October 21st, 2022

BLM Moab Field Office
Attn: Labyrinth/Gemini Bridges
Travel Management
82 East Dogwood
Moab, UT 84532

Re: Labyrinth Rims/Gemini Bridges Travel Management Plan
EA #DOI-BLM-UT-Y010-2020-0097-EA

Exhibit "10" - Wildlife Report

1. Labyrinth Rims TMP Wildlife Report 10-21-2022.

2. Labyrinth Rims CMPs Wildlife Report 6-21-2022.

3. Author's curriculum vitae.

Wildlife comments on the:

Labyrinth/Gemini Bridges Travel Management Plan, Draft Environmental Assessment (September 2022): A review of wildlife-related scientific issues.DOI-BLM-UT-Y010-2020-0097-EA

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October 21, 2022

1) Desert bighorn sheep are not the fragile creatures, or as susceptible to human disturbance, as they have been portrayed in the EA. Instead, these animals live in extreme environments, are well adapted to avoid predation by mountain lions, coyotes, bobcats, and golden eagles. And where human activities are predictable and non-threatening, bighorn sheep habituate to human activity. They are already habituated to human activity in areas where they are not hunted, such as the more remote areas of Canyonlands National Park, and elsewhere, such as major golf resorts, popular hotels, and the most widely used traffic arteries in the Coachella Valley of Southern California. However, ongoing disease issues, (including respiratory pneumonia passed from domestic sheep) and predation have adversely affected many desert bighorn sheep populations, including those in the TMA. We emphasize this and the points below because bighorn sheep figure prominently in the EA's analyses (for example, page 123, Appendix E, *"The TMA supports big game and other general wildlife species. Routes occurring within wildlife habitat may impact wildlife behavior, habitat loss, and physical wellbeing. Species of concern in the TMA include desert bighorn sheep and pronghorn and analysis in EA will focus on those species."*).

In the field of desert bighorn sheep research, there is an absence of clearly defined, scientifically defensible, causal link between human recreational disturbance and reduced bighorn survival or habitat abandonment ultimately resulting in population decline. The main sources of decline in bighorn sheep populations are predation, rainfall, and disease, all of which are independent of the number of and proximity to vehicles, cyclists, and hikers. In fact, the only experimental research that actually tested, instead of speculating on, a population response noted that the population increased as the number of hikers increased (Wehausen 1980). The hypothesis that human disturbance has had demographic effects on bighorn sheep populations lacks factual support. The same can be said of research in Joshua Tree National Monument, where bighorn sheep made adjustments in their use patterns in response to increased human activity. Avoiding heavily visited areas on weekends they readjusted their use patterns to periods after the people had left. Despite speculation, no demographic effect of human disturbance was reported. The EA has similarly based its analysis of alternatives on such speculation, which also extends to presumed impacts on other species as well.

Desert bighorn sheep hunting is permitted by state governments in Arizona, California, New Mexico, Nevada, and Utah. State wildlife agencies, including Utah DWR, permit ewes, (including ewes with lambs), to be chased down by helicopter and net-gunned at close range, subdued and hobbled, fitted with radio collars, and/or slung below helicopters or loaded into horse trailers prior to their being taken to a new area for release. This is considered to be an acceptable risk, while somehow, predictable trail use by motorcycles and OHV's on the fringes of bighorn habitat is considered to be an unacceptable risk and a natural resource loss by the BLM in its EA.

The fact is that the published literature on the subject of human disturbance and bighorn sheep is almost entirely based on opinion without supporting experimental evidence or rigorous hypothesis testing. The majority of papers frequently cited to support claims of human disturbance have relied on unsubstantiated opinion or interpretation of limited or anecdotal observations. None have demonstrated decreased fitness of individuals or populations as a result of human disturbance. Similarly, none have documented any permanent abandonment of range due to transient human disturbance, and any apparent displacement or behavior was temporary (Blong and Pollard 1968; Dunaway 1971; Deforge 1972, 1980; Jorgenson 1974; MacArthur et al. 1979, 1986; Graham 1980; Leslie and Douglas 1980; Wilson et al. 1980; Campbell and Remington 1981; Wehausen 1980; Purdy and Shaw 1981; Cunningham 1982; Deforge 1982; DeForge et al. 1982; Holl and Bleich 1983; Wehausen 1983; Cunningham and Omart 1986; DeForge et al. 1997; Etchberger et al. 1989; Boyce at al. 1992; Harris 1992; McCarthy and Bailey 1994; Rubin et al. 1998, 2000; Etchberger and Krausman 1999; Wagner 1999; Sproat 2012a,b and Sproat et al. 2019; Lowrey and Longshore 2017). Studies that have measured activity, movement, or flight response to humans were only able to suggest a limited and transitory behavioral response over short distances. Again, none have documented any permanent abandonment of range due to transient human disturbance, and any apparent displacement was temporary and of no demographic consequence (Hicks and Elder 1979; Hamilton et al. 1982; King and Workman 1986; Papouchis et al. 1999, 2001; Rubin et al. 2002; Keller and Bender 2007). This includes bighorn sheep in nearby Canyonlands National Park.

One recent paper on Rocky Mountain bighorn sheep *(Ovis canadensis canadensis)* included bold but unsubstantiated claims that a translocated bighorn sheep ewe group's decline and abandonment of an area was the direct result of human disturbance by hikers and a trail (Wiedmann and Bleich 2014). However, a closer examination of that paper revealed that the authors ignored other, far more obvious factors. (For a thorough review of that and other papers recently cited in the BLM's camping plans, please refer to the June 21, 2022 Wildlife Report on DOI-BLM-UT-Y010-2021-0096; DOI-BLM-UT-Y010-2021-0095-EA; DOI-BLM-UT-Y010-2021-0094-EA that is attached and included here by reference.)

Research documenting impacts of construction and mining projects in or near bighorn sheep habitat, highway construction and maintenance, and transmission line construction and maintenance, have not indicated resulting bighorn sheep population declines (Andaloro and Ramey 1981; Wehausen 1980; Oehler et al. 2005). And contrary to expectations, one study (Oehler et al. 2005) reported that mountain lion predation was lower near an active mine than in the undisturbed area away from it. Therefore, much of what has passed for scientific analysis of human disturbance on bighorn sheep has been nothing more than unsupported opinion and

speculation on what the effects might be. Like competition, human disturbance is only of importance if it has a negative demographic effect on populations. While such an effect has not been found, we acknowledge that a threshold of disturbance may not have been reached.

Based on an understanding of plausible cause and effect mechanisms, as long as a few reasonable precautions are taken, effects of OHV and motorcycle trail riding, cycling, and hiking in bighorn sheep habitat will have minimal effect or be non-existent. For example, the presumed level of risk of ewes abandoning lambs is frequently overstated. Even during the lambing season, there is little risk of ewes permanently abandoning lambs. This is because ewes have a substantial parental investment in gestation and rearing and, consequently the probability of lamb abandonment under any circumstance is extremely low. In fact, in the 1980s and 1990s, researchers at the Bighorn Institute in Palm Springs California regularly captured young lambs by hand or with hand-held nets in order to attach radio collars. They reported no problems with abandonment. However, if bighorn ewes are flushed from steep escape terrain in a lambing area, very young lambs (less than 2-3 weeks old) can be placed at risk of predation or injury from falls. Therefore, measures to limit access into an active lambing area (as determined by direct observations of ewes and lambs), can be justified, but there is no credible scientific justification for limiting access to the viewshed of the surrounding area, including "modeled habitat" as used in the EA.

Access to water during the hot, dry summer months is necessary for desert bighorn sheep survival. Seasonal restrictions or rerouting of trails in the immediate vicinity of water points may be reasonable where water sources are few or limited, however, this makes no sense when trails are on the canyon rims or are infrequently used. It is important to realize that bighorn sheep may use alternative sources of water (i.e. the Green River adjacent to the TMA) or adjust the timing of when they access water. In areas where bighorn sheep are habituated to humans, restrictions may not be necessary, hence underscoring the importance of restricting hunting if the BLM wishes the bighorn sheep in their management area to more readily habituate to human activity.

