



August 9, 2019

Hahns Peak-Bears Ears Ranger District
Attn: Mad Rabbit Trails Project
925 Weiss Drive
Steamboat Springs, CO 80477

Sent via email: comments-rm-medicine- bow-routt-
hahns-peak-bears-ears@fs.fed.us

Re: Mad Rabbit Trails Project

Dear Ms. Umphries,

Keep Routt Wild has reviewed the Hahns Peak-Bears Ears Ranger District's preliminary proposed action for the Mad Rabbit Trails Project dated July 16, 2019. We sincerely appreciate the District's efforts to advance this trails planning process in a deliberate manner that is informed by input from last winter's roundtable discussions and other information. The preliminary proposed action eliminates some of the most problematic trail segments from a resource perspective and is a constructive step toward accommodating the multiple objectives that need to be balanced in moving forward in this process. We appreciate the Forest Service's consideration of community input and for taking this step. Keep Routt Wild remains committed to working with the Forest Service and other interested parties in finding common ground on this proposal moving forward.

This letter addresses three key points that we believe are critical to the success of this trails proposal. We also attach more detailed comments on select trail segments that remain of concern to Keep Routt Wild along with feedback on what we believe to be more suitable approaches to accomplish the purpose of those trails (Attachment A); specific input on trail closure dates and enforcement considerations (Attachment B); and a list of references to relevant studies and literature addressing impacts associated with the development and use of trails (Attachment C). We thank you in advance for considering our input on these items.

1. Purpose and Need for the Proposed Action. The Forest Service's original purpose and need statement for its proposed action was "to provide trail-based recreation opportunities as well as to protect forest resources by reducing user-created trails." We request that the stated purpose be revised for the formal scoping process and Draft EA as follows: "to provide trail-based recreation opportunities consistent with the protection and conservation of natural resources and retention of the roadless character of protected areas." We request this change because inherent in multiple use management here is the upfront consideration of opportunities to avoid and minimize impacts to resource values through the selective siting and configuration of new trail segments; impact minimization

opportunities are not restricted to the retirement of pre-existing user-created trails as implied by the original purpose and need statement.

2. Phased Implementation of a Modified Proposed Action. Keep Routt Wild believes it is possible for Mad Rabbit trails to meet the requirements for a Finding of No Significant Impact upon environmental review if the trails configuration is refined in the manner outlined in Attachment A *and* if implementation of the trails is phased in order to assure that impacts are not greater than anticipated, particularly in the sensitive Ferndale area. In concept, under such an approach, we would support approval for immediate Phase 1 implementation of a singular connected trail along the Highway 40 corridor that would provide both short trail use opportunities as well as the desired longer epic trails experience. Implementation of a higher density network of branched and parallel trails could follow on a phased basis pursuant to a pre-approved, mandatory protocol that requires:
 - A. Use of science-based quantitative criteria for measuring physical habitat, soils, visual quality, wildlife, and/or other resource values;
 - B. Baseline monitoring of criteria for those parameters;
 - C. Post-trails monitoring under Phase 1 for measurable changes to those criteria; and
 - D. Satisfaction of identified performance indicators supporting non-significance findings from Phase 1 as a prerequisite to “on-ramps” for additional trails development.

It is critical as we move forward that decisions to on-ramp additional trails be based on sound scientific approaches that reflect the benefit of pre- and post-trails monitoring information relevant to impacts. The approach described above will assure that. We believe Colorado Parks and Wildlife expertise should be utilized by the Forest Service in determining how best to define the resource performance criteria, both in terms of establishing a monitoring baseline and the subsequent performance evaluation, to ensure that such criteria are satisfied.

In addition to the above, approval of Phase 1 and any subsequent trails should include requirements for seasonal trail closures with the specific dates to be set based on available species/habitat data, and should require that funding for maintenance and enforcement be secured in advance of construction. Please see Attachment C. Finally, we request that the Forest Service give specific attention to the growing use of e-bikes and, if they are to be excluded from the non-motorized Mad Rabbit trails, to make that explicit. We observe that Colorado Roadless Areas may place additional restraints on the deployment of e-bikes and that, if the USFS desires to retain flexibility to open some trails to e-bikes in the future, moving the location of those trails to outside the CRAs may help preserve this flexibility.

3. Development of a Recreation Plan. As recreation on Forest Service lands continues to increase we believe there is a growing need for a comprehensive trails and recreation

planning effort.¹ The District's 2015 Trails Plan for the Hahns Peak and Bear Ears Ranger District offers only general guidance for non-motorized trail system development and, by its terms, has a temporal scope limited to two to five years.² To the best of our knowledge, there remains to date no holistic, comprehensive long-range plan (or programmatic NEPA environmental review) guiding future trails and dispersed/developed recreation opportunities on federal lands in the area. And we lack the benefit of a current master planning document for the Routt National Forest, as we continue to operate under a Land and Resource Management Plan that dates back to 1997.

Moving forward, Keep Routt Wild believes it essential that a comprehensive long-range planning process be put in place *prior* to consideration of additional trails proposals on forest lands in the District. This effort is overdue and has unfortunately compromised community confidence in Forest Service decisions that have been proceeding and approved under a series of sequential project-by-project EAs and FONSI's, as evidenced by the Buffalo Pass Trails Project and what is now being pursued for this Mad Rabbit proposal. It is our hope that the Routt Recreation Roundtable can be the forum to start this discussion.

Again, Keep Routt Wild appreciates the role that the Forest Service plays in our community and for their ongoing stewardship of our natural resources. We remain committed to being collaborative partners to the Forest Service in balancing recreational development with the conservation needs of wildlife.

We look forward to commenting on the Draft EA when it is released, and to our future engagement with the USFS and others on the proposed action.

Yours sincerely,
Keep Routt Wild

Larry Desjardin,
President of the Board

¹ See, e.g., Mad Rabbit Trails Project Fact Sheet, p. 1

² Trails Plan 2015, page 4.

ATTACHMENT A - Keep Routt Wild comments on specific trails.

Keep Routt Wild appreciates the opportunity to comment on the most recent Mad Rabbit pre-proposal. This section consolidates our comments on the purpose, need, selection, and routing of specific trails. There is considerable merit in many of the proposed trails, and many of our comments will address specific routing alternatives and designs that will make some of them more friendly to wildlife and more consistent with the aims of the Colorado Roadless Rule and the areas designated under it (Colorado Roadless Areas, or CRAs). There are a few trails that are more problematic to those goals, and we encourage those to either be eliminated or changed enough to make them compatible with the wildlife in our area. We believe that implementing these changes may make a proposal consistent with an EA and a FONSI.

MAD CREEK / HOT SPRINGS AREA

We commend the US Forest Service for listening to community input during the Routt Recreation Roundtable facilitation discussions and eliminating the proposed trails in that area. Furthermore, we endorse the USFS proposal to return a number of unauthorized trails back to their natural state. We believe that this sets a proper precedent for dealing with illegal trails and will attenuate the incentive to create illegal trails in the future. Keep Routt Wild would like to offer at this time that we organize a volunteer effort to re-brush these trails, in coordination with the USFS and other organizations.

OHV TRAILS

We support all the OHV trails south of US40 (Trails 15, 16, 17), as well as Trail #13 and #4 to the north. We also support the USFS' decision to remove the OHV trail previously routed to the north of US40 that encroached into the Long Park Colorado Roadless Area. However, we do have a significant issue with one trail, Trail #10. That connector would encourage through traffic from the north in an area that is elk summer range. Besides the habitat fragmentation that would result, there is a significant risk that the increased traffic would push elk onto nearby agriculture lands in Jackson County, causing depredation. Our rich summer range for elk compensates for some of the impact due to loss of winter range, as elk bring their body fat stores up in order to survive the harsh winter. Significant impacts to the summer range may change this dynamic, leading to the possible implementation of summer closures of impacted areas and the associated reduced recreational opportunities.

Due to all of these concerns, we recommend the elimination of Trail #10. At the very least, the trail should be planned and coordinated with CPW and Jackson County officials and landowners, with triggers in-place for potential summer closures.

NEW EPIC TRAIL FROM US40 THROUGH CONTINENTAL DIVIDE

The latest proposal unveils a new "epic" trail system that extends from a western location on US40, through the CDT (Continental Divide Trail), and then towards the Steamboat Ski Area or

Buffalo Pass. Keep Routt Wild can support this network with some modifications to make the path more wildlife friendly, more consistent with the characteristics of CRAs, and with fewer user conflicts. Since this is a lengthy path in total, we will make comments organized by the specific area the trail is traversing. We will start at the West Rabbit Ears Summit and follow the path east counterclockwise in our comments. We will reserve our comments for trails to the west of the summit for a later section.

