Mission Ridge Trail Camera Survey

2024 - 2025 Wildlife Survey in the Stemilt-Squilchuck Basins

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Executive Summary - Trail Camera Survey

In August 2024, Friends of Mission Ridge (FOMR) initiated a wildlife survey using 19 trail cameras to monitor public lands within the proposed Mission Ridge Ski Area Expansion. The primary goal of this survey was to provide empirical evidence, identify the presence or absence of species, gather insights into patterns of wildlife movement, and document behaviors (such as feeding, rutting, and fleeing). This ongoing camera survey has revealed abundant and diverse wildlife species using critical habitats such as deer and elk migration corridors, fawn and calving areas, ungulate breeding grounds, wetlands and riparian zones, golden eagle and goshawk nesting areas, and regularly used dusky grouse habitats. The survey findings suggest that the proposed Mission Ridge development would have significant adverse impacts on local wildlife and vital habitats.

This brief and limited trail camera survey has shown that many of the assertions in the Plants & Animals section of the 2025 Mission Ridge Expansion Master Planned Resort Draft Environmental Impact Statement (DEIS) are false. High-quality habitat exists within the expansion's project area, and adjacent equivalent habitat is limited and may not exist elsewhere. WDFW, Chelan County Department of Natural Resources, Tribes, agencies, and stakeholder expertise and comments are crucial for accurate assessments within the DEIS.

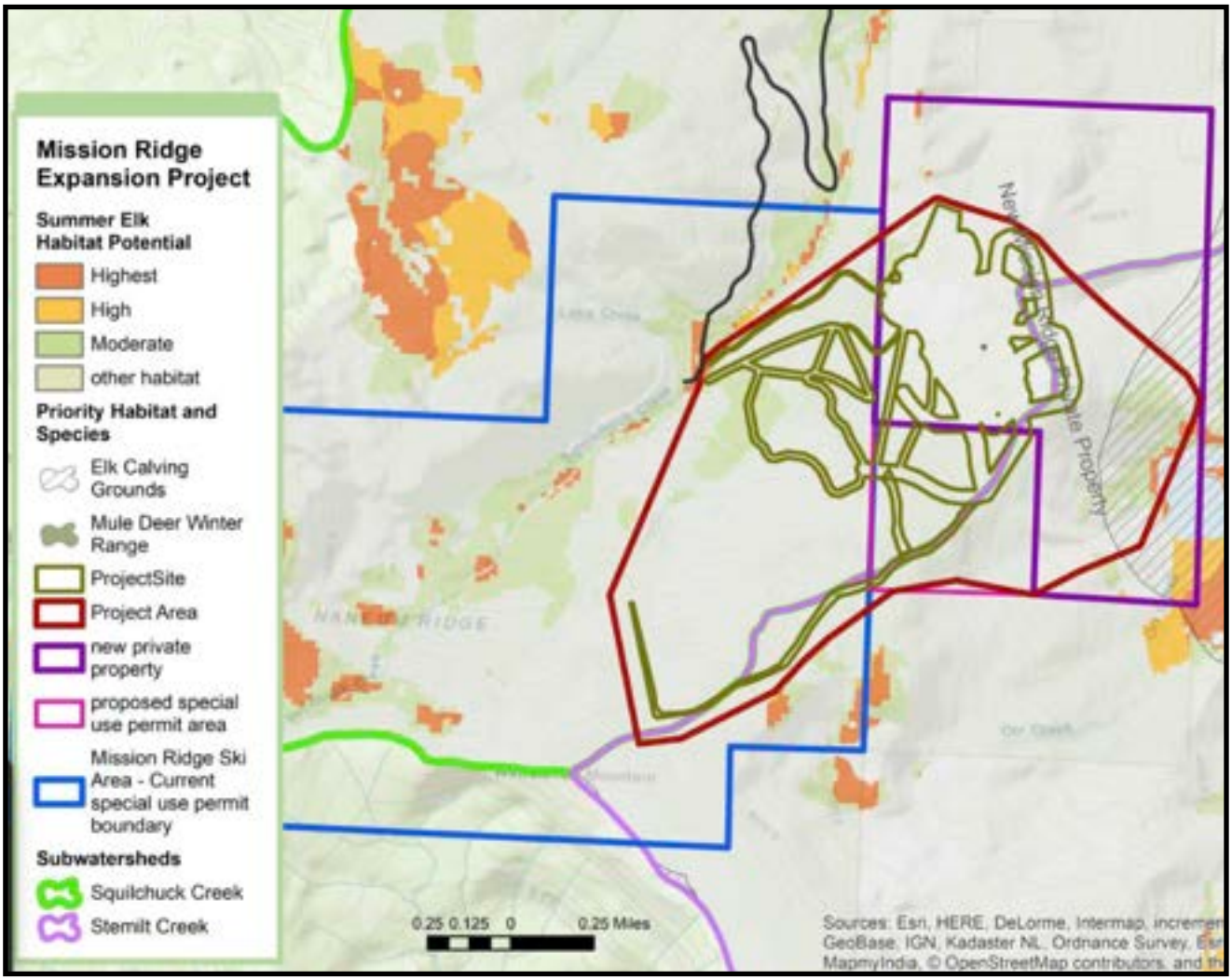
Photo 1 - Cow elk with newborn calf in the project area, walking from Section 19 onto Section 30. This is the site of a proposed 4-million-gallon snowmaking reservoir.

The FOMR trail camera survey was inspired by data gaps found in past planning documents regarding wildlife use in the proposed development area. These data gaps have persisted, and incorrect claims have been made in the 2025 DEIS. These false claims misguide agencies and stakeholders about the actual ecological impacts of the development. The core claim of the DEIS is that the development will cause minimal impacts to wildlife or habitat and that suitable replacement habitat is nearby. Since the DEIS doesn't acknowledge these impacts, it offers no practical mitigation measures. Below are four clear examples of false or misleading claims contained in the 2025 DEIS:

1. "There are **no wintering deer and elk** in the project area" *(Appendix F-9 - Section 2.1.1.3)*
2. "The study area is on the margin of the American pika (Ochotona princeps) range and is **likely too low in elevation for pika**" *(Appendix F-32 - Section 4.1.1.1)*
3. "The study area has **very little suitable habitat for northern goshawk nesting"** *(Appendix F-54, Section 4.2.1.3)*
4. "The study area is either **outside [Golden Eagle] range or lacks suitable habitat.**" *(F-45, Section 4.1.1.3)*

Photo 2 - Immature Golden Eagle after taking a bath in an elk wallow on Section 25. June 13, 2025. Indicates that a nesting site could be nearby. The cliffs of Section 25 are a suitable nesting habitat. *(Appendix F-45)*

Background - "The Map is Not the Territory"[1]



