



COLORADO

Parks and Wildlife

Department of Natural Resources

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Town of Vail
Chris Neubecker, Planning Manager
Community Development Department
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June 27, 2019

Dear Mr. Neubecker,

Thank you for the opportunity to provide comments on the proposed Booth Heights/East Vail Workforce Housing Development. At the request of the Town of Vail (TOV), local residents, and Triumph Development, Colorado Parks and Wildlife (CPW) found it of significant public interest to provide comments on the impacts of the proposed development to wildlife and wildlife habitat, and assess the efficacy of the proposed mitigation measures. CPW has a statutory responsibility to manage all wildlife species in Colorado. This responsibility is embraced and fulfilled through CPW's mission to perpetuate the wildlife resources of Colorado and to provide sustainable outdoor recreation opportunities that educate and inspire future generations. In coordination with many other efforts, we fulfill this mission by responding to requests for comments on wildlife impact reports, land use actions, and consultations through public-private partnerships.

CPW has reviewed the applicant's materials to include site plan, Environmental Impact Report, and the Wildlife Mitigation Plan. We offer the following comments for your consideration.

General Comments:

CPW would like to recognize that the developer has worked with and collaborated with us throughout the planning of this development. Projects such as this can have significant impacts to wildlife and CPW believes that early and continued communication produces the best results for all interests.

Triumph Development has proposed construction of a high-density workforce subdivision located in East Vail. The proposed development lies on a 23.3 acre undeveloped private parcel bordered by U.S. Forest Service land, Town of Vail property, and a CDOT road right-of-way. The East Vail parcel itself contains and overlaps with a variety of wildlife habitat.

In assessing impacts to wildlife, it is increasingly important to understand that residential developments result in both direct and indirect impacts. While direct impacts are easily quantified and can be identified as direct loss of habitat, indirect impacts such as human disturbance, light pollution, and auditory and olfactory impacts are much more difficult to quantify. Indirect impacts can have as great or greater degrees of impact than direct impacts; indirect impacts are often more insidious and can take years to manifest themselves in wildlife populations.



With this in mind, human activity on landscapes inhabited by wildlife has varying degrees of impacts based on six factors identified by Geist (1971) and Knight et al (1995): type of activity, human behavior during the activity, predictability of the activity, frequency and magnitude of the activity, timing (e.g. during migration or breeding seasons), and location of activity (e.g. above or below the animal). Findings from these studies suggest that human disturbance is greatest when it is frequent, unpredictable (Knight and Cole 1995) and occurs when animals are in poor condition (e.g. severe winters) (Geist 1970). The introduction or increase of human activity in close proximity to wildlife can subsequently modify animal behavior. Modification of behavior can take the form of changes in home range, altered movement patterns, altered reproductive success, altered escape response, and altered physiological state (Tromulak and Frissell 2000). The resulting consequences for wildlife can be complete abandonment of preferred habitat (Geist 1978) and overall population decline (Phillips and Alldredge 2000). These elements as they apply to all wildlife species are important considerations when assessing the impacts of developments in wildlife habitat.

Rocky Mountain Bighorn Sheep:

The proposed development of the East Vail parcel is poised to generate both direct and indirect impacts to the local bighorn sheep population. This particular sheep herd is referred to as S2 in CPW reports and is considered a native herd, which received supplementation of six ewes and one ram in the late 1940s. Estimated herd size reached 100 animals as recently as 2007. The current size of this ewe/lamb/young ram group was estimated between 45-50 during 2019 winter surveys. The proposed development site lies within this herd's winter range and severe winter range. It should be noted that the 1,800 acre winter range polygon referenced in the Environmental Impact Report and Mitigation Plan is not representative of current available habitat, current habitat use, or on-the-ground observations of this herd. Many bighorn sheep herds and populations in Colorado do not appear to fully use the suitable habitat available to them for reasons that are not clear (George et al. 2009). The aforementioned occurrence is visible in the current viable winter range for the Booth Creek herd. The most consistently available and suitable winter range is predominantly restricted to the development site and the area below the Booth Creek cliff band. This area encompasses less than 150 acres, which does not include the winter range of the ram group that winters further to the west.