While opponents to motorcycle and OHV use are well-intentioned and share our collective concern for the well-being of the desert bighorn sheep and other species, they are simply mistaken on the science of this issue. We should not allow antiquated assumptions and beliefs to pass as scientific understanding and creep into BLM environmental analyses and decisions. If there are clear, unbiased data and analyses showing a deleterious demographic effect or habitat abandonment that has occurred as a result of excess motorized trail use in a particular area, then regulation and mitigation would clearly be needed for natural resource protection. In the absence of such data, the BLM needs to step back and not attempt to use bighorn and other wildlife as an excuse for its land use agenda.

2) Accurate and transparent data are required for mapping the potential human-wildlife interaction areas for different species, and especially bighorn sheep. According to the EA on page 65, *"The MFO in cooperation with the UDWR, Foundation for North American Wild Sheep, Brigham Young University, Canyonlands Natural History Association, and the National Fish and Wildlife Foundation have done extensive GPS collar studies from 2002 through 2010 and currently Joel Berger with Colorado State University is conducting additional research via collars the UDWR placed on animals in 2019. This large pool of collar data has allowed the*

Moab BLM to further refine the crucial habitats that support this herd. These animals are mostly found in the large canyon systems, making canyon bottoms, talus slopes, and canyon rims vital habitats for this herd. The UDWR has incorporated this data into their statewide habitat files as lambing habitat, though these areas are utilized yearlong."
There are several issues with this statement. First, where are these data and why is the location data not publicly available? Second, it appears that the BLM has made the error of conflating the importance of desert bighorn sheep lambing habitat with yearlong habitat. This is obviously the case with the modeled habitat overlays, which encompass large areas that are clearly not steep and rugged lambing habitat. The BLM needs to separate lambing habitat from general habitat used year-round by rams and outside of lambing season by ewes and lambs.

2a) Species location data on the NatureServe Explorer are not publicly accessible at any meaningful level of resolution.
We also bring to the BLM's attention that NatureServe Explorer does not provide publicly accessible occurrence data on any species with a level of precision that would allow any meaningful analysis of the data relative to the TMA travel routes in question. The finest level of precision available to the public, without a license and end user agreement typically reserved for state and federal biologists and researchers, is a randomized area of 49 square miles in extent, that surrounds each species location (https://explorer.natureserve.org/AboutTheData/Maps). Therefore, how can the public be regulated based upon data that they do not have access to? Minimally, the BLM needs to make such data available for independent review and analysis. This reviewer would agree to a data sharing and non-disclosure agreement to facilitate such access for sensitive species.

2b) Potential habitat and hypothetical impacts are no substitute for verifiable location data and demonstrable impacts with a sound scientific basis.
We are concerned that the data layers used in BLM's GIS analyses are approximations of *potential habitat* upon which the BLM applies *hypothetical impacts* rather than verifiable data on species occurrence(s) and demonstrable, specific impacts to each species. We are further concerned that habitat layers used by the BLM weigh all habitat or nesting site data equally, regardless of when use was last documented. In other words, we have observed a tendency in some GIS analyses to extend polygons to capture and weigh all historical locations regardless of how many years ago they were made and how rarely the area is used (see Turner et al. 2004 and 2006 for examples specific to bighorn sheep). Therefore, we specifically request that the BLM utilize a transparent approach and verifiable location data in its GIS analyses so that validation by independent experts and qualified members of the public would be possible. Additionally, we propose that actual location data be plotted to delineate habitat rather than GIS-modeled potential habitat, to determine overlap with threatened and endangered species, bighorn sheep, pronghorn, BLM sensitive species, migratory species of concern, and/or raptor nesting locations. It is problematic that the entire cumulative effects analysis is built around potential use of potential habitat, rather than actual documented use of habitat in specific areas of interest.

2c) Smart buffers, that account for the mitigating factor of elevation, are needed.
In cases where there is a potentially valid resource conflict, such as a trail passing near important habitat such as a verifiable lambing area, we propose that the BLM employ "smart buffers" that are tailored to the unique topography and likelihood of an animal being present. For example, an

animal living below a canyon rim will generally be unaffected by human activities atop the canyon rim or across a canyon. By incorporating smart buffers, the BLM's decisions would be based on defensible scientific information, and in conformance with the Information Quality Act. Currently, the buffer analyses are simplistic two-dimensional models that completely ignore the obvious mitigating factor of elevation. A digital elevation model and data on actual species occurrence is needed in a revised EA or EIS analysis.

3) The EA's rationale for evaluating OHV route impacts on wildlife is based upon flawed reasoning that equates potential or hypothetical impacts with actual on-the-ground impacts by OHVs. Furthermore, the EA does not accurately portray the science it cites on the adverse effects of OHVs on wildlife. The EA focused on an often assumed, but unproven, deleterious effect of OHV trail use on wildlife populations. However, that assumption is currently not supported by empirical data. None of the studies cited in the EA (or other published research) has demonstrated a deleterious population-level effect of OHV activity on species in the TMA, or adjacent areas in Utah which would potentially rise to the level of significant impact. In the absence of such data, the BLM cannot rely on the surmise and opinion of hypothetical impacts in its analysis of alternatives. We review the most influential papers cited in the EA below and point out the flaws in the EA's uncritical use of them.

The EA states that, "The effects of OHV use can be wide-ranging and detrimental to species and their populations especially if important habitats, like riparian areas, are affected (Gutzwiller et al. 2017)." The paper by Gutzwiller et al. 2017 did not provide any analyses that demonstrated those impacts had occurred. Instead, Gutzwiller et al. 2017 was a GIS methods paper illustrating a *potential* approach for characterizing *potential* recreation disturbance at different spatial scales using three different three software systems (ArcGIS, FRAGSTATS, and Conefor). Clearly, an EA prepared by the BLM should avoid making such misrepresentations and steer clear of GIS methodology that conflates potential impacts with actual impacts to the threatened, endangered, or BLM-sensitive species listed in the EA.

The EA further makes the claim that, "These effects can include direct mortality, injury, habitat destruction, habitat alteration, and habitat fragmentation (Brooks and Lair 2005, Ouren et al. 2007, Trombulak and Frissell 2000)." Brooks and Lair (2005) was only a generalized review of the literature on *Effects of Vehicular Routes on Animals in the Mojave Desert* and concluded that, "No studies that we know of have directly evaluated the role of vehicular routes in fragmenting wildlife habitat in the Mojave Desert." Furthermore, none of the studies cited included any of the species that occur in the TMA. The effects on animals that were noted in most of the cited studies were in areas of open riding in the southern Algodones Sand Dunes in southern California (i.e. Luckenbach and Bury (1983). This is a vastly different ecological setting with different riding regulations than the narrow, regulated trails of the TMA in Utah. Where routes were involved in the reviewed papers, mortalities on invertebrates, lizards and small mammals were only in the immediate vicinity of dirt roads, and no population-level declines were reported. Mortalities of slow-moving desert tortoises were reported along highways, not OHV routes.

Ouren et al. (2007), cited in the EA, was a similar literature review to Brooks and Lair (2005) and claimed a number of generalized impacts to wildlife based upon the opinions of the authors, rather than data. Yet, a closer examination of the text and references in Ouren et al. (2007)

reveals that: 1) none of the studies cited included any of the species that occur in the TMA; 2) the generalized claims of impacts to animals were the surmise and opinion of the authors who used wiggle words such as "may", "could" and "if" to qualify their claims rather than present consistent and conclusive findings; and 3) the authors of Ouren et al. (2007) erroneously conflated the effects of highways, dirt roads, and open riding areas in sand dune fields with restricted, low-speed OHV routes like those proposed for closure in the TMA.

It is also worth noting that the studies of the acoustic effects of OHVs on desert kangaroo rats cited in Ouren et al. (2007), which the EA then cites, were based upon unrealistic and inhumane, 40+ year old lab experiments that would not be allowed by Animals Use and Care committees today. Those included auditory implants and exposure to high-decibel playbacks, under improbable, conditions of 95 dBA as measured at the kangaroo rat's ear, for 8+ minutes (and a sample size of two kangaroo rats). Further contributing to the unrealistic conditions are the facts that: 1) kangaroo rats are nocturnal while OHV's are virtually always diurnal, thus the two would rarely overlap; 2) kangaroo rats reside in underground burrows where they are sheltered from sound, while OHV's travel on the surface; 3) the loud "dune buggies" of the 1970's and early 1980's are virtually extinct and the acoustic signatures of their unregulated exhaust systems were much louder than the regulated and licensed OHV's of today. As for the studies purported to report bleeding of kangaroo rat's ears, we note: 1) the three issues in the previous sentence above, and 2) the studies were not listed in the literature cited by Ouren et al. (2007).