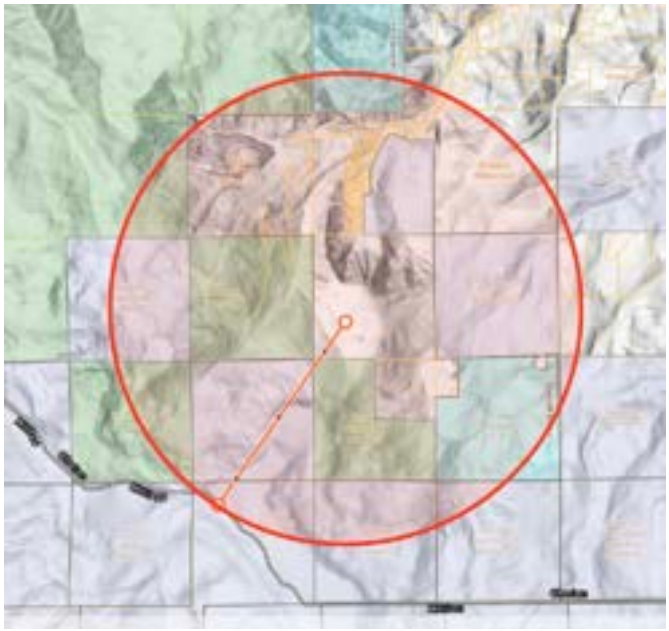
DEIS Map 5.4-3 This map, used for forecasting impacts to wildlife in the DEIS, portrays virtually no high-quality summer elk habitat in the project area. Only a portion of the elk calving grounds is shown on the eastern-most edge of the project area. The location of the elk calf shown in **Photo 1 & Photo 3** are not designated as elk calving grounds on the map. Overall, this map data, and others in the DEIS, contrast with the findings of this trail camera survey, not showing the extent of elk calving ground, mule deer wintering areas, or high-quality summer elk habitat in the project area.

Numerous planning documents covering the Stemilt-Squilchuck basins[2], including the 2025 DEIS for the Mission Ridge Expansion, rely heavily on wildlife habitat mapping models to make key planning decisions. Maps like the **DEIS Map 5.4-3** are used as

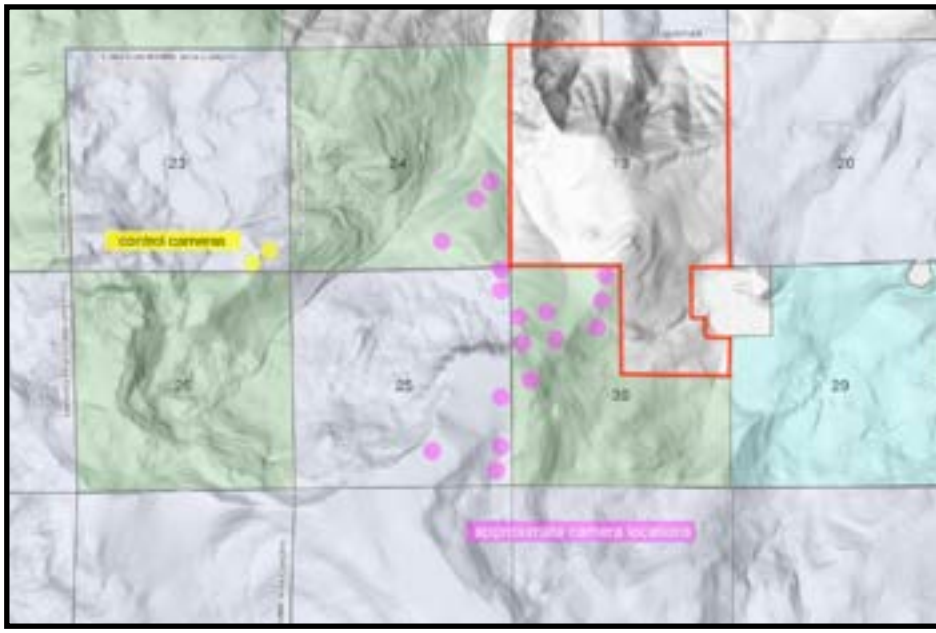
[1] Our perceptions, models, and representations of reality are not reality itself. Simplified abstraction (model or map) of a complex territory and mistaking the map for the actual territory can lead to poor judgment and incorrect conclusions. Phrase attributed to the philosopher/engineer Alfred Korzybski.

[2] https://www.co.chelan.wa.us/files/community-development/documents/Mission%20Ridge/11%20Appendix%20E%20Aquatics%2C%20Wildlife%2C%20and%20Botany%20Resources%20Report.pdf

information to guide agencies and the public's decision-making. However, many of these mapping models do not match on-the-ground reality[3]. FOMR members with decades of experience and observations in these landscapes have noticed a mismatch between what the models say and what the ground-truth is. These ground observations indicate that high-use wildlife habitats are missing from these maps. Conversely, these maps sometimes designate poor habitat as high quality. For example, Map 5.4-3 denotes a strip of the highest quality elk habitat along the edge of the Mission Ridge parking lot, even though it is clearly not. Something is wrong with these models, and these maps do not offer real-world utility. Many variables can influence a model's accuracy and usefulness[4]. Does the model account for human disturbance, or the distance from roads and trails, something that should be done for deer and elk habitat modeling (but not considered in Map 5.4-3)? Is the resolution high enough to make site-specific decisions? Regardless of the variables accounted for in a model, validation is essential. Models should be treated as hypotheses, not facts, and require verification through field surveys. The above DEIS map and other habitat models like those used in the DEIS are misleading, which is why Friends of Mission Ridge felt a trail camera survey was needed to verify wildlife presence and use within the project area.



Map 1 - 3km disturbance zone used as a range in which to place trail cameras around the proposed development



Map 2 - Trail camera locations within the survey area

[3] Barry, S., & Elith, J. (2006). Error and uncertainty in habitat models. *Journal of Applied Ecology*, *43*(3), 413-423. https://doi.org/10.1111/j.1365-2664.2006.01136.x

[4] Johnson, C.J. & Gillingham, M.P. (2004). Mapping uncertainty: sensitivity of wildlife habitat ratings to expert opinion. Journal of Applied Ecology, 41, 1032–1041.

Trail Camera Survey Project Description

FOMR placed 19 cameras within a 3-kilometer perimeter around the center of the proposed 7,812-bed development (see above Maps 1 & 2). To create parameters in which to do the trail camera survey, FOMR consulted the scientific literature[5]. Studies offered varied distances at which wildlife are impacted or displaced by human disturbance. With species like golden eagles[6] being displaced up to 20km from human infrastructure, and others like deer and elk ranging from 1-5 km[7]. FOMR chose a 3-km distance, and acknowledged that this disturbance buffer is conservative and does not account for the edge of the development, the top of the new ski runs or chairlifts, or the fact that some of the human disturbance to wildlife may come from recreation and dispersed use that spreads from planned ski and summer trails. Also missing from this survey is the disturbance zone along the Squilchuck Road corridor to reflect the impacts that ~10,000+ cars/day would have on the wildlife.