The proposed development will result in the direct net loss of 5.4 acres of wildlife habitat, to include bighorn sheep winter range. While difficult to quantify, the indirect impact of human disturbance has the potential to be significantly greater. Both direct and indirect impacts will serve to further restrict available winter range for this herd—effectively increasing the concentration of sheep on an animal to available habitat basis. Reduction in forage resources on winter range may also result in lower lamb recruitment. Furthermore, small herds often become sedentary and their continued, concentrated use of small patches of available habitat could result in paradoxical density-dependent effects wherein habitat actually does become limiting despite an apparent abundance of potentially suitable habitat being available. These characteristics serve to emphasize the importance of maintaining the integrity of winter range for the Booth Creek herd.

Proposed mitigation for direct loss of habitat includes on-site habitat treatments on 15.6 acres of the Natural Area Preservation (NAP) area. While CPW recognizes the need for habitat enhancement, it is unclear if on-site treatments will offset the impacts associated with the direct loss of winter range. In the absence of disturbance, bighorn sheep exhibit strong site fidelity and often occupy ranges because of their openness, high visibility, and proximity to escape terrain over sites with higher quality forage



(Bleich and Wiedmann 2014). CPW encourages the use of treatments to enhance adjacent habitat to the proposed development; however, it remains unclear if it will result in any meaningful winter use by the Booth Creek herd. The proposed on-site mitigation also occurs on a historic debris flow, which may comprise future mitigating features of the NAP. CPW recommends that on-site habitat treatment occurs prior to the construction phase and is timed appropriately in order to provide productive alternative winter range.

Additional off-site habitat enhancement is proposed as part of the mitigation plan. CPW recognizes the need for large-scale habitat treatments to potentially convert areas to more viable bighorn sheep habitat. However, the time frame and scalability of such treatments remains a concern. Off-site areas identified for enhancement are characterized by significant fuel loading, steep slopes, and broken terrain. As such, mechanized treatment and other scalable options are unfeasible, resulting in the need for hand-treatments. Thus, the time frame associated with off-site enhancements likely exceeds 1-2 years. Regardless, CPW recommends that these off-site treatments should take place as soon as possible in order to serve to inform of their efficacy and potentially provide alternative range in the event of herd displacement. Similar to on-site enhancements, it remains unclear whether large-scale off-site treatments will in fact increase the carrying capacity for the Booth Creek herd given the prevalence of other population-limiting factors. CPW emphasizes the strong need for collaboration with the U.S. Forest Service, and the TOV to help achieve desired herd management goals with or without the development of the East Vail parcel.

The Wildlife Mitigation Plan lays out measures for minimizing construction related impacts to wintering sheep. Because there is no meaningful way to negate the auditory, olfactory, and human presence disturbance associated with the construction phase of this project, CPW recommends restricting all construction to a July 31st to November 15th time frame in order to minimize impacts to wintering ungulates and nesting peregrine falcons.

CPW recommends realignment of the planned wildlife fencing. The current alignment unnecessarily excludes potential wildlife habitat. We recommend the relocation of this alignment from north of the rockfall berm to south of the berm and immediately behind the building structures. This will further discourage access to critical wildlife habitat by residents and potentially provide for additional useable habitat for wildlife. We encourage additional dialogues surrounding the addition of one-way wildlife passage structures within the length of proposed fencing. A modular design could allow for passage if trapped wildlife within the development becomes an issue.

CPW largely supports the proposed “Wildlife Requirements for Residents of the East Vail Workforce Housing Parcel.” Restrictions on human access to the NAP portion of the parcel will prove critical to minimizing the degree of human disturbance. We recommend that the developer and property manager implement a continuous year round closure of the NAP. Currently, the NAP, surrounding TOV, and USFS lands see recreational impacts during all four seasons. A year round closure of the NAP will help solidify the potential for this area to act as mitigating habitat, and will help accommodate seasonal variations in habitat use by the Booth Creek sheep herd. Pet control measures are also instrumental in minimizing impacts. Human disturbance involving dogs are well documented as eliciting greater impacts on wildlife than human disturbance alone (King 1985). Therefore, education of residents and the subsequent pet restrictions detailed in the Wildlife Mitigation Plan should be an integral component of living within the proposed development. However, the mitigation plan states “Housing Management reserves the right, at any time and from time to time hereafter, to modify, amend, repeal, and/or re-enact these Wildlife



Requirements.” CPW recommends that in order to ensure minimization of impacts, occupancy of the housing development be contingent on adhering to all the elements of 9.3.2 of the Wildlife Mitigation Plan.

