are sink habitats that prevent the increase of hare populations.[103] Open areas can be generated by timber harvest or fire and are avoided by lynx for ten years or more. (Holbrook et al 2018 cited before).

A study in northern Utah evaluated snowshoe hare pellet densities in different vegetation types.[104] Correlations were found between hare use and horizontal cover densities in the understory vegetation. Cover densities above the snow level of at least 40% accounted for 85% of hare winter use. An important aspect of this study was that two locations were studied. One was not grazed by livestock, and one was grazed. In the grazed location in the Bear River Range, no pellets were found in the dry meadows, and this was not considered habitat. Aspen stands in the ungrazed location had hare pellet densities of 0.2/ha, which was compares to the 0.1 pellets/ha in the ungrazed locations with sparse understory. However, in the ungrazed location with dense understory, pellet counts were 3.5/ha. In Chapter 6 studies by the author in this area in the Bear River Range show severe degradation of the plant community by livestock. The meadow areas are low in ground cover and have lost much of the herbaceous component as have aspen stands where livestock congregate for shade. This is the case across broad swaths of habitat in the Yellowstone to Uintas Connection in the Bear River Range and Uinta Mountains. While hare populations documented in these areas have indicated sufficient hares to support lynx, these livestock altered systems are limiting hare populations, and thereby lynx.

Observations by the author at Kiesha's Preserve in SE Idaho show snowshoe hare use of a variety of habitats.[105] They are not limited to high canopy conifer habitats. While they are found in mature mixed conifer with high canopy cover, they are also found in the mountain

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[102] Murphy, K.M., Potter, T.M., Halfpenny, J.C., Gunther, K.A., Jones, M.T., Lundberg, P.A., & Berg, N.A. 2006. Distribution of Canada lynx in Yellowstone National Park. Northwest Science 80(3):199 – 206. https://app.box.com/s/zclyv61d9hiv8strn2nq7m5i8awweafv

[103] Griffin, P.C. & Mills, S.M. 2009. Sinks without borders: snowshoe hare dynamics in a complex landscape. Oikos 118: 1487-1498, doi: 10.1111/j.1600-0706.2009.17621.x https://app.box.com/s/ebq9h01y76u9mt64loteuxp2eyite8gi

[104] Wolfe, M.L., Debyle, N.V., Winchell, C.S. & McCabe, T.R. 1982. Snowshoe hare cover relationships in northern Utah. Journal of Wildlife Management. 46(3):662 – 670). https://app.box.com/s/us5pmju07cvwtqgapcq088z1jwzuc1co

[105] Observations by Dr. John Carter over multiple years 2010 - 2019

brush and aspen communities where sparse Douglas Fir occurs in association with aspen, chokecherry, serviceberry, snowberry and other shrubs. They use the conifers for cover during the day, and nocturnally they move into the aspen, foraging there and in the adjacent riparian corridor which has high cover of willow, river birch, dogwoods and other shrubs. Where the mountain sagebrush community occurs between the mature mixed conifer and riparian area, they move quickly through the sagebrush to the riparian area. Livestock were removed decades earlier allowing the trees, shrubs and herbaceous plants to recover, which provides the cover and food needed to support hares and other birds and mammals functioning in a natural system.

It appears that hares and other prey, if allowed to have productive habitats, should be able to support lynx here. While more data is needed and should be required as part of any recovery effort, agencies should be addressing the suite of factors that limit hare populations in the GYA and in the Y2UConn and Regionally Significant Wildlife Corridor.

3.7 Fragmenting Critical Habitat. The currently proposed critical habitat is fragmented between and within Rocky Mountain SSA Units. (Figure 17). The Biological Assessment[106] for Canada lynx documents the importance of peripheral areas as:

> *Peripheral populations may contain valuable genetic, physiological or behavioral adaptations that are unique to their ecological success. Because suitable habitats in areas where populations act as metapopulations are spatially separated, the persistence of a metapopulation is dependent on the efficiency and success of dispersing animals in reaching isolated patches of suitable habitat. When patches are fragmented and connections between patches do not exist, recolonization becomes problematic and the metapopulation may be unable to persist, even though patches of suitable habitat remain (Meffe and Carroll 1997). Additional fragmentation and isolation of suitable habitat occurring as a result of land management activities can not only affect small isolated habitat patches supporting smaller populations but also large contiguous patches supporting higher population levels.*

Ruggerio et al (1999) also discusses the effects of fragmentation on competition with lynx by other carnivores and the loss of connectivity. [107] Ruediger et al (2000)[108] citing

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[106] USDA Forest Service 1999. Biological Assessment of the Effects of National Forest Land and Resource Management Plans and Bureau of Land Management Land Use Plans on Canada Lynx. 149p. https://app.box.com/s/pc4oeefty80a9gd4sa0757tne6020hp4

[107] Ruggerio, L.F., Aubry, K.B., Buskirk, S.W., Koehler, G.M., Krebs, C.J., McKelvey, K.S., & Squires, J.R. (Eds.), Ecology and Conservation of Lynx in the United States. University of Colorado Press, Boulder, CO. (pp84-86). https://app.box.com/s/6bg8w6k5ru1axlv3zcm5ba2tt3gjz9hg

[108] Ruediger, W., J. Claar, S. Mighton, B. Naney, T. Rinaldi, F. Wahl, N. Warren, D. Wenger, & A. 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. 142 pp. Canada Lynx Conservation Assessment and Strategy. USDA Forest Service, USDI Fish and Wildlife

McElvey at al (2000)[109] (p2-19) notes that *"a system of reserves embedded in a fragmented and non-natural landscape would not be sufficient to sustain lynx populations. Rather, a strategy that encompasses the entire landscape may be necessary".* Squires et al (2024)[110] notes, *"future expansion of human-caused disturbance from urbanization and resort development in the relatively low-elevation valleys that intersect patches of lynx habitat in the Southern Rockies may threaten population connectivity and persistence, but that disturbance threshold is unknown."* This points out the need for specific standards to prevent the destruction of lynx habitat, particularly in these sensitive Units 5 and 6 and their connections.

Kosterman et al (2018) *"The forest characteristics that defined high success included (1) abundant and connected mature forest and (2) intermediate amounts of small-diameter regenerating forest."*[111] Holbrook et al (2019)[112] *"the probability of a female producing kittens was most associated with the connectivity of mature, multistoried forests".* Habitat fragmentation, *"accentuates the viability risk inherent in a small population and increases its vulnerability to local extirpation."* (LCAS p76). Examples of fragmentation include, *"removal of forest cover, development of highways and associated infrastructure, and intensive minerals or energy development…"* (LCAS p77). [113]

Anderson et al (2023) in their Glacier National Park study noted in their camera survey that *"odds of lynx detection decreased by 0.8 times (95% CI = 0.7–1.0 times) for a 1 standard deviation increase in average human detections per day".*[114] *"Another explanation for a muted response of lynx to*

Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. https://app.box.com/s/xr7z1581gtmap9h46zbdzjp8sjzrvocy

[109] McKelvey, K. S., K. B. Aubry, J. K. Agee, S. W. Buskirk, L. F. Ruggiero, & Koehler, G.M. 2000. Lynx Conservation in an Ecosystem Management Context. Pp 419-441 In Ruggiero, L.E, K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. S. McKelvey, & Squires, J.R. (Tech. Eds.). Ecology and Conservation of lynx in the United States. Univ. Press of Colorado. Boulder, CO. 480 pp. https://app.box.com/s/6bg8w6k5ru1axlv3zcm5ba2tt3gjz9hg

[110] Squires, J.R., Olson, L.R., Ivan, J.S., McDonald, P.M., & Holbrook, J.D. 2024. Anthropogenically protected but naturally disturbed: a specialist carnivore at its southern range periphery. Biodiversity and Conservation: https://doi.org/10.1007/s10531-024-02978-8 https://app.box.com/s/qirh6aet9aqkfiwzix9uol1z2mzzuxgp

[111] Kosterman, M.K., Squires, J.R., Holbrook,J.D., Pletscher, D.H., & Hebblewhite, M. 2018. Forest structure provides the income for reproductive success in a southern population of Canada lynx. Ecological Applications 28(4):pp 1032-1043. https://app.box.com/s/1ecvhd4nznc1wdppvyu6naufzpiwzr80

[112] Holbrook, J. D., Squires, J.R., Bollenbacher, B., Graham, R., Olson, L.E., Hanvey, G, Jackson, S., Lawrence, R.L., & Savage, S. L. 2019. Management of forests and forest carnivores: Relating landscape mosaics to habitat quality of Canada lynx at their range periphery. Forest Ecology and Management, 437: 411–425. DOI: https://doi.org/10.1016/j.foreco.2019.01.011 https://app.box.com/s/c2jelk9v0gnyex1r5s2w2myhiws9p3hl

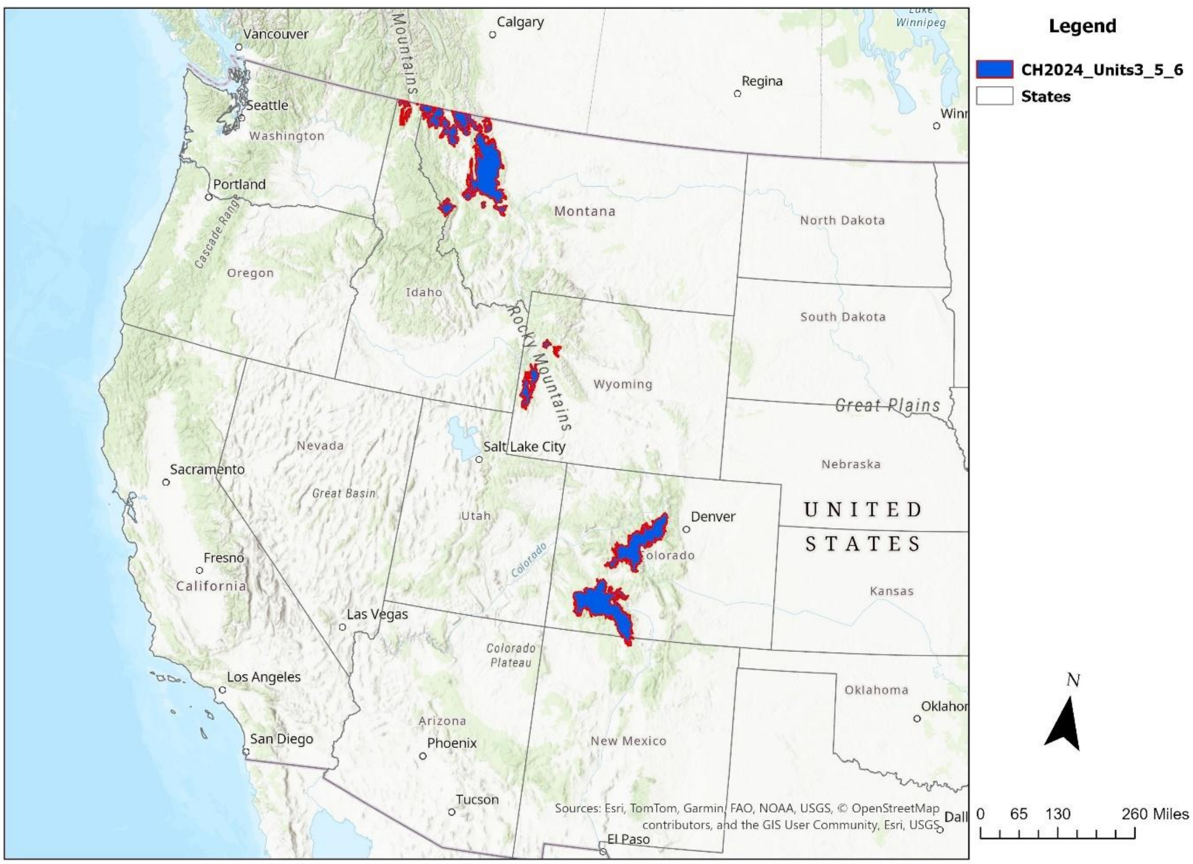
[113] Interagency Lynx Biology Team. 2013. Canada Lynx Conservation Assessment and Strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp. https://app.box.com/s/p80ykdfc41slqnm55j8f2qo5m7npb4aj

[114] Anderson, A. K., J. S. Waller, & Thornton, D.H. 2023. Canada lynx occupancy and

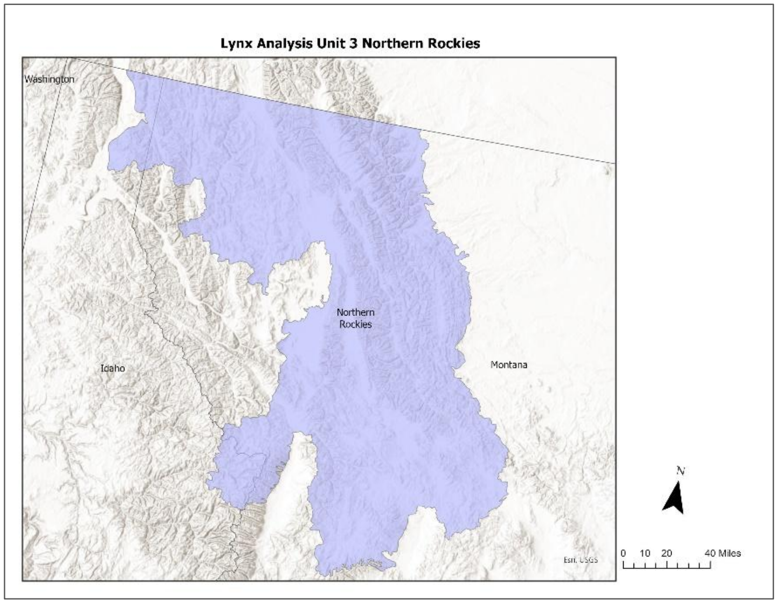
recreation could be that recreation in Glacier NP is mostly concentrated on trails and may occur in a predictable enough fashion that lynx were able to cope to some degree. Other carnivores respond more strongly to off-trail versus on-trail recreation (Heinemeyer et al. 2019, Gunther and Haroldson 2020)." Human presence and activities are clearly a factor in fragmentation of habitat.

GIS data from FWS was used to compare the SSA Analysis Units, Focal Areas and Critical Habitat to determine changes in area. (Figures 3.17 – 3.20, Table 3.6).

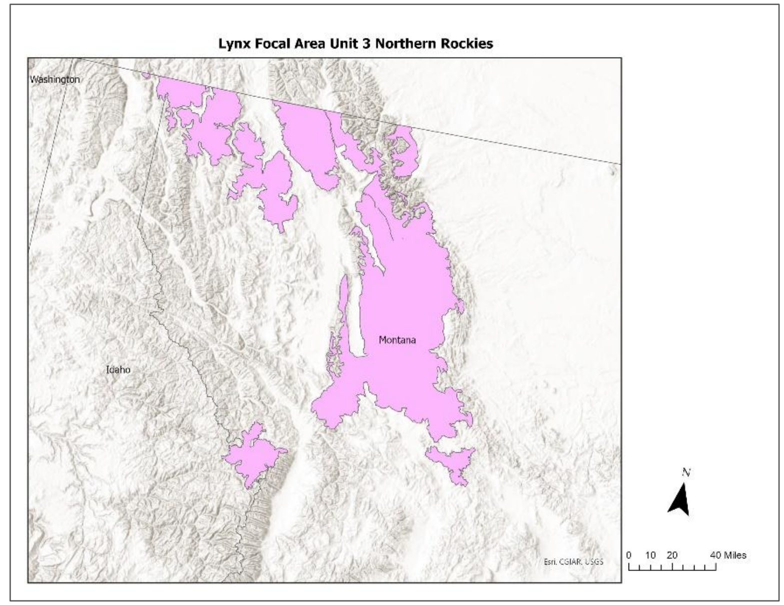
Figure 3.17 2024 Proposed Critical Habitat



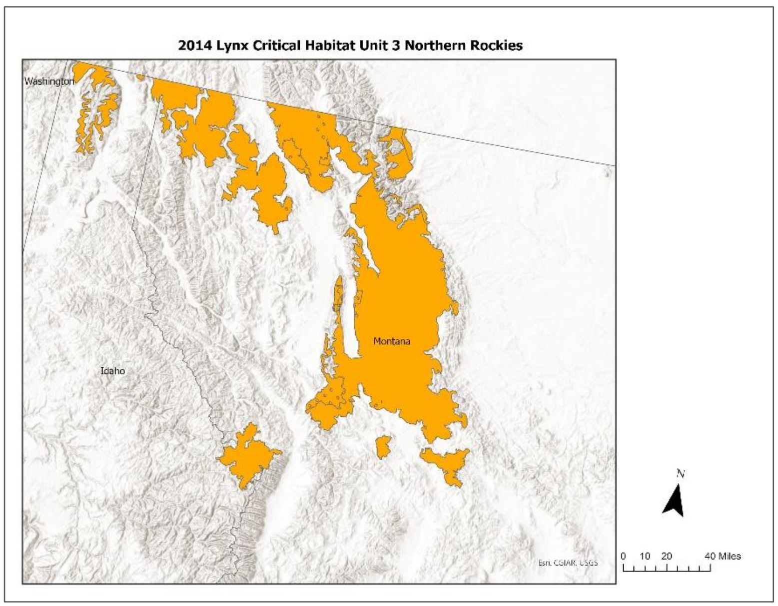
density in Glacier National Park. Journal of Wildlife Management 87:e22383. https://doi.org/10.1002/jwmg.22383 https://app.box.com/s/fiu2oxhqe0gs4nswps9tcd12l5p6rlz9



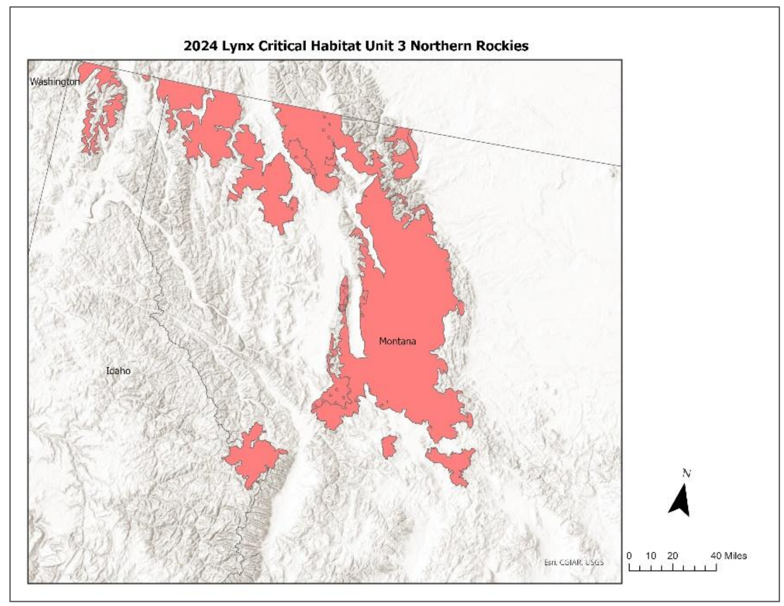
13,263,764 Acres Intact



4,867,820 Acres Fragmented

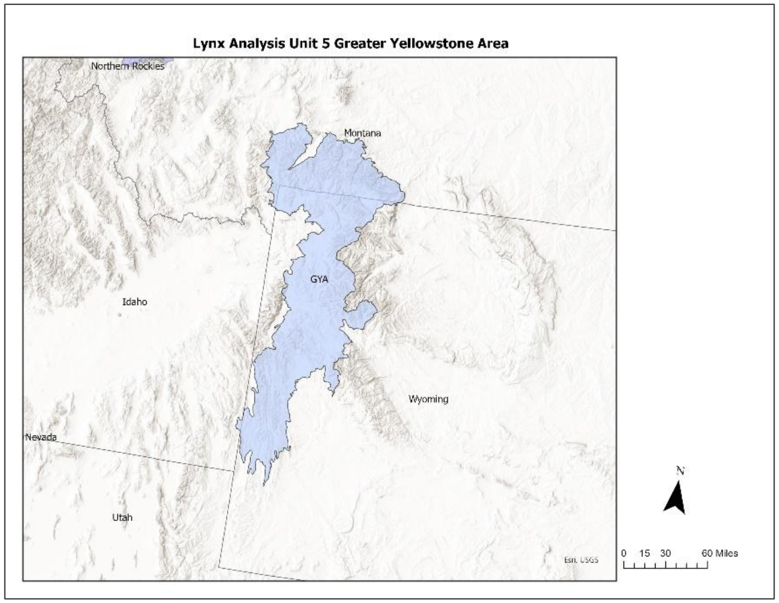


6,260,861 Acres Fragmented

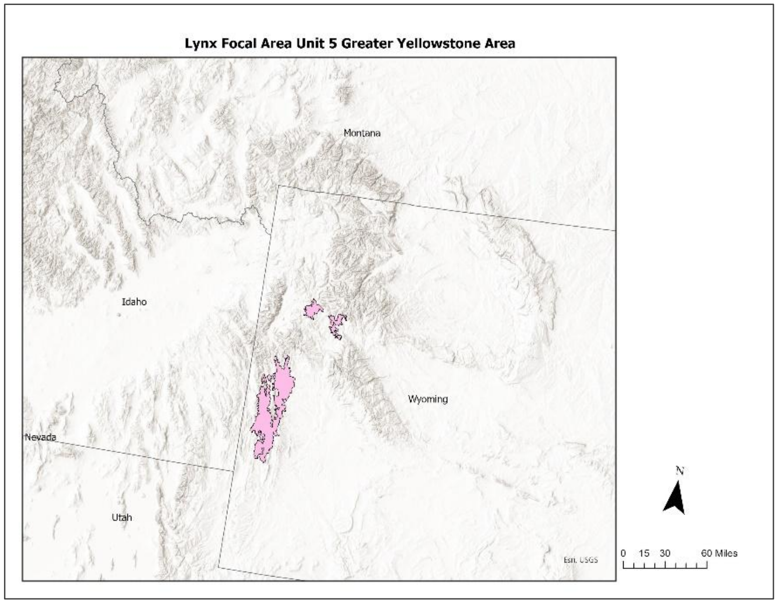


5,093,479Acres Fragmented

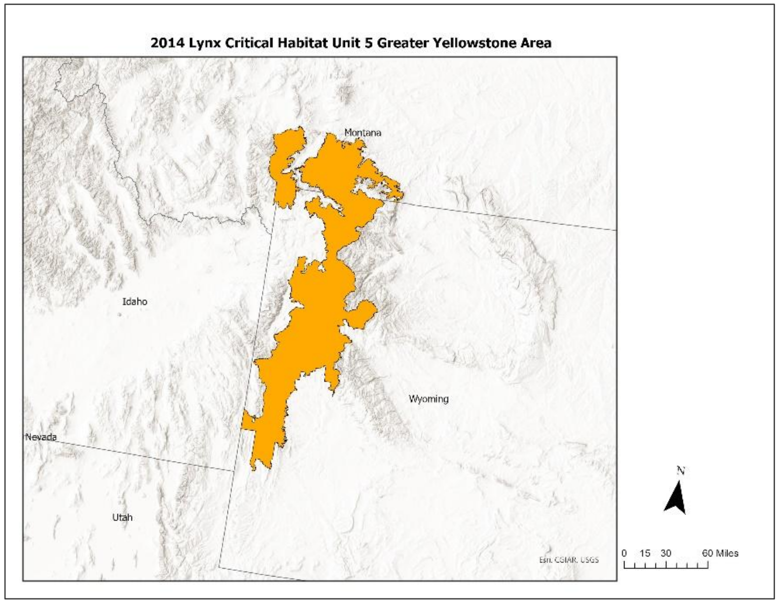
Figure 3.18 Evolution of 2024 Critical Habitat Analysis Unit 3 Northern Rockies