Photo 3 - Elk calf within the 3km disturbance buffer of the proposed 7,812-bed village

[5] Wearn, O. R., & Glover-Kapfer, P. (2019). Snap happy: camera traps are an effective sampling tool when compared with alternative methods. *Royal Society Open Science*, 6(3), 190036. https://royalsocietypublishing.org/doi/10.1098/rsos.190036

[6] Maynard, L. D., Lemaître, J., Therrien, J., & Lecomte, N. (2025). Vulnerability and behavioral avoidance of Golden Eagles near wind farms during the breeding season. *Environmental Impact Assessment Review*, *112*, 107843. https://doi.org/10.1016/j.eiar.2025.107843

[7] Benítez-López, A., Alkemade, R., & Verweij, P. A. (2010). The impacts of roads and other infrastructure on mammal and bird populations: A meta-analysis. *Biological Conservation*, *143*(6), 1307-1316. https://doi.org/10.1016/j.biocon.2010.02.009

Photo 4 - Mule deer foraging near the proposed 4-million-gallon snow-making reservoir. Deer and elk were frequently documented feeding in these forest openings during the snow-free season. This highly used foraging area was marked as the lowest quality habitat use in multiple maps and models used in the DEIS.

Photo 5 - Goshawk bathing in elk wallow. June 30, 2025. A likely nesting site was located in the project area, near the border of Sections 30 & 19, on multiple trips in 2025. The DEIS claims, "Because the study area has very little suitable habitat for northern goshawk nesting, impacts to northern goshawk by project operation are unlikely to negatively impact goshawk populations." *(Appendix F-54)*

Photo 6 - Bull elk using the same meadow as the mule deer above. This area was used regularly for feeding and as a travel corridor for much of the year.

Care was taken not to check cameras too often, and on every trip into the project area, other data was collected, including tracks and signs (animal beds, tree rubs, scat), and sound observations (bird and animal calls). The FOMR survey utilized trail cameras shooting primarily high-resolution 4k video to aid species identification and to catalog behaviors. This survey focused on the public land that would be impacted. However, by observing animals moving in and out of the private land section, the data collected provides insight into how Section 19 is being utilized by wildlife. The cameras were placed starting in August 2024. Cameras were also placed in adjacent but similar habitats on Section 23 as a control and to compare differences. The following observations were collected during the 12-month survey period.

Results

The trail cameras documented year-round use by elk and mule deer, alongside other species. Golden eagles and goshawks were documented on trail cameras multiple times using elk wallows for drinking and as bird baths. The survey results underscore the need for further investigation into the impacts of proposed development on wildlife populations, particularly concerning the false assumptions made in the DEIS. The migration corridor is a heavily used critical wildlife habitat.

Trail cameras detected the following animals in the project area:

Rocky Mountain Elk
Mule Deer
Mountain Lion
Black Bear
Bobcat
Coyote
Pika
Weasel
Skunk
Marmot
Golden-Mantled Ground Squirrel
Douglas Squirrel
Chipmunk
Bushy-tailed Woodrat
Mice
Golden Eagle
Goshawk
Dusky Grouse
Robin
Dark-eyed Junco
Hummingbird
Clark’s nutcracker
Yellow-rumped warbler
Black-headed Grosbeak
Bluebird
Rock Wren

The following species were detected by tracks, visual sighting, or by ear:

Goshawk (nesting)
Pileated woodpecker
Coopers hawk
American Kestrel
Common Poorwill
icebug (Grylloblattidae)
Bumblebees (many spp.)
American marten tracks (winter)
Fox tracks (winter)
Northern Flicker
Barred Owl (calls)
Pacific Wren

Photo 7 - Pika

Photo 8 - Weasel

Photo 9 - Coyote

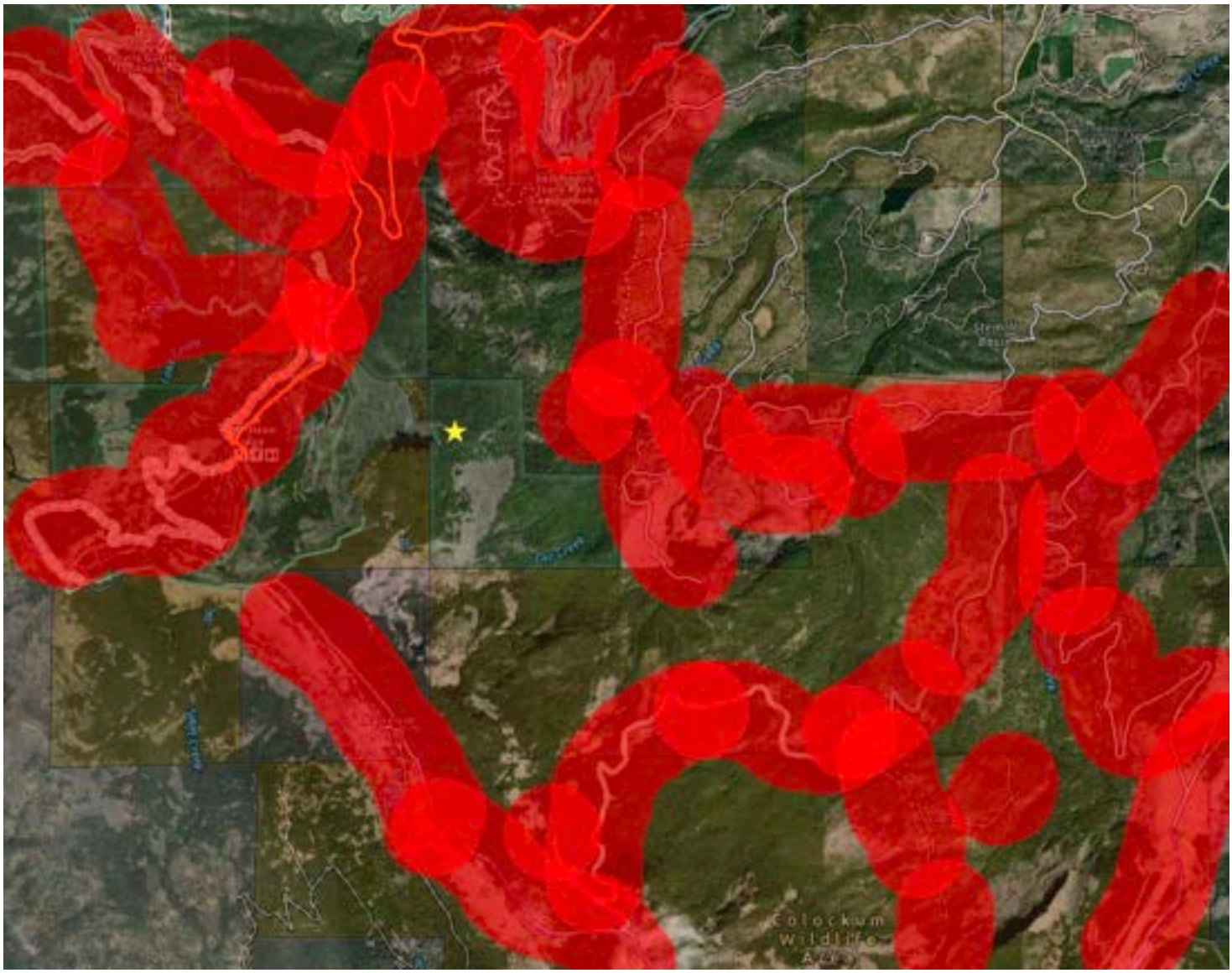
Discussion

Trail cameras are a useful tool to gain an understanding of the presence of wildlife[8]. They can be used to verify or falsify modeling hypotheses (habitat maps), and more importantly, accurately indicate the presence of species and show how those species are using the landscape. Trail cameras have limitations and will almost always under-represent both the number of species and the quantity of individuals present on a landscape.