Trombulak and Frissell (2000) is another review paper uncritically cited by the EA, which like the two above, editorializes its conclusions rather than presenting new data and analyses or meta-analyses that could result in definitive conclusions. Trombulak and Frissell (2000) focused on reviewing the effects of highly-trafficked, high-speed roads, not dirt OHV trails and single tracks. The only two studies they included that remotely resemble OHV trails (unpaved roads less than 3 meters wide), reported that: 1) a land snail (*Arianta arbustorum*) from Eastern Europe avoided crossing these, and 2) Cotton rats (*Sigmodon hispidus*), prairie voles (*Microtus ochrogaster*), and white-footed mice (*Peromyscus leucopus*) were "reluctant" to cross these as well. We note that none of these species occur in the TMA and "reluctance" (by rodents) and "avoidance" (by a snail) of dirt roads do not equate to permanent barriers to movements. Similarly, chemical impacts described in Trombulak and Frissell (2000) involved highways (i.e. de-icing salts) not unimproved OHV trails and single tracks. Moreover, the assertion in the EA that roads lead to "increased poaching", with citation to Trombulak and Frissell (2000), comes from studies on brown and black bears, Iberian lynx and Egyptian mongooses. Clearly, the EA is lacking in any evidence that poaching in the TMA is a problem. Plus, Iberian lynx, and Egyptian mongooses do not occur in the TMA. Other examples in Trombulak and Frissell (2000) of physical changes and spread of exotics species did not involve the species or ecological setting of the TMA.

And finally, the EA speculates that, *"Additionally, roadside use, whether by foot, camping, roadside parking, passing, staging, or other means, can lead to the alteration of animal behavior or alteration or destruction of foraging, burrowing, or nesting habitats. Because of this, travel routes that go through or are adjacent to nesting, burrowing, or riparian habitat areas are of particular concern."* However, the EA presents no direct, empirical evidence to support its

assertion that this is a biological issue in the TMA that rises to the level of significance (i.e. a population-level demographic impact) in any of the EA's analysis of alternatives.

Other papers cited in the EA include the literature review by Ortega et al. (2012), which reported on the findings of other studies of noise on birds instead of presenting new evidence directly relevant to species and OHV trails in the TMA. The one study involving busy OHV trails and small songbirds, was from Northeastern California and none of the species overlapped with those threatened, endangered, or BLM-sensitive in the TMA. Rather than a consistent negative effect, the authors reported: *"Our results suggest a positive effect of proximity to OHV trail on nest desertion and abandonment* [though the later was not statistically significant] *and a negative relationship of proximity to OHV trail on predation rates of nests built in shrubs. These effects have opposite net effects on nesting success, making interpretation difficult."* In other words, negative effects in the immediate area of OHV trails were unproven.

The literature review by Larson et al. (2016) interestingly reported that, *"We found that non-motorized activities had more evidence for negative effects* [on wildlife] *than motorized activities. Motorized activities are often expected to be more harmful to animals because of vehicle speed and noise, but our results suggest the opposite across a wide range of study locations and taxa."* Thus, that study does not support the EA's assertions regarding presumed wildlife impacts of OHV use.

A recurring problem with the EA's uncritical reliance on such review literature is that the BLM fails to recognize that the opinions and recommendations that are stated in the conclusions of the reviewed papers (and in some cases statistically insignificant results) are often treated by the authors of the reviews as if they were valid experimental results, which they are not.

We urge the BLM to support and base management conclusions on unbiased, experimental research with study designs that include analysis of the effects of independent environmental variables on demographic parameters and ideally, incorporate a spatio-temporal analysis.

Most importantly, the EA's authors fail to understand that while wildlife may respond to human activities by adjusting their behavior (i.e. temporary avoidance, timing, route selection) these do not automatically equate to a negative effect on the entire population (i.e. lower productivity, survivorship, or recruitment, such that total number decline). If regulation of disturbing human activities is required for conservation, then data showing a population decline must be a prerequisite.

4) Double standards being applied to some of the proposed wildlife closures based on unfounded assumptions regarding mode of travel and impact to species. More specifically**,** there appears to be double standard applied to some of the proposed closures based on unfounded but implicit assumptions in the EA that: 1) vehicles on nearby route are more disturbing to nesting raptors than non-motorized traffic, and 2) that nesting raptors, especially peregrine falcons, are incapable of habituation to non-threatening and geographically predictable human travel along established routes, regardless of mode. To illustrate these broader issues in the EA, consider the case of route D1944, which is the northern section of the "7-Up" trail. There is no credible scientific rationale for this route to be closed completely under Alternative B or

with only non-motorized travel with seasonal restrictions under Alternative C, simply because it is in the vicinity of a peregrine falcon nest.

As an initial matter, the BLM provides no evidence that this nest site (or others) is active or that if recently active, it has failed to produce fledglings as a result of human recreational use in the area. In the absence of such data the BLM cannot rely on surmise that the nest site is annually occupied by peregrines or that they are disturbed by activity such that their individual fitness is compromised or more importantly, that the population fitness has been compromised.

Second, simplistic one-size-fits-all, two-dimensional, circular closure buffers do not take into account the obvious influence of topography that obviates their utility (hence the need for using smart buffers that are tailored to the situation). This is important because peregrines nest on cliffs, so while a seasonal climbing closure in the immediate vicinity of an active nest may be appropriate, there are no data to suggest that a route such as D1944 ("7-Up") which passes atop the mesa above and to the west of the canyon is a threat to peregrines nesting in a nearby canyon. (Using the information on this and nearby route descriptions, I was able to triangulate on the approximate location of the nearby peregrine nest site in the Seven Mile Canyon, east of the southern end of D1944.)

Third, the reference cited in the EA for raptor buffers, a table in an appendix of the 2008 RMP, like other such recommended buffers are not based on data, and thus, are only guidelines based upon opinion of those writing them. In the case of the recommended 2008 RMP raptor buffers, no credible, data-based scientific research are cited, and the reason for this is simple, it does not exist. Similarly, there are no data to suggest that peregrines are more tolerant of non-motorized versus motorized modes of travel. In contrast, there is abundant evidence that peregrines have adapted to urban life in cities across North America, nesting on bridges and buildings in close proximity to humans using all modes of transportation. Similarly, peregrines successfully nest on the cliffs of Yosemite, Zion, and Grand Canyon National Parks, that are bustling with human activity, well within the BLM's recommended one-mile circular buffer. **Simply put, peregrines are not the fragile, disturbance-susceptible animals they have been portrayed to be.** Should the BLM require additional convincing, I include the excerpt from peregrine expert, Dr. Clayton White (2012):

> "I have ridden in helicopters hundreds of times to within 50 feet of peregrine nests, even while females were incubating, with the falcons showing no signs of disturbance. I have also seen injured adult falcons brought in from the wild that were kept in a cage and would allow people to approach within 10 feet of them, as long as the people were outside the cage which measured some 10 feet by 20 feet, while exhibiting no signs of alarm or distress. This observation is published. I have seen peregrines hunting bats during crepuscular periods over the bustling streets of Porto Alegre, Brazil (a city of several million people), only 30-40 feet above the sweeping sidewalks lined with people. These are wintering falcons from the unspoiled, unpeopled, wilderness of Arctic North America. I have heard of peregrines in Australia eagerly greeting the arrival of climbers who periodically brought them pigeons for food. And I have seen peregrines follow a car down a dirt road to catch birds flushed by the car. In the Aleutian Islands I have witnessed a peregrine learn to use our helicopter as cover, as we slowly precede across a lake while surveying ducks, and awaiting the ducks on the lake

to reach the lake shore and be flushed. At that time the falcon turned on the speed, left the cover of the helicopter, and pursed the ducks. Professor Tom Cade has seen peregrines nesting in the face of a quarry in Britain that was being used as a landfill. Throughout the day, trucks backed up to the edge of the quarry and dumped trash over the side, right past the entrance to the nest site. The falcons were so accustomed to it they took no notice."