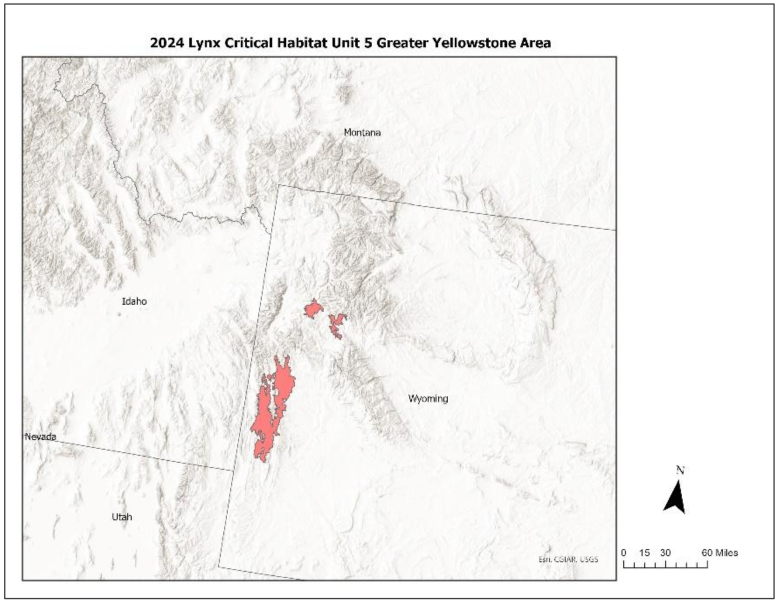
7,541,043 Acres Intact



717,141 Acres Fragmented

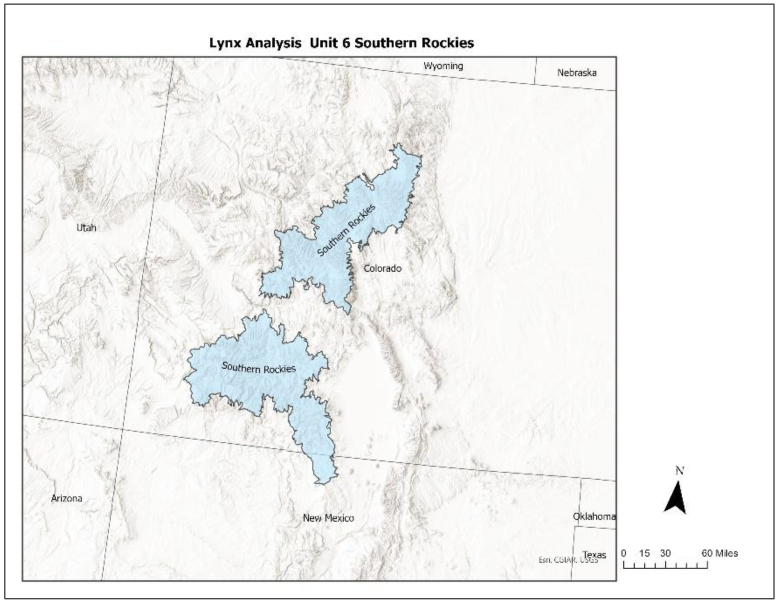


5,853,154 Acres Fragmented

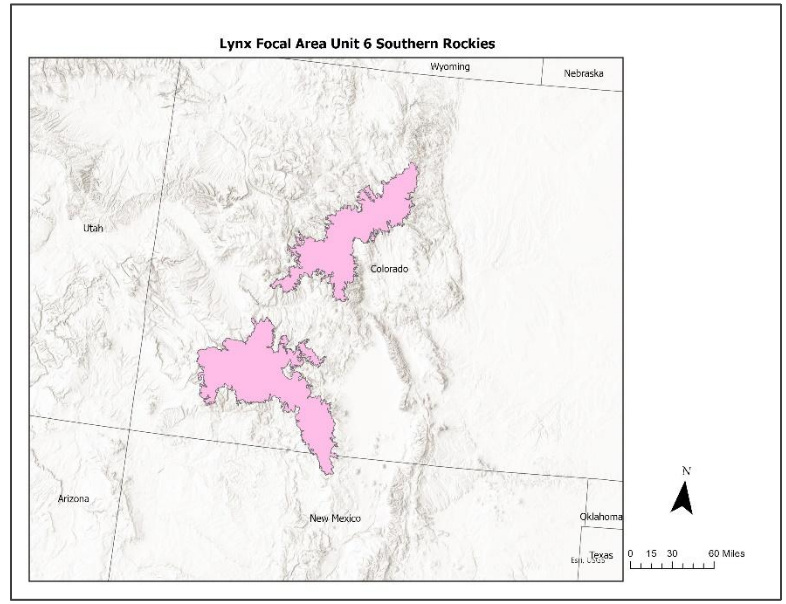


717,140 Acres Fragmented

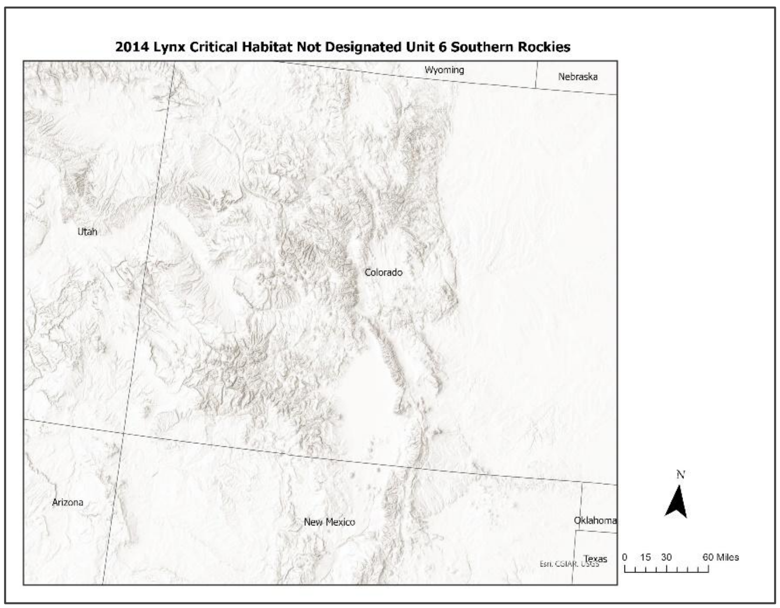
Figure 3.19 Evolution of 2024 Critical Habitat Analysis Unit 5 GYA



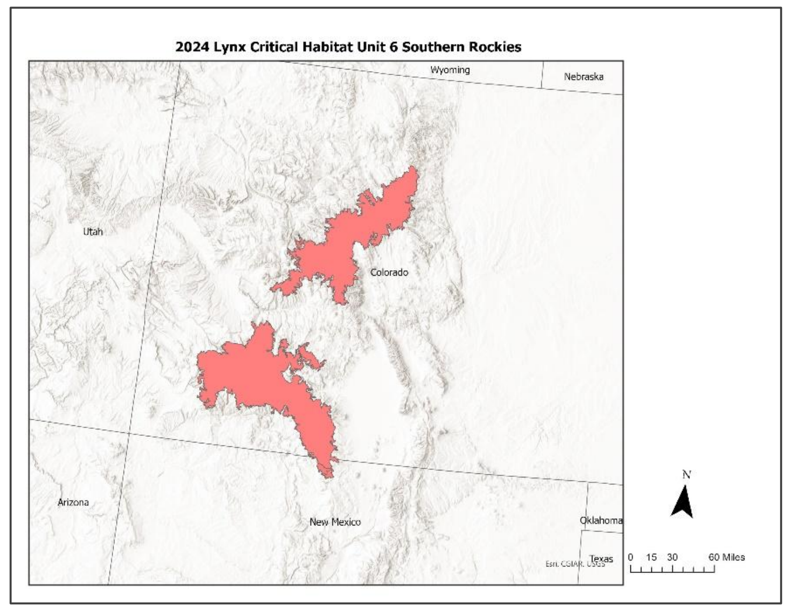
6,821,605 Acres Fragmented



4,867,820 Acres Fragmented



0 Acres



4,914,547 Acres Fragmented

Figure 3.20 Evolution of 2024 Critical Habitat Analysis Unit 6 Southern Rockies

Table 3.6 Proposed Changes in Lynx Critical Habitat from 2014 to 2024

Rocky Mountain Management Areas	Acres	CH Change %
2014 CH	12,114,016	
2024 CH proposed	10,725,166	11% loss
Rocky Mtn SSA Units	27,626,412	
Unit 3	13,263,764	
Unit 5	7,541,043	
Unit 6	6,821,605	
Unit 3 FA	4,867,620	
Unit 5 FA	717,141	
Unit 6 FA	4,795,468	
2014 CH Unit 3	6,260,861	
2014 CH Unit 5	5,853,154	
2024 CH Unit 3	5,093,479	19% loss
2024 CH Unit 5	717,140	88% loss
2024 CH Unit 6	4,914,547	na

Overall, proposed CH in the Rocky Mountains was reduced 11% from the 2014 CH status. The CH for Unit 3 declined 11% and for Unit 5 declined 88%. Colorado had no CH in 2014 and gained nearly 5 million acres, while Unit 3 lost 1.4 million acres and Unit 5 lost 5.1 million acres. This appears contradictory in that Colorado (Unit 6) which was deemed not occupied at the time of listing, is now proposed for nearly 5 million acres of CH. Meanwhile, Unit 5, which was occupied, is now facing an 88% reduction. The proposed CH for SSA Units 3, 5, and 6 are fragmented into smaller units. No mapped corridors or linkages are provided within the Analysis Units nor between the Analysis Units.

Basing critical habitat on areas occupied at the time of listing has the effect of discounting historical observations prior to listing and depends on the effort expended to document observations. It also depends on how an area is defined. For example, a National Forest may have lynx observations at a particular point in time, while a smaller management unit such as a Ranger District might have none, so the Forest is occupied, while the Ranger District is not. A Ranger District may have observations while others do not, but using the Forest as a measure, the Forest would be occupied. The rationale to now add critical habitat in Unit 6 should be used to expand critical habitat in Unit 5 to include the moderate and high probability habitat from Olson et al (2021), and in addition include the connecting corridor between Unit 5 and 6 which passes through the Caribou-Targhee NF, the Uinta-Wasatch-Cache NF, the Ashley NF and the BLM lands identified later in this report.

The McElvey historical observations[115], were tabulated by management areas (Table 3.7). Unit 3 (Montana and Northern Idaho), being directly connected to the Canadian populations had the most observations (1200) with Unit 5 (219) and Unit 6 (57). Here, Unit 5 had four times the observations of Unit 6, yet Unit 6 added CH while Unit 5 lost most of its CH.

To correct the fragmentation in proposed management within Units 3, 5, and 6, the Analysis Units themselves should become critical habitat or expanded as recommended above to capture most historical observations. A further level of fragmentation occurs between these Units and their critical habitats. The Olson et al (2021) Model[116] and the Squires et al 2024[117] Model areas are not connected. (Figure 3.21). This is an obvious omission since lynx were historically observed in the area including the Uinta Mountains in Utah and Wyoming. Figure 3.21 illustrates the Olson and Squires model areas, 2024 proposed critical habitat and historic observations from McElvey. A large gap (Model Gap) occurs between these. Modeling analyses have omitted the consideration of the higher elevation corridor between the GYA and Uinta Mountains, and between the Uinta Mountains and Colorado.

Table 3.7. McElvey Lynx Observations by Management Area

Rocky Mountain (RM) Management Areas	McElvey Observations	Percent of RM Historical	CH Percent of AU
Rocky Mtn States	2286	100	
2014 CH	1106	44.6	
2024 CH proposed	804	35.1	
Unit 3	1200	52.4	
Unit 5	219	9.6	
Unit 6	65	2.8	
2014 CH Unit 3	827	36.1	68.9
2014 CH Unit 5	189	8.3	86.3
2024 CH Unit 3	729	31.9	60.8
2024 CH Unit 5	75	3.3	34.2
2024 CH Unit 6	57	2.5	87.7

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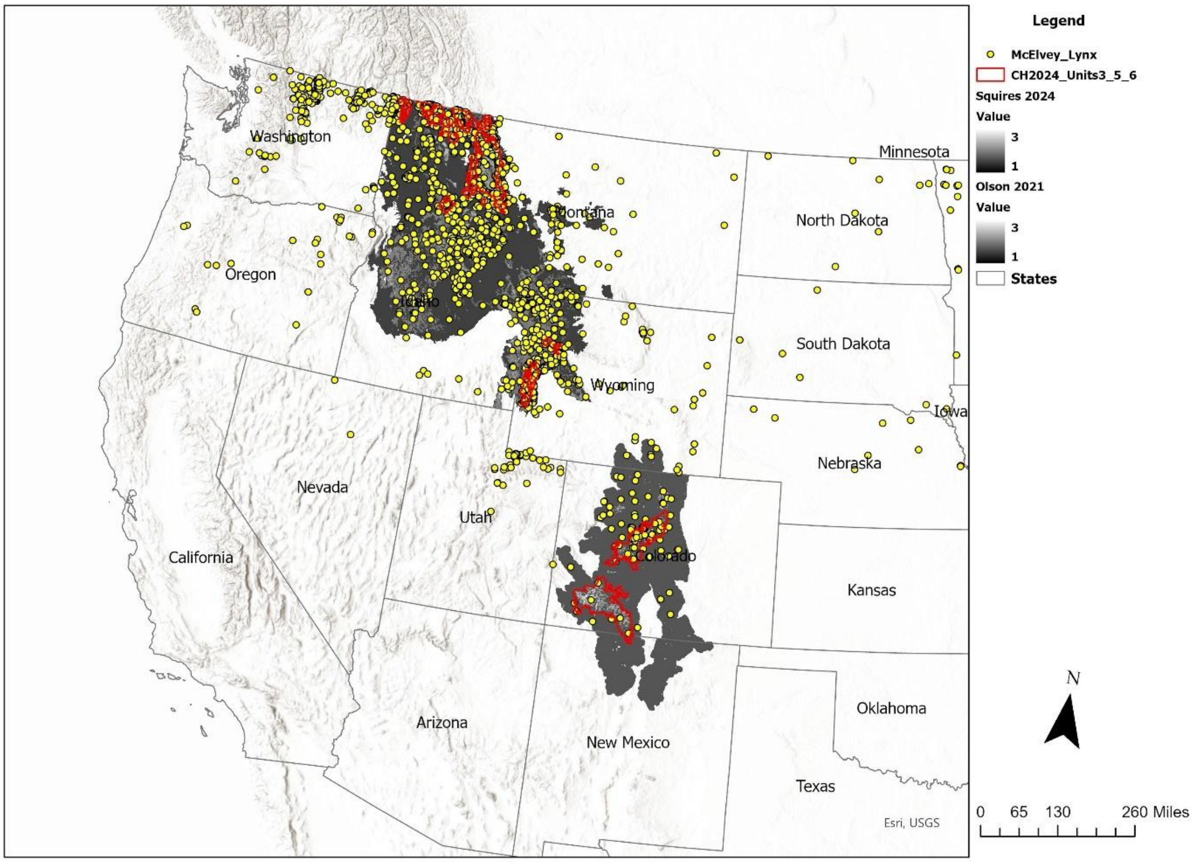
115 Records obtained from the Beaverhead-Deerlodge NF in the form of a layer file: Historic Lynx Records (citing McKelvey et al, 1999). https://app.box.com/s/6bg8w6k5ru1axlv3zcm5ba2tt3gjz9hg
116 Olson, L. E., Bjornlie, N., Hanvey, G, Holbrook, J.D., Ivan, J.S., Jackson, S., Kertson, B., King, T., Lucid, M., Murray, D., Naney, R., Rohrer, J., Scully, A., Thornton, D., Walker, Z. & Squires, J.R. 2021. Improved prediction of Canada lynx distribution through regional model transferability and data efficiency. Ecology and Evolution 11:1667 – 1690. https://app.box.com/s/32ww5q3ci96now3zy1fd2qgxzdf4lb21
117 Squires, J.R., Olson, L.E., Ivan, J.S., McDonald, P.M., & Holbrook, J.D. 2024. Anthropogenically protected but naturally disturbed: a specialist carnivore at its southern range periphery. Biodiversity and Conservation. 27p. https://app.box.com/s/qirh6aet9aqkfiwzix9uol1z2mzzuxgp

Figure 3.21 Gap Between Models and 2024 Critical Habitat



Lynx were documented in the Uinta Mountains and Greater Yellowstone Area from the Colorado reintroductions.[118] Ivan (2018)[119] characterized the lynx movements into Utah:

> *Lynx that went to Utah were there long enough to transmit 1–136 ($\bar{x}$= 42) locations per individual across approximately 1–287 ($\bar{x}$= 100) days (Table 1; tally is approximate because we do not know where animals were in between weekly locations). Most of these individuals entered and exited Utah via the Uinta Mountains in the northeast, Abajo Mountains in the southeast, or the East Tavaput Plateau in the east-central part of the state (Figures 1–29). Those that spent a considerable amount of time in Utah tended to find and traverse the high country running north-south through the central portion of the state. Of the 17 individuals that spent time in Utah, 3 were known to have died there (Table 1). Six others were known to have died elsewhere (Colorado, Nebraska, New*

[118] Ivan, J. 2017. Summary of movements of Colorado lynx in Wyoming.   Colorado Parks and Wildlife. 36p. https://app.box.com/s/da8t9fbd3l587gpd1kmqnsikzugeir07
[119] Ivan, J. Summary of movements of Colorado lynx in Utah. Colorado Parks and Wildlife. 34p. https://app.box.com/s/7cwyp8cw68bxzsib0o8hyd9pb5lo6k61

Mexico,) and the fates of the other 8 were unknown because their collars failed before they died (Table 1).

CPW has no direct data indicative of reproductive activity for reintroduced lynx that traveled to Utah. However, a male (BC05M03) and female (QU05F05) did occupy the same area of the Uinta Mountains for >200 days, including during breeding season, of 2006. It is not known whether or not these individuals bred, denned, and/or produced kittens.

These two lynx were able to survive in the Uinta Mountains. The locations were clustered in the western end of the Uintas where livestock grazing has been terminated or greatly reduced.

Fragmentation in Analysis Unit 5, particularly in the Bridger-Teton NF and Caribou-Targhee NF is severe. High and moderate probability habitat in Olson et al (2021) is fragmented by roads, clearcuts and mines. Inventoried Roadless Areas are subject to disturbance and are fragmented. The Idaho Roadless Rule allows the IRAs to be divided up into prescriptions allowing timber harvest, mining, livestock grazing and in the case of southeast Idaho, IRAs are traded away for tailings ponds and mine expansions. For example, the tailings pond for the Dairy Syncline Mine referenced earlier.

Figure 3.22 shows the southeast Idaho linkage in the Soda Springs and Montpelier Ranger Districts. Phosphate mine leases effectively block the linkage as they operate 24/7 year-round, have heavy haul road and railroad traffic, and engage in blasting up to 400 times per week.[120] The roads shown do not include all roads. Non-system Forest Service roads, illegal or user-created roads and trails are not mapped. Nor is snowmobile activity represented. Ninety-seven percent[121] of the Caribou National Forest is open to snowmobiles, groomed trails fragment the Bear River Range and there is active trapping and dog pursuit of lions and other animals.

Figure 3.23 widens the view into Wyoming and the 2024 Proposed Critical Habitat. In the Wyoming portion, the linkages and proposed critical habitat are fragmented by timber harvest (clearcuts) and roads. Inventoried Roadless Areas are also fragmented by roads. Not all timber and thinning, prescribed fire, hazardous fuel reduction activities, or non-system roads are shown.

What is clear is that so-called protected areas such as IRAs cannot function for lynx unless they are given specific protection from roads, mines, and recreational vehicles as well as trapping and dog pursuit of predators. This should be part of the management going forward in designated critical habitat and connecting corridors.