It is clear from the trail cameras and on-the-ground tracks and signs that sections surrounding Section 19: Sections 24, 25 & 30 contain wildlife migration routes, travel corridors, feeding areas, bedding areas, fawn and calving zones, and ungulate breeding habitat.

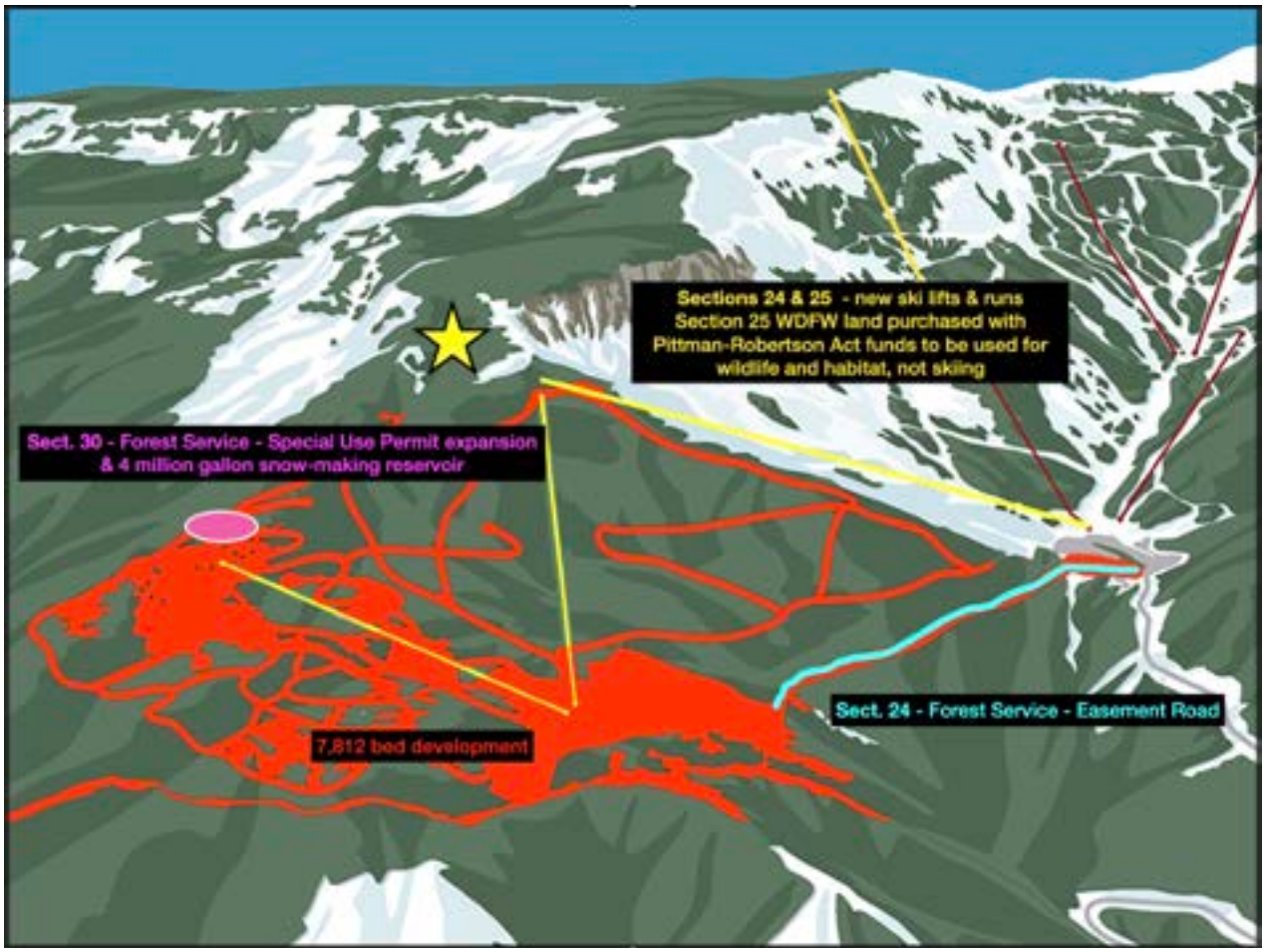
Photo 10 - Marten tracks in Section 25

[8] Blount, J. D., Chynoweth, M. W., Green, A. M., & Şekercioğlu, Ç. H. (2021). Review: COVID-19 highlights the importance of camera traps for wildlife conservation research and management. *Biological Conservation*, *256*, 108984. https://doi.org/10.1016/j.biocon.2021.108984



Map 3 - 500-meter buffer around roads and trails in the Upper Stemilt-Squilchuck

Why is this such a wildlife-rich area? These sections contain a diverse range of habitats: cool north-facing slopes, mature forests with complex horizontal structure and closed overhead canopy, old-growth forests interspersed with open grassy meadows, shrub steppe, springs, cliffs, talus, and aspen groves. The diversity of habitats allows for a diversity of wildlife species.



Map 4 - For ungulates and larger mammals in particular, the abundance of talus fields (and cliffs) creates a barrier. Most large animals avoid traveling through the loose talus and seek firmer footing to avoid the cattle-guard-like danger of talus. Adjacent terrain, with compact soil (yellow star above), often contains well-used travel routes that serve as migration and travel routes across the landscape. The yellow star on Map 4 (above) denotes a high-use travel corridor that is irreplaceable.

Photo 11 - Bull elk on the highly used travel corridor, denoted by the yellow star in the above maps

The Last Undisturbed Habitats[9]

The maps[10] above illustrate how important the project area's wildlife corridors and unbroken habitat are. Per this trail camera survey, the bottleneck area (yellow star) contained the highest levels of wildlife traffic, by all species. This wildlife corridor is used as a migration route for animals moving between low and high elevations. This corridor is also used on a
near-daily basis by many of the species detected. Contrary to the claims in the DEIS, there is no equivalent cool, north-facing habitat for these animals to be displaced to. If this development is allowed, this habitat will shrink, and there will be only one remaining undisturbed ridgeline left in the upper basin. Habitat to the West is already impacted by the ski area, the popular Clara & Marion Lakes, Squilchuck Trail, and the motorized Liberty-Beehive Road and Mission Ridge Trail. To the East are vast basalt fields, and past this basalt, just one more timbered ridge that connects the lower basin to the upper. However, this eastern ridge is surrounded by roads emanating from Wheeler Reservoir, Upper Basin Loop Road, and Pole Flat Road, which reduce habitat value and increase disturbance.