NON-MOTORIZED TRAILS ALONG US40

We support a well-designed singular connected trail alongside US40 that would provide both short trail use opportunities as well as the desired longer epic trails experience.

We believe a general design constraint for such a trail network, to be compatible with the undeveloped characteristics of CRAs, is to minimize the excursion of trails into the Long Park CRA. Ideally all trails would be outside of the CRA. We note that CRAs may place additional restraints on the deployment of e-bikes and that, if the USFS desires to retain flexibility to open some trails to e-bikes in the future, moving those trails to outside the CRAs may help preserve that flexibility.

We realize that it may not be feasible to route all trails along the north side of US40 outside of the Long Park CRA. In those cases, the excursion into the CRA should be minimized, with none more than a quarter mile into the CRA. We note that some proposed trail routings along US40 violate these design rules, and the extended excursions are not needed in the creation of a singular connected trail that parallels US40. We observe that many of these trails are funded by the Steamboat Springs 2A accommodation tax with the explicit goal of attracting up to 180,000 new visitors to Steamboat Springs. As an explicit commercial operation, care needs to be exercised whenever a trail traverses a CRA, lest it impacts the undeveloped characteristic of a CRA and subsequently mandates the use of an EIS before it can be approved.

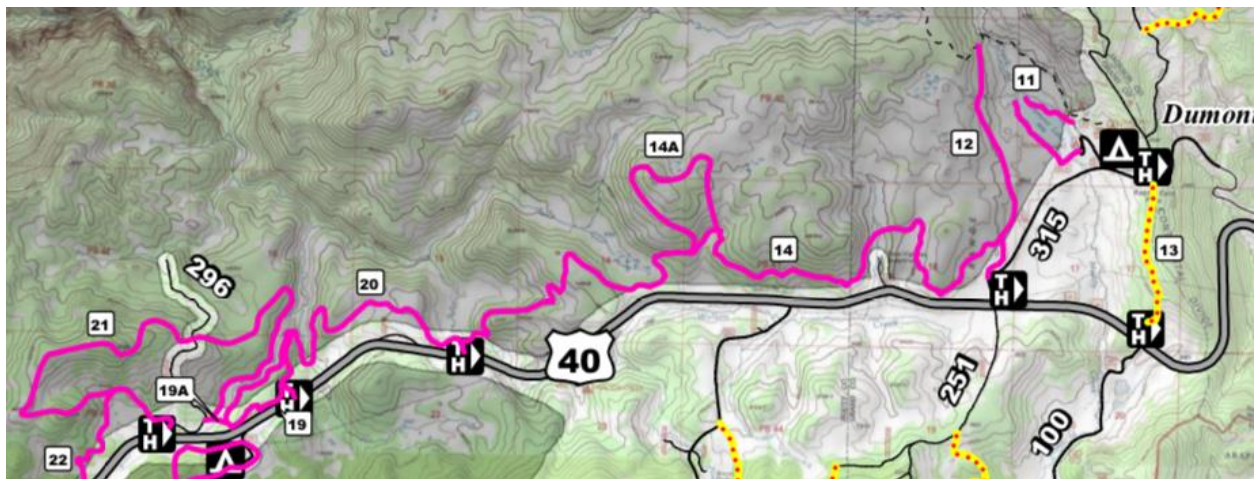


Image 1 shows the currently proposed routing of trails along the north side of US40, starting at the West Summit trailhead

Specific comments we have for the trails along the north side of US40 follows:

- Trail 21 includes routing that goes deep into the Long Park CRA. This is unnecessary for the epic trail experience. The excursions into the CRA should be significantly reduced, or eliminated altogether.
- Trail 19A is a connector trail outside the CRA, and we have no issues with this.
- Trail 19 is a commonly known as the area of Bruce's Trail. We have no issues with this trail as long as the trail is kept within the current envelope of Bruce's Trail.
- Trail 20 appears to fall within the recommended design constraints, and we have no further comments.
- Trail 14 replaced the previously proposed motorized trail. We can support this trail as long as excursions into the CRA are minimized. From the map, it is not clear that this is the case. We ask that the routing of this trail be placed as close to US40 and the edge of the CRA as possible.
- Trail 14A was newly added in this proposal. It intrudes deeply into the CRA and is unnecessary for the epic trail experience. Furthermore, it cannot be accessed just by itself from a nearby trailhead, eliminating its use as a self-contained short loop to be used by hikers or bikers. This trail should be eliminated.
- Trail 12 connects the US40 trail network to the CDT. It unnecessarily intrudes into the CRA to make the connection. The trail should be rerouted to parallel the Dumont Lake access road (315) and connect with the CDT at Dumont Lake or the Dumont Lake Campground.

CAMPGROUND TRAILS

There are new proposed trails in the Meadows Campground and in the vicinity of Dumont Lake. We have no objection to these trails. Our one comment is that there is a large wetland area to the northwest of Dumont Lake that needs to be protected. The new proposal shows the trail configuration not as a loop, but roughly paralleling Dumont Lake on two sides, with no connection through or around the wetland area. We support this concept, and ask that the length and position of these two trails be viewed critically so they do not encourage hikers and anglers to cross into the wetland area to get closer to the edge of the lake.

ALTERNATE CDT (COLORADO DIVIDE TRAIL)

The new pre-proposal shows additional multi-use trail segments (Trails 7 and 8) that “parallel” the current CDT, which is also a multi-use trail. Members of Keep Routt Wild have both hiked and biked the current trail. We have not witnessed significant user conflicts that would warrant the construction of a new trail. Unfortunately, the proposed configuration presents significant wildlife concerns and may unintentionally increase user conflict. If reducing user conflict is the goal, we will present an alternate configuration that resolves that issue, below.

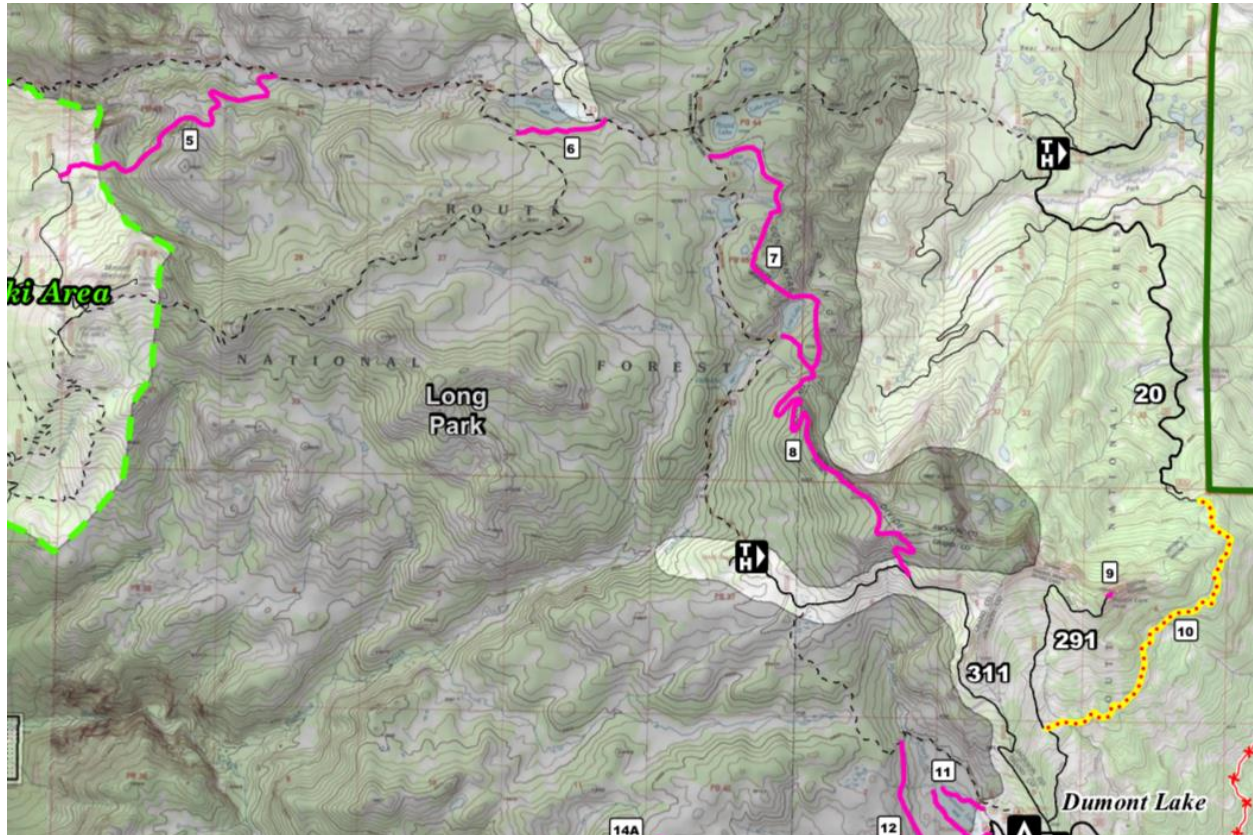


Image 2 shows proposed trails 5 through 8. Note that Trails 7 and 8 create islands that are totally surrounded by human disturbance. They also create the opportunity for recreationalists to use the loops as day excursions, increasing user conflict.