In my work on research and management with peregrine falcons, I have had similar experiences with directly approaching peregrine nests in helicopters. I have also not experienced any nest failures (or abandonment) after climbing directly into dozens of nests to recover eggs for captive incubation and fostering captive-reared young into the nests. Clearly, part of the peregrine falcon's post-DDT era recovery success has been their ability to adapt to human activity.

In conclusion, the BLM needs to do a more thorough inventory of peregrine and other raptor nesting sites in the TMA, and take a more tailored approach to considering closures. More specifically, this can be done adaptively, using spatially-limited, ad-hoc seasonal closures where specifically warranted rather than blanket, one-sized-fits-all closures that are not scientifically justified.

5) There is a logical inconsistency that pervades this EA: that harassment of wildlife is to be minimized, yet hunting, which results in harassment and death of game animals and displacement of others need not be minimized. Hunting virtually always involves on-trail motorized access, followed by off-trail hiking for scouting, pursuit of game, the load report of firearm being shot, killing of game, and then dissection and transporting segments of the carcass back to the waiting vehicle. Clearly, hunting results in significant disruption of wildlife. Hunting also creates a "landscape of fear" for wildlife in the area which leads to avoidance of human activity, particularly when humans are on-foot during hunting seasons. The EA fails to acknowledge that bighorn sheep and other hunted species will eventually habituate to nonthreatening and predictable human activities. However, since hunting of bighorn sheep is allowed within the TMA it can be expected that some avoidance of human activity by bighorn sheep may occur. Therefore, a simple solution presents itself: stop hunting in the TMA and surrounding area so the bighorn and other previously hunted species may habituate. This solution is well-supported in the peer-reviewed scientific literature: big game species that are hunted tend to avoid human activity, yet readily tolerate human presence in areas where they have not been hunted (Thurfjell et al. 2017; Goumas et al. 2020; Sergeyev et al. 2020; Zanette and Clinchy 2020). For additional proof, a visit to any national park in the world is a revelation as to what non-hunted animal behavior can become.

6) A more detailed analysis is required in the Route Reports as per the requirements of the Interdisciplinary Team Checklist, Determination of Staff (i.e. PI = present with potential for relevant impact that needs to be analyzed in detail in the EA). We note that on page 77, Environmental Effects Analysis, the EA states that, *"During the route evaluation process, the IDT considered special status wildlife species and their habitat in addressing designation criterion 8342.1 (b): Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats. This attention to special status wildlife species and their habitat as a potential resource conflict is noted in the route reports and informed the IDT's*

formulation of alternative route networks. The action alternatives include measures to minimize impacts to special status wildlife species and their habitats, such as proposing routes for closure or seasonal limitations." Despite this bold claim, the BLM has not provided proof that any of the trails subject to proposed closures have resulted in harassment of wildlife or significant disruption of wildlife habitats such that their populations have declined, independent of other factors. Impacts are presented without describing the type of impact, its magnitude, or quantitative effect on the local wildlife population(s). Thus, "impacts" as presented in the EA's Draft Route Reports are vague, speculative, and scientifically unsupported. The BLM has the capacity to provide the detailed information required and needs to provide it to the public.

7) The BLM has conducted a basic inventory of travel routes for the EA but the route descriptions proposed for closure in Alternatives B and C are lacking in detail and scientifically defensible rationale as to why they are to be closed. More specifically, the decision to close a number of individual routes appears to be based on the undocumented opinion of the BLM biologist, which in some cases, is clearly inconsistent with scientifically defensible and rational biological criteria as to what constitutes "harassment of wildlife or significant disruption of wildlife habitats" for each of the species listed in the EA. Otherwise, it appears that the EA's Route Reports are simply based on the subjective opinions of BLM staff. Specific information used for each segment closure is required for the sake of transparency and consistency with the Information Quality Act.

For an example of these inconsistencies, please see the Draft Route reports for EL2A (Enduro Loop west of Big Drop) and D2750. This is in mapped bighorn sheep habitat and there is a water source located atop a point that's north of and over 500' above EL2A and that's west of and at the same elevation as D2750. The EA is inconsistent in proposing the closing of EL2A under Alternatives B and C, as it is a single-track through route along a wash in a relatively flat area south of the point (and as a single-track route, thus a more restricted use), and it exits the wash to stay 200 yards away from a minor spring, thus it's mostly outside of mapped bighorn habitat. In contrast D2750 (closed under Alternative B, open under Alternative C) is also on the rim and allows travel to the same point by any means available, and being an overlook, is a location where people are more likely to venture about on foot. There is no credible scientific evidence (beyond hearsay, anecdote, and opinion) that bighorn sheep, pronghorn, or other species would be displaced from the point habitat or the water source by vehicles moving over a half-mile south and over 500' below them. Therefore, we urge the BLM to leave EL2A (and similar routes) open with management under alternatives B and C, like EL2 is, and focus management efforts instead taking measures to reduce route proliferation and potentially rerouting minor sections to reduce conflicts, rather than assuming that wildlife harassment occurs while motorcycles and other vehicles remain on geographically predictable route and exhibit non-threatening behavior (i.e. following a through route, where stops are less likely to occur).

8) A double standard is being applied to proposed closures for wildlife. The EA states that, *"Route networks with open or limited designations can contribute to the perpetuation of OHV use-related effects as discussed above. Conversely, closed and limited designations that prohibit OHV use wholly or in part can reduce or eliminate the perpetuation of the OHV-use effects, thereby benefitting wildlife species."* We do not see how the authors of the EA can make such a misleading statement when closed routes will still be open to foot, bicycle and horseback,

including cross-country travel on foot. As shown by Papouchis et al. (2001) bighorn flee at far greater distances when humans are on foot and approaching them, than bicycles or vehicles traveling predictable routes. Again, foot-travel would not be such an issue if the bighorn were not hunted.

9) In conclusion, there may be other reasons to manage OHV trail use, such as erosion, route proliferation, visitor experience, and acoustics. However, impacts on bighorn sheep and other wildlife is not the primary reason and should not be used as an excuse.

Literature Cited

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June 21st, 2022

Bureau of Land Management
Moab Field Office
Attention: Camping Proposals
82 East Dogwood
Moab, UT 84532

RE: Managing Camping within the Two Rivers SRMA (DOI-BLM-UT-Y010-2021-0096)
Managing Camping within the Utah Rims SRMA (DOI-BLM-UT-Y010-2021-0095-EA)
Managing Camping within the Labyrinth Rims/Gemini Bridges SRMA (DOI-BLM-UT-Y010-2021-0094-EA)

Wildlife Report

In this report, the "Organizations" will refer to the Trails Preservation Alliance (TPA), Ride with Respect (RwR), Colorado Off-Highway Vehicle Coalition (COHVCO), and Colorado Off Road Enterprise (CORE).

A. General Concerns

1. Buffer Distances between campsites or travel routes and "sensitive species" are proposed without a sound scientific basis.

The proposed, one-size-fits all buffers and restrictions are without a sound scientific basis. In justification of buffers and restrictions, the Draft Environmental Assessments (EAs) presume worst-case scenarios of what "may," "could," or "possibly" happen to the species in question, and thus a heavy-handed approach appears to be needed. In our view, this appears to be contrary to the scientific integrity guidelines, multiple-use mandate of the BLM, and the Information Quality Act.

From our discussions with subject matter experts, it also appears that some of the "science" cited in support of the impacts in the EAs are not as conclusive as they may appear to be. An expert examination of some of the most influential papers cited in the EAs reveals than some of the conclusions and management recommendations are regrettably based upon surmise and opinion, omissions and misrepresentations, examples drawn from species on other continents, and in one case, simulation modeling that is so bold as to make impact predictions 100 years into the future. (A review of the primary issues with key scientific papers cited in the EAs, especially on bighorn sheep, may be found below). The EAs also cite review papers that summarize the opinions of previous authors rather than actual results based upon data. And finally, some of the study findings appear to be simply taken out of context by the authors of the EAs. Because we understand the difficulty the BLM has working under deadlines with limited staff resources to digest complex, technical subject matter, we are happy to work with them to assist in developing scientifically defensible guidelines for protecting wildlife and other resources.

2. Accurate and Transparent Data is required for mapping the potential for human-wildlife interactions for different species.