Alternative locations for the driveway access to the housing development were explored during conversations between CPW staff and Triumph Development. Per these conversations, CPW recommends relocating access to the housing development to the eastern side of the 5.4 acres. Driveway relocation to the east of the development site will help alleviate traffic concerns—vehicular, pedestrian, cycling, and otherwise—with current bighorn sheep habitat use. In conjunction with driveway relocation, CPW also recommends any buildout of ADA access and a public transit bus stop be located on the eastern edge of the 5.4 acre parcel. The presence of pedestrians/human disturbance in close proximity to wintering sheep will generate greater stressors than vehicular traffic and run the risk of flushing wildlife onto the frontage road or I-70.

Elk:

The proposed development site lies within Data Analysis Unit (DAU) E-12, with I-70 being the dividing line between DAU E-12 and E-16. Both of these units have experienced significant declines in elk populations, and to a lesser degree in mule deer populations. The Wildlife Mitigation Plan states, “In recent years, CPW have increased their hunting permits to increase harvest and reduce the elk and deer populations to levels that the smaller winter range acreage can support.” This is inaccurate. CPW has dramatically reduced hunting quotas for both elk and mule deer since the mid-2000s. In the last 5 years, E-12 and E-16 have seen a 50% and 99% reduction in limited elk licenses, respectively. Cow elk hunting in E-16 has ostensibly been eliminated. These reductions in cow quotas are in an attempt to protect the reproductive, calf bearing, portion of the herd.

Habitat loss and human disturbance continue to be significant concerns in managing the E-12 and E-16 elk herds. The few remaining wintering elk in proximity to the proposed development have not habituated to the increases in human disturbance in the Pitkin and Booth Creek areas. Continued loss of winter range and increased human disturbance may lead to total abandonment of this winter range. While the scale and proximity to human disturbance of proposed enhancements on the NAP is unlikely to yield meaningful results for the elk herd, CPW still encourages the on-site habitat enhancement treatments for the potential benefit of elk.

Recommendations for mitigation measures previously discussed for bighorn sheep are also applicable to the elk within E-12. CPW emphasizes the need for continued collaboration with the TOV and USFS in order to implement large-scale habitat enhancement projects off-site that will serve to benefit the E-12 elk population.

Black Bear:

The proposed development site lies within a black bear/human conflict area, with a minimum of 2 reports of conflicts between bears and humans per year. CPW generally supports the proposed mitigation to reduce conflicts with black bears. Given the close proximity of proposed habitat enhancements to the development, CPW emphasizes the importance of adhering to all elements set forth in 9.3.1 of the Wildlife Mitigation Plan to include prohibiting fruit bearing vegetation from on-site



landscaping and providing bear resistant trash containers. CPW further stresses enforcement of Chapter 9, Wildlife Protection, Ordinance No. 20, Series 2006 of the Vail Town Code.

Peregrine Falcon:

The American peregrine falcon is listed as a state species of concern in Colorado. The proposed development site lies within the CPW-recommended half mile buffer of an active peregrine falcon nest. CPW guidelines recommend that no surface occupancy beyond historical occurrences take place within this half mile buffer zone. This nest was established under the current levels of disturbance, with no new development in the area for the peregrines to habituate to. Human disturbance has the ability to lead to nest failure or total abandonment of historical nesting sites (Olsen and Olsen 1980). Despite the presence of the I-70 corridor and adjacent human disturbance to nesting sites, habituation does not necessarily beget additional habituation in the face of new disturbances. CPW asks that the developer continue communication throughout the project to evaluate specific concerns regarding peregrines at which time CPW can provide additional recommendations to mitigate disturbances during critical periods.

Additional Recommendations:

Previous application submissions by Triumph Development allocated annual funding contributions earmarked for future maintenance of proposed mitigation measures. There is no discussion of these payments in the current application. CPW recommends continued discussions to determine the details of these payments and an appropriate receiving party.