The wildlife concern comes from the two additional trails creating loops that may exclude the significant area within them as suitable habitat for wildlife. Those areas will have human disturbance on all sides. As stated by former CPW District Manager, Jim Haskins, in *Impacts of Off-Road Recreation On Public Lands Habitat* published by Colorado Backcountry Hunters and Anglers, “New mountain bike [trail] construction will likely result in permanent habitat fragmentation. Habitat fragmentation impedes the movement of wildlife across landscapes. Looped trails may create islands of habitat that may be avoided entirely by wildlife.” The link to the report is included in Attachment C. The following two images show the habitat islands formed by these loops, with the second showing the overlay with CPW-designated elk summer concentration.

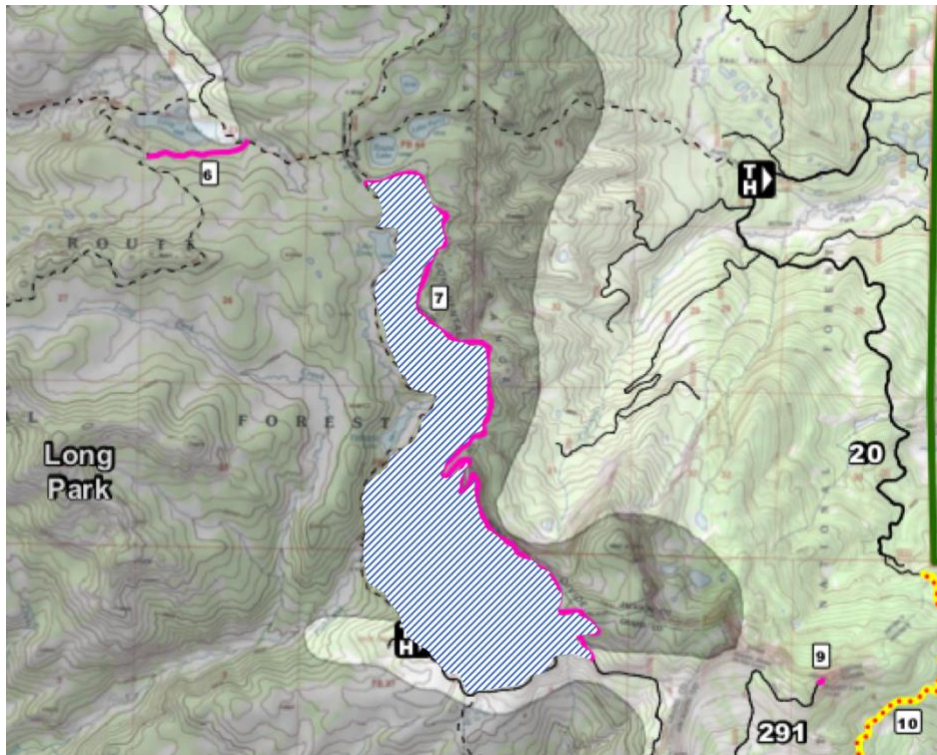


Image 3 shows the island of habitat loss that may be created by implementing two paths for the Continental Divide Trail. This will also lead to significant habitat fragmentation.

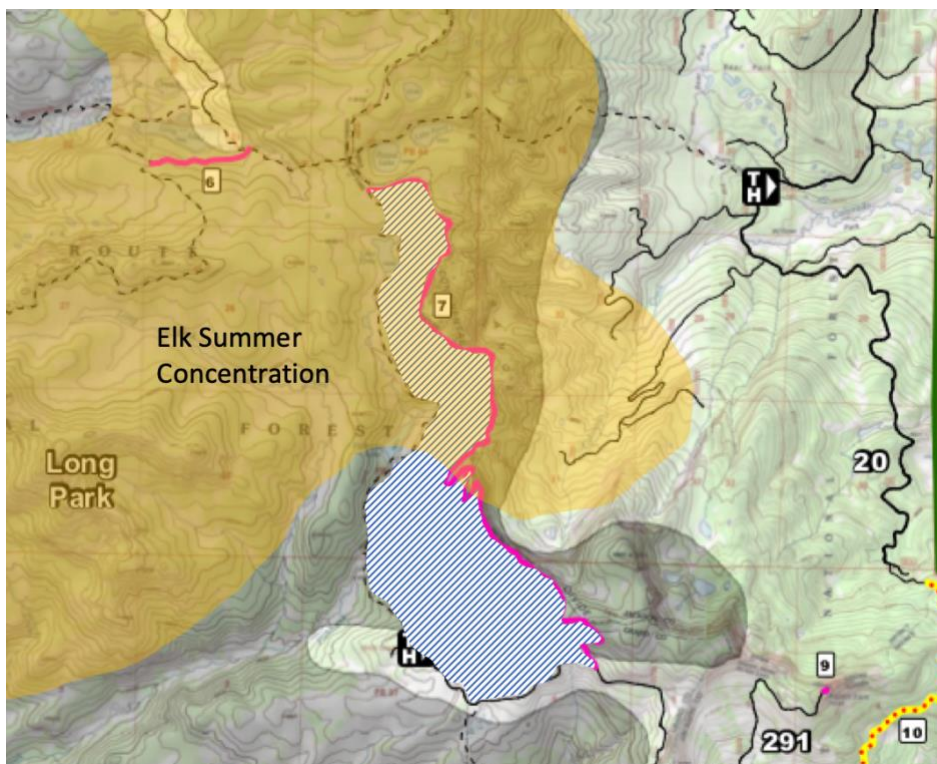


Image 4 overlays CPW-designated elk summer concentration on trails 7 and 8, showing the significant habitat fragmentation caused by the creation of habitat islands.

The concept of these additional trails is to reduce user conflict by offering two paths instead of one. However, this configuration offers a new opportunity for day recreationalists to make looped excursions from the Dumont Lake area, by taking one path in one direction, and another for returning. This increases, rather than decreases, user conflict.

We also note that Trails 7 and 8 nearly double the maintenance required for that area of the CDT, by nearly doubling the length of trails.

If reducing user conflict is the goal, all these issues can be better addressed by the creation of a single CDT with sufficient width to accommodate two-way traffic, with spurs to each lake along the way. This single path may be the current CDT, may be the proposed Trails 7 and 8, or may be some combination. However, it is not a redundant set of trails as proposed that creates loops and the associated habitat islands. To the extent that a new path for the CDT is pursued, the unused existing CDT trail would be re-brushed to its original natural state.

Doing so has many advantages:

- Maintenance is reduced, as there is just one path to be blocked by a fallen tree instead of two, and the total number of miles is reduced.

- Loops are eliminated, so wildlife needs to cross just one path of human disturbance and no islands of human disturbance are created.

- The elimination of loops also eliminates them being used by day recreationalists, and reduces the associated user conflict.

- Spurs to lakes along the path separates destination users from users traveling through, thus reducing user conflict.

A conceptual drawing of the alternative is shown below.