We are concerned that the point/line/polygon data layers used in BLM's GIS analyses will be approximations of *potential habitat* rather than verifiable data on species occurrence(s). We are further

concerned that polygon layers could weight all habitat or nesting sites equally, regardless of when use was last documented. In other words, we have observed a tendency in some GIS analyses to extend polygons to capture and weigh all historical locations regardless of how many years ago they were made and how rarely the area is used (see Turner et al. 2004 and 2006 for examples specific to bighorn sheep). Therefore, we specifically request that the BLM utilize a transparent approach and verifiable location data in its GIS analyses so that validation by independent experts and qualified members of the public would be possible. Additionally, we propose that actual location data be plotted to delineate habitat rather than GIS-modeled potential habitat, to determine overlap with bighorn sheep, sensitive plant species, and/or raptor nesting locations.

We strongly discourage the use of arbitrary buffers, kernel functions plotted around location data from individuals (i.e. no 50, 90, or 95% kernels as these include large areas of unoccupied or non-habitat), and hypothetical movement corridors. We propose that the BLM employ the practice of using "smart buffers" that are tailored to the unique topography, likelihood of animal being present, type of species habitat or resource, and the sound and viewshed unique to individual campsites, roads, or trails that are immediately adjacent to or overlap with wildlife habitat. We encourage the BLM to utilize location data from recent years (i.e. the past decade), especially in the case of plants and raptor nests which can shift year to year among alternative nests.

The Organizations stand ready to provide unbiased, professional, subject matter experts to assist the BLM in preparation of criteria for tailored set-backs for species of conservation importance.

In this way, the BLM's decisions will be based on defensible scientific information, and in conformance with the Information Quality Act. This is just one reason why the complete planning of a much more thorough EA or Environmental Impact Statement (EIS), including robust data and transparency, is needed to evaluate proposed actions and alternatives for the planning areas.

3. **The Organizations support sound scientific research as a basis for decision making by land managers.**

We request that the BLM, and their NPS partners at Canyonlands and Arches national parks, make available to the public copies of current research proposal abstracts on species named in the EAs.

4. **Wildlife habitat should be based upon verifiable data and not on modeled potential habitat.**

We are concerned that recommended buffer distances for wildlife in the EAs are designed for the convenience of GIS analyses without any data that demonstrate permanent abandonment of an area or reproductive failure by the species of bird or mammal in question would result from specific camping or travel route use.

We are also concerned that BLM decisions on camping, roads, and trails could be erroneously based upon the State of Utah's "modeled habitat", which is really potential habitat that includes physical characteristics rather than recent occurrence data, or "occupied habitat" that is a misnomer because it encompasses large swaths of non-habitat between areas of modeled habitat, rather than inhabited areas based upon recent, verifiable radio-collar and observational data. The problem with basing restrictions on the State's "modeled habitat" and "occupied habitat" is that those will lead to unnecessary restrictions

on the recreational community while not benefiting bighorn sheep or other species. Therefore, we urge the BLM to only base their decision-making on inhabited habitat that is based upon recent, verifiable radio-collar and observational data.

B. Bighorn Sheep

1. A narrative is developed in the Draft EAs that wildlife populations are threatened from currently regulated recreational use.

It is important that the BLM acknowledge that there is no demographic data that indicates a long-term decline in bighorn sheep inhabiting the La Sal/Potash/South Cisco population unit, or a decline in individual bighorn sheep fitness in this population that can be directly attributable to "human use." It is therefore disingenuous that the Labyrinth Rims/Gemini Bridges EA attempts to link a study about bighorn sheep vigilance (Sproat 2012) without first demonstrating that there has also been bighorn sheep abandonment of an area and/or population-level decline, in order to justify new camping and travel route restrictions in the EA.

As an initial matter, all the cited studies in the EA on human disturbance of bighorn sheep cited in the study share the following important characteristics:

a) None of the studies have shown a demonstrable, causal link between human activity and population decline, loss of individual fitness, or permanent habitat abandonment that is *independent of other factors* (i.e. predation, disease, livestock, drought, or permanent removal due to agriculture or development).
b) The studies rely on speculation, that the worst-case circumstances they describe "could," "may," or "potentially" lead to population declines. The authors of these papers generally *assume*, without supporting demographic data, that any observed effect in flight distance or time spent foraging or scanning results in a decrease in individual fitness and ultimately population number.
c) Anecdotes and opinions expressed by authors, often in the conclusions or management implications of their papers, have been erroneously cited by subsequent authors, as if these anecdotes and opinions were actual demographic results. This leads to a "snowball effect" of opinions, beliefs, and biases becoming uncritically entrenched in the "scientific literature" on human disturbance of bighorn sheep. In other words, if repeated often enough, anything can take on the appearance of truth.
d) The authors fail to acknowledge that their study population has been repeatedly exposed to humans as predators either through hunting and/or repeated capture and handling (for radio-collaring, research, or translocation). Both of these activities can be expected to result in bighorns having increased wariness around humans. The simple fact is that bighorn sheep, like many other animals, habituate to predictable and non-threatening human behavior (i.e. they will habituate to humans if they are not hunted or otherwise pursued).

Despite dire predictions of what could happen in the cited studies, there is no compelling data to indicate that the La Sal/Potash population has declined, has abandoned habitat critical to survival, or that recruitment and adult survival have been compromised due to human disturbance from recreational use, including camping. Quite to the contrary, the State of Utah allows hunting of this population on BLM and

State lands outside of Canyonlands and Arches National Parks. Furthermore, this population has also had bighorn sheep regularly captured and removed for translocations elsewhere for decades.

2. The BLM presents no data on bighorn sheep locations to indicate that they are habitat limited.

We are concerned that some of the language in the EA and proposed conservation measures are built on the false premise that the resident bighorn sheep population is in decline or in imminent threat of decline due to recreational use. However, no data are presented in the EA that bighorn or wildlife populations are in decline, or that populations are declining as a result of recreational use of a road and trail network that has been in continuous use for over 50 years. The BLM presents no data on bighorn sheep locations to indicate that they are habitat limited.

3. The EA has an over reliance on papers that misrepresent conclusions.

In order for the BLM to take a more measured and scientifically-defensible view of the data and issues surrounding bighorn sheep in the SRMA, we ask that the BLM reconsider its reliance on the following papers as they misrepresent the factual basis of their conclusions and therefore are not up to the data quality standards required of the BLM. (Reasons are detailed in the attached reviews below). Those papers include: Papouchis et al. 2000, 2001; Sproat 2012 and Sproat et al. 2019, and Widedmann and Bleich 2014.

A review of scientific issues in Papouchis (2000, 2001):

Papouchis did not design the study or participate in the fieldwork, but was recruited by the late Dr. Francis Singer to analyze and publish a paper out of the data gathered, essentially to salvage results from a flawed study design.

The study by Papouchis et al. (2000, 2001) was methodologically flawed and biased in its interpretation of results because the "hikers" in that study were actually researchers who used telemetry to locate radio-collared bighorn sheep and intentionally harassed them until they fled by approaching directly, off-trail and on foot. Thus, the results of Papouchis et al. (2000, 2001) were an artifact of the experimental design rather than an unbiased comparison of bighorn reaction to "hikers." Thus, no conclusions can be drawn to hikers on trails or humans in campsites. The intentional harassment used in Papouchis et al. (2000, 2001) is clearly a different circumstance from trail hikers and even the occasional cross-country hiker who does not have the intention or means of locating, tracking, and approaching bighorn sheep until they flee. Instead, the methods of Papouchis et al. (2000, 2001), as well as similar harassment used in MacArthur (1979) and Phillips and Alldredge (2000), more closely approximated the behavior of hunters pursuing their quarry. The BLM needs to understand and acknowledge this fundamental bias in the results and conclusions of Papouchis et al. (2000, 2001).

The authors of Papouchis et al. (2000, 2001) did not acknowledge that the bighorn sheep in their study, and the population of bighorn sheep in general, had already been subject to capture and handling by humans and that bighorn in that study population are hunted on BLM land outside of the national parks. Thus, the bighorn sheep were pre-conditioned to react to humans approaching on-foot and in close proximity.