In order to ensure the longevity of the NAP portion of the East Vail parcel, CPW recommends future discussions with the TOV, local land trust organizations, and the developer to explore conservation easement opportunities. CPW also recommends limiting short-term rentals within the development to reduce any potential shortfalls in education of residents on wildlife considerations.

In considering the rockfall berm, CPW seeks clarification on any maintenance trail for berm access. We recommend that this trail be gated and signed in order to minimize the potential for any residents to access sensitive wildlife habitat.

CPW also seeks clarification on the means, methods and funding for enforcement of the “Wildlife Requirements” set for in the Wildlife Mitigation Plan. Mitigation of impacts is not a “one-and-done” approach, but necessitates continual maintenance in order to achieve desired results. As such, clarification on who specifically will be responsible for enforcement and with what frequency enforcement will occur are essential to ensuring compliance.

Closing Comments:

In closing, CPW wants to emphasize the importance of viewing proposed developments through a comprehensive impact analysis lens. In light of proposed housing developments in the vicinity of the “Town Shops,” which is also within sheep winter range, and the I-70 expansion project, a holistic approach of impacts to wildlife should be used. This approach will serve to better inform decisions surrounding the conservation of wildlife and enlighten stakeholders about the impacts humans have on a landscape scale.



CPW values the opportunity to provide comment. If you have any questions or concerns, please reach out to District Wildlife Manager Devin Duval at (970) 930-5264.

Sincerely,



Matt Yamashita,
Area Wildlife Manager

cc: JT Romatzke, NW Regional Manager
Devin Duval, District Wildlife Manager
Julie Mao, Terrestrial Wildlife Biologist
Taylor Elm, NW Region Energy Liaison
Danielle Neumann, NW Region Land Use Specialist
File



Work Cited:

Beale, C. M. 2007. The behavioral ecology of disturbance responses. *International Journal of Comparative Psychology* 20:111–120.

Behavioral Response of Desert Bighorn Sheep to Human Harassment: A Comparison of Disturbed and Undisturbed Populations, By Michael M King, A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Fisheries and Wildlife.

Berger, J. 1990. Persistence of different-sized populations: an empirical assessment of rapid extinctions in bighorn sheep. *Conservation Biology* 4:91-98.

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Geist, V. 1978. Behavior. In *Big Game of North America: ecology and management*, J.L. Schmidt and D.L.

Geist, V. 1971. *Mountain sheep: a study in behavior and evolution*. University of Chicago Press, Chicago, IL.

George, J. L., R. Kahn, M. W. Miller, B. Watkins. 2009. COLORADO BIGHORN SHEEP MANAGEMENT PLAN 2009–2019.

Knight, R.L and D.N. Cole. 1991. Effects of Recreational Activity on Wildlife in Wildlands. *N.A. Wildl. & Nat. Res. Conf.*

Knight, R. L., and K. J. Gutzwiller, editors. 1995. *Wildlife and recreationists: coexistence through management and research*. Island Press, Washington, D.C., USA.

Krausman, P.R., R.C. Etchberger, and R.M. Lee. 1996. Persistence of mountain sheep populations in Arizona. *Southwest Naturalist* 41:399-402.

McKinney, T., S.R. Boe, and J.C. DeVos Jr. 2003. GIS-based evaluation of escape terrain and desert bighorn sheep populations in Arizona. *Wildl. Soc. Bull.* 31:1229-1236.

Olsen, J. and Olsen P. 1980. Alleviating the Impact of Human Disturbance on the Breeding Peregrine Falcon. *Corella* 4: 54-57.

Phillips, G.E. and A.W. Alldredge. 2000. Reproductive Success of Elk Following Disturbance by Humans during Calving Season. *The Journal of Wildlife Management*. 64: 521-530.

Singer, F.J., L.C. Ziegenfuss and L. Spicer. 2001. Role of patch size, disease, and movement in rapid extinction in bighorn sheep. *Conservation Biology* 15:1347-1354.



Trombulaka, S.C. and C.A. Frissell. 2000. Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities. *Conservation Biology*. Volume 14, No 1.

Wehausen, J.D. 1996. Effects of mountain lion predation on bighorn sheep in the Sierra Nevada and Granite Mountains of California. *Wildlife Society Bulletin* 24:471-479.