Photo 12 - Mule deer on Section 23 before summer construction activities at the Ski Area started.

[9] Beaupre, C., Bevan, A., Young, J. R., & Blecha, K. A. (2025). Recreational trail traffic counts and trail proximity as a driver of ungulate landscape utilization. *Ecosphere*, 16(6). https://doi.org/10.1002/ecs2.70305

[10] Preisler, H. K., Ager, A. A., & Wisdom, M. J. (2013). Analyzing animal movement patterns using potential functions. *Ecosphere*, *4*(3), 1-13. https://doi.org/10.1890/ES12-00286.1

Control Cameras - Section 23

Control cameras were placed in Section 23 between the ski area and Clara & Marion Lakes. This area has open ridgelines, nearby water, and security habitat. The control area is "high-quality elk summer habitat" according to DEIS Map 5.4-3 (page 4), and the control cameras were the closest FOMR cameras to the largest patch of "highest quality habitat" shown on the DEIS map. The control area had signs of repeated deer & elk spring, summer, and fall use, including well-worn beds, seasonal scats, rub trees, and game trails similar to those found on Sections 24, 25, & 30. The control cameras documented many mule deer, coyotes, black bears, and a mountain lion in the springtime. Despite the map designation as "high-quality elk summer habitat", no elk were observed by the control cameras. (This further illustrates the importance of ground-truthing the habitat models.)

Animal detections on the control cameras dropped off to near zero by mid-summer. The absence of animal detections appeared to coincide with the operation of heavy machinery and work site disturbances associated with Mission Ridge's snowmaking pipeline replacement project adjacent to Squilchuck Creek on nearby Mimi ski run. Simultaneously with the construction project, the Chair 5 pub opened for summer business with live outdoor music. This lull in control area wildlife detection contrasted with the near-constant high use documented by the cameras in the proposed expansion area in sections 24, 25, & 30. Note that despite the high wildlife use, the proposed expansion area in these sections is generally designated as the lowest rating of habitat on the DEIS maps.

We suggest that the reason for abandonment of the control area was not a habitat problem, but that disturbances from the Mission Ridge Ski Area caused wildlife to discontinue use in the area. Scientific literature suggests that deer[11] & elk can be displaced 1-5 kilometers by infrastructure and human disturbance[12]. The control area, unbeknownst to us, ended up being within 1km - 0.5 kilometers of the disturbances this summer at Mission Ridge. The eastern-most trail camera in the project area, on Section 24, was approximately 0.5 kilometers from the ski area. This project camera detected high wildlife use in the spring and tapered off as summer disturbances at the ski area increased. This observation supports the hypothesis that summertime ski area activity displaces wildlife. Cameras further from the ski area, 1 kilometer and beyond, in the project study area, did not show this profound downward trend in wildlife detections. We suggest that this evidence suggests causation, matching the literature which describes human disturbances on wildlife, and we believe that the impacts of Mission Ridge's summertime disturbances should be further studied.

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[11] Gamo & Beck 2017 — Energy Disturbance and Productivity of Mule Deer Habitat in Sage-Grouse Core Areas (Rangeland Ecology & Management) https://www.uwyo.edu/esm/_files/docs/beck/docs/publications/gamo-and-beck-rem-2017.pdf

[12] Benítez-López, A., Alkemade, R., & Verweij, P. A. (2010). The impacts of roads and other infrastructure on mammal and bird populations: A meta-analysis. *Biological Conservation*, *143*(6), 1307-1316. https://doi.org/10.1016/j.biocon.2010.02.009

The other takeaway from the control trail cameras on Section 23 is that the assertion made throughout the 2025 DEIS (Appendix F - Plants & Animals) "*that suitable, equivalent habitats exist adjacent to the project area*" appears to be false. The DEIS assumes that any displaced wildlife from Section 19 and the surrounding areas will be fine since they have other equally good places to go. If this were true, and other habitats were equal, they would already be a high-use, occupied habitat. The fact that Sections 24, 25 & 30 are currently highly used indicates either that they are already ideal habitats for the animals or that they are subpar habitats, and that the wildlife have been pushed out of other ideal habitats. Recommending "the animals can just go somewhere else" ignores the actual impacts of destroying wildlife habitat[13] and the harm that displacing animals has. This approach is reckless and does not comport with common sense or the massive body of evidence that suggests otherwise.[14]

Photo 13 - Nocturnal elk use on the "temporary road." Most elk detections through the project area were in the daylight, except for those closest to Mission Ridge Ski Area, where nighttime detections more frequently occurred.

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[13] Tilman, D., May, R. M., Lehman, C. L., & Nowak, M. A. (1994). Habitat destruction and the extinction debt. *Nature*, *371*(6492), 65-66. https://doi.org/10.1038/371065a0

[14] Haddad, N. M., et al (2015). Habitat fragmentation and its lasting impact on Earth's ecosystems. *Science Advances*, 1(2), e1500052. doi:10.1126/sciadv.1500052.

Section 19 - Private Land -

While this camera survey did not include cameras on the private land of Section 19, some cameras were placed right on the boundary of Section 19. The migration routes, calving and fawning areas, and high detection areas near the private property boundary show that animals are coming and going from Section 19. Cameras on the boundary of the property detected a solo cow elk traveling back and forth onto Section 19 for two weeks before eventually leading a newborn calf onto Section 30 (Photo 1 - page 2). The primary attributes of the terrain that wildlife use to get in and out of Section 19 are:

- a riparian corridor around a perennial spring to the West
- open grassy feeding areas, a ridgeline migration route, and a corridor passing a spring that runs through an old roadbed on the Southern boundary

These findings should drive future study into the elk calving use in Section 19 and help update the PHS map-elk calving layer to show that elk are using a portion of Section 19 for calving. Additionally, young mule deer fawns were detected on both the Western and Southern boundaries of Section 19.

“Temporary Road” - Section 24

In 2018, the Mission Ridge Ski Area built a road[15] from the existing ski area parking lot, crossing Forest Service Section 30, to the developer's private property on Section 19. Trail cameras placed along the road provided the following information: the road is used by elk, deer, coyotes, and black bears. The road crosses mule deer fawning habitat, close to the boundary of Section 19 (see above Photo 13). Much of the elk use was at night, likely due to proximity to the Ski Area, the increase in human use of this road, and the Mission Ridge/ Squilchuck Road.