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[120] Draft Environmental Impact Statement Dairy Syncline for the proposed Dairy Syncline Mine and Reclamation Plan p2-9. https://app.box.com/s/8jtek3c3jttt4e0xppcytr9jwash9mao
[121] USDA. 2003. Revised Forest Plan and FEIS Caribou National Forest. https://app.box.com/s/seeaqtwqfyzlqcu64th3byuga9e0c5vb

Figure 3.22 SE Idaho Linkage Areas, IRAs Fragmented by Mines and Roads

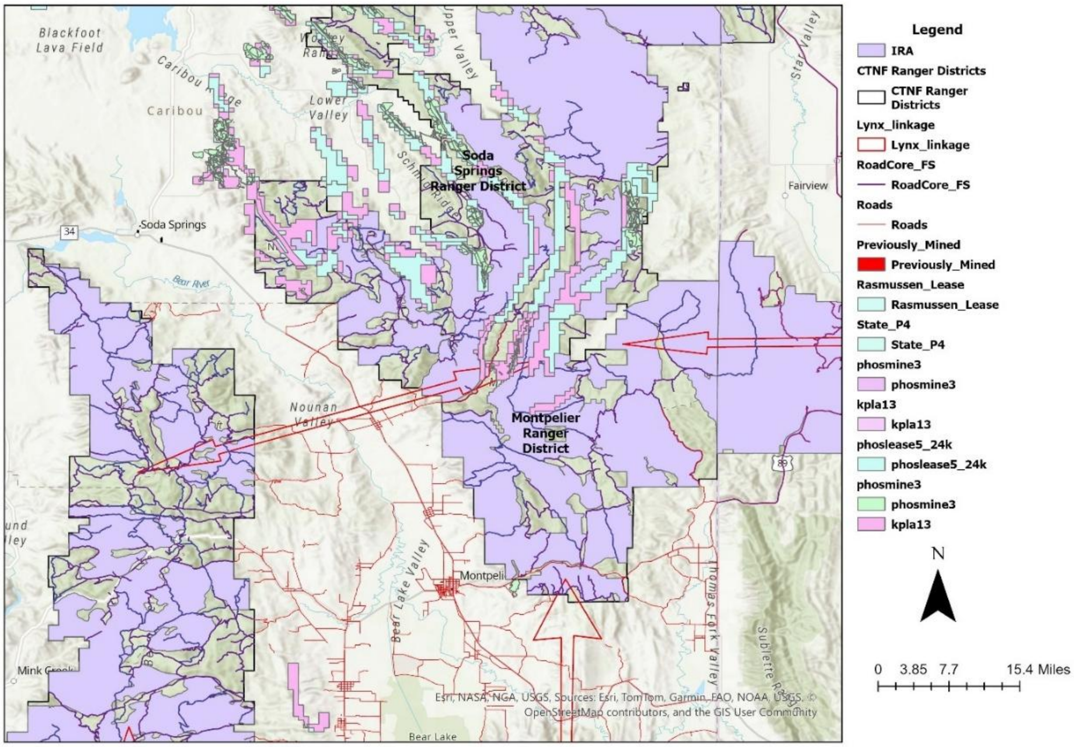
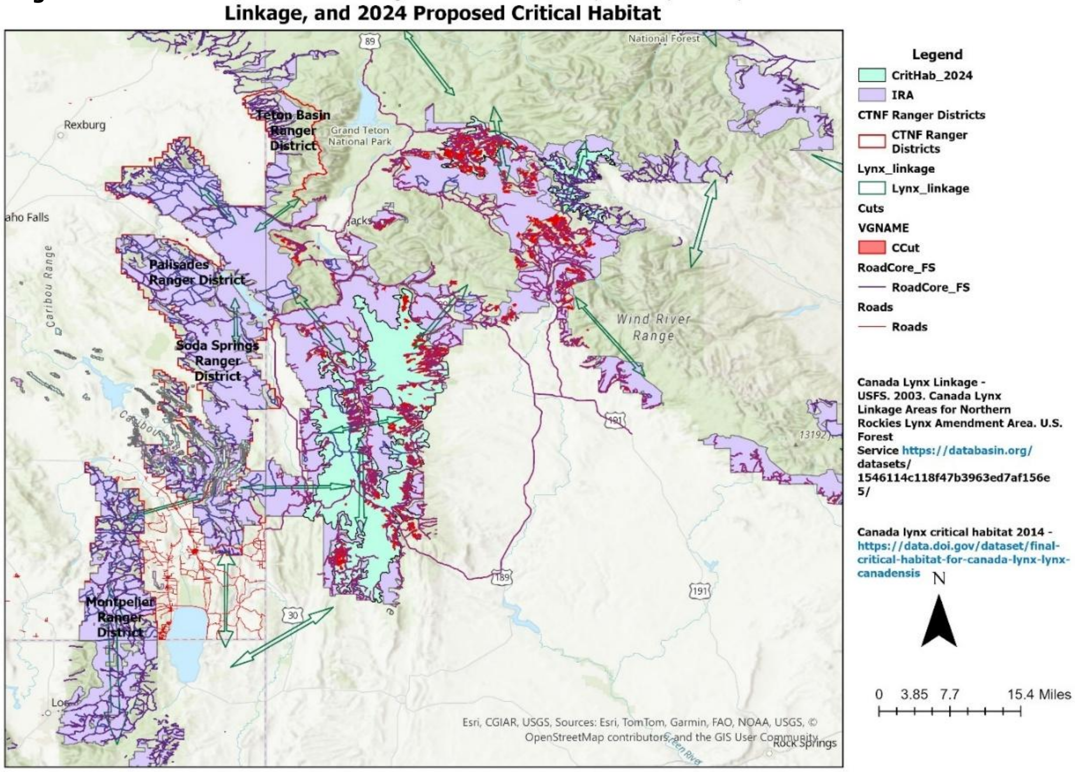


Figure 3.23 Greater Yellowstone Analysis Unit 5 Clearcuts, Roads, Mines, Linkage, and 2024 Proposed Critical Habitat



3.8 Applying the Olson and Squires Models. Squires et al (2024) constructed a model and analysis for the Southern Rockies lynx population in Colorado, southern Wyoming and northern New Mexico.[122] The modeling was similar to that in Olson et al (2021), which is useful in prioritizing management areas for protection of lynx habitat and connectivity. An additional value of the Squires et al (2024) analysis is they incorporated natural disturbance such as fire and insect outbreaks, forest management such as timber harvest, protected areas such as National Parks and roadless areas, and human disturbance such as recreation use. The detrimental effects of these activities can be corrected with protective standards that allow recovery of lynx habitat.

This type of analysis is missing in the numerous National Forest projects (mining, timber harvest, fire-related practices, ohv routes), resulting in litigation. The Fish and Wildlife Service and its cooperating agencies should map and protect lynx habitat and connectivity through expansion of critical habitat across the landscape. In this section, the focus is on SSA Units 3 and 5 in the GYA and Northern Rockies using the Olson Model. What is needed now is the blank portion of the map (Model Gap) between SSA Unit 6 (Southern Rockies) and Unit 5 (Greater Yellowstone Area) to be mapped, protected, and connected to the Greater Yellowstone Area and Northern Rockies.

In the following, the Regionally Significant Wildlife Corridor that was part of the Wasatch-Cache National Forest Plan[123] is mapped along with the National Forests present within the models and the Corridor. National Forests were used to analyze the models as they constitute the major portion of the modeled areas, and they encompass most of the higher elevations in the regions of interest. Other land management areas must be included in critical habitat. These lands would include BLM, Tribal, State, Wildlife Refuges, National Parks and Monuments.

There are 16 National Forests, 81 Ranger Districts, 3 National Parks, 25 Wilderness Areas, and 482 individual polygons representing the fragmented IRAs. There are three National Forests in the Y2UConn in NE Utah, and 9 National Forests in the Squires et al (2024) model area. (Figures 3.24 – 3.27).

The ArcGIS Pro 3.2 Zonal Statistics tool was used to visually categorize the National Forests, Ranger Districts, National Parks, Wilderness Areas, and Inventoried Roadless Areas within the Olson Model area. The maps provide ranges of habitat probability, with the red and orange representing those land management units with higher probabilities. Using these categories, visual patterns emerge across the landscape.

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[122] Squires, J. R., Olson, L. E., Ivan, J. S., McDonald, P. M., & Holbrook, J.D. 2024. Anthropogenically protected but naturally disturbed: A specialist carnivore at its southern range periphery. Biodiversity and Conservation. https://doi.org/10.1007/s10531-024-02978-8. https://app.box.com/s/qirh6aet9aqkfiwzix9uol1z2mzzuxgp

[123] Wasatch Cache Revised Forest Plan and Final Environmental Impact Statement Regionally Significant Wildlife Corridor. 2003. https://app.box.com/s/l9qjhi81fi7uknrc3t935jt03luvqe4g

Figure 3.24 National Forests Olson Probability Northern Rockies and Greater Yellowstone Area

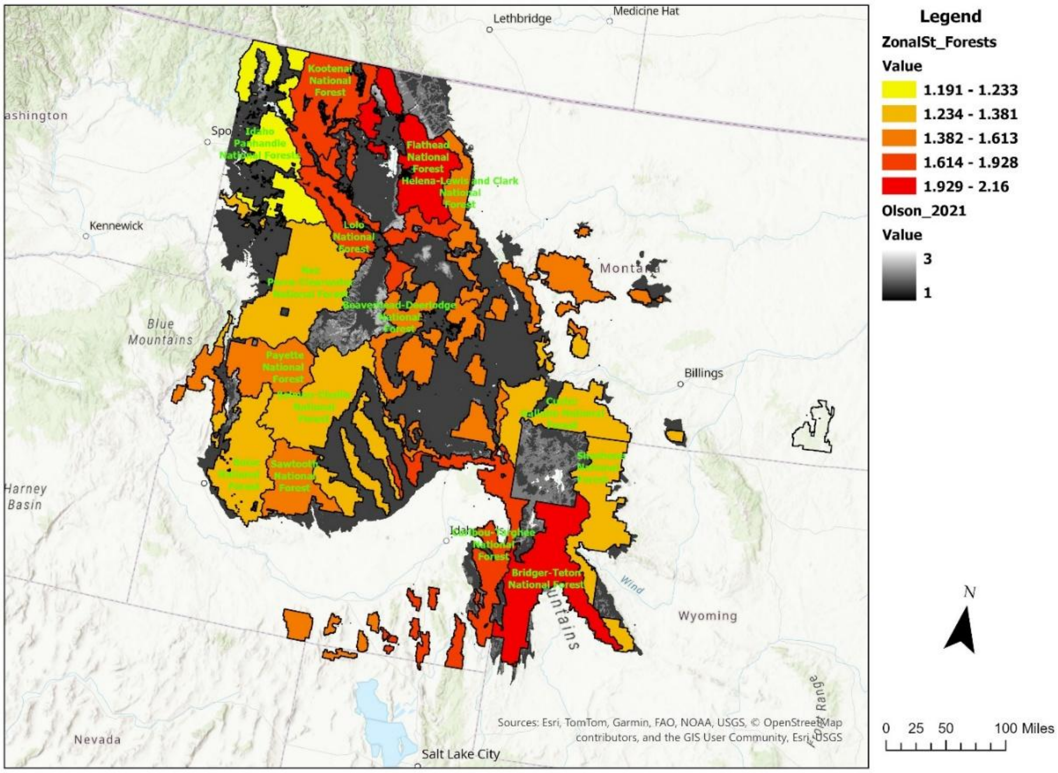
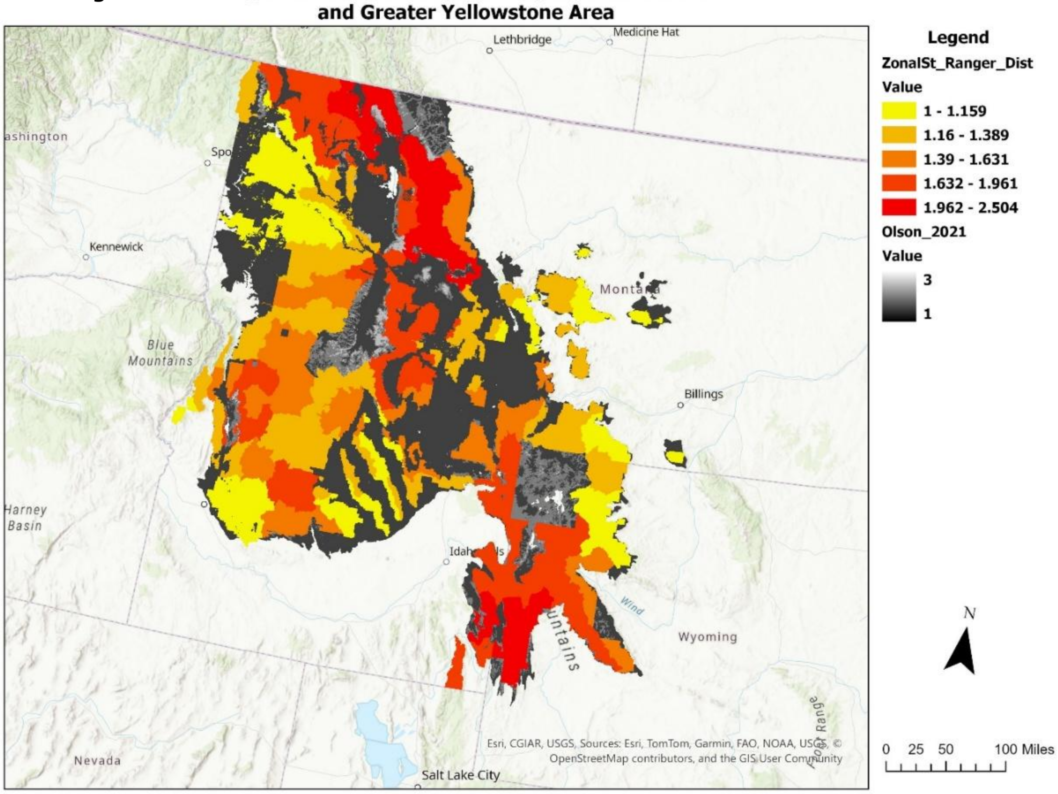
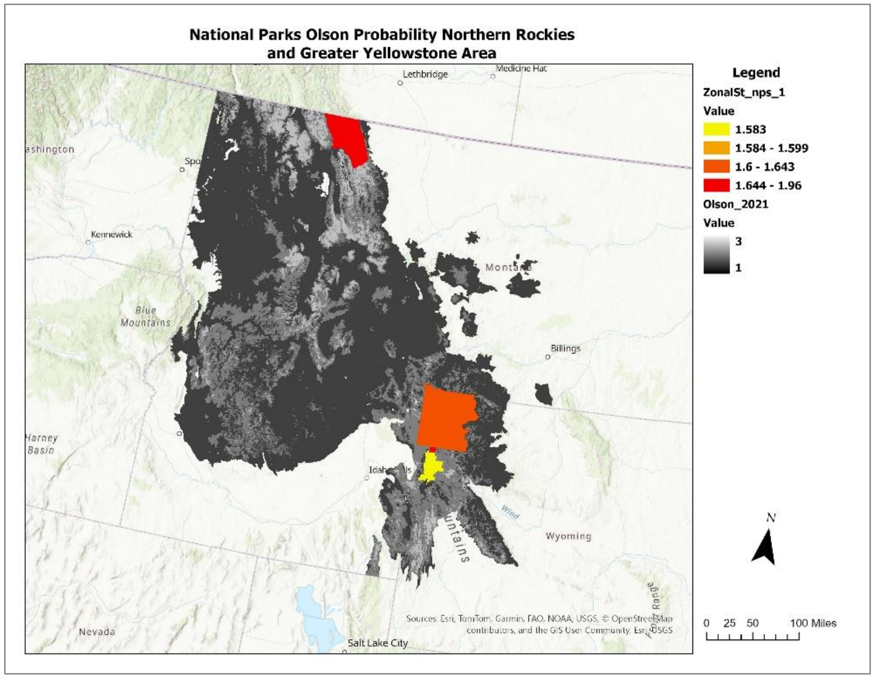
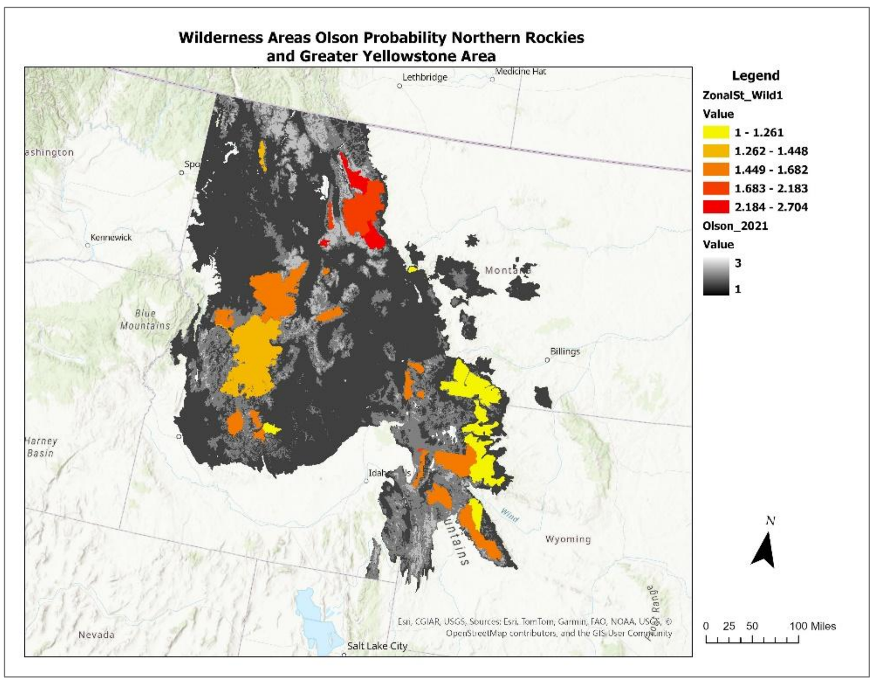


Figure 3.25 Ranger Districts Olson Probability Northern Rockies and Greater Yellowstone Area







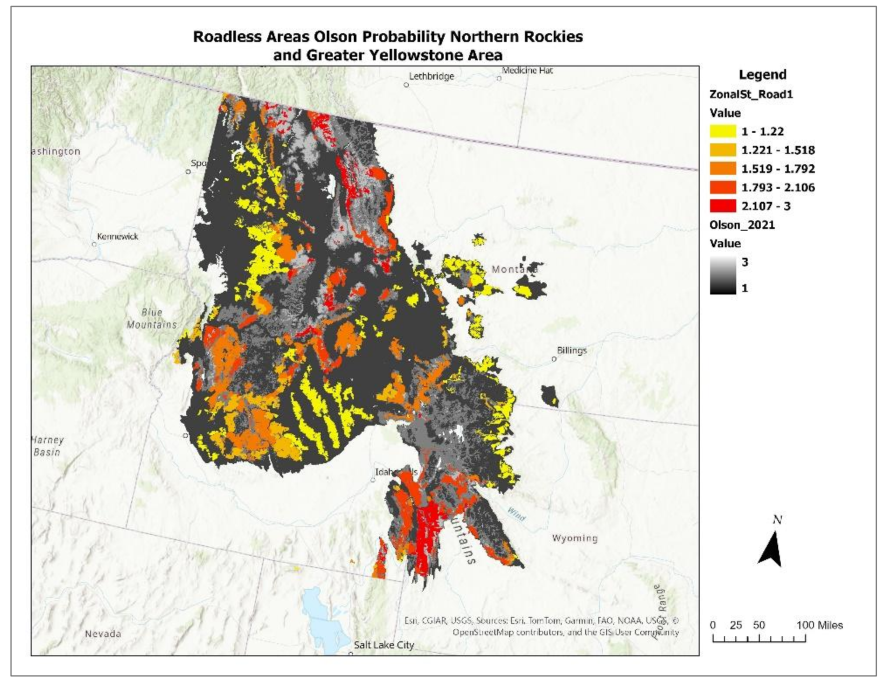
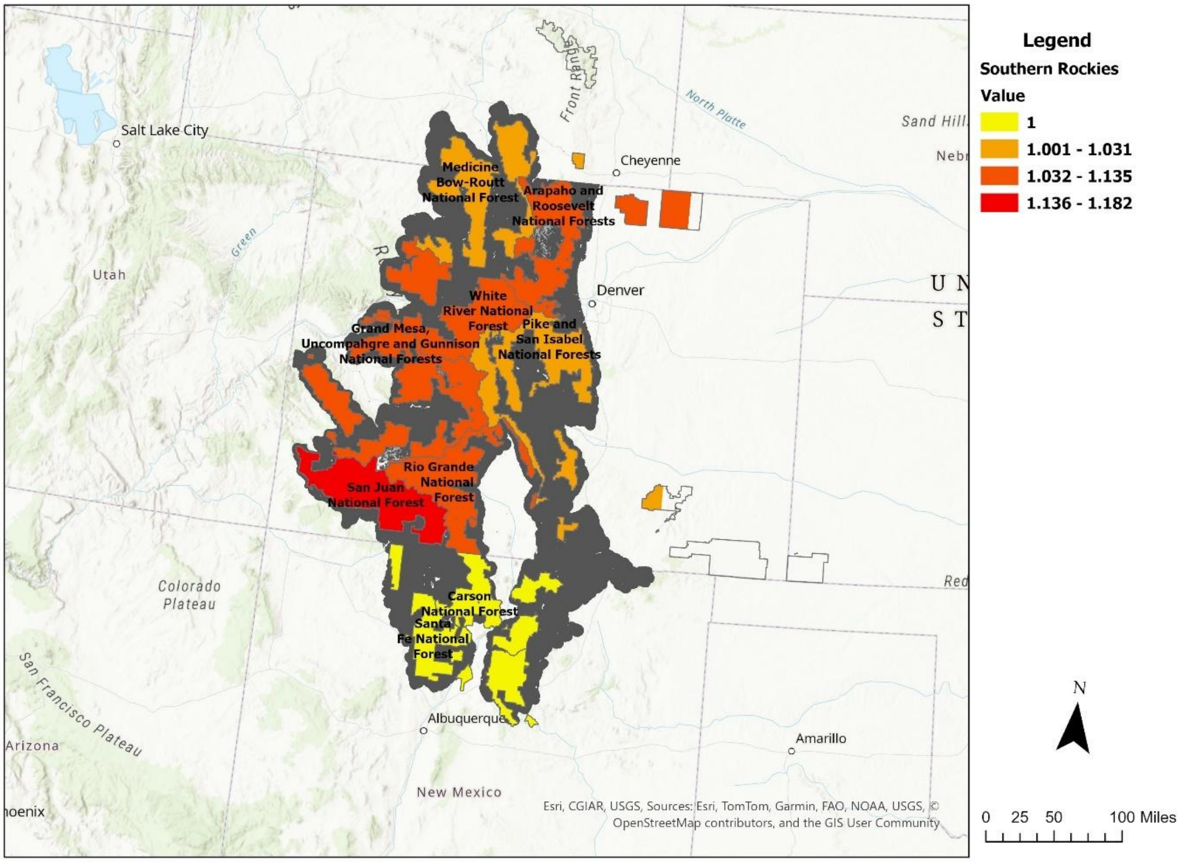


Figure 3.26. National Parks, Wilderness Areas, and IRAs within the Northern Rockies and Greater Yellowstone Area and Olson Model

Figure 3.27 National Forests Squires Probability for the Southern Rockies



The Anderson et al (2023) study cited above estimated a population of 52 lynx for Glacier National Park. The Olson Model was analyzed using the ArcGIS Pro Zonal Statistics tool to determine the mean habitat probability of 1.64 ± 0.59 for Glacier NP. In Figure 3.28, the Analysis Units, Focal Areas, 2014 Critical Habitat and 2024 Proposed Critical Habitat were plotted. The Focal Areas and Critical Habitats had the highest habitat probabilities, but as discussed before, they are fragmented and disconnected.

The standard deviations in Figure 3.28 indicate through their overlap, that the National Parks, the Unit 3 and 5 Analysis Units, and 2014 Critical Habitats have almost identical habitat probabilities to Glacier NP. Note that the Unit 3 2014 Critical Habitat more closely compares to the Focal Area habitat probability. This analysis suggests that a broader critical habitat, that lowers the threshold to that of the Glacier NP level allows protection of habitats that should support lynx.