Notably, Papouchis et al. (2000, 2001) reported that the radio-collared ewes whose home ranges were along road corridors had obviously habituated to cars, and recommended that these habituated bighorn should not be captured and removed for translocations. Such captures and removals would deplete the population of resident bighorn that had habituated to habitat along roads in Canyonlands National Park, which is also a safe haven from hunting. This is an important finding because it underscores how bighorn sheep readily habituate geographically to predictable and non-threatening human activity. This habituation is also why desert bighorn sheep near Palm Springs, California wander into the suburbs and city, why hikers have to walk around them on trails, and why they have to be shooed off of lawns and golf courses in the area. Other examples of habituation in desert bighorn include those along the banks of the Green and San Juan rivers in Utah, as well as in the Grand Canyon and along roads in Canyonlands National Park.

The only quantitative data used by Papouchis et al. (2000, 2001) to distinguish human use in the high vs. low-use areas was as follows, "Approximately 1 vehicle passed along roads/hour during peak visitor months in the low-use area. … Between 5 and 13 vehicles passed along roads/hour during peak visitor months in the high-use area." Papouchis et al. (2000, 2001) also did not mention whether this human use statistic was on paved or dirt roads, the footprint of roads in bighorn habitat, the types of use or intensity of other human use in bighorn habitat, and most importantly, differences in habitat quality which would lead to differences in bighorn sheep density and behavior. The purported increase in human use in the study area was entirely anecdotal.

A review of scientific issues in:
Sproat 2012a, thesis, *Alteration of behavior by desert bighorn sheep from human recreation and Desert Bighorn Sheep Survival in Canyonlands National Park: 2002 – 2010;*
Sproat 2012b, report and presentation, *Potash Desert Bighorn Sheep Research;*
and
Sproat et al. 2019, publication, *Desert bighorn sheep responses to human activity in south-eastern Utah.*

The titles used by Sproat (2012) and Sproat et al. (2019) were not accurate because the authors never actually measured bighorn reactions to human activity. Instead, the authors measured scanning vs. foraging behaviors in two different areas, designated high and low human use, but made no attempt to quantify habitat differences, bighorn density, or predation rates that would have influenced their results.

The author(s) of Sproat (2012a,b) and Sproat et al. (2019) assume that a bighorn sheep observed "scanning" is looking at "threats" resulting from human use of the environment although they never consider any alternative hypotheses. Those alternative hypotheses include (a) the bighorn is looking for other bighorn sheep, (b) the bighorn is scanning to locate additional food resources, or (c) the bighorn is scanning for predators, including mountain lions, coyotes, bobcats, and golden eagles, all of which prey on bighorn sheep or their lambs. The authors present no data that time spent scanning vs. grazing has a fitness consequence to the bighorn population.

In the abstract of their paper, the authors of Sproat et al. (2019) make several bold and inaccurate statements. For example, under "Implications" the author(s) state:

> "From 1979 to 2000, human recreation increased over 300% in areas occupied by desert bighorn sheep (*O. c. nelsoni*) in south-eastern Utah. Concurrently, the population of desert

bighorn sheep occupying the Potash Bighorn Sheep Management Unit of south-eastern Utah was in steep decline."

"We raise a cautionary flag because recreational use in bighorn sheep habitat near Moab, Utah, continues to increase and bighorn numbers continue to decline."

However, no bighorn sheep population data was presented by the authors of Sproat et al. (2019) to support these statements. Quite to the contrary, data from the State of Utah (2019) for the La Sal-Potash population, which includes bighorn sheep in Island in the Sky, Potash, Professor Valley and Dolores Triangle subpopulations, clearly refutes this claim. The State data reveal that this population had increased despite both repeated captures and removals of bighorn sheep from the La Sal-Potash population for translocations, with 289 bighorn captured and translocated between 1982-2008, mainly from the Potash area and other parts of Canyonlands National Park (Wild Sheep Working Group 2015). Additionally, 2 to 4 bighorn sheep are hunted annually on BLM, state, and private land outside of the national parks (including the Potash area), with 31 bighorn sheep killed by hunters between 2010 and 2019 (see big game report above). This bighorn population increase also occurred despite the fact that predation accounted for 44% of radio-collared mortalities reported by Sproat (2012b). And most importantly, the bighorn population increase occurred despite the reported increase in recreational use which Sproat et al. (2019) attempted to link to a non-existent bighorn sheep decline.

Something is clearly amiss with Sproat et al. (2019) because in Sproat's own words (Sproat 2012b, which included annual survival data from radio-collared bighorn), he concluded:

"Survival for desert bighorn sheep in CNP [Canyonlands National Park] was relatively high (83%—88%; Table 7), as evidenced by population estimates (*n* = 400, status = stable/increasing). Our statistical analyses indicate that temporal variables (season and month) had the greatest effect on survival."

And in the discussion of Sproat et al. (2019), those authors state:

"We determined that bighorn sheep grazed less and scanned more in areas of high human use, but there was no apparent effect on the survival rates of adult desert bighorn sheep in the study area, as documented by Sproat (2012)."

Oddly, in the concluding sentences that follow, Sproat et al. (2019) tried to qualify this non-effect by reiterating speculation that increasing human use will have population level impacts on bighorn that needs to be mitigated and further research is needed. Specific wording includes "links among human activity, behavior of bighorn sheep and resulting consequences for fitness [which] will provide additional information useful to managers." This inability to let go of a desired but undemonstrated research outcome is typical of some of the most frequently cited literature on human disturbance of wildlife. Also typical is the call for more data but never the critical tests that could potentially falsify their human disturbance hypothesis. It appears that Sproat (and his coauthors) were attempting to squeeze a conclusion out of data that are contrary to that conclusion.

In the discussion of their paper, Sproat et al. (2019) attempt to build a case that bighorn sheep habitat in Canyonlands is under threat of being abandoned citing other bighorn studies. Contrary to Sproat et al's (2019) assertion, Longshore et al. (2013) did not report any abandonment of habitat or population

decline in Joshua Tree National Park, instead those desert bighorn sheep ewes merely moved away from centers of human activity on busy weekends and moved back during the week when human use was lower. No deleterious effect on demography was reported. We also note that those desert bighorn sheep in Joshua Tree are not hunted. As pointed out in the attached reviews, Widedmann and Bleich (2014) did not even attempt to rule out more obvious cases for decline and eventual abandonment in a study area in North Dakota along the Little Missouri River; namely, extensive residential, commercial, and agricultural development, and suboptimal habitat to begin with. They did not rule out these factors because they never admitted that they existed.

Also cited by Sproat (2019) is the thesis by Courtemanch (2014) which presented data about constriction of winter range bighorn habitat by backcountry skiers and snowboarders in the Tetons of Wyoming. However, neither that study nor Sproat et al. (2019) mentioned the fact that bighorn sheep from the Teton bighorn population are hunted, which results in bighorn avoiding humans because they are potential predators. In addition to bighorn, mountain goats that utilize the same habitat as bighorn in the Tetons, are hunted on USFS land just outside the Grand Teton National Park. The State of Wyoming Bighorn Sheep Hunt Area #6 lists a quota of one bighorn sheep annually with a hunting season extending from August 1st through October 31st. This bighorn population also overlaps Mountain Goat Hunt Areas #2 and #5 with a current quota of 4 and 8 mountain goats respectively and a hunting season from August 15 to October 31st. While these quotas may not seem high, it is significant that hunters and their guides often spend weeks scouting and hunting in bighorn and mountain goat habitat, approaching their potential quarry as predators, and killing them with archery or rifle. Consequently, it should come as no surprise that bighorn sheep in the study by Courtemanch (2014) avoided other humans as potential predators.

Like the subpopulation studied by Wieddemann and Bleich (2014), the Grand Teton bighorn sheep population was also compromised by extensive development, as Courtemanch (2014) notes:

> "The Teton bighorn sheep population has experienced numerous changes to its habitats and migration patterns due to residential development, construction of roads and fences, historical livestock grazing, and wildfire suppression, culminating in the population abandoning its traditional low elevation winter ranges (Whitfield 1983)."

Also unusual is the fact that 78% of backcountry skiers and snowboarders in the study by Courtemanch (2014) accessed the backcountry and bighorn habitat from ski lifts in Jackson Hole Mountain Resort and Grand Targhee ski resorts, a situation very different from the desert of southeastern Utah.