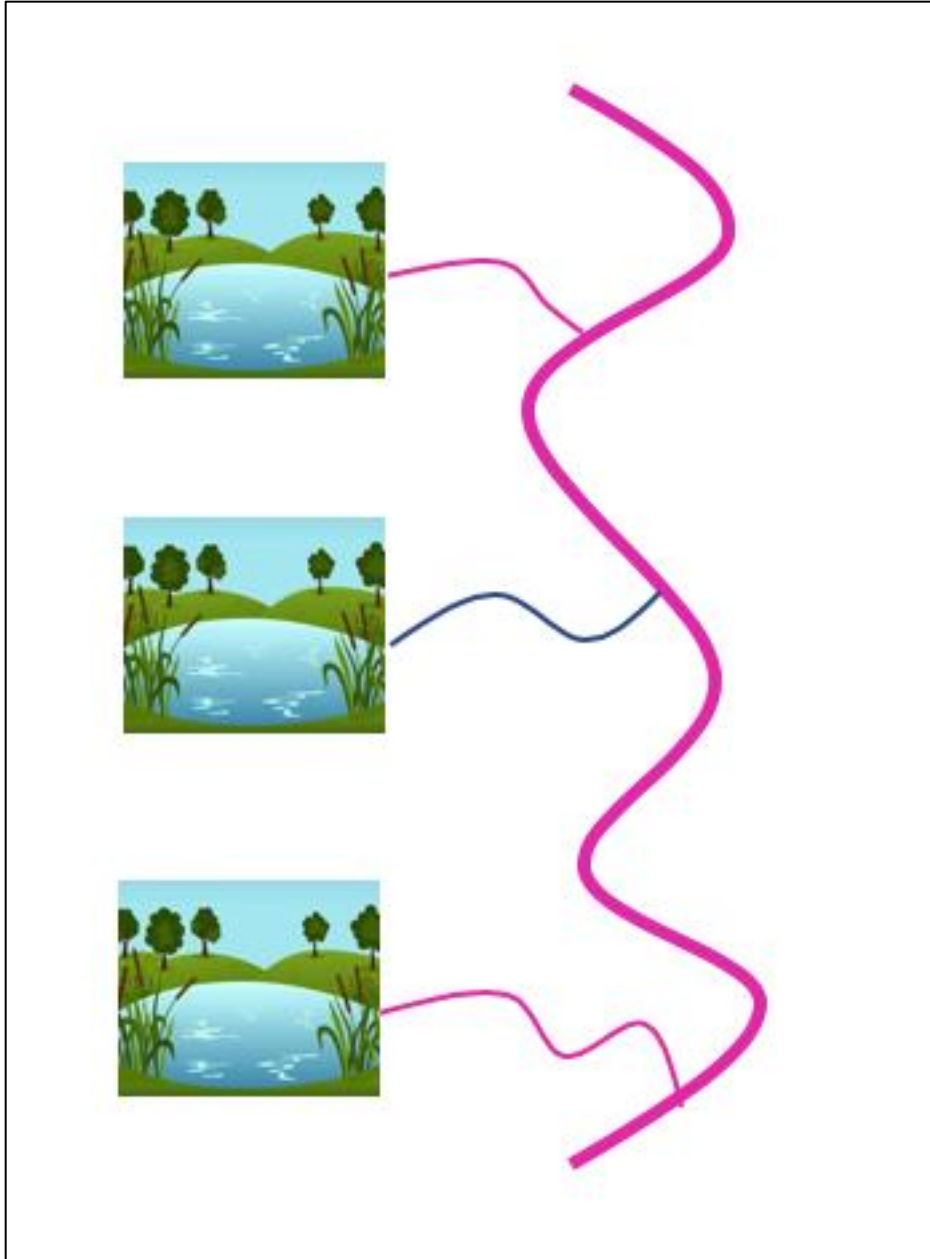


Image 5 is a conceptual diagram of an alternative to Trails 7 and 8 that shows a single Continental Divide Trail that better meets the needs of lower maintenance, lower wildlife impact, and reduced user conflict.

In summary, Keep Rout Wild opposes any redundant trails to the CDT that create loops. We would be open to a new single-path CDT as described above, once it has been shown that there is a serious user conflict with the existing route.

LONG LAKE BYPASS

Trail 6 is the Long Lake bypass. While we question the need for the bypass, the trail is sufficiently close to Long Lake that the habitat island formed is small, and we do not object to the trail.

FISH CREEK BYPASS

Trail 5 is the Fish Creek Bypass that connects the Fish Creek trail to the ski area. We believe that this trail is unnecessary, and presents a serious threat to summer wildlife.

The stated purpose of the trail is to reduce biker/hiker conflict on the lower Fish Creek Trail. This conflict is minimal, as biking the lower Fish Creek Trail is rare. It is possible to have numerous outings on the Fish Creek Trail without viewing a single biker. Many of us have never viewed a biker on lower Fish Creek Trail at all, through many years of hiking the trail. At the present time, lower Fish Creek Trail does not present a serious or even significant user conflict.

However, the addition of Trail 5 does pose serious issues by connecting to the ski area. It extends summer recreation through an area that is currently not impacted by human disturbance, thus disturbing and fragmenting habitat. The ski area operates under summer recreation restrictions, and this would dramatically increase the amount of summer recreationalists on the mountain. It creates a new trail that, due to its topography and location, may become a source of illegal trail construction.

Trail 5, the Fish Creek Bypass, should be eliminated.

TRAILS TO THE WEST OF RABBIT EARS WEST SUMMIT

The pre-proposed trails to the west of Rabbit Ears West Summit are shown below.

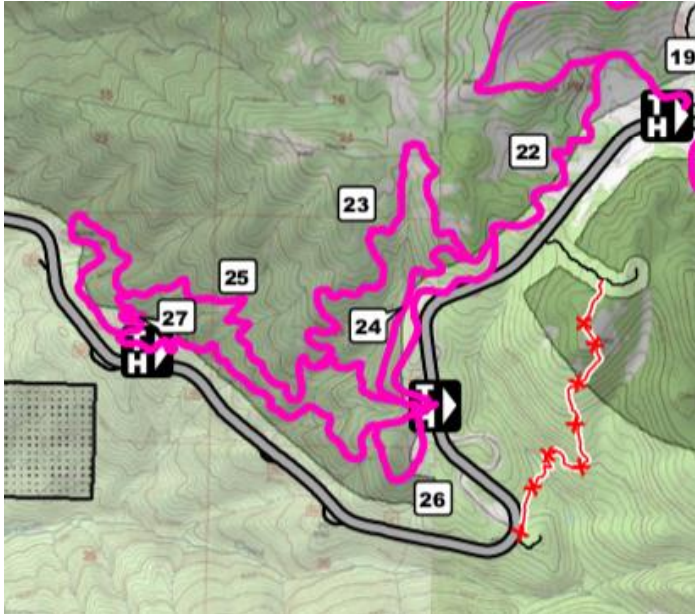


Image 6 shows trails west of Rabbit Ears West Summit, in an area commonly referred to as Ferndale.

We support the elimination of the illegal trail shown in the lower right of the figure.

However, we have serious issues with many of the other trails shown due to their extension deep into the Long Park CRA and impact on the biodiversity of the area. We note that there are serious parking constraints for these trails as well. A new trailhead and parking area would have to be constructed between the Ferndale and Rabbit Ears summit areas, and there is limited parking at the existing Ferndale trailhead.

Regarding the Ferndale area, aspen forests and the interface between aspen and evergreen are widely considered hotspots for biodiversity. A high level of plant diversity supports diverse and abundant insect, bird (especially neotropical migrant songbirds) and small mammal populations which in turn supports predator populations (both, mammalian and avian). They are also important spots for larger animals such as deer, elk, and their predators due to plant diversity. Much of the Ferndale area is designated by CPW as an elk calving area.

First, we'd like to dispel the notion that since US40 is nearby, additional human paths would not add to the disturbance. Research has shown that wildlife reacts more negatively to the human form and activities than to continuous automobile traffic. In Attachment C we have linked to the study performed in the Mud Springs Gulch area close to Vail that showed the addition to a cycling/pedestrian path alongside I-70 dramatically reduced mule deer migration in the area, and the mule deer migration resumed to its previous levels once a visual barrier had been placed on both sides of the pedestrian/cycling path. This is in spite of the mule deer being able to observe all four lanes of I-70 traffic even after the visual barrier was installed. This is

consistent to the very first radio-collared studies of elk (Ward et al., also linked in Attachment C) near Pole Mountain, just north of I-80 in Wyoming. They found that humans on foot or vehicles coming to a stop produced more reaction than continuously moving automobiles.

Elk Production Areas

Many of the proposed trails in the Ferndale area venture well into elk production (calving) areas, as shown by the image below. (Green represents CPW-designated elk production areas). This includes Trails 23, 25, and 27. One of those trails (#23) is a directional mountain bike trail for advanced riders that also unnecessarily extends into the CRA. Loop #25 also extends well into the CRA to the north and to the west. Trails 22, 24, and 26 appear to skirt the designated elk calving area, but due to the imprecise boundary fundamental in defining a calving area, may still present an impact.