National Forests in the Northern Rockies and Greater Yellowstone Area are shown in Figure 3.29. They are ranked in order from highest to lowest Olson Model probabilities. The standard deviations show much overlap between these Forests and do not disqualify any of them as important or critical habitat. Several National Forests in Unit 5 have higher mean habitat probabilities than those in Unit 3, for example, the Bridger-Teton and Caribou-Targhee NFs. Yet the Federal Register Notice for critical habitat downplays these SSA Unit 5 NFs.

Figure 3.28 Comparison of Focal Units, Focal Areas, Critical Habitat, and National Parks in GYA and Northern Rockies Using Olson 2021

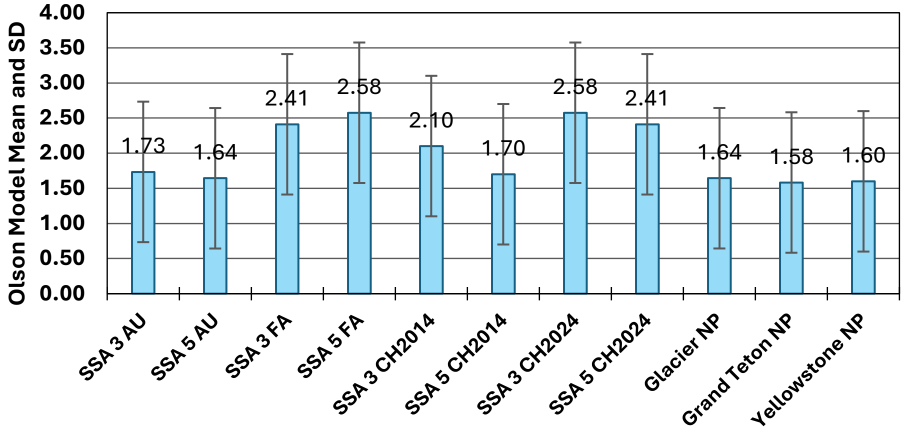
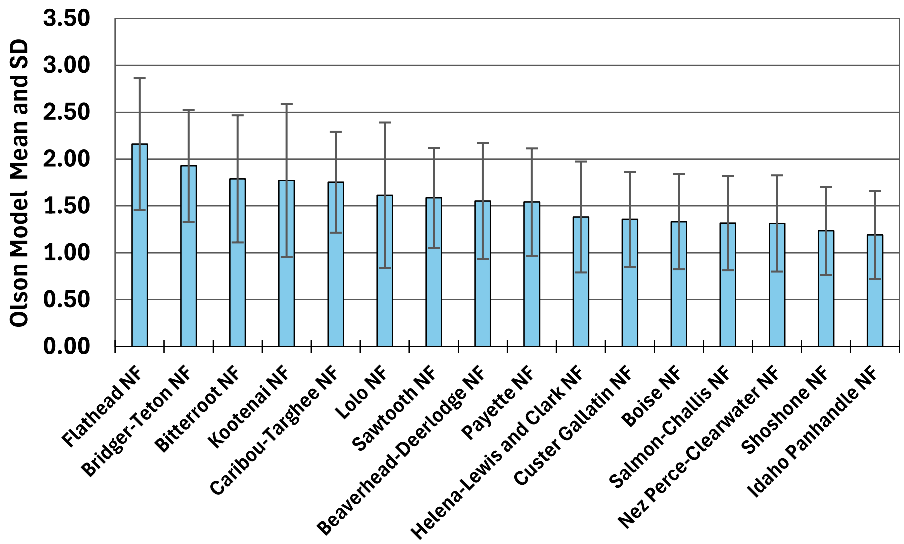
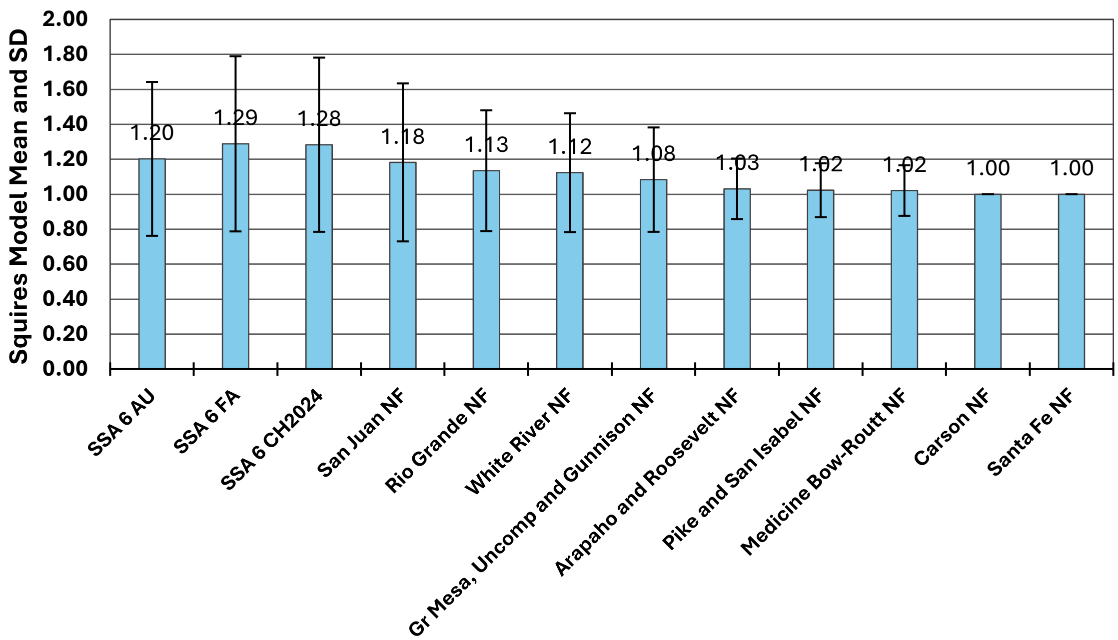


Figure 3.29 Comparison of National Forests in the Northern Rockies and Greater Yellowstone Area Using Olson 2021



A similar chart was generated for nine National Forests in the Southern Rockies Unit 6 using the Squires et al (2024) model. (Figure 3.30). The raster values in the Squires Model range up to 3 as they did for the Olson Model. The mean values of the Olson Model range above 1.6 for all management areas. In the Southern Rockies, none approached this value, with the highest being the Unit 6 Focal Area at 1.29. Both models operate over a range from 1 to 3, representing the pixel values within the model images. This indicates that Unit 5 should be more suitable than Unit 6 for supporting Canada lynx as the mean within the range of values is higher. This comports with the Science Report noting lower population densities in the south.

Figure 3.30 Comparison of Unit 6 Focal Unit, Focal Area, Critical Habitat and National Forests in Southern Rockies using Squires 2024

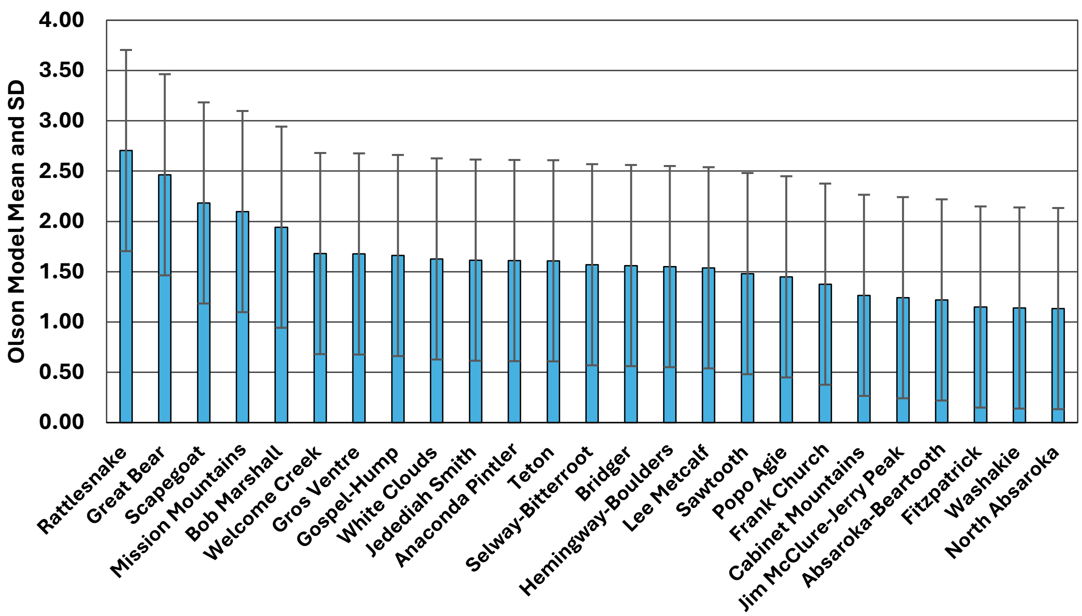


Whether the models are comparable is a question for the authors of those models. However, as habitat becomes less productive for lynx south from the Canadian Boreal Forest, it makes sense that the Northern Rockies might have the highest values, followed by the Greater Yellowstone Area, then the Southern Rockies. This then becomes an important issue in that Colorado, with its much lower habitat probability is deemed suitable habitat and an introduced population is now considered as occupied habitat and given a much larger critical habitat than the Greater Yellowstone Area even though the GYA has higher modeled habitat probability and is closer to the Canadian population.

This appears to amount to bias in application of these models by claiming that Unit 5 (GYA) is does not contain the physical and biological features needed and is not directly connected to habitats elsewhere. Yet the analysis herein demonstrates that it has higher habitat probability than Unit 6 (Southern Rockies). The claim that it is not connected to habitats elsewhere is equally applicable to Unit 6 (Southern Rockies). They are not directly connected either. The fault lies not in the landscape, but the failure to provide the needed connections. It is also a failure of the agencies to explain why lynx are largely absent from the landscape in Unit 5 when, according to their own preferred model, it has high habitat probability across large areas.

The ArcGIS Pro 3.2 Zonal Statistics tool was applied to the Wilderness Areas in the GYA and Northern Rockies. These are ranked in Figure 3.31. Ranking such as this will help in prioritizing land management units for designation as critical habitat or other protections. When it comes to Wilderness Areas, they have the highest level of protection against human disturbance, so can function as primary habitat or connections depending on their location and habitat probabilities. The habitat probability was also determined for Inventoried Roadless Areas, but there are too many polygons to represent in a chart. This data can be accessed in our spreadsheet which contains all the calculations and charts.[124]

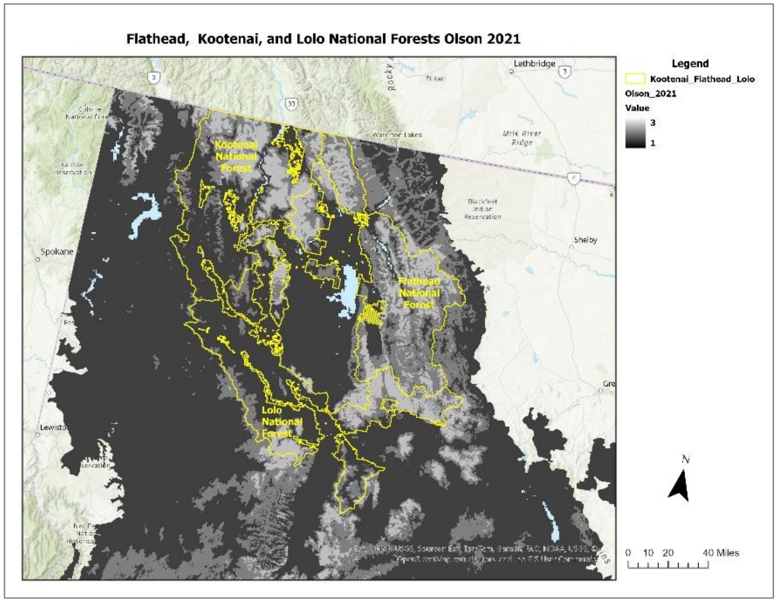
Figure 3.31 Comparison of Wilderness Areas in the GYA and Northern Rockies Using Olson 2021

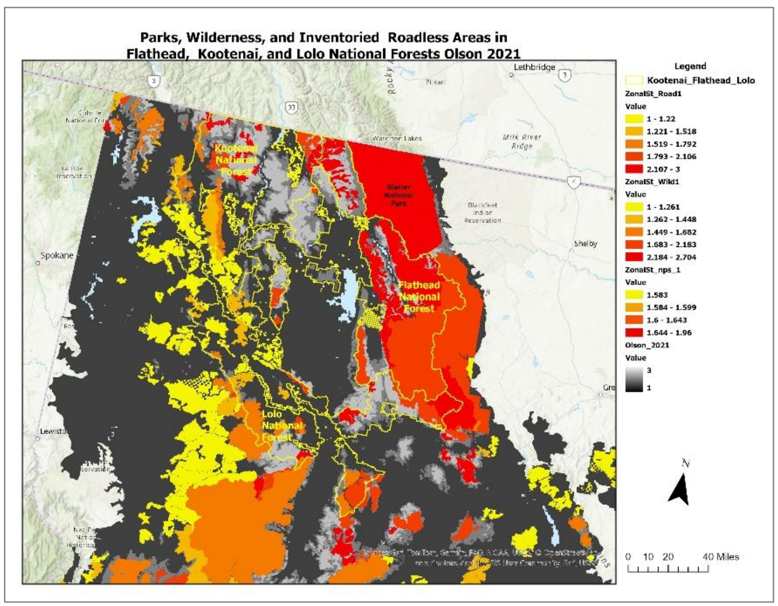


[124] https://app.box.com/s/p50ujoi6b9rixcg17e872ne6uqwd24k6

Figure 3.26 provided a visual of the land management areas (parks, wilderness, roadless), with higher habitat probability that could be used to identify connections. However, not all higher probability habitat is included in these more protective designations. For example, in the Northern Rockies, three NFs (Flathead, Kootenai, and Lolo) with high habitat probability there are not sufficient protective designations to capture the highest probability habitat. (Figure 3.32). The Kootenai NF has a large area of higher probability habitat that is not in wilderness or roadless categories. For this reason, National Forests and Ranger Districts are used to help identify core and connecting habitat for management purposes.

3.9 Summary. Chapter 3 critiques the 2025 revised Critical Habitat designation for the Canada lynx, arguing that it underrepresents occupied and historically used habitat in the Greater Yellowstone Area (GYA) and fails to adequately account for fragmentation and human disturbance. The chapter examines pre- and post-1990 lynx observations, contending that agency reliance on limited recent detections artificially constrains critical habitat boundaries. It evaluates key factors affecting occupancy—including mining, timber harvest, road density, trapping, snow depth, and snowshoe hare abundance—and asserts that their cumulative impacts are minimized or dismissed in federal analyses. Emphasis is placed on large-scale mineral development and expanding motorized access as drivers of habitat degradation and disrupted connectivity. The chapter also analyzes the application of the Olson and Squires habitat models, arguing that these tools, when properly interpreted, identify broader areas of suitable and linkage habitat than those designated in critical habitat. The model analysis ranks National Forests, Ranger Districts, Wilderness, National Parks and Inventoried Roadless Areas, showing large regional possibilities to restore habitat and connections at the LMP level. Overall, Chapter 3 concludes that the revised Critical Habitat fragments the landscape further by excluding essential linkage and high probability habitat areas, thereby weakening long-term recovery prospects in the southern portion of the species' U.S. range.





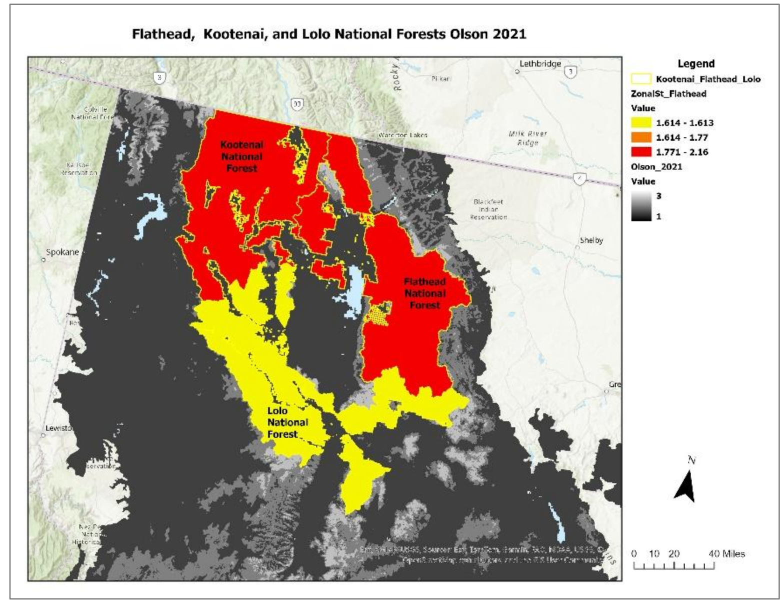


Figure 3.32. Olson Model probabilities for the Flathead, Kootenai, and Lolo National Forests and Protected Areas

CHAPTER 4 The Yellowstone to Uintas Connection and Colorado

4.1 Background. The following discussion is about the need to define, protect and restore a corridor or corridors, and set in place science-based, quantitative standards for habitat to provide for lynx core areas and linkage corridors to the southern population of lynx in Colorado's Unit 6. This discussion is focused on the Y2UConn (higher elevation) corridor passing through western Wyoming, southeastern Idaho, and northeastern Utah to connect critical habitat in the GYA to the Colorado lynx population.

The Colorado Division of Wildlife tracked radio-collared lynx released in Colorado.[125] According to the Forest Service's Rocky Mountain Research Station, *"By 2010, all indications were that the vast majority of animals relocated there had stayed in the state and they seemed to be surviving and reproducing well enough that the population was on a slight upward trajectory."*[126] That report also noted that lynx were extirpated or greatly reduced in Colorado by the 1970s. The report noted that *"managers really understand the need to provide for connectivity in these critical areas we've identified."* To date none of the major players, the FWS, FS and BLM have mapped and provided protective criteria for migration corridors. The FWS should require evidence in producing recovery plans, designating critical habitat, and in biological opinions.

Lynx telemetry records summarized in 2007 confirmed that there was a *"hot spot"* of lynx occurrences at the western end of the Uinta Mountains, where collared lynx from Colorado remained for a time before moving on. As of 2007, at least 22 individuals had made at least 27 visits to the state of Utah, recorded by air telemetry and satellite. The highest concentration of lynx locations in Utah, as identified by telemetry, was in the Uinta Mountains. *"The use-density surface for lynx use in Utah indicates the primary area of use being located in the Uinta Mountains."*[127]

Colorado Parks and Wildlife, using information from the tracking devices, found that 19 males and 10 females reintroduced into Colorado between 1999 - 2006 were in Utah.[128] Because some of these were single data points, CPW chose to evaluate 11 males and 6 females that were in Utah between 2000 and 2010. Most of the individuals *"entered and exited Utah via the Uinta Mountains in the northeast, Abajo Mountains in the southeast, or the East Tavaputs Plateau in the east-central part of the state… ."* The report points out that a male and female occupied the same area in the Uinta Mountains for >200 days, but it is not known if there was denning or reproduction. *"Those that spent a considerable amount of time in Utah tended to find and traverse*

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[125] Devineau, P., Shenk T.M., White, G.C., Doherty Jr., P.M. & Kahn, R.H. 2010. Evaluating the Canada lynx reintroduction programme in Colorado: patterns in mortality. Journal of Applied Ecology. doi:10.1111/j.1365- 2664.2010.01805. https://app.box.com/s/ieark75mjbuh5et4ldy53eity3txw2gp
[126] USDA RMRS. 2019. Winter Sports and wildlife: Can Canada lynx and winter recreation share the same slope? https://app.box.com/s/ihnjws0md8l92w5ef1fo2gyl7wslm88m
[127] Schenk, T.M. 2007. Wildlife Research Report. Colorado Division of Wildlife Report, 2006-7. Table 4, p23, and Figure 7, p34. https://app.box.com/s/zc6i1zl0dxsograf7qjndea05fink1ro
[128] Ivan, J. 2019. Summary of movements of Colorado lynx in Utah. Colorado Parks and Wildlife, Fort Collins. https://app.box.com/s/x904j6b8dw74uexzxy9m0iuxzzswt55c by 2007

the high country running north – south through the central portion of the state." "There were likely other individuals who made the trip. Also, CPW stopped monitoring collared lynx in April 2011. Movements into Utah may or may not have continued since then, but we have no documentation." (p3).

The Science Report (Chapter 10) discusses the history of lynx occurrence in Colorado. *"… boreal forest habitat in Colorado is insular in nature and isolated from similar habitat in Utah and Wyoming by more than 150 km of lower elevation habitats in the Green River Valley and Wyoming Basin (Findley and Anderson 1956). All but a few specimen records are from the center of this island of boreal forest habitat in west-central Colorado."* (SR p230). There were 15 specimens found between the 1800's and 1936 with none thereafter until 1969, 1972, and 1974 when four additional specimens were identified. Despite snow tracking efforts, there have been no verified records in Colorado since 1974. (SR p231). Chapter 1 (Table 1.2) shows that of 196 records in Colorado between 1878 – 1974, there were 17 verified records, but 84 reliable records.

Figures 8.19 and 8.20 in the Science Report (p247) depict lynx occurrences overlaid on Kuchler (1964) vegetation classes in the western U.S. It is noted that Rocky Mountain Conifer cover type enclosed 82% of lynx occurrences. Those Figures and Figure 8.17 in the SR, show dense patterns of lynx occurrence in Colorado, western Wyoming and the GYA, western Montana, northern Idaho, and Washington bordering Canada. A pattern of occurrence also is shown in northeast Utah and along the border between Idaho and Wyoming. Connecting these populations is critical for the DPS to recover, maintain gene flow, and help lynx persist as climate effects worsen. (Figure 3.21 Chapter 3).

The Y2UConn leg of the Regionally Significant Wildlife Corridor is the high elevation, conifer dominated link needed to connect the GYA and northern Rockies to the Uinta Mountains and southern Rockies. The CNF Forest Plan FEIS (pD-5)[129] summarizes the history/knowledge of this corridor through southeastern Idaho.