Human use on the road was observed year-round, with heavy use in winter, as people appear to use the road to walk dogs almost daily[16] from the ski area RV-camping section of the parking lot. The roadbed, for the first quarter mile, was commonly littered with dozens of domestic dog scats. During these heavy human-use periods, wildlife use was low and pushed further from the parking lot. Mule deer continued to be observed along the road into January 2025 despite deep snows. In the snow-free months, the roadbed was used almost weekly by hikers and occasional mountain bikers. The now seven-year-old “temp

[15] The road was built without a special use permit and was to be decommissioned after one year. Seven years later, it is still impacting the landscape and wildlife through erosion, invasive weeds, and human and pet use. https://wdfw.wa.gov/sites/default/files/sepa/2018/18051dns.pdf

[16] Gompper, M. E. (Ed.). (2013). Free-Ranging Dogs and Wildlife Conservation. Oxford University Press.

road" continues to impact the landscape[17]. Ongoing problems such as erosion, invasive weeds (knapweed and thistle), and increased recreation impacts to wildlife are occurring in an otherwise road and trail-free zone.

Photo 14 - mule deer winter use on the "temporary road"

Photo 15 - newborn mule deer fawn crossing the temp road near Section 19

Photo 16 - Elk in waist-deep snow near the proposed development

Photo 17 - Mule deer in the middle of winter, Squilchuck basin. Mule deer and elk are commonly encountered in the project area (up to 5500') during winter months in all but the deepest snow years.

[17] FOMR walked the 'temp road' with the Forest Service Supervisor, District Ranger, and Mission Ridge Special Use Permit Officer. FOMR asked them to enforce the terms of their Decision Memo and to see if they would ask Mission Ridge Ski Area to partake in any rehabilitation: weed management, reseeding, erosion control, etc. The Forest Service and Mission Ridge have not indicated any intention to do any of the mitigation work required under the Decision Memo.

Winter Use by Deer & Elk Within the Project Area

The 2025 DEIS states, “there are **no wintering deer and elk** in the project area[18].” However, deer and elk are commonly encountered in the upper basin year-round (see photos 16 & 17 above). While many wildlife habitat models place wintering deer and elk only at low-elevation, south-facing slopes, this does not describe what is found on Mission Ridge. While the majority of Mission Ridge elk and deer migrate to lower elevations in the winter, sub-herds in the upper Stemilt-Squilchuck have a different pattern. The pattern observed with these winter deer and elk is that they either use windswept ridges[19] or thick closed canopy forest[20], traveling between tree wells to survive the deep snow. They appear to seek out lichens and browse on trees and shrubs. While none of the prior wildlife models for Mission Ridge capture this wildlife use, past observations and current trail camera footage show this wintertime use up to 5,500 elevation during the 2024/2025 winter.

What are deer and elk doing in waist-deep snow on thick forested North-facing slopes[21]? Could these animals be displaced from other ideal winter grounds by human development[22]? Or is this a behavioral strategy to avoid predators? Either way, nature would favor a variety of wildlife behaviors on a landscape (ie, migratory and resident animals) as they would be adaptive for long-term species survival[23]. A harsh winter could kill off resident ungulates, or disease (Chronic Wasting Disease, Hoof Disease) could decimate the migratory populations. By having alternative wintering habits, these herds' behaviors could help them adapt to future conditions. We have a responsibility to preserve habitat and wintering grounds for both of these kinds of behaviors, which will help the long-term viability of the Colockum Elk herd and mule deer on Mission Ridge.

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[18] 2025 DEIS *Appendix F-9 - Section 2.1.1.3*

[19] Thomas, J. W., Leckenby, D. A., Henjum, M., Pedersen, R. J., & Bryant, L. D. (1988). *Habitat-Effectiveness Index for Elk on Blue Mountain Winter Ranges*. General Technical Report PNW-GTR-218. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

[20] Gilbert, S. L., Hundertmark, K. J., Person, D. K., Lindberg, M. S., & Boyce, M. S. (2017). Behavioral plasticity in a variable environment: Snow depth and habitat interactions drive deer movement in winter. *Journal of Mammalogy*, *98*(1), 246-259. https://doi.org/10.1093/jmammal/gyw167

[21] Cook, J. G., Irwin, L. L., Bryant, L. D., Riggs, R. A., & Ward, J. T. (1998). Thermal Cover Needs of Large Ungulates: A Review of Hypothesis Tests. In Transactions of the 69th North American Wildlife and Natural Resources Conference. National Council for Air and Stream Improvement, La Grande, Oregon.

[22] Prokopenko, C. M. (2016). Multiscale habitat selection and road avoidance of elk on their winter range. Master’s thesis, University of Alberta, Department of Biological Sciences.

[23] Courtemanch, A. B., Kauffman, M. J., Kilpatrick, S., & Dewey, S. (2017). Alternative foraging strategies enable a mountain ungulate to persist after migration loss. *Ecosphere*, 8(6), e01855. https://doi.org/10.1002/ecs2.1855

Impacts of the Proposed Development

The impacts of the "Mission Ridge Ski Area Expansion" would be immense. The development plans for an urban-style village, with a sleeping capacity of up to 7,812 people, attending traffic of over 10,000 vehicles per day[24], outdoor concerts, alpine roller coasters, and more. The impacts of noise and light pollution, a shift from primary day-use in the winter to year-round use, the spillover of pets[25], recreation, pesticides[26], rodenticides[27], and human disturbance into surrounding public lands would be incomparable to anything in our region.[28]

This development would fundamentally alter the landscape of the upper Stemilt-Squilchuck basins. The development would likely cause displacement through disturbance. Direct habitat destruction would shrink the available areas for species to live. Habitat loss is considered one of the greatest threats to biodiversity[29]. Habitat loss due to avoidance behaviors is effective habitat loss**.** While the focus of this trail camera survey has been mostly on mid to large-sized animals, it is clear that many smaller species, from rare and native bumble bees to icebugs, frogs, toads, snakes, and salamanders, would also be impacted by the development. The developer plans to grade and shape talus fields[30] for homesites, the urban village, and ski runs. The destruction of the talus habitat will directly destroy the homes of pika[31], bats[32], and other creatures that rely on the talus for cover and thermal refuge.

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[24] McCorquodale, Scott M. "A Brief Review of the Scientific Literature on Elk, Roads, & Traffic." March 2013. Washington Department of Fish and Wildlife.

[25] Loss, S. R., Will, T., & Marra, P. P. (2013). The impact of free-ranging domestic cats on wildlife of the United States. *Nature Communications*, *4*(1), 1-8. https://doi.org/10.1038/ncomms2380

[26] Douglas, M. R., Baisley, P., Soba, S., Kammerer, M., Lonsdorf, E. V., & Grozinger, C. M. (2022). Putting pesticides on the map for pollinator research and conservation. *Scientific Data*, *9*(1), 1-15. https://doi.org/10.1038/s41597-022-01584-z

[27] Nakayama SMM, Morita A, Ikenaka Y, Mizukawa H, Ishizuka M. A review: poisoning by anticoagulant rodenticides in non-target animals globally. J Vet Med Sci. 2019 Feb 28;81(2):298-313. doi: 10.1292/jvms.17-0717. Epub 2018 Dec 27. PMID: 30587672; PMCID: PMC6395208.