In conclusion, Sproat and the EA make apples-to-oranges comparison to studies with very different circumstances and uncritically accept the authors conclusions without first evaluating the assumptions, methods and data used.

A review of scientific issues in Wideman and Bleich (2014):

The paper by Wiedmann and Bleich (2014), cited by Sproat et al. (2019) and in the EA, attempted to lay blame for the abandonment of habitat by a ewe group on construction of a trail, while ignoring other, far more obvious factors for the decline and eventual abandonment of this translocated ewe group and associated lambing area. The authors of that paper failed to account for and test other, far more obvious factors, including disease, habitat fragmentation and development. Additionally, because Wiedmann and Bleich (2014) erroneously cited the speculation in Papouchis et al. (2000,

2001) as if they were data-driven results, other authors have used this study to further reinforce their belief that human recreational disturbance of bighorn sheep is deleterious to their health and population survival. However, a closer examination of that paper reveals it to be factually deficient and misleading.

The authors of Wiedemann and Bleich (2014) failed to acknowledge that Sully Creek was a marginal site to translocate bighorn sheep into for reasons that now appear to be obvious. This area has low topographic relief as it is along the river breaks of the Little Missouri River in North Dakota. Connectivity to the northern ewe groups required that bighorn ewes migrate along a river corridor under or over the four-lane highway (Interstate 94), across a railroad track as well as across numerous paved and unpaved roads, and around development. The close proximity to the town of Medora, North Dakota and availability of private land, where the bighorn were released in the 1950's, would inevitably lead to extensive development of the surrounding area including habitat occupied by bighorn. Seen from Google Earth historical imagery, permanent land conversion and development over the past 20 years in (and surrounding) the Sully Creek ewe home ranges and lambing areas has included: a golf course, a bible camp, agricultural field development, livestock, new private home construction, expansion of existing ranching and private land infrastructure (trailers, pens, fences, outbuildings, livestock, paved and dirt roads), oil and gas development, and artificial water ponds. This land conversion and development fragmenting and encroaching on the limited bighorn sheep habitat and movement corridors was not mentioned at all by Widedmann and Bleich (2014).

And finally, given that bighorn sheep are highly susceptible to strains of bacteria that cause fatal respiratory pneumonia in bighorn sheep and that the State of North Dakota has over 72,000 domestic sheep, it would seem obvious that disease should be strictly ruled out as a cause of decline before invoking other causes. However, none of the tonsillar swabs used to test for this disease were taken from sick or dying lambs. The only tonsil swabs were taken from healthy ewes that were captured for radio-collaring and the authors did not mention the number of samples that were taken from the Sully Creek ewe group.

In conclusion, if obvious sources of bighorn population loss, including capture and removal for translocations and ongoing mortality from hunting and predation have not been found to negatively affect population status, then why is the BLM proposing additional restrictions in bighorn sheep habitat? Can the BLM demonstrate why (and where) previous regulations and restrictions were found to be inadequate for maintaining a stable bighorn sheep population? Is the BLM willing to base its wildlife regulations on the hypothetical threat that bighorn sheep are not eating enough in areas where humans are present, based on worst-case scenarios from a study that could not find those effects? Why does the BLM not acknowledge in the EA that bighorn sheep habituate to predictable and non-threatening human behaviors?

C. Raptors

(1) Raptor Guidelines are Applicable to New Projects Rather than Existing Uses

As stated in the 2002 raptor guidelines (Romin and Muck 2002), the guidelines are applicable to new projects and expanding development/activity, rather than existing land uses to which raptors have habituated, such as those in the SMRA. Therefore, rather than restrict or eliminate existing campsites and travel routes within the 0.5 mile one-size-fits-all buffer zone of raptor nests, as proposed in the EAs, we

recommend retaining these but posting educational signage and/or physical impediments (i.e., logs or boulders) to discourage use outside of the existing campsite and travel route envelope. The BLM could also monitor these raptor nesting locations as part of its adaptive management strategy to evaluate and refine future mitigation measures with systematically collected data.

The above strategy would be separate from the process involved in the BLM evaluation of new campgrounds.

(2) Raptors and Adaptation to Human Activity

The BLM needs to acknowledge the fact that raptors do adapt to human activity that is much closer and more intense than camping and recreational use. For example, the specific language in the Romin and Muck (2002) guidelines are as follows:

> *"Prior disturbance history and tolerance of raptors* -- As mentioned previously, some individual and breeding pairs of raptors appear relatively unperturbed by some human disturbance and human-induced impacts and continue to breed successfully amid these activities. Nesting within or near human-altered environments may be a manifestation of the decreased availability of high-quality natural nest sites; indicative of high densities of breeding birds; indicative of abundant or available prey; or simply a display of higher tolerance for disturbance by certain individuals or breeding pairs. Accordingly, it is not the intent of these guidelines to restrict current land use activities in those situations where raptors appear to have acclimated to the current level of disturbance and human-induced impacts. However, these Guidelines should be closely followed if proposed land use activities may result in exceeding the current levels and timing of disturbances."

As discussed in the raptor guidelines, this habituation has been documented to occur at more intense levels of human disturbance, and more frequently than that associated with campsites and travel routes, trails, and current recreational activities in the planning areas:

> "Some individual breeding pairs appear relatively unperturbed by human disturbance and human-induced impacts and continue to breed successfully amid development (Mathisen 1968, Bird et al. 1996). In addition, some land-use actions are potentially beneficial for some raptor species, such as: selective logging, utility lines, dams and reservoirs, farming, grazing, fire, mechanical/chemical, and public observation (Olendorff et al. 1989). For example, peregrine falcons and prairie falcons have been observed nesting on transmission towers, bridges, and buildings in many cities and raptors, including bald eagles and golden eagles, have nested within a few hundred meters of airports, blasting, construction, quarry, and mine sites (Pruett-Jones et al. 1980, Haugh 1982, White et al. 1988, Holthuijzen et al. 1990, Russell and Lewis 1993, Steenhof et al. 1993, Bird et al. 1996, Carey 1998)."

(3) Raptor Nest Buffer Distances

Raptor Nest Buffer Distances should be revised based on data rather than opinion, as they are currently in the EAs and papers cited in the EAs. Raptor buffer distances around points, such as the 0.5 mile-radius buffer, is a one-size-fits-all buffer that lacks a sound scientific basis (e.g., data that can show a reduced survivorship of individuals or a population-level effect at distances less than this threshold). In fact, none

of the species listed in the EAs are notably sensitive to human presence and the often-repeated myth of human disturbance causing nest abandonment or failure comes from decades in the past (i.e., before the 1970s and the environmental movement). Those early documented cases of "human disturbance" leading to nest failure were actually from the destruction of golden eagle nests, killing of young, and shooting of adults from the ground near nests and birds in flight from aircraft. This misguided persecution was carried out by domestic sheep producers and ranchers in the USA (Nelson 1982). In fact, Colorado had a hunting season on golden eagles until 1966. The killing of eagles by Native Americans for feathers used in ceremonial headdresses was another documented form of "human disturbance" (Nelson 1982). During the same period, "human disturbance" of peregrine falcons was from egg collectors who "roped" into nests and were mistakenly referred to in the past as "climbers." And in Scotland and the UK, game keepers shot peregrine falcons on sight to protect game birds (Ratcliffe 1993). Although that dark chapter of persecution of raptors is now closed, some uncritical authors still conflate past human disturbance that had lethal intent, with contemporary use of the term "human disturbance" that refers to any human presence in the vicinity of nests, even if it is benign.

Experimental evidence reveals a greater tolerance of golden eagles (and other raptors) to human presence and activities than is typically parroted in the literature and in various well-intentioned guidelines that are based upon opinions rather than experimental data. Three studies on human disturbance of raptors stand out in contrast to the trend described above because they relied on controlled experiments to test the effects of human disturbance on the fitness of raptors (White and Thurow 1985, Holthuijzen et al. 1990, Grubb et al. 2007, 2010). All three utilized disturbances that were clearly threatening (e.g. blasting, threatening approach via foot/vehicle/helicopter, gunshots and noisemakers), as compared to relatively benign activities such as hiking, rock climbing, horseback riding, and driving vehicles. Yet, all three reported a remarkable tolerance of human presence, a decreased response when habituated, and recommended substantially smaller buffer zones than those typically imposed. The BLM needs to acknowledge this tolerance and habituation to human activities that are far more threatening than recreational uses in the planning areas.