> *Most of the efforts to date to map corridors have focused on large-scale dispersal corridors generally from the Northern Rockies (Glacier NP) to the Greater Yellowstone Ecosystem. The USFWS, in efforts to conserve large carnivores in the Northern Rocky Mountains, has developed the concept of linkage zones. The linkage zone is an area between habitat fragments able to support both movement and low-density occupancy. The distinction between linkage zone and corridor is the width of habitat—that is the ability to support low density occupancy by species (Samson et al, 1997).*
>
> *Ruediger, et al, 2000 drafted a map titled "IGBC Wildlife Habitat Linkage in the Northern Rocky Mountains." This map also includes the northeastern portion of the Caribou in the mapped north-south linkage zone. Other agencies and groups have done*

[129] USDA Forest Service. 2003. Final Environmental Statement for the Caribou National Forest Revised Forest Plan. Volume IV. https://app.box.com/s/fmw6cu7vgrhs6fdb7xiuzkyrt9o2n0tz

mapping as well.

In May 2000, a meeting was held with several state and federal agencies as well as other interested groups, to discuss developing common criteria to help identify linkages of highest importance (Ruediger, 2000). They recommended factors to consider when identifying wildlife habitat linkages; 1) consider all scales, 2) landforms and topography are important, mountain passes, river bottoms and major ridges are often natural movement corridors, 3) vegetation is important, many species use forested areas for cover, 4) quality of habitat is important, 5) areas with low road densities and low levels of human use are important, 6) need data and 7) maintain large intact blocks of habitat (Ruediger, 2000)

The Wasatch-Cache National Forest in Utah looked at a north-south corridor passing through the Forest. They used McNab, et al, (1994) to identify Province M331 "Southern Rocky Mountain Steppe" as main north-south corridor (Williams, Forest Biologist pers. comm.) Part of this province (M331) passes through part of the Caribou NF in the Caribou/Webster/Preuss subsections. This same area has been mapped as part of the Greater Yellowstone Ecosystem and was included on Ruediger's "IGBC Wildlife Habitat Linkages" map.[130]

The Wasatch-Cache National Forest provided a map of the Regionally Significant Wildlife Corridor (Figure 4.1) along with a map of Lynx Analysis Units in the Wasatch-Cache NF, Uinta NF, and Ashley NF on its website until recently. Those have been deleted as of January 2026, however Y2U obtained the GIS data defining this Corridor and downloaded the map in the event of this deletion.[131]

Figure 4.2 illustrates this Corridor in the region of SSA Units 5 and 6. Figure 4.3 illustrates the Kuchler Rocky Mountain Conifer type, and Figure 4.4, the topography. These maps show that the Science Report ignored this conifer dominated, high elevation connection in its claim that the Colorado boreal forest is *"isolated from similar habitat in Utah and Wyoming by more than 150 km of lower elevation habitats in the Green River Valley and Wyoming Basin."* Distances between higher elevation forested areas are much less in the western leg of the Corridor than across the Green River Valley from Colorado.

[130] USDA Forest Service. Undated. M331 Southern Rocky Mountain Steppe--Open Woodland--Coniferous Forest--Alpine Meadow Province. https://app.box.com/s/us2o9977tjddr46sgxkh7vtirvtl0bmj
[131] Download map at: https://app.box.com/s/l9qjhi81fi7uknrc3t935jt03luvqe4g

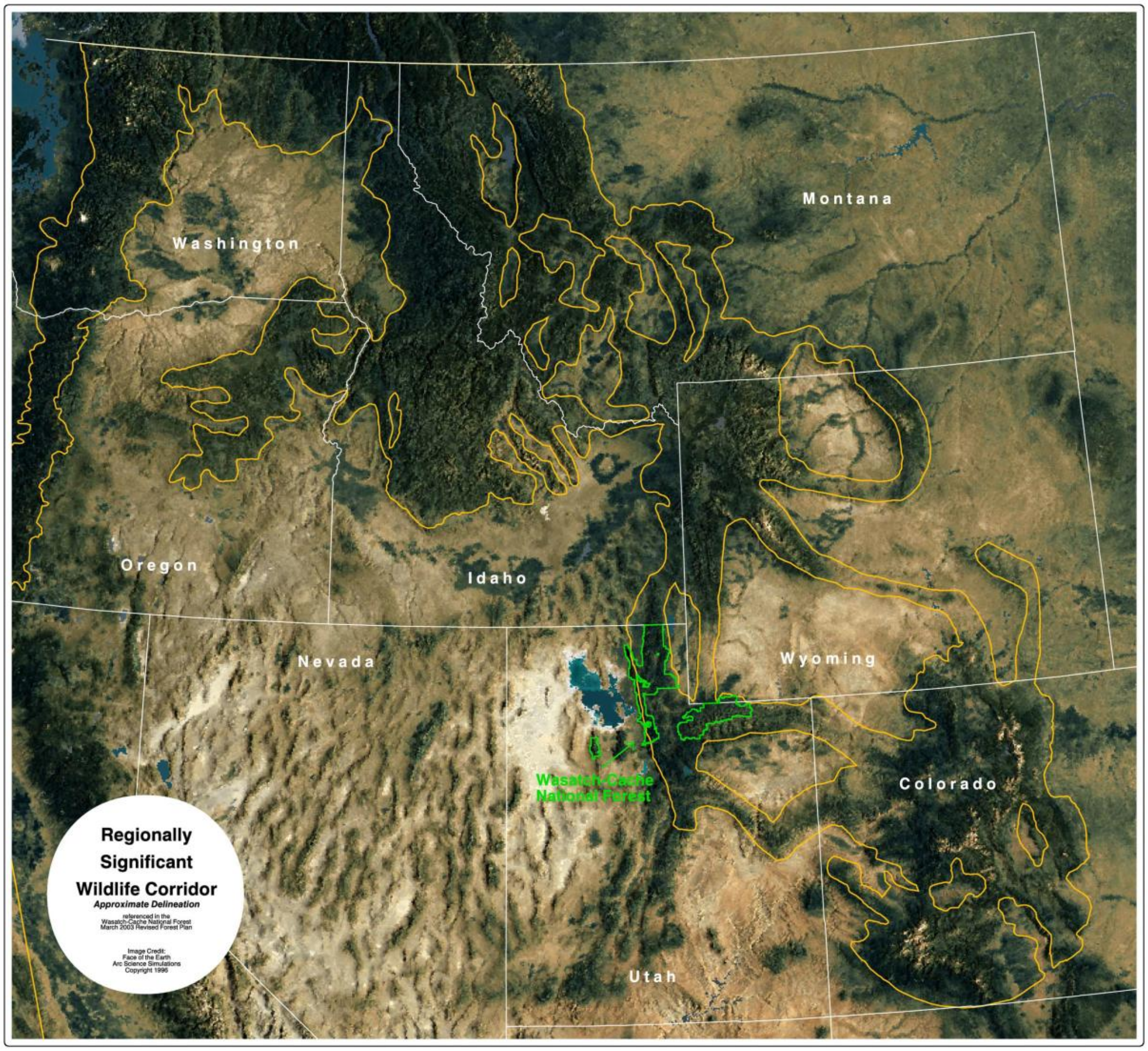
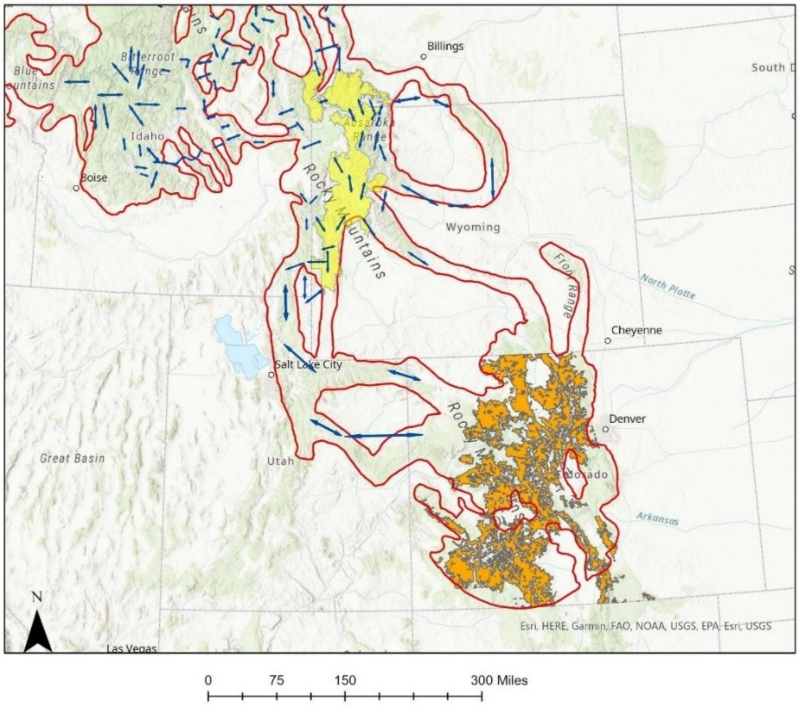


Figure 4.1. Regionally Significant Wildlife Corridor

Figure 4.2 **Regionally Significant Wildlife Corridor, Lynx Linkage and Colorado Potential Habitat**



Regional Corridor - Referenced in USDA. 2003. Revised Forest Plan Wasatch-Cache NF.

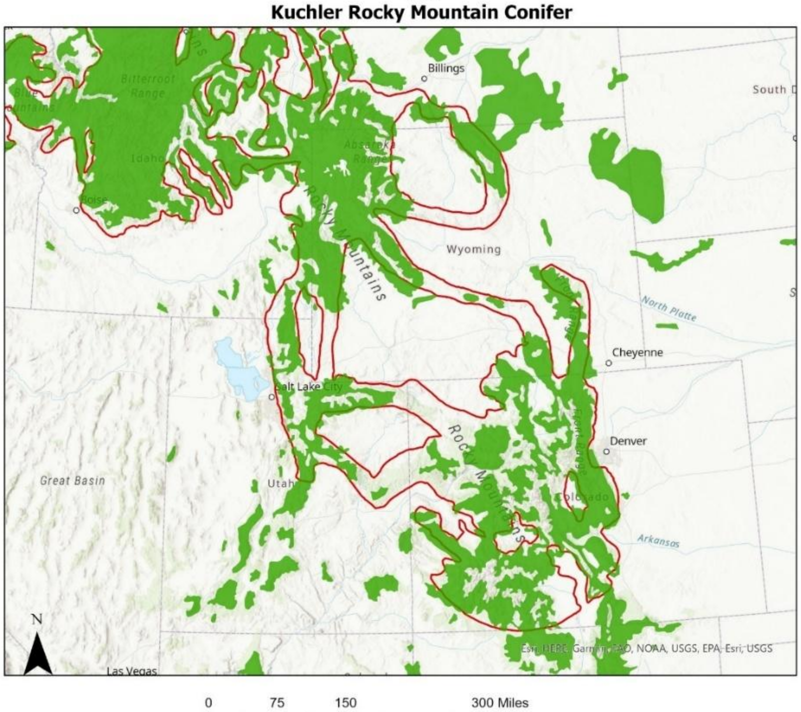
https://www.fs.usda.gov/detailfull/uwcnf/landmanagement/planning/?cid=stelprdb5076923&width=full

Canada Lynx Linkage - USDA Forest Service Northern Region. November 13, 2003. Canada lynx linkage areas for the Northern Rockies Lynx Amendment.

Lynx Potential Habitat - Colorado Parks and Wildlife

Critical Habitat - Fish and Wildlife Service designation. See Federal Register Citation Number 79 FR 54782, published 20140912 for the legal critical habitat information.

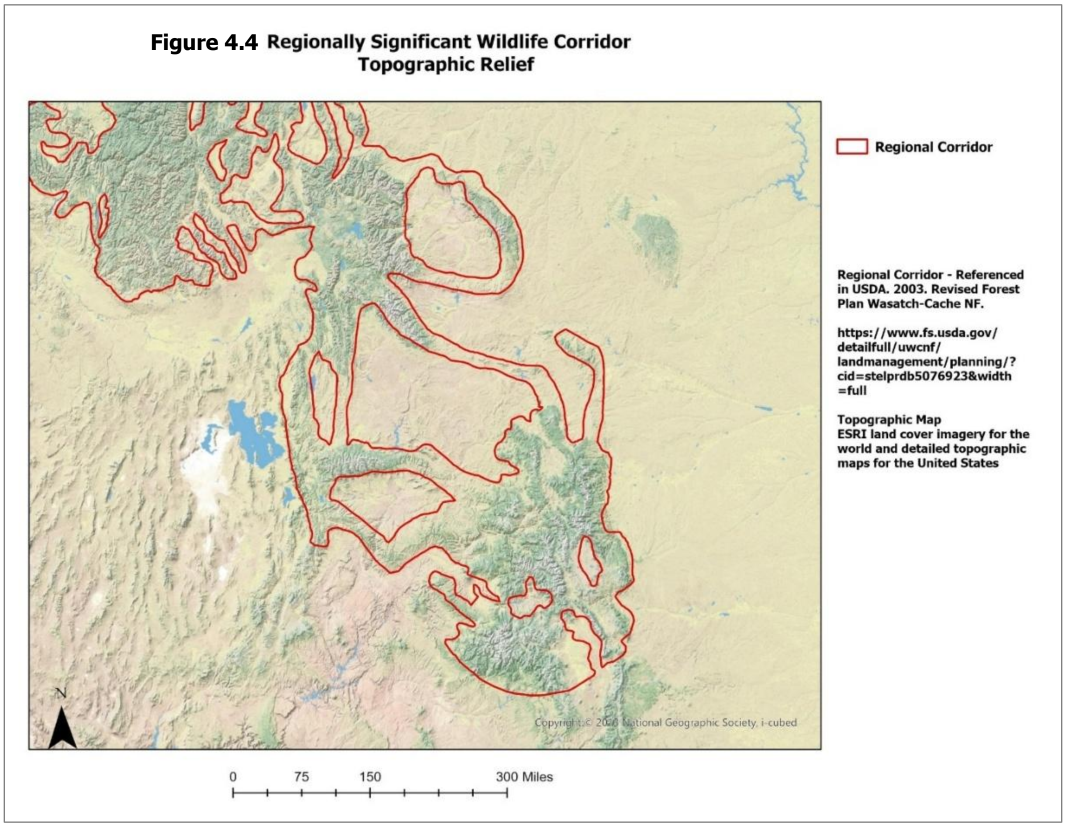
Figure 4.3 **Regionally Significant Wildlife Corridor and Kuchler Rocky Mountain Conifer**



Regional Corridor - Referenced in USDA. 2003. Revised Forest Plan Wasatch-Cache NF.

https://www.fs.usda.gov/detailfull/uwcnf/landmanagement/planning/?cid=stelprdb5076923&width=full

Kuchler type GIS files from Data Basin. http://app.databasin.org/app/pages/datasetPage.jsp?id=1c7a301c8e6843f2b4fe63

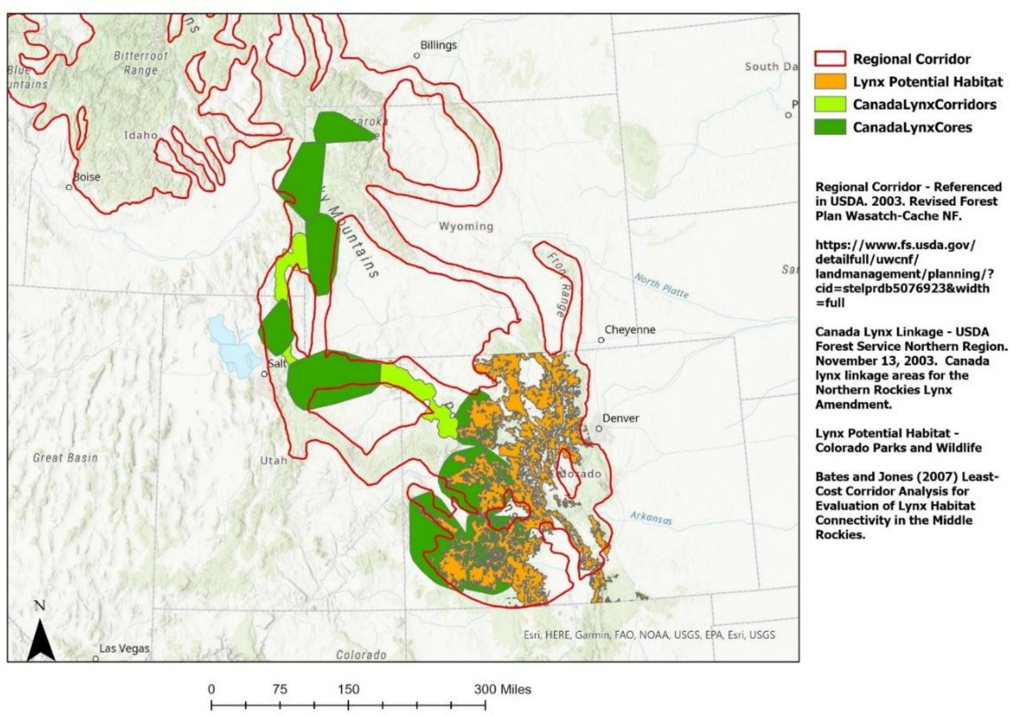


4.2 Colorado. Colorado Parks and Wildlife summarized lynx movements to Wyoming from the reintroductions in Colorado.[132] Locations from 16 male and 15 female lynx that were released in Colorado between 1999 -2006 were in Wyoming between 1999 – 2010. It is interesting to note that the reintroduced lynx came from Canadian populations. Inspection of the maps in the report indicate they were attempting to find their way back north. As the report describes, *"Most of these individuals entered and exited Wyoming via the Medicine Bow Mountains or the Park Range and traveled no farther into the state than the northern extent of these ranges… . At least 8 lynx made it to the Greater Yellowstone Area and beyond. A few entered/exited via the Uinta Mountains in Utah… ."* The report notes that there were likely other individuals that made the trip, but there has been no documentation since that time. Inspection of the figures in the report shows that some lynx apparently did cross the wide lower elevation valleys between the Medicine Bow Mountains and GYA, but there was no consistent path being followed and there were few conifer or high elevation areas along those paths. (Figure 4.3 and 4.4).

[132] Ivan, J. 2017. Summary of movements of Colorado lynx in Wyoming. Colorado Parks and Wildlife. https://app.box.com/s/0gzfalf58upz1h88zseb476q70xdbvk0

A least-cost path analysis of lynx connectivity between the San Juan Mountains in Colorado and the Greater Yellowstone Area reviewed the negative effects of habitat loss and fragmentation and the resulting isolation of those populations.[133] The role of landscape linkages in providing connections and gene flow was addressed. Using GIS, current spatial data for habitats, and human factors affecting lynx movement, potential travel corridors between core patches of lynx habitat in the southern and northern Rockies were identified. Habitat suitability analysis identified the best core areas for lynx based on vegetation type and road density. Habitat types suitable for lynx were identified and scored. Figure 4.5 shows these core and corridor areas of the least cost path overlaid with the Y2UConn leg of the Regional Corridor. These are well aligned with each other. Detailed maps of vegetation classes, road densities, core areas, housing density, slope, habitat permeability, and least cost corridors are provided in the report. The analysis provided an assessment of the probability of successful dispersal for lynx as it assessed the entire landscape, while *"an animal traveling on the ground may not have prior knowledge of the territory it is crossing or obstacles it may come upon."* (p21). The model is suitable for making conservation and management decisions.

Figure 4.5 Regionally Significant Wildlife Corridor, Lynx Linkage and Colorado Potential Habitat



[133] Bates, W. & Jones, A. 2007. Least-Cost Corridor Analysis for Evaluation of Lynx Habitat Connectivity in the Middle Rockies. Report to the Nature Conservancy by the Wild Utah Project, Salt Lake City. https://app.box.com/s/0g8b1ryqg1iz6r1fd61rdkc8fso97oh5

Colorado Parks and Wildlife engaged in a similar effort to map predicted use areas in Colorado.[134] They used location data from reintroduced lynx fitted with transmitters, filtered those data to remove locations for the first six months to account for habituation, considered elevations above 8,000 feet, and included factors for housing and road density, slope, distance to forest patches and vegetation types. Summer and winter data were used to generate models for both seasons. Figures 4.6 and 4.7. They reported an estimated 95% overlap between summer and winter habitats. Aspen habitats were used in both summer and winter while lodgepole pine habitats saw increased use in summer. Lynx avoided areas with high volume of traffic during summer.

A map of the predicted distribution for Canada lynx in the 2050's based on modeled climatic conditions is provided in Figure 4.8.[135] A current map obtained from NASA[136] for January 14, 2026 shows those modeled areas are validated by the presence of snow with lower elevations lacking snow. (Figure 4.9).