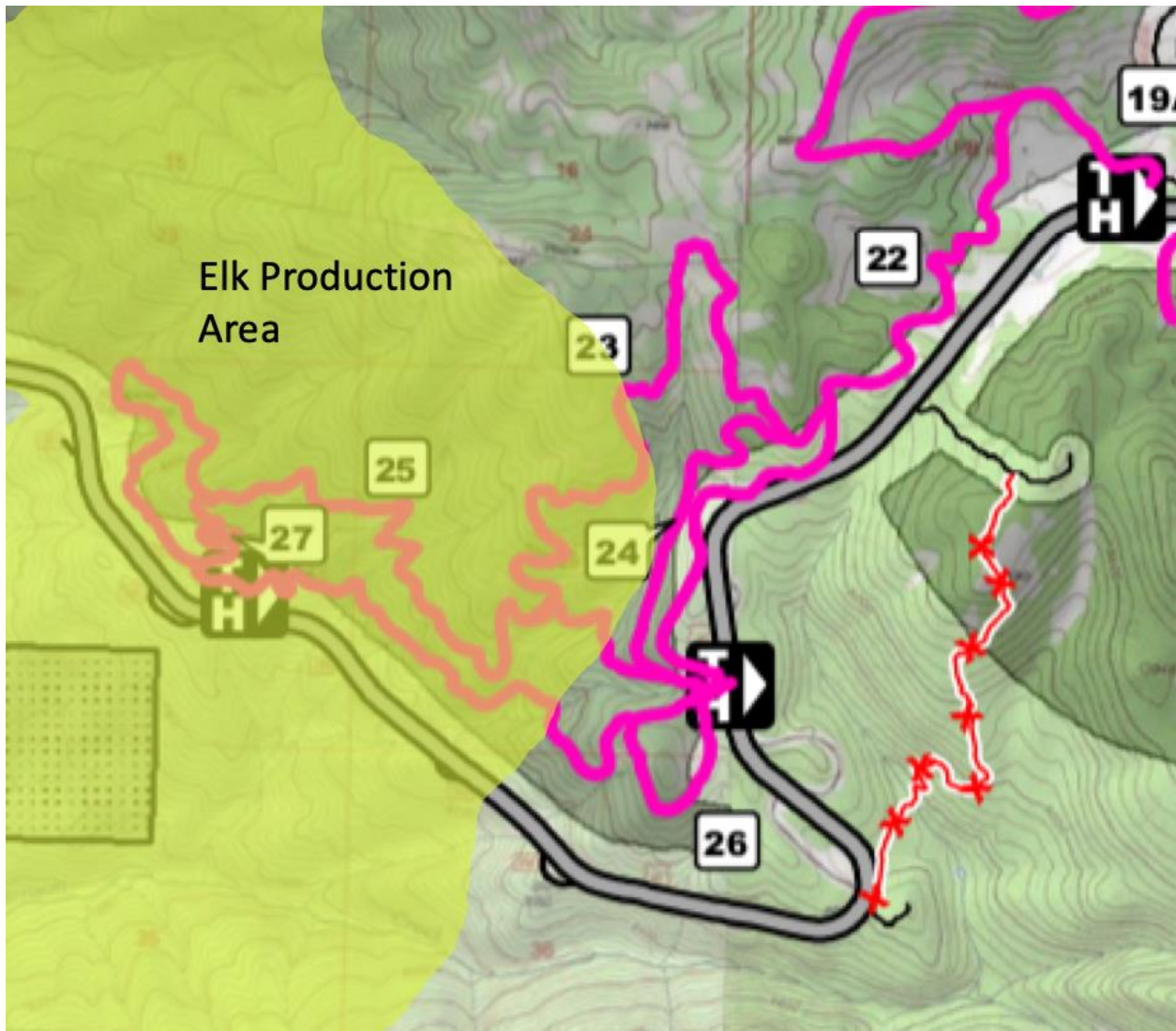


Image 7 shows CPW-designated elk production areas in the Ferndale region.

In Attachment B we outlined the scientific studies showing the large impact human disturbance in elk calving areas has on calf mortality. We also showed that a large portion of calves, perhaps a majority, are impacted by a 15 June opening date. The research suggests a 1 July opening date or later for all trails through elk production areas. However, our local track record of trail closure enforcement is not good. Enforcement is further complicated in this case by the layout of these trails as an interconnected mesh network, allowing multiple ways to access the closed area. With the current layout, it is simply not possible to enforce a trail closure from the trailheads. Even if the two trailheads west of Rabbit Ears West Summit are marked “Closed”, the closed trails are accessible from the West Summit Trail #22.

Trail Density

Trails 23, 24, 25, 26, and 27 exist in an area approximately 1.5 miles square, or about 2.25 square miles, and total 10.13 miles in length. That area also includes a portion of trail 22, bringing the total trail mileage in that small area to approximately 11 miles, resulting in a density of 4.9 miles of trails per square mile. This is a very high trail density to be considered within a CRA. The concentrated use in this area is problematic due to USFS zoning, retaining the undeveloped character of the CRA, and wildlife concerns. Furthermore, the existing parking at the Ferndale trailhead is limited, and many of the trails require the proposed new trailhead on US40 between the Ferndale trailhead and Rabbit Eras West Summit.

For all of the above reasons, we believe the trails west of the West Rabbit Ears Summit should be eliminated.

SEASONAL AND DAILY CLOSURES

In Attachment B we’ve outlined the research that shows that the opening date after an elk calving season closure should be no sooner than 1 July. Even then, this form of mitigation lowers, but does not eliminate, the impacts due to human disturbance. A study of 190 elk calves born in northwest Colorado (Byrne 1990) showed that 37 of them were born between 15 June and 4 July, leading to 19% of elk calves potentially impacted even with a closure date through 1 July. In addition to setting the actual date, there needs to be a credible enforcement plan with identified methods and resources for any new trails that intrude into productivity areas.

We also note that wildlife takes respite in darkness. Activities that include night hiking, running, biking, or ATV use intrude on this time that wildlife is normally undisturbed. The evening hours are particularly important, as this is the time of most human nighttime trail activities and also the time that wildlife may emerge to feed again. We suggest that the USFS look at placing restrictions on nighttime use. We note that hunting is restricted to 30 minutes before sunrise to 30 minutes after sunset. This may serve as a guideline for restrictions of all mechanized use. These restrictions should not be meant to impede lawful activities such as search and rescue missions or the mandated retrieval of harvested game.

PHASING

We believe a phased approach to the trail construction is a prudent policy. This allows land and resource managers to assess the success and challenges of trails in these new areas, along with their associated policies and impacts. Our recommended phasing follows:

Phase 1:

- The elimination of the unauthorized trails
- A singular connected trail along the US40 corridor from the West Rabbit Ears Summit to Dumont Lake as outlined in our comments above
- All OHV trails except for #10
- Trails in the vicinity of the Meadows CG and Dumont Lake

Phase 2:

- A re-designed single-path Continental Divide Trail as outlined in the comments above

Keep Routt Wild has documented that this trail should only go forward once it has been shown that there is a serious user conflict with the existing route. We also ask that the CPW-sponsored studies on the impact of recreation on elk be completed before Phase 2 or Phase 3 begins.

Phase 3:

Keep Routt Wild has raised serious concerns about Trails #5, #10, and trails west of the Rabbit Ears Summit known as the Ferndale area. We've asked that the USFS not proceed with these. However, if the USFS does proceed with any of these trails, it is important that they do so using a pre-approved, mandatory protocol that requires:

- A. Use of science-based quantitative criteria for measuring physical habitat, soils, visual quality, wildlife, and/or other resource values;
- B. Baseline monitoring of criteria for those parameters;
- C. Post-trails monitoring under Phase 1 and Phase 2 for measurable changes to those criteria; and
- D. Satisfaction of identified performance indicators supporting non-significance findings from Phase 1 and Phase 2 as a prerequisite to "on-ramps" for additional trails development.

We believe Colorado Parks and Wildlife expertise should be utilized by the Forest Service in determining how best to define the resource performance criteria, both in terms of establishing a monitoring baseline and the subsequent performance evaluation, to ensure that such criteria are satisfied.

CONCLUSION

In this Attachment, Keep Routt Wild has outlined a trail network that increases recreational opportunities while protecting habitat and wildlife. It also keeps the integrity of the CRA roadless characteristics. We believe that Mad Rabbit trails may meet the requirements for a Finding of No Significant Impact if the trails configuration is refined in the manner outlined in this attachment, and by following the associated phasing.