More specifically, the activities include those in three studies that we'll summarize. First, Holthuijzen et al. (1990) measured the effects of nearby blasting on nesting prairie falcons, as compared to undisturbed controls. They reported:

> "This study demonstrated that, in general, blasting had no severe adverse effects on the falcon's behavioral repertoire, productivity, and occupancy of nesting territories. Therefore, we suggest that when blasting does not occur prior to aerie selection and ceases prior to fledging, blasting that takes place at least 125 m from occupied prairie falcon aeries need not be restricted, provided that peak noise levels do not exceed 140 dB at the aerie (i.e., the noise level we measured for our experimental blasts). We recommend that no more than 3 blasts occur on any given day or 90 blasts during the nesting season."

Second, White and Thurow (1985) used an experimental approach to quantify the effects of human disturbance on nesting ferruginous hawks. Their "low level" disturbance involved approaching nests on foot while firing a rifle every 20m, driving up to nests, and continuously operating a 3.5hp gasoline motor or noisemaker within 30-50m of a nest. They reported:

> "Unlike previous reports of substantial nest desertion by raptors as a result of human activity, the number of disturbed nests that were deserted in our study was unexpectedly low."

> "Our observations suggest that a sufficient buffer zone for brief human disturbance around ferruginous hawk nests is 250 m. Adults will not flush 90% of the time if human activity is confined to distances greater than this."

Third, Grubb et al. (2007, 2010) directly approached golden eagle nests at close range via helicopter, and quantified behavior and nest success. This study was a poignant refutation to an often repeated but erroneous perception (discussed above) that golden eagles are highly susceptible to human disturbance. The authors reported results contrary to expectations:

> "Multiple exposures to helicopters during our experimentation in 2006 and 2007 had no effect on golden eagle nesting success or productivity rates, within the same year, or on rates of renewed nesting activity the following year, when compared to the corresponding figures for the larger population of non-manipulated sites. During our active testing and passive observations, we found no evidence that helicopters bother golden eagles nor disrupt nesting. In 303 helicopter passes near eagles, we observed no significant, detrimental, or disruptive responses. 96% of 227 experimental passes of Apache helicopters at test distances of 0-800 m from nesting golden eagles resulted in no more response than watching the helicopter pass (30%). "

> "We found no relationship between helicopter sound levels [even though Apache helicopters were twice as loud as the civilian helicopters] and corresponding eagle ambient behaviors or limited responses, which occurred throughout recorded test levels (76.7-108.8 dB, unweighted)."

> "Between all the other aircraft and human activities occurring in the Tri-Canyon Area, as well as their long term coexistance with WPG and apparent indifference to current operations, golden eagles in the area appear acclimated to current levels of activity. "

> "For the specific question of WPG operating in the Tri-Canyon Area without potentially impacting nesting golden eagles, we found no evidence that special management restrictions are required. (Authors' Note: The results of this research were very much unexpected since helicopters are usually considered more disruptive to bald eagles than any other type of aircraft. Plus, golden eagles are traditionally thought to be more sensitive, and therefore more responsive, to human intrusions than bald eagles. However, **we found the golden eagles studied during this project to be just as adaptive, tolerant, and acclimated to human activities as any bald eagles in our rather considerable, collective experience with this species. We hypothesize this may at least be in part due to the proximity of the large, growing, and outdoor-oriented population of the Salt Lake Valley and Wasatch Front.**"

The experimental results of the three studies above should serve as an inspiration to the BLM to incorporate an adaptive management strategy into the planning process for evaluating the influence of specific types and locations of recreational use on nesting raptors.

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EDUCATION

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AREAS OF EXPERTISE

- **Endangered species conservation**: 30+ years of experience with scientific research, consulting, and hands-on management of endangered species in the United States and abroad, and extensive experience with the U.S. Endangered Species Act.
- **Scientific review, advising, and research:** Peer review of scientific research, organizing scientific review teams, conducting original research, and providing expert testimony.
- **Emerging Environmental Issues:** Including, but not limited to, emerging infectious diseases in wildlife, adaptation of species to changing environments, and human-wildlife interactions.
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RESEARCH AND PROFESSIONAL EXPERIENCE

President, Wildlife Science International, Inc., Nederland, CO (2007 - present) https://www.wildlifescienceintl.com/

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Consulting Science Advisor, Center for Environmental Science Accuracy and Reliability (CESAR), (2009-2021)

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Curator of Vertebrate Zoology, Denver Museum of Nature and Science (2000 - 2005)

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USDA Postdoctoral Research Fellow, University of Colorado, Boulder (1994 - 1997)

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Research Associate, University of California, White Mountain Research Station (1986 - 1994)

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Research Assistant, Yale University, Department of Biology, New Haven, CT (1985)

Field biologist, Condor Research Center, Ventura, CA (1983 - 1984)

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CONGRESSIONAL TESTIMONY

April, 8 2014, United States House of Representatives, Committee on Resources. Hearing on: *H.R. 4315, (Hastings), "21st Century Endangered Species Transparency Act," H.R. 4316, (Lummis), "Endangered Species Recovery Transparency Act," H.R. 4317, (Neugebauer), "State, Tribal, and Local Species Transparency and Recovery Act," and H.R. 4318, (Huizenga), "Endangered Species Litigation Reasonableness Act."* (Provided oral and written testimony.)

August 1, 2013, United States House of Representatives, Committee on Resources. Oversight Hearing on: *"Transparency and Sound Science Gone Extinct?: The Impacts of the Obama Administration's Closed-Door Settlements on Endangered Species and People*." (Provided oral and written testimony.)

July 3, 2012, California State Legislature, Senate Committee on Natural Resources and Wildlife. Provided oral and written testimony on scientific issues concerning supposed human disturbance of bighorn sheep, relevant to Assembly Bill AB880. (AB880 was subsequently passed and signed into law by Governor Brown).

July 31, 2007, United States House of Representatives, Committee on Resources. Legislative Hearing on: *"Crisis of Confidence: The Political Influence of the Bush Administration on Agency Science and Decision-Making" (Provided written testimony.)*

April 28, 2004, United States House of Representatives, Committee on Resources. Legislative Hearing on: *"H.R. 2933, To amend the Endangered Species Act of 1973 to reform the process for designating critical habitat under that Act."* (Provided oral and written testimony.)

TEACHING EXPERIENCE

Continuing Legal Education International, American Law Institute, and University of Pennsylvania Workshops on Markets and the Environment - Invited faculty to lecture on the U.S. Endangered Species Act (2004-2008)

Colorado Bar Association, Invited faculty to lecture on the U.S. Endangered Species Act (2014)

The Watershed School, Boulder, CO - Instructor for May Term course on *Biodiversity and Conservation Issues in Hawaii* (2010, 2013)

University of Colorado, Boulder. Instructor of Genetics (1998 - 1999)

University of Colorado, Boulder – Research Advisor for Hughes Undergraduate Research Initiative (1996 - 1999)

Cornell University, Teaching Assistant for majors and non- majors courses in Evolutionary Biology (1988 - 1992)

AWARDS, FELLOWSHIPS and MEMBERSHIPS

Boulder Climbing Community - Stewardship Award for golden eagle monitoring (2020)
International Union for the Conservation of Nature, Caprinae Specialist Group (2000 - 2013)
University of Colorado, Denver, Department of Environmental Science - Adjunct Faculty (2002 - 2006)
University of Denver, Department of Biology - Adjunct Faculty (2002 - 2004)
U.S. Department of Agriculture, Postdoctoral Research Fellowship (1994 - 1996)
Cornell University, Outstanding Graduate Student Teaching Award (1992)

COMMUNITY SERVICE

Nederland Fire Protection District: Volunteer Firefighter (1996 - 2013, now retired)
U.S. Forest Service and Boulder Climbing Community: Volunteer Golden Eagle Nesting Monitor in Boulder Canyon, Colorado (2001 to present)
Desert Elephant Conservation: Board member and researcher (2006 to present)
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AVOCATIONS

Rock climbing, backcountry telemark skiing, river rafting, and travel to remote locations.

SELECTED SCIENTIFIC PUBLICATIONS

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