Modeling and analysis such as these examples should be used to delineate the final configurations for regional corridors needed to maintain connectivity for lynx populations. The Y2UConn leg of the Corridor is a viable option for the higher elevations and snow cover needed by lynx. It also includes the potential core area of the Uinta Mountains where historical observations indicate a lynx population existed there prior to trapping and exploitation by people. The Bates and Jones Model (Figure 4.5) show additional core and connecting areas in the Y2UConn from the Uinta Mountains through northern Utah, southeast Idaho and western Wyoming. The Y2UConn connects to Critical Habitat in Western Wyoming where studies documented lynx present in 2004/2005 along with populations of snowshoe hares.[137] A follow-up effort in the winter of 2008/2009 also detected lynx in the Greater Yellowstone Area.[138]

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134 Ivan, J.S. 2011. Predicted Lynx Habitat in Colorado. In: Wildlife Research Report. Mammals Program. Colorado Division of Parks and Wildlife. https://app.box.com/s/hh1607p89cgcpptt4x8k2m0j3r1cyf9d

135 Hamilton, H. 2008. Predicted Distribution of Canada Lynx (Lynx canadensis) - A2 emissions scenario - 2050's. California Academy of Sciences 07.29.2008. https://app.box.com/s/68dkiy59090hq6p3k14o2zifvwk740kg

136 NASA Worldview. https://worldview.earthdata.nasa.gov/. Accessed February 8, 2026.

137 Berg, N.D., Burghardt, J., Gray, R., & Smith, B. 2005. The Greater Yellowstone Lynx Study 2004/2005 Annual Report. The Endeavor Wildlife Research Foundation. https://app.box.com/s/5d09m4ak6d7zwoiptwv0kjqq7qghjcjq

138 Holmes, M. & Berg, N. 2009. Greater Yellowstone Ecosystem Lynx Study. Endeavor Wildlife Research Foundation. https://app.box.com/s/cop90dant8ai6rbi0dtcusqk1nwpvfkv

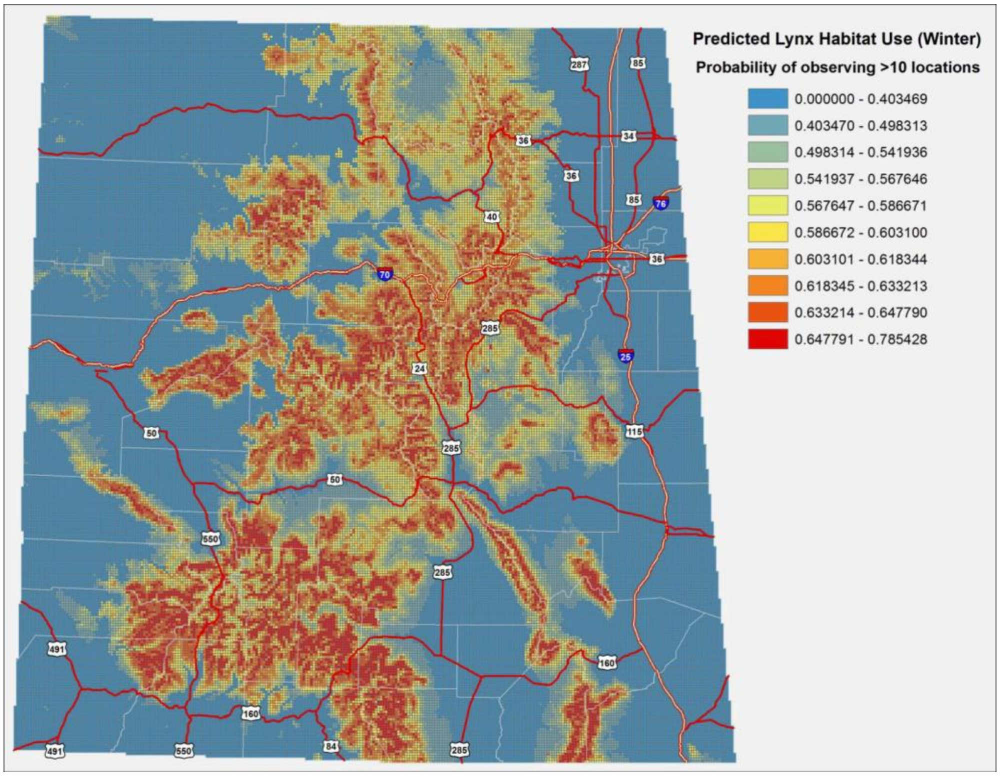


Figure 4.6 Predicted winter use by Canada lynx in western Colorado. (From Ivan et al Figure 2)

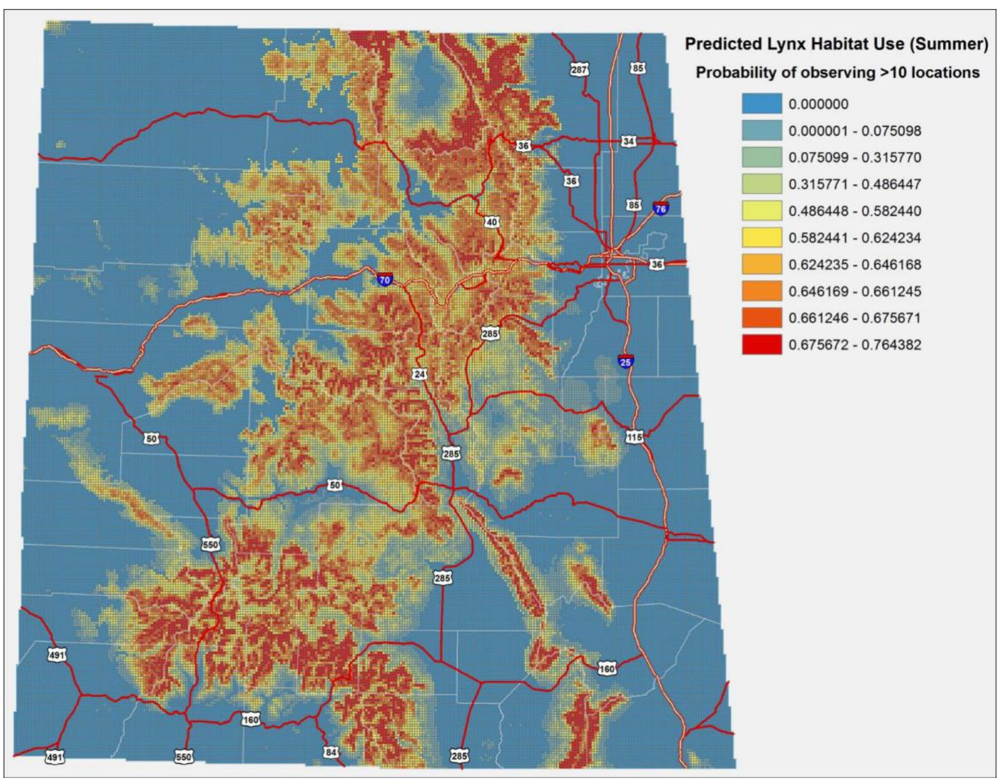


Figure 4.7 Predicted summer use by Canada lynx in western Colorado. (From Ivan et al Figure 3)

Figure 4.8 Regionally Significant Wildlife Corridor
Predicted Lynx Distribution in 2050s Using Climate Model

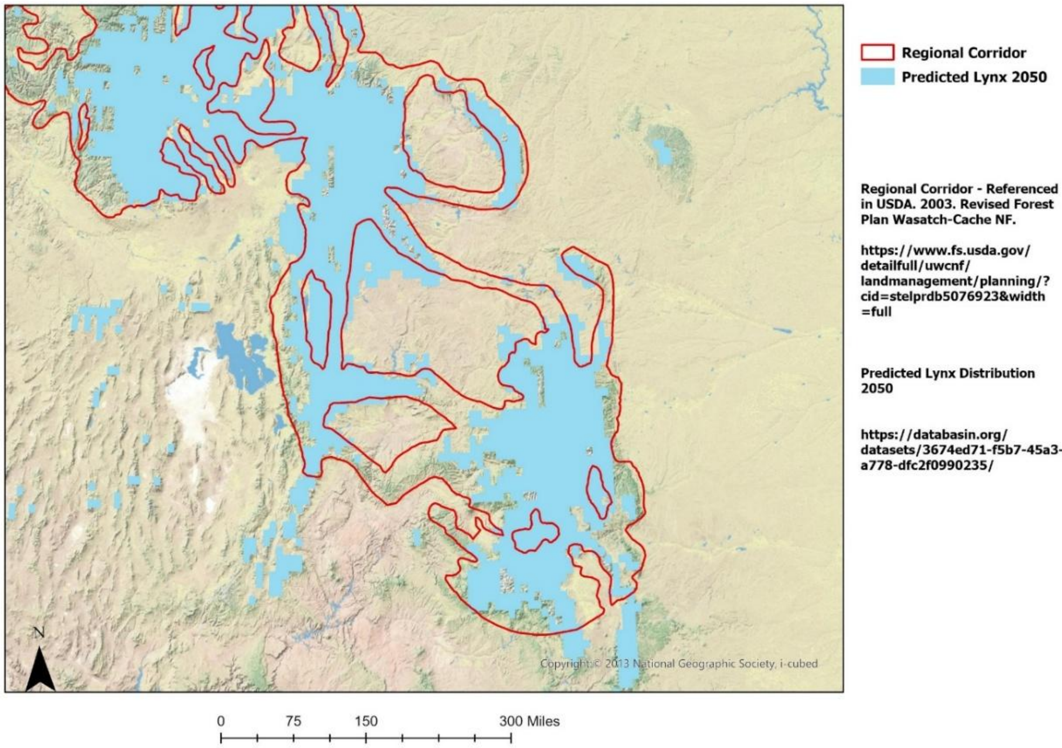
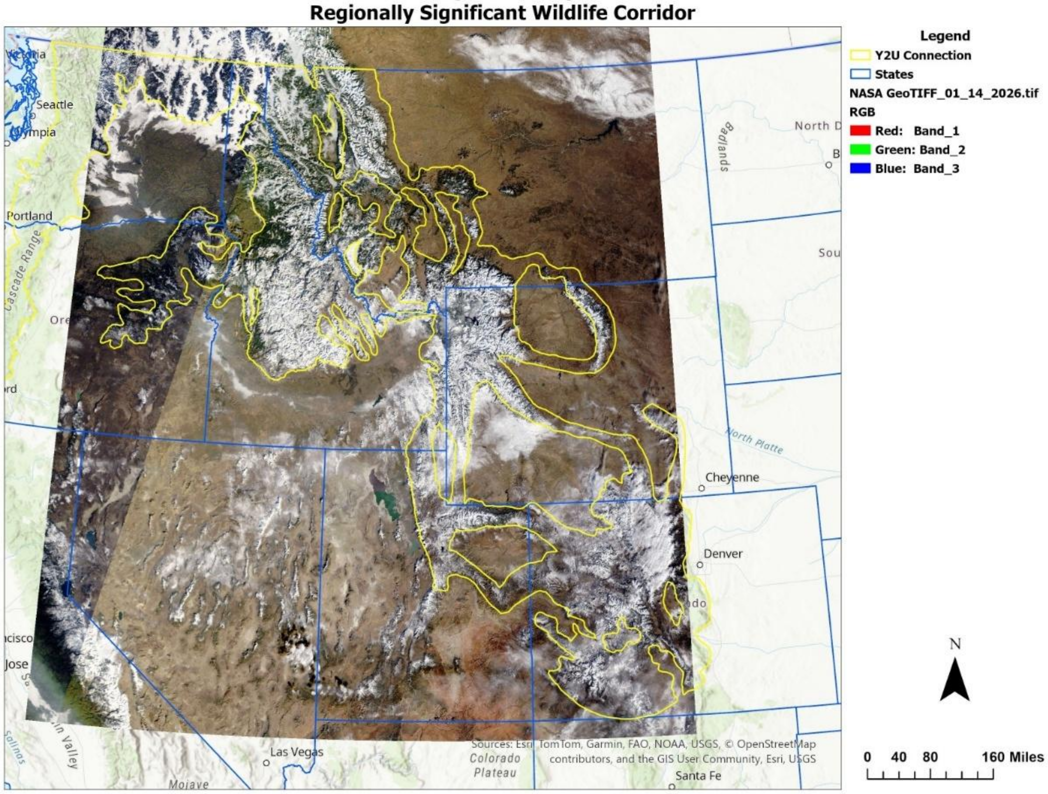


Figure 4.9 NASA Satellite Image - January 14 2026 and Regionally Significant Wildlife Corridor



4.3 Summary. Chapter 4 examines the Y2UConn and its relationship to lynx conservation in both the GYA and Colorado, arguing that this landscape functions as a critical but underrecognized linkage for the Canada lynx in the southern Rockies. The chapter describes the ecological importance of maintaining connectivity between higher-elevation forested habitats across western Wyoming, southeastern Idaho, northeastern Utah, and into Colorado, emphasizing that dispersal and genetic exchange depend on functional corridor integrity. It critiques federal analyses for failing to adequately map, protect, or prioritize these linkage areas, particularly where they are classified as unoccupied habitat and therefore receive weaker to non-existent management direction. The Colorado discussion challenges assumptions that southern populations rely solely on immigration from Canada, highlighting evidence of habitat capability and successful reestablishment while stressing the need for secure north - south connectivity. FWS modeling has shown that as climate warms, the GYA and Colorado higher elevations will constitute refuges for lynx. Current satellite imagery shows this modeling to be valid. Overall, Chapter 4 concludes that without explicit recognition and protection of the Y2UConn corridor and related southern linkages, long-term recovery and demographic stability for lynx in the southern portion of their U.S. range remain unlikely.

CHAPTER 5 Providing for the Southern Population of Canada Lynx

5.1 Background. The Southern population includes the areas historically used or occupied by Canada lynx that do not border the Canadian Provinces (excluding northern Idaho. Ensuring connectivity and habitat protection in this southern core and corridor area that is disconnected from habitats in Canada is critical to maintain the isolated meta-populations in the south. The Colorado reintroductions show lynx can survive in this southern portion of the DPS, yet research and monitoring of habitats and prey populations are lacking for much of this area. The Science Report (SR p338) reported only seven studies with two of those being for bobcats.

The Science Report Chapter 13 reviewed the ecology of lynx in these southern areas and compared them to the taiga in Canada. In both regions, lynx occurred where snowshoe hares were abundant. In the southern region, lynx were known to make exploratory movements prior to dispersal. The Colorado tracking data clearly illustrated these exploratory movements. Habitats in the southern region are patchier, and lynx make more use of alternate prey. For instance, lynx scats collected in north-central Washington contained 79% snowshoe hare and 24% red squirrel. (SR p376 - 377). Snow tracking studies in the southern Canadian Rocky Mountains found prey consisted of 52% snowshoe hare, 30% red squirrels, and the rest were flying squirrels, martens, voles, and grouse, plus unknowns. Snowshoe hare densities were estimated to range from 0.01 - 0.47 hares/ha. (SR p377). *"In southern boreal forests, limited data suggest that because snowshoe hares typically occur at low densities (Chapter 7), alternative prey may always be important components of lynx diets, especially in the western mountains."* (SR p378). This was discussed in Chapter 3, showing that snowshoe hare in these southern areas can, with habitat protections, support Canada lynx.

5.2 Habitat Associations. The Science Report described the association between lynx locations and habitat. The predominant association was with Rocky Mountain Conifer in these western interior states. Lynx use a variety of habitats and elevations between summer and winter. Generally, they use higher elevations in more southerly locations and between summer and winter. Most conifer types are included in areas used by lynx and can include Douglas-fir, western larch, lodgepole pine, subalpine fir, whitebark pine, and Engelmann spruce. Occasionally, they will occur in non-forested areas such as shrub-steppe. (SR p379). Snow tracking in Washington found that lynx traveled around meadows and used thinned stands that contained several hundred trees per hectare. (SR p381).

Home ranges in these southern areas are larger than in the north. The average for males is 151 km^2 and females, 72 km^2. In west-central Wyoming they were smaller at 90 and 66 km^2. (SR p383 – 384). In Washington, home ranges were bounded by rivers, ridges, and major highways. (SR p385). Exploratory movements in Montana ranged from 17 to 38 km. (SR p386). Dispersal can take place over larger distances of several hundred km. (SR p386 -387). In the north-central Washington study, 8 kittens were documented in a population of 23 lynx during the three-year study. Estimates of total lynx density for the 1,161 km^2 area was 2.4 lynx/100 km^2. (SR p387).

Comparisons made to northern populations during the lows in hare cycles, indicate that similar demographics occur in the southern populations compared to these lows. (SR p389).
Because lynx are adapted to pursue snowshoe hares in deep snow, hare density in these southern states is important. Chapter 11 of the Science Report summarizes densities in Montana as well as the Wyoming Range. (SR p346). This ranged from 0.6/ha to 1.4/ha. Two studies cited from Utah gave densities ranging from lows in aspen with dense understory of 0.22/ha to 2.7/ha in spruce-fir habitat. Intermediate numbers occurred in Douglas-fir (0.57/ha and subalpine fir of 0.99/ha). These were estimated from pellet counts while the higher numbers from spruce-fir were from live trapping. Pellet plots in Colorado ranged from 0.26/ha in aspen, to 0.46 in Engelmann spruce. (SR p185).

These southern hare densities compare to population lows in areas of Canada with persistent lynx populations. For example, from the Science Report (SR p362), *"Hare densities in the southwest Yukon declined from 8.0 to 10.7/ha to 0.2 to 0.5/ha during one cycle (Ward and Krebs 1985), and another population fell from 7.5/ha to 1.3/ha during the next cycle (Slough and Mowat 1996). Similarly, a population in the Northwest Territories fell from 7 to 9/ha to 0.4 to 1.0/ha during the early 1990s (Poole 1994), and a northern Alberta population declined drastically from about 17/ha to 0.34/ha during the early 1970s (Brand et al. 1976)."* Hare densities in these studies appear sufficient to support lynx populations in the DPS, but the absence of recent hare studies leaves open the question as to the status and extent of current hare densities in the southern portion of the DPS. Whether snowshoe hares exist in sufficient numbers in these southern regions needs to be determined along with factors (deforestation, livestock grazing, predation, etc.) driving their population density.

A recent study of forest characteristics centered around lynx reproductive success looked at habitat fragmentation and loss of connectivity.[139] In particular, the natural patchiness of lynx habitat at the southern extent of its range is *"subject to loss and fragmentation by some forest management practices (i.e. regeneration harvests, pre-commercial and commercial thins, prescribed burns), wildfires and insect infestations, and climate change… ."* (p2). There are data gaps on the abundance and arrangement of lynx habitat and how these relate to reproductive success. The research was conducted in the Swan, Mission, and Purcell Mountains in Montana and included low to mid-elevation ponderosa pine and Douglas-fir to high-elevation subalpine fir, spruce and lodgepole pine. (p3 - 4). Thirty - six female lynx were radio collared and monitored. They produced 36 litters with an average of 2.46 kittens during the 14-year period 1998 – 2012. (p12 – 13*).* Mature forests were the dominant structure in core areas and home ranges. Forty-nine percent of core habitat contained 13% of regenerating forest. Fifty percent of home ranges averaged 11% regenerating forest. (p13). When the proportion of young regenerating forest reached 10 – 15% of the core area, the probability of producing a litter declined. (p14). Females with larger surviving litters *"had less fragmented home ranges, lower moisture variance, young*

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[139]Kosterman, Megan K. 2014. *Correlates of Canada Lynx Reproductive Success in Northwestern Montana*. Theses, Dissertations, Professional Papers. Paper 4363.
https://app.box.com/s/j1kfpjbznr88juzdazkhyhdqal5lw7in

regenerating forest patches with low perimeter-area ratio, and lower percent composition of old regenerating forest than home ranges of females with smaller surviving litter sizes". (p15). *"…connectivity of mature forest, percent composition of young regenerating forest and young regenerating forest patches with low perimeter-area ratio, and adjacency of mature to young regenerating forest types were the most important predictors for overall lynx reproductive success in our study areas."* (p16). A follow-up paper pointed out that *"The forest characteristics that defined high success included (1) abundant and connected mature forest and (2) intermediate amounts of small-diameter regenerating forest. These attributes are consistent with providing abundant, temporally stable, and accessible prey resources (i.e., snowshoe hares; Lepus americanus) for lynx and reinforce the bottom-up mechanisms influencing Canada lynx populations."*[140]

Habitat standards should incorporate these characteristics of core areas, home ranges, and apply them to connecting corridors such as the Y2UConn. Similarly, standards should be developed to protect snowshoe hare habitat and ensure adequate populations to support lynx. Monitoring programs should document forest cover characteristics in lynx and snowshoe hare habitat. A particular focus should be to document the effects of livestock grazing on understory vegetation affecting both species and provide mechanisms in LMPs and permits to avoid grazing these areas.

5.3 Northern Rockies Lynx Management Direction. The Northern Rockies Lynx Management Direction Record of Decision (NRLMD ROD) and its standards and guidelines provided no adequate standard for levels of mature forest habitat within LAUs and provided nothing for habitat not designated in LAUs. While it states that habitat connectivity will be maintained, there is no definition of what constitutes connected habitat, even though this can be defined by current science. The NRLMD ROD does not clearly define what qualifies as unsuitable lynx habitat, which is limited to no more than 30% of an LAU (VEG S1) with no more than 15% unsuitable habitat created in 10 years (VEG S2). The glossary (p12) also defines lynx habitat in an unsuitable condition as the stand initiation structural stage but notes that unsuitable habitat can also be created by shelterwood cuts and commercial thinning depending on the resulting stand composition and structure. The ROD (p9) defines lynx habitat in an unsuitable condition as those forests in a stand initiation structural stage that are too short to provide winter snowshoe hare habitat; these conditions are created by stand-replacing wildfires, prescribed burns that remove all vegetation, or regeneration timber harvest. The ROD (p10) states that the definition of VEG S2 was changed to clarify that it only applies to timber management practices that regenerate a forest, such as clear-cut, seed tree, shelterwood, and group selection. The NRLMD does not ensure persistence of lynx, since there are no restrictions on the amount of an LAU that can be converted to habitats that are avoided by lynx, to habitats that reduce habitat connectivity via mature forests, or provide for snowshoe hare habitat.

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[140] Kosterman, M., Squires, J., Holbrook, J., Pletscher, D., & Hebblewhite, M. 2018. Forest structure provides the income for reproductive success in a southern population of Canada lynx. Ecological applications : a publication of the Ecological Society of America. 28. 10.1002/eap.1707. https://app.box.com/s/1d43elbdnwk3p98hy7fbwcs4q8wkeowq

The 30% clear-cut standard for lynx habitat in the NRLMD is based on habitat recommendations published in 1989, while other key recommendations were ignored. Although these recommendations noted that monitoring was required to determine if they would be effective, there is no evidence such monitoring was ever done before they were included in the LCAS and the NRLMD. Currently, the best available science demonstrates that the 33% opening level allowed by these recommendations is invalid, while the unused recommendation of maintaining a high level of forest cover of 69% has been validated. The 1989 Brittell recommendations for lynx habitat defined a level of habitat connectivity for lynx, which included denning, travel, and stalking habitat as 66% of each square mile of lynx habitat, not an entire LAU of many square miles with no guidance as to where within that LAU habitat should be maintained.[141]

While clear-cuts and sparse forests may receive some lynx use, their suitability for lynx is significantly reduced. It has been shown not only that those clear-cuts and sparse forests are strongly avoided by lynx, but that restoration of lynx habitat use in these logging areas to 50% of previous use takes 20 years in thinned forests, and 34-40 years for selection cuts and clear-cuts. Also, all logging treatments are avoided by lynx for at least 10 years.[142] Predictors for lynx reproductive success within occupied female home ranges were the connectivity of mature forest, intermediate (10 - 15%) amounts of young regenerating forest, young regenerating forest patches with low perimeter - area ratios, and the adjacency of mature forest to young regenerating types. Female lynx home ranges with greater than 50% mature forest and 10 - 15% young regenerating forest appear to be the optimum.[143]

More recent work has characterized habitat quality of Canada lynx at their "range periphery".