[28] The Wildlife Society, Habitat Loss & Fragmentation (2017). https://wildlife.org/wp-content/uploads/2017/05/FactSheet-Fragmentation_FINAL.pdf

[29] Pimm, S. L., Jenkins, C. N., Abell, R., Brooks, T. M., Gittleman, J. L., Joppa, L. N., Raven, P. H., Roberts, C. M., & Sexton, J. O. (2014). The biodiversity of species and their rates of extinction, distribution, and protection. *Science*, 344(6187), DOI: 10.1126/science.1246752.

[30] Shoo, L. P., Storlie, C., Williams, Y. M., & Williams, S. E. (2010). Potential for mountaintop boulder fields to buffer species against extreme heat stress under climate change. *Biological Conservation*, 54(4), 475-478. https://doi.org/10.1007/s00484-009-0286-4

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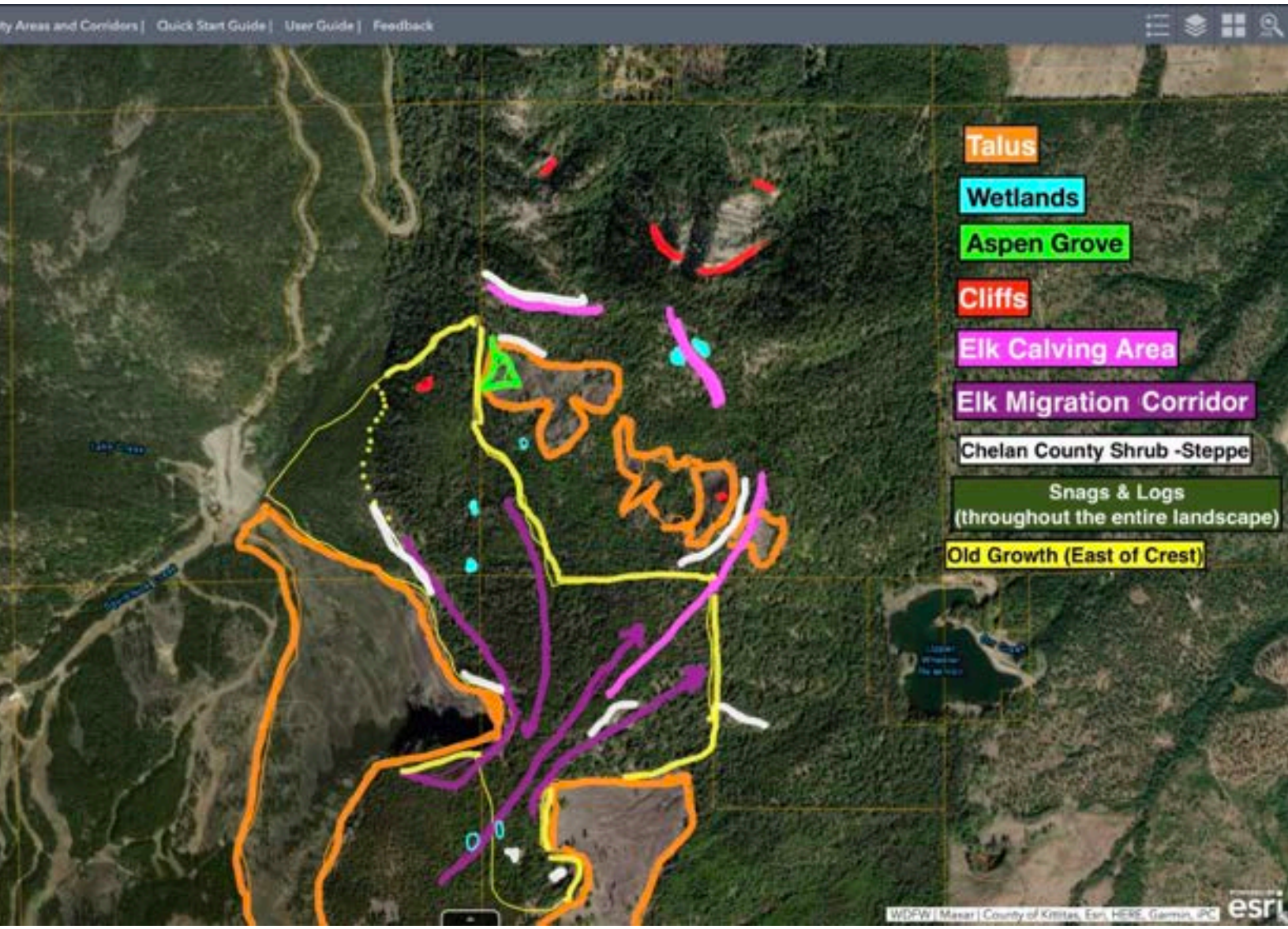
The DEIS falsely asserts that the planned “open space” areas (areas not paved over) will be suitable habitats. It claims the proposed ski runs will also improve foraging habitat for deer and elk. If this were the case, the current Mission Ridge Ski Area would have abundant deer and elk foraging on the ski runs. However, deer and elk signs and sightings on ski runs are infrequent. The reason for their absence is not because of forage availability; it's human disturbance: disturbance from outdoor concerts, construction/maintenance activities with heavy machinery, trucks driving up service roads, recreationalists, and pets accessing the ski area. Wildlife will not only abandon habitats over disturbance, but they can be physiologically stressed enough by the disturbance that it can be measured[33]. The DEIS dismisses the impacts that human disturbance has on wildlife and asserts, without evidence, that the animals will use new ski runs, be unaffected by 10,000 cars/day, or can move to adjacent equivalent habitat.

Photo 18 - Bull elk foraging on WDFW Section 25

[33] McCorquodale, Scott M. 2013. “A Brief Review of the Scientific Literature on Elk, Roads, & Traffic.” Washington Department of Fish and Wildlife. “Elk exhibited elevated fecal glucocorticoids during high non-hunting recreational activity, indicating psychological stress from regular vehicle use.”

Recommendations - Updates to PHS Maps

The marked up map below contains suggested edits to the WA Department of Fish and Wildlife Priority Habitats and Species Map. For example, stands of East-side old-growth (10 trees over 21” DBH per acre) were measured, but no old-growth was noted on the map. Particularly devoid of big tree information is the Forest Service’s Section 30, where ski runs, access roads, and a 4 million-gallon snowmaking reservoir are proposed to go in where multiple 40”+ DBH trees reside.