ATTACHMENT B - Trail Closures and Enforcement

There are a number of proposed trails within CPW-designated Elk Production Areas in the preliminary proposed action for the Mad Rabbit Trails Project. This addendum uses wildlife research studies to conclude:

- Human disturbance has a very large impact on elk calf mortality during calving periods
- The largest proximate cause of elk calf mortality, when disturbed, is predation
- There are two sensitive times for disturbance- up to the time of birth, and post-birth when elk calves use a “hiding” strategy as a tactic against predation
- The distribution of birth dates is determined by the date an elk cow is bred, combined with the distribution of gestation time. Most cows are bred during the first estrus, but a significant minority are bred during the second estrous period.
- If bred during the first estrus, the birth date distribution is roughly 1 June +/- 14 days.
- If bred during the second estrus, the birth date distribution is delayed 19-25 days, resulting in 20 June +/- 14 days
- Elk calves employ the hiding strategy for approximately 14 days before joining nursery herds.
- The critical disturbance window is the sum of the hiding period plus the birth date.
- In order to effectively protect elk calves, trail and area closures in elk production areas must be extended to or past 1 July.

This addendum will also look at alternatives to trail closures, the need for enforcement, and techniques for higher compliance to trail closures.

The impact of human disturbance during elk calving seasons

Elk production areas are problematic due to the high impact human disturbance has on elk calf mortality as demonstrated by CSU researchers Gregory Phillips and William Alldredge in a paper in the Journal of Wildlife Management in 2000. This study, performed in Eagle County, showed that calf/cow ratios declined by approximately 40% (from 64.6 calves per 100 cows to 39.8 calves per 100 cows) as a result of human disturbance during the calving season. Reproduction levels during the treatment period were determined insufficient to maintain a stable elk population. The second half of the study involved removing the human disturbance component. With the human disturbance removed the calf/cow ratios rebounded to their pre-treatment levels.

Reproductive Success of Elk Following Disturbance by Humans During Calving Season

(Phillips and Alldredge 2000)

<https://www.emwh.org/pdf/elk/Reproductive%20success%20of%20elk%20following%20disturbance%20by%20humans%20during%20calving%20season%202000.pdf>

Elk Reproduction Response to Removal of Calving Season Disturbance by Humans

(Shivaley et al 2005)

https://www.jstor.org/stable/pdf/3803346.pdf?seq=1#page_scan_tab_contents

Predation as the primary proximate cause of elk calf mortality

With just over 8 disturbances per cow elk resulting in nearly 40% fewer surviving calves, each disturbance averaged nearly 5% probability of the death of a calf. The researchers added, “We speculate that predation may have been the primary proximate factor in reducing calf/cow proportions on Beaver Creek during treatment years.” This is consistent with previous research that showed that disturbed calves move greater distances than undisturbed calves (Kuck et al. 1985). It is also consistent with studies reporting predation as the primary proximate factor of mortality of radiocollared neonatal elk calves (Bear 1989, Schlegel 1976, Singer et al. 1997).

Elk calf hiding strategy

To combat predation, elk calves exhibit a survival trait called the “hiding” or “hider” strategy after birth. They are scentless and remain stationary while the mother forages for food. This is their primary defense against predation. According to the US Forest Service FEIS summary of elk (*cervus elaphus*), “Pregnant cows leave the herd in spring several days prior to parturition. After giving birth, the cow and calf remain in proximity of, but secluded from, the main herd for several days to several weeks (the “hiding period”). “

The Journal of Wildlife Management published a research article titled Annual Elk Calf Survival in a Multiple Carnivore System (Eacker et al. 2016) that further delineated the key periods of a calf’s life. “For summer analysis, we divided the time period into 3 intervals that coincided with different calf development phases: early hiding phase (0-14 days) when calves are most vulnerable, when they join nursery herds (15-18 days) and are less vulnerable to mortality, and when they continue to grow larger (>28 days; White et al. 2010)”

US Forest Service FEIS summary of *cervus elaphus*

<https://www.fs.fed.us/database/feis/animals/mammal/ceel/all.html>

Annual Elk Calf Survival in a Multiple Carnivore System

(Eacker et al. 2016)

<http://bit.ly/2Gx3wOw>

The critical disturbance window is the sum of the birth date plus the hiding period.

The term “calving season” is used in two different ways when discussing elk and human disturbance. It is often used as the actual period when most calves are born. It is also used as the time period that elk cows and calves are most prone to human disturbance, and must be protected. It is important not to confuse the two uses, as these periods are different. We will refer to these as the “birthing” period and the “disturbance” period. When looking at trail

closures as a mitigation technique, it is the latter that is important, and extends the former by the length of the hiding period, approximately two weeks.

The distribution of elk calf birth dates

Phillips and Alldredge in their 2000 study stated, "Based on estimated parturition and conception dates for elk in Colorado (Bear 1989, Freddy 1989, Byrne 1990), and a median gestation period of 255 days (Bubenik 1982:171), we expected that 80-90% of the calves would be born from 26 May to 19 June. These dates bounded our treatment period in 1996, but to increase treatment efficacy, we expanded the treatment period by 7 days in 1997 to 19 May through 19 June." This centers the birthing period at 5 June with a window of 14 days on either side. This is similar to the CPW definition of an Elk Production Area as the range occupied by cow elk between May 15 and June 15. Presumably the 10-20% of the calves born outside of the primary birthing window are either tails on the distribution or cows that were bred during their second estrus. The US Forest Service states, "The interval between estrous periods ranges from 19 to 25 days." This creates a smaller distribution of birth dates centered 19-25 days after the center of birth dates created from the first estrous period, approximately late June.

We have attached an appendix of figures and tables from Byrne 1990 that show the distribution of birth dates of NW Colorado elk over three consecutive years. We also analyzed, using that date, the percentage of elk calves that *would not be adequately protected* for each of those years using a 15 June trail opening date and either a 10-day or 14-day hiding period:

1988: $\geq 23\%$

1989: $\geq 74\%$

1990: $\geq 64\%$

Spring Calving Season Closure Summary

Altogether, the above research bounds the first estrus birthing window for elk from approximately 15 May to 15-19 June. The addition of the two-week hiding strategy window brings the disturbance window to 29 June – 3 July. Any consideration of cows bred in their second estrus brings the dates even further out into July. In summary, the bulk of the scientific research would point to a disturbance period that extends to or beyond 1 July. **When looking at trail closures to mitigate impacts due to human disturbance the opening date should be set no sooner than 1 July.**

The above analysis relies on studies to determine the birth date distribution. We observe that part of the ongoing CPW research studies in the area employ radiocollared cow elk with VITs (Vaginal Implant Transmitters) that indicate the date and location of a calf's birth. Once the number of births tracked by the study are large enough to provide a statistically accurate estimate of the date of peak parturition and the distribution, these data may be used to fine tune the locally-relevant birth date distribution. The hiding period would be added to the distribution to determine closure dates.



Image 8 Elk calf born to Elk R190 on 13 June, 2019. Image courtesy of Colorado Parks and Wildlife – Steamboat Springs.

An example of this is the recent calf born to Elk R190, tagged near Maybell, and giving birth near the Continental Divide on 13 June, 2019. It is pictured to the left. The newborn is largely sedentary for two weeks after birth, allowing researchers to approach and collar it. The mother will forage for food, often for hours, before returning to nurse the calf. The mother is at peak calorie expenditure during lactation. Disturbing the mother causes it to expend, rather than consume, needed calories. Disturbing the calf causes it to move locations, making it more susceptible to predators.

The hiding period for this elk calf is approximately through 27 June.

Alternatives to Closures

The above closure dates can be avoided by not building trails in Elk Production Areas. The Colorado State Parks Trails and Wildlife Task Force described a number of best practices when designing trails near wildlife calving areas. Indeed, Routt County Riders has published Rules of Thumb for Protecting Wildlife During Trail Development, derived from the task force's recommended practices. These Rules of Thumb may be found at <https://routtcountryriders.org/2019/03/01/rules-of-thumb-for-protecting-wildlife-during-trail-development/>

Three of the points published by Routt County Riders are very pertinent:

- Either avoid wildlife breeding areas or close trails through them at the times such wildlife are most sensitive to human disturbance.
- If there won't be sufficient resources to enforce a trail closure during wildlife-sensitive seasons, consider rerouting the trail through another area.
- Don't depend on management to resolve wildlife conflicts that can be avoided by careful alignment in the first place.