> *Our results indicated that the probability of a female producing kittens was most associated with the connectivity of mature, multistoried forests (composed of mostly spruce-fir). However, the variation among female lynx accounted for ≈62% of the total variation explained in litter production, suggesting substantial individual-level variation. Thus, managers can contribute to increased reproductive success of female Canada lynx by facilitating the development of mature forests but measuring that success will be difficult given the individual variation. In core areas of high-quality females (i.e., produced kittens frequently), mature forest was 17% more abundant (i.e., ≈60% of the total core area), more connected, less clumpy, and exhibited 2.25-times larger patch sizes*

[141] Brittell, J.D., Poelker, R.J., Sweeney, S.J., & Koehler, G.M. 1989. Native cats of Washington. Washington. Department of Wildlife, Olympia. https://app.box.com/s/2lx6s6kt23un6p7qmmnzqs38dxjk3b8i

[142] Holbrook, J.D., Squires, J.R., Bollenbacher, B., Graham, R., Olson, L.E., Hanvey, G., Jackson, S., & Lawrence, R.L., 2018. Spatio-temporal responses of Canada lynx to silvicultural treatments within the Northern Rockies, U.S. For. Ecol. Manage. 422, 114–124. https://app.box.com/s/qz9hh7g724y0o8qv5jb75y17u1perqyj

[143] Kosterman, M.K. 2014. *Correlates of Canada Lynx Reproductive Success in Northwestern Montana*. Graduate Student Theses, Dissertations, & Professional Papers. 4363. https://app.box.com/s/j1kfpjbznr88juzdazkhyhdqal5lw7in

than the core areas of low-quality females. At the home-range extent, patterns were less pronounced while the abundance of mature forests remained high (≈50%) for high quality females. Additionally, we demonstrated that the relative density of snowshoe hares was ≥2.8 times higher in advanced regenerating forests compared to all other structural classes, including mature forest. Advanced regenerating forests accounted for ≈18–19% of the core area and home range of high-quality female lynx. Combined, our results suggest that a high-quality mosaic for female Canada lynx contains ≈50–60% mature forest and ≈18–19% advanced regenerating forest. Furthermore, we used Forest Inventory and Analysis data to characterize the approximate age distribution of advanced regeneration and mature forest, which was relevant for rotation schedules of forest silviculture. Results indicated that advanced regeneration was ≈20 to 80 years old while mature forest was ≈50 to ≥200 years old. [144]

Lynx spend a significant amount of time at the interface between mature and advanced regeneration forest. This is likely because advanced regeneration forest provides the most hares, but mature forest habitat makes these hares more accessible. This indicates that advanced regeneration forest subsidizes the occurrence of hares in adjacent mature forest where they are more accessible to lynx.[145] Here, Holbrook et al (2017, 2019) have provided science-based criteria that needs to be included in updated Recovery Plans and LMPs.

What is lacking today is the inclusion of current knowledge of what is known about lynx, snowshoe hare, red squirrels and their habitats into quantitative criteria that define these habitats in the southern DPS. The NRLMD and current Forest Plans are badly out of date and omit critical information. This is especially true in those areas not bordering the Canadian populations. While the Science Report has pointed out study and research needs, there has been a lack of definitive work in the southern-most states, particularly in western Wyoming, southeast Idaho, northeast Utah, Colorado, and the linkages or connections between these areas. Since these areas are heavily used by livestock as opposed to the situation further north, the effects of livestock on habitats are important to document to provide cover and forage for snowshoe hares, and cover for lynx. Also, the effects of over-snow travel, cross-country skiing, summer recreation and road density must be studied because the earlier data in the Science Report and the conclusions represented in the NRLMD, both LCASs, the 2017 SSA and the Remand Notice were based on earlier times in the absence of the levels of activity currently flooding throughout the western National Forests and BLM lands.

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[144] Holbrook, J.D., Squires, J. R., Bollenbacher, B., Graham, R. O., Lucretia E., Hanvey, G., J, S., Lawrence, R.L., & Savage, S. L. 2019. Management of forests and forest carnivores: Relating landscape mosaics to habitat quality of Canada lynx at their range periphery. Forest Ecology and Management. 437: 411-425. https://doi.org/10.1016/j.foreco.2019.01.011
https://app.box.com/s/61ycrxd2mcfpk96opast73yl0lyivrrn .

[145] Holbrook, J.D., Squires, J.S., Olson, L.E., Lawrence, R.L., & Savage, S., 2017. Multi-scale habitat relationships of snowshoe hares (Lepus americanus) in the mixed conifer landscape of the Northern Rockies, USA: cross-scale effects of horizontal cover with implications for forest management. Ecol. Evol. 7, 125–144. https://app.box.com/s/008jbo2p4ows1ufg4ju0lds4x5vj2125

It is in this vacuum of current data and information that agencies must evaluate the status of Canada lynx in the DPS. Continuing to cast doubt on the historical presence of lynx in these southern areas cannot be used as a mechanism to reduce the area of potential lynx habitat, the habitat connections needed, or regulatory requirements. Instead, the current existing database and science must be applied to map and describe these areas of historical observations (not just verified records), their current habitat status and fragmentation by human uses as compared to what is known about the habitat needs of lynx. Studies and data collection need to happen to answer the questions and fill the data needs.

The criteria for identifying and managing LAUs needs to change to more specific, quantitative limitations on timber harvest, road density, mining, recreation use, perhaps using blocks of contiguous habitat and connections. Currently "unoccupied" or "peripheral" areas that had historical lynx observations must have potential lynx habitat mapped into LAUs, watershed areas, or blocks of habitat with definitive and quantitative criteria and standards reflecting what is known about lynx habitat. The parameters defining lynx habitat in places such as those studies cited here in the contiguous states could be used to define current standards. Forest Plans and BLM Resource Management Plans must be amended with new standards to correct the current lack of regulatory requirements as described in this report. Corridors must be mapped and defined following the examples cited herein in which models have been used to identify lynx habitat, corridors, and connections. Those should have the same standards as occupied habitat.

5.4 Prioritizing Landscapes and Promoting Connectivity. In Chapter 4, a Colorado Parks and Wildlife summary of lynx movements to Wyoming from the reintroductions in Colorado was reviewed.[146] Locations from 16 male and 15 female lynx that were released in Colorado between 1999 - 2006 were found in Wyoming between 1999 – 2010. It is interesting to note that the reintroduced lynx came from Canadian populations to the north. Inspection of the maps in the report gives the impression that they were attempting to find their way directly back north. As the report describes, *"Most of these individuals entered and exited Wyoming via the Medicine Bow Mountains or the Park Range and traveled no farther into the state than the northern extent of these ranges… . At least 8 lynx made it to the Greater Yellowstone Area and beyond. A few entered/exited via the Uinta Mountains in Utah… ."* The report noted that there were likely other individuals that made the trip, but there has been no documentation since that time. Inspection of the figures in the report shows that some lynx apparently did cross the wide lower elevation valleys between the Medicine Bow Mountains and GYA, but there was no consistent path being followed and there were few conifer or high elevation areas present.

The lynx least-cost path corridors and cores mapped by Bates and Jones (2007) connect the GYA by passing through the Wyoming Range into southeast Idaho and northeast Utah through the

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[146] Ivan, J. 2017. Summary of movements of Colorado lynx in Wyoming. Colorado Parks and Wildlife. https://app.box.com/s/0gzfalf58upz1h88zseb476q70xdbvk0

Bear River and Monte Christo Ranges to the Uinta Mountains and Southern Rockies.[147] (Figure 5.1). This least-cost path followed the Y2UConn through the Uinta Mountains to Colorado. A slightly longer leg of the Y2UConn passes to the south and through the East Tavaputs Plateau and Book Cliffs with elevations of 9,000 to 10,000 feet. Lynx from the Colorado reintroductions used these paths as described. The higher elevation areas are visible in Figure 4.4.

Bates and Jones (2007) least-cost path analysis of lynx connectivity between the San Juan Mountains in Colorado and the GYA reviewed the negative effects of habitat loss and fragmentation on wildlife populations and the resulting isolation of those populations. The role of landscape linkages in providing connections and gene flow was addressed. Using GIS, current spatial data for habitats, human factors affecting lynx movement, and potential travel corridors between core patches of lynx habitat in the southern and northern Rockies were identified. Habitat suitability analysis identified the best core areas for lynx based on vegetation type and road density. Habitat types suitable for lynx were identified and scored. These core and corridor areas aligned with the Y2UConn leg of the Regional Corridor. Detailed maps of vegetation classes, road densities, core areas, housing density, slope, habitat permeability, and least cost corridors are provided in Bates and Jones (2007). Their analysis provides an assessment of the probability of successful dispersal for lynx as it assessed the entire landscape, while *"an animal traveling on the ground may not have prior knowledge of the territory it is crossing or obstacles it may come upon."* (p21). The model is suitable for making conservation and management decisions. (Figure 5.1).

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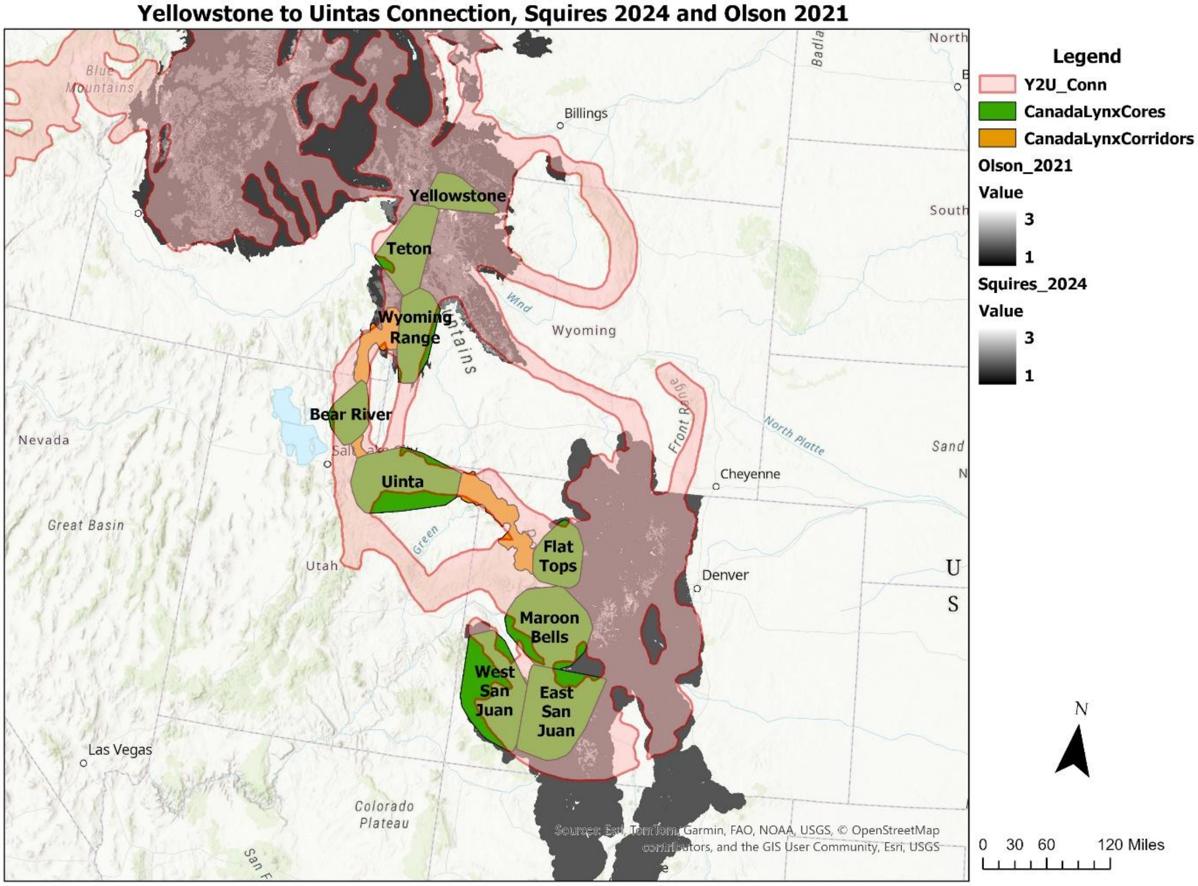
[147] Bates, W. & Jones, A. 2007. Least-Cost Corridor Analysis for Evaluation of Lynx Habitat Connectivity in the Middle Rockies. Report to the Nature Conservancy by the Wild Utah Project, Salt Lake City. https://app.box.com/s/0gzfalf58upz1h88zseb476q70xdbvk0

Figure 5.1 Bates and Jones (2007) Canada Lynx Cores and Corridors
Yellowstone to Uintas Connection, Squires 2024 and Olson 2021



5.5 Model Gap. Colorado Parks and Wildlife engaged in a similar effort to map predicted use areas in Colorado.[148] They used location data from reintroduced lynx fitted with transmitters, filtered those data to remove locations for the first six months to account for habituation, considered elevations above 8,000 feet, and included factors for housing and road density, slope, distance to forest patches and vegetation types. Summer and winter data were used to generate models for both seasons. Squires et al (2024) includes one of the authors of the CPW analysis and report. What is needed is a review of these two analyses and extending the Squires and Olson Models to cover this Model Gap and the Y2UConn.

A closer look was taken at land management in this Model Gap and the Y2UConn. Figures 5.2 and 5.3 show National Forests and BLM Field Offices within this Model Gap are responsible for management of most of these public lands. This provides an opportunity to identify a continuous core and corridor system connecting the Southern Rockies and Greater Yellowstone

[148] Ivan, J., Rice, M., Shenk, T., Theobald, D., & Odell, E. 2011. Predictive Map of Canada Lynx Habitat Use in Colorado. Colorado Parks and Wildlife.

Area, and through land use plan amendments remove barriers for lynx and provide standards to make these cores and corridors functional for lynx.

The linkages identified by the Forest Service[149], the National Parks and National Forests within the Northern Rockies and Greater Yellowstone Area provide general patterns of potential movement for lynx (Figure 5.4 and 5.5). These are National Parks and National Forests with the highest Olson probabilities. (Chapter 3) A more detailed analysis that includes Wilderness Areas, IRAs, BLM, and other land management areas can help identify specific paths for connecting these areas.

These were combined in Figure 5.5 to show the major vectors of movement within areas of high habitat probability or suitability in the Olson Model. National Parks (Yellowstone and Grand Teton) and National Forests south to north (Uinta-Wasatch-Cache, Caribou-Targhee, Bridger-Teton, Shoshone, Custer-Gallatin, Beaverhead-Deerlodge, Helena-Lewis and Clark, Lolo, Kootenai, and Flathead) combine to form a direct path (green arrows) from south of the GYA through the Northern Rockies to Canada. A secondary leg (blue arrows) passes to the west and then north through the Sawtooth, Boise, Salmon-Challis, Payette, Nez Perce-Clearwater, Lolo, and Kootenai National Forests). This path needs to be linked to the Y2UConn, Model Gap and Colorado.

5.6 Summary. Chapter 5 focuses on the conservation needs of the southern population of the Canada lynx, arguing that current management frameworks inadequately address the ecological realities of small, peripheral populations in the Southern Rockies and Greater Yellowstone region. The chapter reviews habitat associations - particularly forest structure, snow conditions, and snowshoe hare availability - and contends that federal land management direction, including the Northern Rockies Lynx Management Direction, lacks enforceable standards for maintaining habitat quality and connectivity in southern landscapes. It emphasizes prioritizing key landscapes and strengthening corridor functionality to support dispersal, genetic exchange, and resilience under climate change. The chapter also identifies "model gaps," asserting that existing habitat models fail to fully capture fine-scale habitat structure, fragmentation effects, and human disturbance influences that shape lynx persistence at the southern edge of the species' range. Overall, Chapter 5 concludes that without stronger, landscape-level prioritization, refined habitat definition and analysis, and strict standards, southern lynx populations remain vulnerable to isolation and local extirpation with little chance of recovery.

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[149] USDA Forest Service. 2007. FEIS Northern Rockies Lynx Management Direction. https://app.box.com/s/smz8ucyfq4d07i27of3ot2tli89va9gx and Figure 1 map: https://app.box.com/s/eaeejkj1gdznfx2ja7d3xh14bex3i83t

Figure 5.2 The Model Gap in the Yellowstone to Uintas Connection
NE Utah and NW Colorado

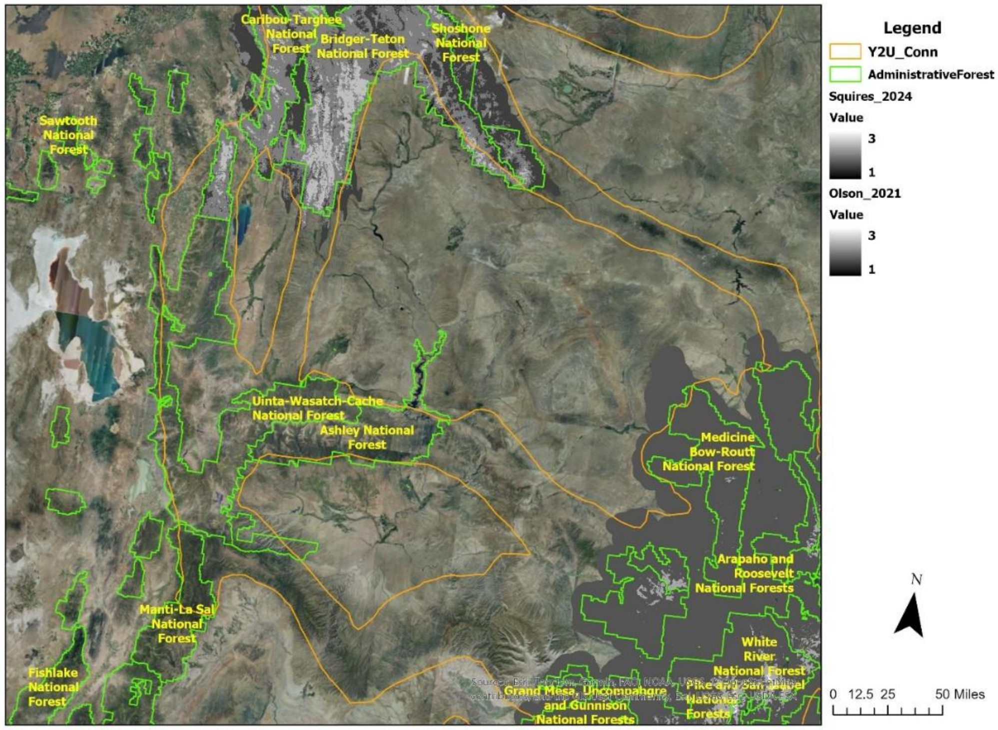


Figure 5.3 The Model Gap in the Yellowstone to Uintas Connection
NE Utah and NW Colorado - BLM Field Offices

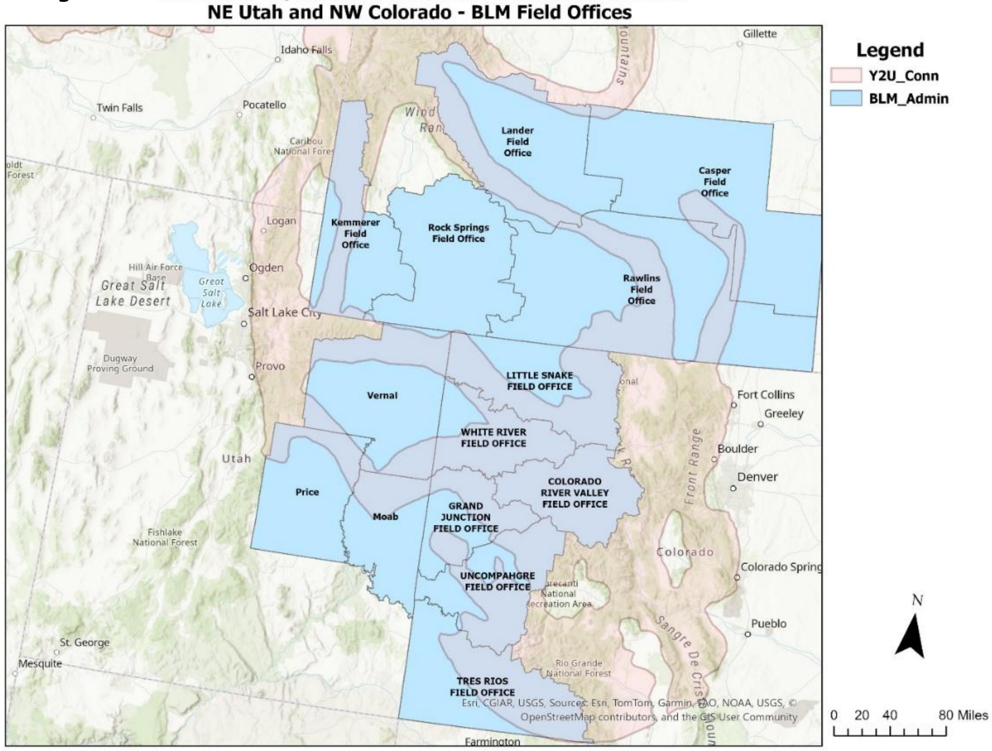


Figure 5.4
Major Pathways for Canada Lynx in the GYA and Northern Rockies

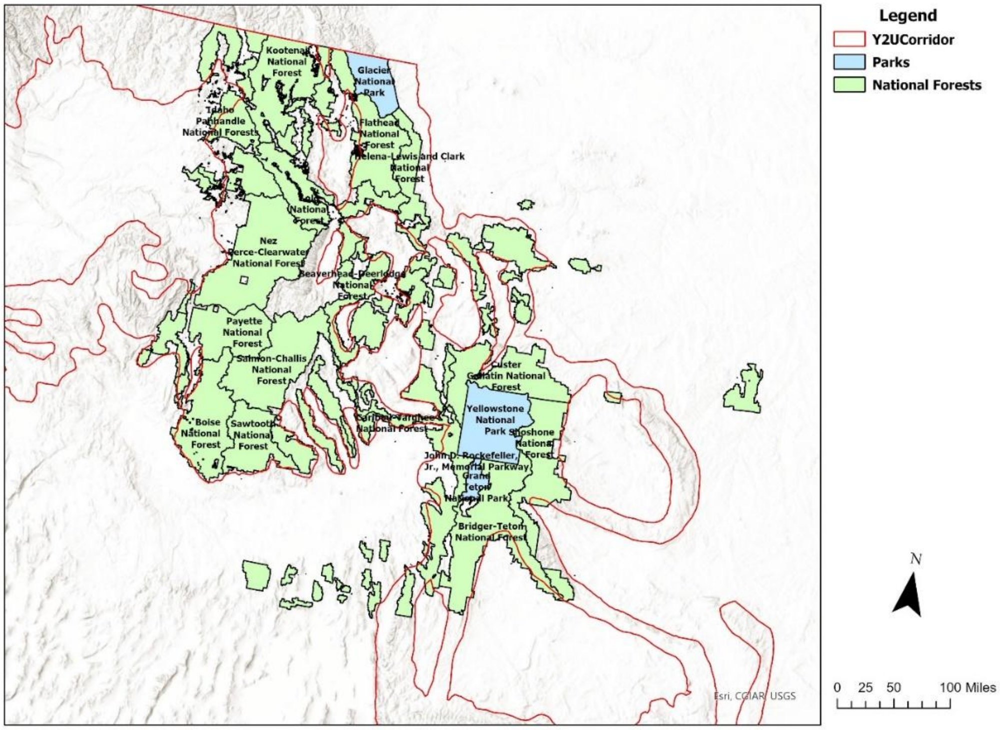
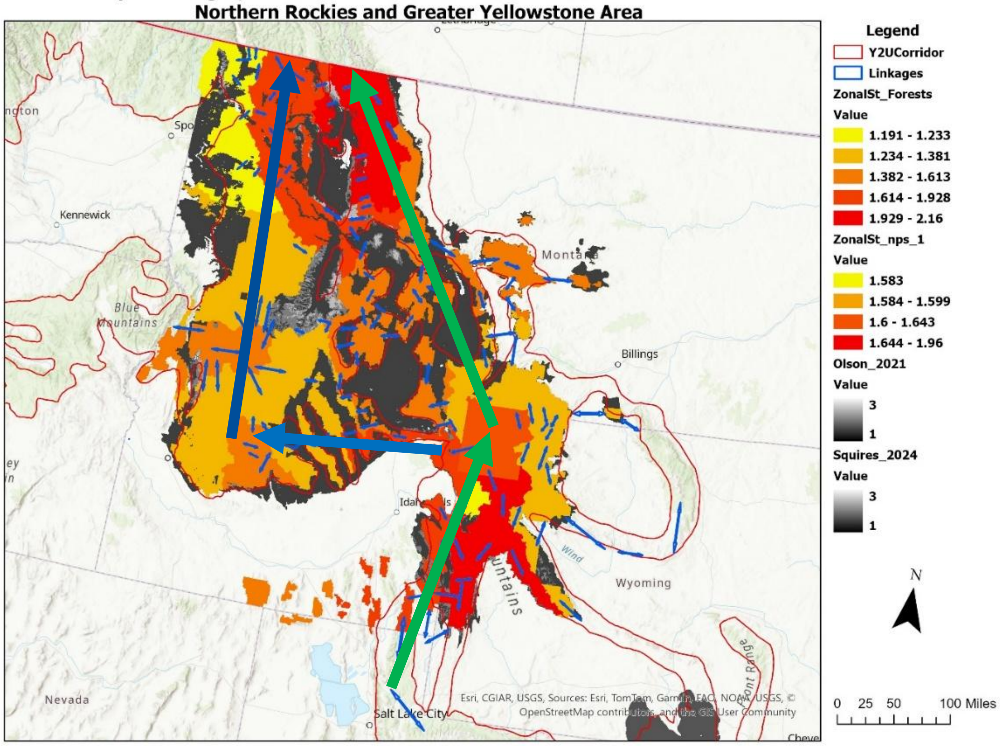