Map 5 - Suggested updates to the WADFW Priority Habitats and Species Map

Recommendations - Scrutiny

This trail camera survey showed how many of the claims in the DEIS are false or misleading. This is a troubling pattern that calls into question the validity of the other ecological assessments presented by the developer that are included in the DEIS. These errors and omissions of important data highlight the need for a high level of scrutiny and third-party, on-the-ground verification. Other examples not covered in this paper are:

- under-counting the size of an aspen grove (suspiciously at 0.9 acres) just below the Priority Habitats and Species threshold (measured to be ~1.7 acres via a drone survey).
- DEIS wetland survey omitted one or two perennial wetlands and a perennial stream within the project area.
- DEIS contends that the project area is too low for pika, but there are at least a dozen active pika haystacks visible in the proposed village footprint (identified via drone) on Section 19 talus.

Photo 19 - It is possible to identify pika haystacks via drone survey. Note the fresh green vegetation added to the top haystack, denoting active use.

Photo 20 - One of a dozen pika haystacks visible via drone on Section 19 where the DEIS states: "the study area is on the margin of the American pika (Ochotona princeps) range and is **likely too low in elevation for pika**" *(Appendix F-32 - Section 4.1.1.1)*

Recommendations - Future Studies, Gaps in Research

1. What are the impacts of summer use at the ski area on the area's wildlife? Specifically, does summer operation of the Chair 5 pub/Midway Lodge, and summer maintenance and construction activities displace or impact wildlife use? It appears this summer's activity did not undergo any additional environmental review. Answers to these questions would help provide some insight into how the proposed development would impact adjacent wildlife habitat. A trail camera study within the ski area could help understand how much wildlife use is occurring in and around the ski area. The DEIS claims that cutting ski runs helps deer and elk by providing forage. To test their hypothesis, research could be done on the existing ski runs.

Photo 21 - The impacts are light & noise pollution are well known. While past attempts to expand summer ski area operations were stopped due to impacts, this did stop Mission Ridge from expanding its 2025 summer activities.

Photo 22 - Heavy machinery operated along ski runs, 0.5 km away from the control cameras.

2. What is the role of talus fields in offering habitat for not only pika, but also bats[34], reptiles, amphibians, and insects? Interstitial spaces underneath the talus provide a stable thermal refuge–up to 86°F temperature difference[35] from the ambient air! The presence of aspen growing out of basalt talus, the sound of springs gurgling underneath talus, and the presence of icebugs[36] suggest that underneath these talus slopes is a cool, moist, wetland/riparian-like environment suitable for many species. These cool, moist, stable areas will likely become more important as climate change warms these slopes. Acoustic sensors and/or radar could detect bat usage of talus fields. E-DNA testing of springs seeping out of talus fields could help identify species using those subterranean spaces.

Photo 23 - Drone image of the main aspen grove on Section 19. Aspens growing out of the talus are a clue that near-surface water exists under the basalt.

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[34] McEwan, A. L., & Bachen, D. A. (2017). Use of Talus and Other Rock Outcrops by Bats in Western Montana. Montana Natural Heritage Program, Natural Resource Information System, Montana State Library.

[35] Varner, J., & Dearing, M. D. (2014). The importance of biologically relevant microclimates in habitat suitability assessments. *PLoS ONE*, 9(8), e107201. https://doi.org/10.1371/journal.pone.0107201

[36] Buczkowski, G. (2017). Conservation biology of ice crawlers (Grylloblattids) in the Pacific Northwest. Purdue University. Retrieved from www.entm.purdue.edu/ants/ice-crawlers.php

Photo 24 - Widespread beetle kill on top of Mission Ridge, September 2025. New outbreaks of beetle kill are devastating stands of whitebark pine, lodgepole pine, and other tree species on the upper mountain. How will this impact wildlife?

3. What are the historic trends, anticipated future conditions, and cumulative impacts that are facing the wildlife on Mission Ridge? Will future condition makes this undisturbed high elevation habitat more valuable? A larger meta-analysis needs to be done to factor in the nearby habitat loss through things like orchard development (ie. Section 17), what is the development future of nearby Section 13–owned by the same developer, increased impacts of recreation, climate change impacts, beetle kill outbreaks, drought stress, the encroachment of wildlife disease (Chronic Wasting Disease and Hoof Disease), etc. All these variables interplay and will determine the health of the landscape and wildlife.

4. To monitor the presence of arboreal species, setting up trail cameras on large snags, hollow tree cavities, etc., would help detect the presence of wildlife not captured on camera near ground level and pointed at game trails. This may be a low-cost, non-invasive way to detect marten, fisher, etc, compared to using bait stations, winter tracking, or other traditional and reliable methods.

5. With an anticipated traffic load of roughly 10,000 vehicle trips per day, wildlife surveys targeting migration routes[37] and frequent crossing should be conducted along Mission Ridge Road & Squilchuck Road[38]. These surveys would need to be done year-round to identify seasonal hotspots. The projected traffic from the development will be roughly double the average traffic of Stevens Pass or Blewett Pass. Those traffic numbers will greatly impact wildlife movement and mortality within the Squilchuck Road corridor. These surveys would help to understand wildlife movements that could be used to inform mitigation efforts like signage and wildlife crossing structures.

6. The seasonal wetlands, shown in the DEIS, on Section 19 are known amphibian breeding ponds. However, it is unknown exactly how many species of amphibians use these wetlands. In addition, there is an uncatalogued wetland on Section 19 (Photo 25, below) and an unmapped perennial stream on Section 30. The perennial stream appears to be an important water source for the calving area/travel corridor/migration route in that area. Both are absent from the DEIS Wetland Survey. Nearby sightings of salamanders, boreal toads, and a possible Columbian spotted frog at Wheeler Reservoir suggest that further study is warranted. Amphibian surveys or E-DNA could help understand which species are using these areas.

Photo 25 - Drone photo of a perennial wetland not marked on any of the DEIS wetland surveys.

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[37] Rowland, M. M., Wisdom, M. J., Johnson, B. K., & Penninger, M. A. (Year). *Effects of Roads on Elk: Implications for Management in Forested Ecosystems*. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. La Grande, Oregon.

[38] Gucinski, Hermann, Brookes, Martha H., Furniss, Michael J., & Ziemer, Robert R. (2001). *Forest Roads: A Synthesis of Scientific Information*. General Technical Report PNW-GTR-509. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Photos from the Trail Camera Survey

Photo 26 - mule deer on migration corridor along basalt field of Section 25/30

Photo 27 -black bear on Section 24

Photo 28 -snowshoe hare

Photo 29 - black bear cub

Photo 30 - red-tailed hawk at elk wallow

Photo 31 - adult golden eagle at an elk wallow, Section 25

Photo 32 - coyote, control camera

Photo 33 - bobcat

Photo 34 - black bear, Section 23, control camera

Photo 35 - marmot

Photo 36 - bobcat, Section 30

Photo 37 - yellow-rumped warbler

Photo 38 - dusky grouse

Photo 39 - elk feeding along a riparian zone in the project area, Section 25

Photo 40 - mountain lion, Section 23, control camera

Photo 41 - cow elk, on the boundary of Section 30/Section 19