The trails in the lower area of Ferndale (#23, 25, 27) are in a CPW-designated Elk Production Area, and should be viewed through this prism. Locally, we have a poor track record of trail closure enforcement. Points 2 and 3 would indicate that we should not be constructing trails in that area unless there is a new and credible enforcement mechanism. However, this is made

more difficult due to the interconnected mesh trail network being proposed in that area. This leads to multiple points of entry away from trailheads. As it stands, it is not practical to enforce trail closures in this area. **These trails should either be redesigned so they are accessible from a single trailhead, re-routed to be outside of an Elk Production Area, or eliminated.**

Enforcement

Winter and spring wildlife closures only help if the closures are rigorously enforced. Due to the wide areas needing to be addressed, enforcement is logistically difficult. The significant number of tracks observed near trailheads during winter and spring closures are evidence that the closures are routinely violated. We believe that no new trails should be constructed that require closures, unless there is a credible new enforcement mechanism with funding and other resources dedicated to their enforcement.

Techniques for higher compliance to trail and area closures

The best enforcement mechanism would be to have dedicated enforcement officers monitoring trail use during winter and spring closures. Additionally, the construction and signage at a trailhead could be used to help enforcement by informing and deterring potential violators. Below is a photo of a trailhead on USFS land in Eagle County showing a gate, a clear sign, and a volunteer trail ambassador at the trailhead. **We recommend that all access points be gated, signed, with staffing to turn away potential violators.**



Image 9 shows a trailhead at a US Forest location in Eagle County.

Trail closures are not the only enforcement issue. Keeping motorized vehicles out of trails dedicated to non-motorized use is another. E-bikes (electronic bikes that include an electric motor) have the potential to create a wider disturbance area than that of either a hiker or mountain biker. This is due to e-bikes having a disturbance window width from the trail at least that of mountain bikes, but with the potential of higher speeds and distance from each use. Multiplied together, this creates a larger disturbance area than a non-motorized vehicle. E-bikes are widely available for sale or rent in Steamboat Springs. Their growing popularity leads to the need of specific enforcement and signage. Below is a sign from Mt. Hood National Forest announcing the prohibition of e-bikes. **We recommend that similar signs be posted at each trailhead at non-motorized trails.**



Image 10 shows a sign at Mt. Hood National Forest indicating the prohibition of e-bikes

Appendix to Attachment B

The following Figures and Table comes from Byrne 1990 study of parturition dates of elk in NW Colorado over three years, 1988 to 1990.

Table 3. Parturition dates from elk in NW Colorado - 1988
1990.

Date	1988		1989		1990		Total	
	No.	%	No.	%	No.	%	No.	%
May 1-5								
May 6-9								
May 11-15	1	3%			1	1%	2	1%
May 16-20	2	6%			1	1%	3	2%
May 21-25	3	8%			3	3%	6	3%
May 26-30	9	25%	6	18%	4	3%	19	10%
May 31 - Jun 4	13	36%	3	9%	21	18%	37	19%
Jun 5-9	5	14%	12	35%	25	21%	42	22%
Jun 10-14			7	21%	29	24%	36	19%
Jun 15-19	1	3%	1	3%	16	13%	18	9%
Jun 20-24	2	6%			5	4%	7	4%
Jun 25-29			1	3%	6	5%	7	4%
Jun 30 - Jul 4			2	6%	3	3%	5	3%
Jul 5-9					2	2%	2	1%
Jul 10-14			1	3%			1	1%
Jul 15-19			1	3%			1	1%
Jul 20-24								
Jul 25-29								
Jul 30 - Aug 3								
Aug 4-8								
Aug 9-13								
Aug 14-18								
Aug 19-23								
Aug 24-28					2	2%	2	1%
Aug 29-Sep 2					2	2%	2	1%
Sep 3-7								
Sep 8-12								
	36	100%	34	100%	120	100%	190	100%

The above table is represented graphically below. It should be noted that different years can have a different distribution. The median date of parturition for the three years are:

1988: May 31-June 4

1989: June 5-9

1990: June 10-14

Percentage of elk calves not adequately protected assuming a 14-day hiding period and a June 15 trail opening date:

1988: $\geq 23\%$

1989: $\geq 74\%$

1990: $\geq 64\%$

Note that even if the hiding period is reduced from 14 days to 10 days, the above percentages remain the same since they do not include any calves born between 31 May and 4 June.

Also note that of the 190 elk calf birthdates recorded, 37 of them were born between 15 June and 4 July. This leads to 19% of elk calves potentially impacted even when the area closure is extended to 1 July. This fact shows that mitigation through area closures does not eliminate the impact of human disturbance, and that the preferred solution is to avoid the area altogether.

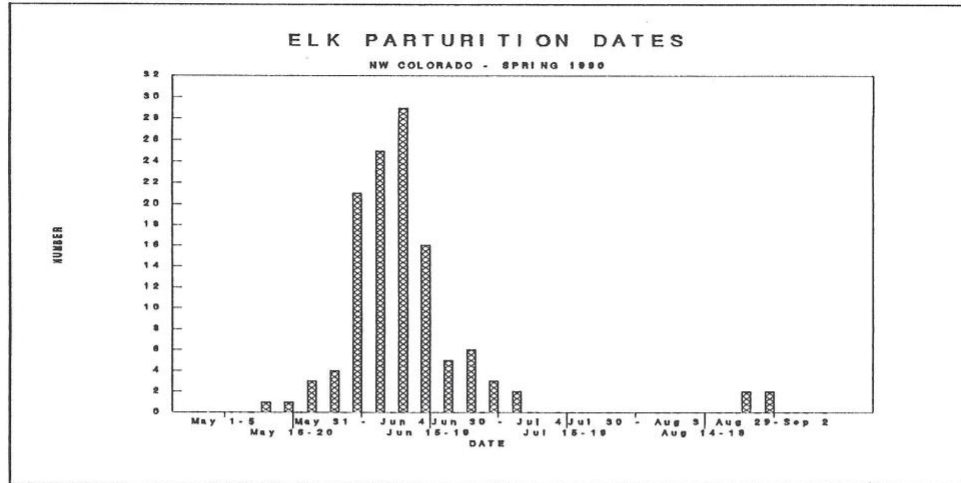


Figure 4. Estimated elk parturition dates for elk harvested in NW Colorado during the winter of 1989-90.

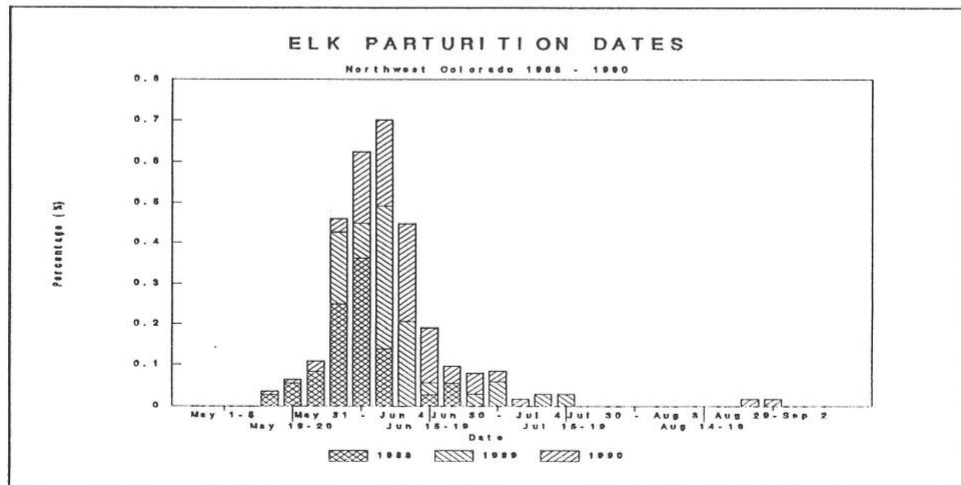


Figure 5. Estimated elk parturition dates for elk harvested in NW Colorado during the previous 3 winters - 1987-88, 1988-89 & 1989-90.

ATTACHMENT C – Relevant Studies and Articles

References to relevant studies and literature addressing impacts associated with the development and use of trails.