Figure 5.5
Canada Lynx Linkages, Zonal Statistics at National Forest and National Park Level
Northern Rockies and Greater Yellowstone Area



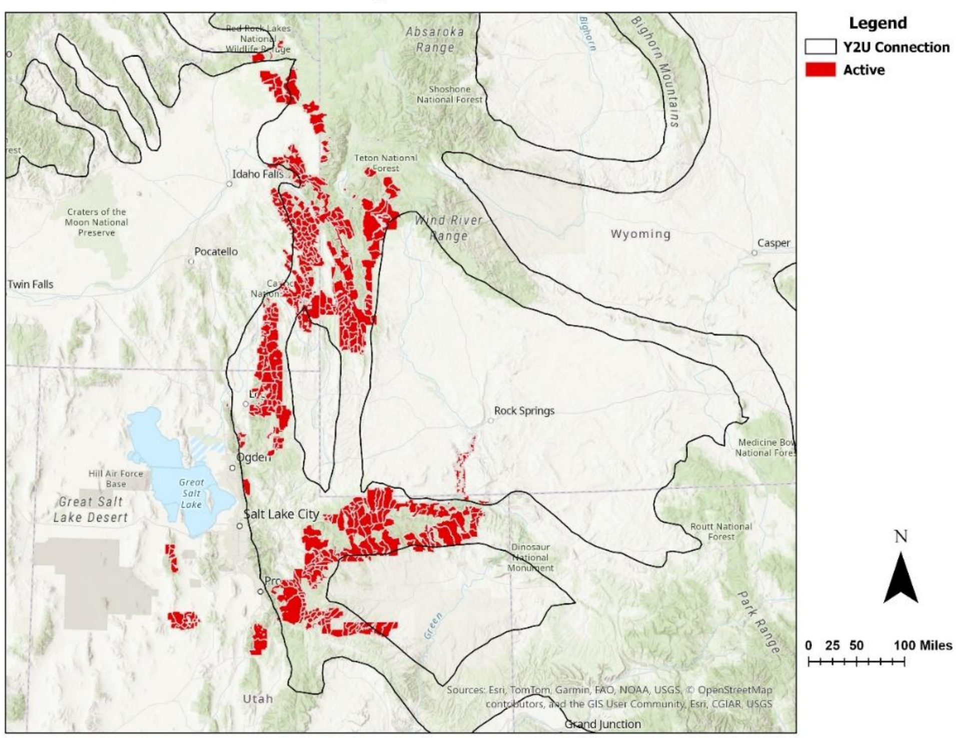
Chapter 6 Livestock Grazing in the Yellowstone to Uintas Connection

6.1 Background. Since the late 1980s the author and associates have been engaged in collecting data on wildlife habitat in the Y2UConn. These are areas located in important habitat in the Bridger-Teton NF, and in the linkage and peripheral habitat in the Ashley, Caribou-Targhee, and Wasatch-Cache NFs. The 2013 LCAS (p68) stated that, *"Federal agencies have amended or revised land management plans across much of the range of the lynx to provide direction to conserve lynx and lynx habitat. Thus, the impacts of anthropogenic influences have been substantially reduced."* The data collected and observations made over the past four decades refute that presumption.

When mapped in ArcGIS Pro 3.2, the U.S. Forest Service GIS database for grazing allotments revealed that are over 400 active livestock grazing allotments on Forest Service managed lands within and adjacent to the Y2UConn.[150] (Figure 6.1). There are a few closed and vacant allotments intermixed with the active allotments. BLM managed lands and the grazing allotments therein are not shown, but surveys on these lands show the same serious degradation as on Forest Service lands.

Figure 6.1

Forest Service Active Grazing Allotments in the Y2U Connection



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[150] U.S. Forest Service. 2026. EDW Dataset Range:Allotment. Accessed February 12, 2026. https://data.fs.usda.gov/geodata/edw/datasets.php?xmlKeyword=allotment

6.2 The Bear River Range A survey in the Bear River Range was carried out in the Caribou NF in 2001.[151]. The data collected was during the time frame of lynx listing and the NRLMD. This study showed tremendous degradation of plant communities and riparian areas. Monitoring in this and other areas in the Caribou NF, the Wasatch-Cache NF, and Ashley NF since that time has shown no progress. Use of forage by livestock is typically higher than sustainable levels and livestock are the base of the pyramid of damaging actions the Forest Service allows to continue. The photos in Figures 6.2 - 6.6 were taken during the 2001 survey and are from that Report. They show examples of the impact of livestock grazing and water developments on vegetation, soils, aspen understory and recruitment, conifer understory, and riparian areas.

This survey relied on Forest Service monitoring reports, the Draft EIS for the Caribou NF Revised Forest Plan[152], and literature characterizing livestock impacts on upland and riparian habitats. In the late 1990's, the Forest Service had prepared Regional and Sub-Regional Reports characterizing departures from Proper Functioning Condition (PFC) for aspen, conifer, tall forb, sagebrush/grasslands, riparian, and wetland areas. They found livestock grazing and past timber harvest in conifer forest were fundamental issues leading to loss of PFC in these communities.[153] [154]

Eighty-six locations were assessed for PFC in the Bear River Range including uplands, riparian areas, open basins/meadows, aspen and conifer stands. These were within one mile of water sources in areas considered "capable" for livestock based on slope and distance to water. Mapping analysis predetermined the locations for the survey. Conditions were compared to the Caribou RFP Draft EIS PFC guidelines. Table 6.1 shows the number of locations of each habitat type assessed. A total of 310 individual habitats were assessed. As shown, a small percentage met the Forest Service guidelines for PFC, most did not.

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151 Carter, J., Chard, B. &Chard, J. 2002. Assessment of Habitat Conditions Bear River Range Caribou National Forest, Idaho. https://app.box.com/shared/5q2hazcnfu

152 USDA. 2001. Draft Environmental Impact Statement for the Caribou National Forest Revised Forest Plan. No electronic copy available.

Draft Revised Forest Plan. Caribou-Targhee National Forest.

153 USDA. 1996. Intermountain Regional Assessment: Properly Functioning Condition. USDA Forest Service, Region IV, Ogden, Utah. No electronic copy available.

154 USDA. 1998b. Draft Sub-regional Assessment of Properly Functioning Condition for Areas Encompassing the National Forests of Northern Utah. USDA Forest Service, Region IV, Ogden, Utah. No electronic copy available.

Figure 6.2 Sheep watering and bedding area showing complete loss of understory vegetation, loss of aspen recruitment and high-lined aspen, and the soil is completely exposed.

Figure 6.3 Cattle watering area showing complete loss of understory vegetation, loss of aspen recruitment and the soil is completely exposed.

Figure 6.4 Grazed conifer stand with little herbaceous vegetation present

Figure 6.5 Grazed riparian area with barren banks, little vegetation left in riparian zone

Figure 6.6 Sediment-laden stream substrate from trampled and eroding banks, adjacent roads

Table 6.1 Results of Bear River Range PFC Assessments

Habitat type	Number of locations	Number in PFC	Percent in PFC
Aspen forest	71	17	24%
Conifer forest	68	14	21%
Forb meadow	44	2	4.5%
Sage – grass	73	8	11%
Riparian	54	12	22%

Ground and canopy cover were measured along transects at 55 locations in sagebrush-grassland and tall forb habitats. (Tables 6.2 and 6.3). Bare soil averages were well below potential. These averages included some ungrazed exclosures, which if omitted from the analysis, would have resulted in even lower soil cover values. The Sub-Regional Assessment by the Forest Service indicated ground cover potential ranges between 80 - 95%. In surveys of un-grazed areas in the Bear River Range potential ground cover is near 100% in all habitats.

Table 6.2 Cover Data for 45 Sagebrush Locations

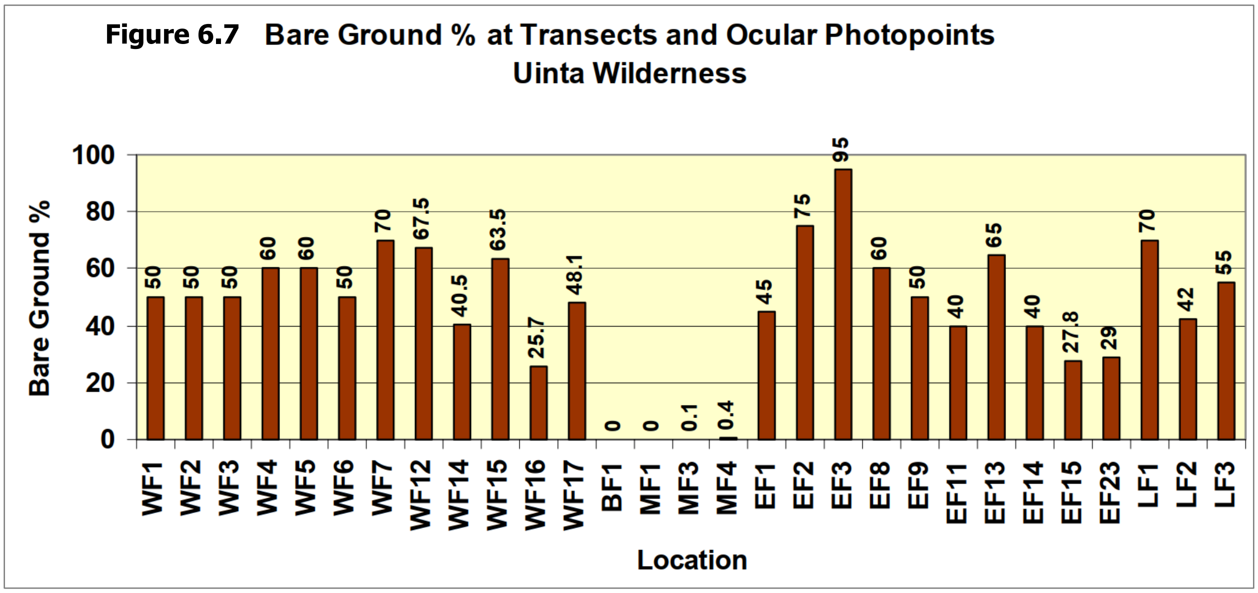
Cover type	Range	Average	Standard Deviation
Bare Ground	86.2 – 10.7	51.6	19.0
Litter	68.2 – 2.0	31.5	15.2
Grass	23.2 – 0.3	5.1	5.3
Forb	14.7 – 0.5	4.5	3.4
Shrub	16.7 – 0	4.7	3.6
Rock	11.9 – 0	2.2	2.8
Crust/moss	10.4 – 0	0.4	1.6
Shrub Canopy	43.0 - 0	12.4	9.0

Table 6.3 Cover Data for 10 Locations in Tall Forb

Cover type	Range	Average	Standard Deviation
Bare Ground	78.8 – 5.5	54.1	22.6
Litter	55.0 – 4.9	24.2	15.5
Grass	16.5 – 1.0	6.0	5.6
Forb	21.1 – 2.8	11.6	5.2
Shrub	10.3 - 0	3.0	3.4
Rock	3.6 - 0	0.8	1.2
Crust/moss	1.9 - 0	0.3	0.6

Data collected in this 2001 study as well as other surveys the author and associates have conducted in the area demonstrate that all Forest habitats grazed by livestock are well below potential.

6.3 The High Uintas Wilderness. The author began exploring the High Uintas Wilderness in the 1970s. It was clear this was a unique and beautiful place with its glaciated valleys, forested slopes, alpine basins and peaks. The author and associates began surveying grazing allotments in the Wilderness in the 1990s. Allotments that had been closed to domestic sheep were an initial focus as these had been closed for decades and offered an opportunity to see the systems in a near-natural, or recovering state. During those years many trips were made throughout these allotments, over the ridges and through the forested areas on foot with trained Akitas carrying gear. Surveys and observations of ground cover and watershed condition were conducted with a final report issued in 2006.[155] Figure 6.7 shows that ground cover in the ungrazed Burnt Fork (BF) and Middle Fork Beaver Creek (MF) locations were near 100 percent (minimal bare soil). Locations in the annually grazed West Fork Blacks Fork (WFBF), East Fork Blacks Fork (EFBF) and Lake Fork (LF) had bare soil ranging from 25% to 95%. The absence of ground covering vegetation and litter has resulted in severe erosion and loss of the productive upper soil horizon. This demonstrates a large departure from potential. Streambanks were scoured by high runoff events due to loss of stabilizing vegetation in the watershed and stream banks. Figures 6.8 – 6.10 provide some photo examples of areas grazed by domestic sheep compared to those that have not been subjected to livestock grazing for decades.



This degradation has occurred because thousands of domestic sheep are annually grazed, trailed, and bedded in areas with steep slopes, highly erodible soils, forested, and riparian areas. When the capability criteria of slope, soil erosion hazard, distance to water, and other criteria established by the Forest Service were evaluated, only about 5% of the land area was determined to be capable. (See Tables 4 and 5 of the report). Capability criteria were developed by the Forest Service decades ago to avoid degradation of sensitive areas. Unfortunately, they are not followed, resulting in severe degradation of the ecosystem.

In 2016, in conjunction with a permit renewal process by the Forest Service for ten allotments in the High Uintas Wilderness, forage production data was collected in areas that were not grazed. These represented the soil types and plant communities occurring in the allotments. That data was combined with a GIS analysis of capability using Forest Service criteria.

[155] Carter, J. 2006. Watershed Conditions Uinta Wilderness, Utah. Report for Western Watersheds Project. https://app.box.com/s/944957604b8618539585

While all lands in this 160,000-acre set of domestic sheep allotments are grazed by domestic sheep, only a small fraction of the area (6%) is capable for grazing based on Forest Service capability criteria. The current forage on the allotments provides only 10% of the demand. The result of this is accelerated erosion, sedimentation of lakes and streams, and depletion of the native plant community to below its potential. Based on the scenarios, the stocking rate would need to be reduced between 90 – 97%.[156] These allotments are in lynx peripheral habitat and in designated LAUs.

6.4 Other Studies. Besides these projects, utilization by livestock and forage production was measured in numerous locations in the Bear River Range in southeast Idaho and northeast Utah. These were conducted on National Forest and adjacent BLM managed lands. Compared to Forest Plan or BLM land use plan standards allowing 30 – 50% use in upland and riparian areas, utilization in riparian areas and meadows is near 100% and in uplands 70 – 80%. A summary of studies is listed:

1. Unpublished data for Bear River Range riparian areas (12) using paired plots found utilization rates averaging 81%.[157]
2. 2007 Monitoring Report 1st Hollows and Paris Canyon Allotments.[158] Utilization ranged from 75 – 92% in meadows, riparian area use was 63 and 82.6% at two locations monitored, upland low sagebrush sites ranged from 49 to 69%, and upland big sagebrush sites ranged from 85 to 88%.
3. Multiyear study in the Bear River Range in northern Utah looked at livestock grazing effects on plant production, soil nitrogen and carbon.[159] That study documented losses in plant cover, plant production, soil carbon and nitrogen in areas grazed by livestock compared to long term ungrazed areas.
4. Summary of utilization data for riparian areas on the North Rich Allotment in the Bear River Range.[160] Over a four-year period these remained nearly constant at 83 – 93%.

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[156] Carter, J., Vasquez, E. & Jones, A. (2020) Spatial Analysis of Livestock Grazing and Forest Service Management in the High Uintas Wilderness, Utah. Journal of Geographic Information System, 12, 45-69. https://doi.org/10.4236/jgis.2020.122003 https://app.box.com/s/iyuq30k1g860hybuais31mbzkucnsic9

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[158] Carter, J. 2007. 2006 and 2007 Monitoring Reports 1st Hollows and Paris Canyon Allotments. Report prepared for Western Watersheds Project and Yellowstone to Uintas Connection. Dated March 1, 2012. https://app.box.com/s/2v7o2ucrevb8g8wt5owcq1vel8zfwpdh and https://app.box.com/s/xw2jd3lxvvglxtavaxbuo6acz7xjrvj1

[159] Carter, J., Chard, B., & Chard, J. 2011. Moderating livestock grazing effects on plant productivity, nitrogen and carbon storage. In Monaco, T.A. et al. comps. 2011. Proceedings – Threats to Shrubland Ecosystem Integrity; 2010 May 18-20; Logan, UT. Natural Resources and Environmental Issues, Volume XVII. S.J. and Jessie E. Quinney Natural Resources Research Library, Logan Utah, USA. https://app.box.com/s/titggrw054zjcix7kjqob0u9vliut78o

[160] Carter, J. 2009. Allotment Summary North Rich Allotment Riparian Areas. https://app.box.com/s/5a9dhi5i13a62htx0aqg0m19n1sebu83

5. A multiyear study on a BLM managed allotment (Duck Creek) in the lower elevation foothills adjacent to the Bear River Range in Utah. BLM monitoring was evaluated by collecting data on grazed and ungrazed paired plots. BLM understated utilization, while native herbaceous plant production was greatly reduced by decades of improper management.[161]
6. A paper illustrating upland and riparian outcomes from BLM management of the Duck Creek allotment showed the installation of upland water and a deferred rotation grazing system resulted in increased use on the riparian area, bank alteration by trampling remained at 80%, riparian utilization remained near 100%, and upland utilization increased to near 80%.[162]
7. Surveys, forage utilization, and production surveys in lynx critical habitat in the Bridger-Teton NF. The Forest Service reported utilization of 11%. When actual grazed and ungrazed plots were measured, the actual utilization in upland and riparian areas was 75%. Herbaceous production was less than 40% of potential, with most areas surveyed less than 25% of potential. The large native bunchgrasses such as bluebunch wheatgrass have disappeared and have been replaced with short stature grasses of low desirability for livestock or wildlife. Cover is depleted in riparian and aspen areas as livestock concentrate in those places.[163]

These and other surveys and reports have been provided to the Forest Service and BLM. No management changes have resulted from this input decades after these monitoring studies were conducted and submitted to the agencies. The habitats are depleted of the forage and horizontal cover needed by snowshoe hares and other wildlife. The Desired Future Conditions and Standards provided in the Forest Plans for these places have resulted in no positive change as the damage continues and basic range science and ecological principles are ignored. The presence of closed and vacant allotments in a few places along with very steep terrain provide isolated patches of habitat that are not used by livestock and that, if connected by removing livestock, could provide productive habitat for snowshoe hares and lynx.

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[161] Catlin, J., Carter, J., & Jones, A. 2011. Range management in the face of climate change. In Monaco, T.A. et al. comps. 2011. Proceedings – Threats to Shrubland Ecosystem Integrity; 2010 May 18-20; Logan, UT. Natural Resources and Environmental Issues, Volume XVII. S.J. and Jessie E. Quinney Natural Resources Research Library, Logan Utah, USA.
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[162] Carter, J., Catlin, J., Hurwitz, N., Jones, A., & Ratner, J. 2017. Upland water and deferred rotation effects on cattle use in riparian and upland areas. Rangelands 39(4):112-118.
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6.5 Summary. Chapter 6 examines the impacts of livestock grazing within the Yellowstone to Uintas Connection (Y2UConn), with particular focus on the Bear River Range and the High Uintas Wilderness, arguing that grazing is a significant and underrecognized contributor to habitat degradation for the Canada lynx The chapter contends that chronic overgrazing in riparian areas, aspen stands, and forest understories has reduced vegetation structure and forage critical to snowshoe hares, the lynx's primary prey, thereby indirectly diminishing habitat suitability. It challenges agency conclusions that grazing effects are minimal or localized, presenting field observations and photographic documentation to illustrate cumulative impacts across southern forests. The chapter further asserts that grazing management lacks adequate monitoring, enforceable standards, and meaningful integration into lynx conservation planning. Overall, Chapter 6 concludes that without reform of grazing practices and stronger habitat protections, southern corridor functionality and long-term lynx recovery objectives will remain compromised**.**

Figure 6.8 Small streams in forest understory. Left side is trailed and grazed by domestic sheep, right is ungrazed.

Figure 6.9 Forest understory not grazed by domestic sheep.

Figure 6.10 Forest understory grazed by domestic sheep.