ELK PRODUCTION AREAS AND IMPACTS DUE TO HUMAN DISTURBANCE

Reproductive Success of Elk Following Disturbance by Humans During Calving Season

(Phillips and Alldredge 2000)

<https://www.emwh.org/pdf/elk/Reproductive%20success%20of%20elk%20following%20disturbance%20by%20humans%20during%20calving%20season%202000.pdf>

Elk Reproduction Response to Removal of Calving Season Disturbance by Humans

Shivaley et al. 2005

https://www.jstor.org/stable/pdf/3803346.pdf?seq=1#page_scan_tab_contents

US Forest Service FEIS summary of cervus elaphus (elk)

<https://www.fs.fed.us/database/feis/animals/mammal/ceel/all.html>

Annual Elk Calf Survival in a Multiple Carnivore System

Eacker et al. 2016

<http://bit.ly/2Gx3wOw>

Estimated Parturition and Conceptions Dates of Elk

-Bear 1989

-Freddy 1989

-Byrne 1990

Gestation Periods of Elk

-Bubenik 1982:171

Rules of Thumb for Protecting Wildlife During Trail Development

Routt County Riders

<https://routtcountyridders.org/2019/03/01/rules-of-thumb-for-protecting-wildlife-during-trail-development/>

Planning Trails With Wildlife in Mind – A Handbook For Trail Planners

Trails and Wildlife Task Force, Colorado State Parks, September 1998

<https://cpw.state.co.us/Documents/Trails/TrailsPlanningPrimer.pdf>

WILDLIFE IMPACT DUE TO RECREATIONAL USERS

These studies look at the “zone of influence” (ZOI) of differing recreational activities on wildlife. The ZOI may extend for some distance beyond the actual activity and will vary depending on habitat composition, topography, and a species’ tolerance of human disturbance. The immediate disturbance causes an animal to expend calories instead of consuming calories, either by fleeing or an elevated heartrate. The impacted area leads to habitat loss and fragmentation.

Effects of Off-road Recreation on Mule Deer and Elk

Wisdom et al. 2004

https://www.fs.fed.us/pnw/pubs/journals/pnw_2004_wisdom001.pdf?fbclid=IwAR323w8YN5MH1LTG35QL_eqPEXqBgy06Q3XbKlvehV_Tn8SB7T0j5DQJm8w

Elk responses to trail-based recreation on public forests

Wisdom et al. 2018

https://www.fs.fed.us/pnw/pubs/journals/pnw_2018_wisdom001.pdf

Behavioral Responses of North American Elk to Recreational Activity

Naylor et al. 2008

<https://pubag.nal.usda.gov/pubag/downloadPDF.xhtml?id=28480&content=PDF>

Naturalist Says Outdoor Recreation Can Have Huge Impacts on Wildlife

Todd Wilkinson, Mountain Journal March 2019

<https://mountainjournal.org/mountain-biking-and-hiking-with-dogs-impacts-wildlife>

Effects of recreation on Rocky Mountain wildlife: A Review for Montana

Montana Chapter of The Wildlife Society. Joslin and Youmans, coordinators, 1999

https://www.researchgate.net/publication/242715856_G_Joslin_and_H_Youmans_coordinator_s_1999_Effects_of_recreation_on_Rocky_Mountain_wildlife_A_Review_for_Montana_Committee_on_Effects_of_Recreation_on_Wildlife_Montana_Chapter_of_Wildlife_Society_307_pp

Other:

-Goldstein et al. 2010

-Keller and Bender 2007

-Taylor and Knight 2003

-Papouchis 2001

-Joslin and Youmans 1999

Comparison of Human Disturbance Due to Highways vs. Trails

There is a common bias for humans to project their own tolerance for disturbance to be the same as for wildlife. Most common of these is to perceive a highway as causing more disturbance to wildlife than a pedestrian or bike trail. However, studies have shown that deer and elk perceive disturbances differently. Elk and deer are more likely to tolerate a continuous disturbance from a highway than they are from human activity. Cars act as a mobile blind, hiding the human form, scent, behavior, and pets. A key study below is the construction of a bike/pedestrian path alongside I-70 west of Vail. The location included an underpass previously constructed for migrating mule deer under I-70. The pedestrian path paralleled I-70, and went over the migration tunnel as did the four lanes of the interstate highway. However, mule deer were reluctant to use the tunnel if cyclists were present on the path. The solution to bring the migration back to the previous levels was to build an opaque screen to shield the path users from the vision of the mule deer. Note that only the path was shielded- the mule deer still saw all four lanes of I-70 traffic.

Mud Springs Gulch Deer Underpass Study, Conducted for Town of Vail

Allredge and Phillips 2000

https://www.eaglecounty.us/uploadedFiles/ECG_Website/ECO_Trails/Mud%20Springs%20Gulch%20Deer%20Study_red.pdf

Mitigating Disturbance of migrating mule deer caused by cyclists and pedestrians at a highway underpass near Vail, Colorado

Phillips et al. 2001

<https://escholarship.org/uc/item/2p6340b0>

This is not unique to mule deer. In one of the very first telemetered elk experiments, researchers Ward and Cupal placed heart rate monitors on elk who grazed near Pole Mountain, just north of I-80 in Wyoming. They found that close-range gunshots, vehicles coming to a stop, and humans on foot produced more reaction than moving automobiles, motorbikes, and low flying aircraft.

Telemetered Heart Rate of Three Elk as Affected by Activity and Human Disturbance

Ward and Cupal 1979

<http://ctva-ohv.com/docs/Issues/Articles/Measured%20Elk%20Heart%20Rate%20for%20Motorized%20vs%20NonMotorized.pdf>

Impact of Recreation on Wildlife across Colorado and the West

Are Trails in Colorado Harming Wildlife?

Kelly Bastone, 5280 Magazine

<https://www.5280.com/2019/07/are-trails-in-colorado-harming-wildlife/>

Impact of Off-Road Recreation on Public Lands Habitat

Colorado Backcountry Hunters and Anglers 2019

https://www.backcountryhunters.org/colorado_bha_report_impacts_of_off_road_recreation_on_public_lands_habitat

Can Greater Yellowstone's Wildlife Survive Industrial Strength Recreation?

Todd Wilkinson, Mountain Journal March 2019

<https://mountainjournal.org/can-wildlife-survive-industrial-strength-recreation>

Eagle County officials concerned by wildlife population declines

Vail Daily 2018

<https://www.vaildaily.com/news/eagle-county-officials-concerned-by-wildlife-population-declines/>

Where has all the wildlife gone: CPW officials cite 50 percent drop in Eagle Valley's elk population

Vail Daily 2018

<https://www.vaildaily.com/news/where-has-all-the-wildlife-gone-cpw-officials-cite-50-percent-drop-in-eagle-valleys-elk-population/>

Avon photographer explores why the wildlife seem to be vanishing in Eagle County

9News 2019

<https://www.9news.com/article/life/style/colorado-guide/avon-photographer-explores-why-the-wildlife-seem-to-be-vanishing-in-eagle-county/73-0afe78c7-39c9-4c29-a9dd-2fd7677862e3>

Matt Holloran: Collaboration, thoughtfulness needed for sustainability

Matt Holloran, PhD 2019

<https://www.steamboatpilot.com/opinion/matt-holloran-collaboration-thoughtfulness-needed-for-sustainability/>

Human Perceptions of Their Impact on Wildlife

Many recreational users state that they have a low impact on wildlife. A study by Taylor and Knight compared visitor perceptions to the actual disturbance data.

“We surveyed 640 backcountry trail users on Antelope Island to investigate their perceptions of the effects of recreation on wildlife. Approximately 50% of recreationists felt that recreation was not having a negative effect on wildlife. In general, survey respondents perceived that it was acceptable to approach wildlife more closely than our empirical data indicated wildlife would allow. Recreationists also tended to blame other user groups for stress to wildlife rather than holding themselves responsible.”

“The results of both the biological and human-dimensions aspects of our research have implications for the management of public lands where the continued coexistence of wildlife and recreation is a primary goal. Understanding wildlife responses to recreation and the “area of influence” of human activities may help managers judge whether wildlife populations are experiencing stress due to interactions with humans, and may aid in tailoring recreation plans to minimize long-term effects to wildlife from disturbance. Knowledge of recreationists’ perceptions and beliefs regarding their effects on wildlife may also assist public lands managers in encouraging positive visitor behaviors around wildlife.”

Wildlife Responses to Recreation and Associated Visitor Perceptions

Taylor and Knight 2003

http://staff.washington.edu/kwolf/Archive/Classes/ESRM304_SocSci/304%20Soc%20Sci%20Lab%20Articles/Taylor_2003.pdf