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**RE: Colorado Chronic Wasting Disease Response Plan**

Dear Director Broscheid and members of the CWD Advisory Group:

On behalf of the Humane Society of the United States, Mountain Lion Foundation, WildEarth Guardians and our numerous members and supporters in Colorado, we appreciate the opportunity to comment on the Colorado Chronic Wasting Disease (“CWD”) Response Plan. We support the CWD Advisory Group’s efforts to help curb the spread of CWD across Colorado by providing proactive responses to the epidemic. However, we believe the advisory group must fully consider the benefits provided by large carnivores to reduce the spread of CWD—chiefly, mountain lion predation on CWD-infected wild cervids. For the reasons that follow, the CWD Response Plan must incorporate protections for mountain lions from trophy hunting, especially in areas where CWD has been identified. We also recommend the CWD Advisory Group include a strategy to address the spread of CWD between captive and wild herds.

**1. The CWD Response Plan must consider the vital ecosystems benefits provided by mountain lions, including removing CWD-infected wild cervids.**

Top carnivores like mountain lions face an extinction crisis in North America and across the earth.<sup>i</sup> The loss of megafauna, including top carnivores, caused 23 prominent biologists to convene and produce a seminal paper called, “Trophic Downgrading of Planet Earth.”<sup>ii</sup> In it, biologists warn that the loss of top carnivores and other megafauna will cause increasing pandemics, dysfunctional ecosystems and accelerate the increases in the effects of climate change.

Mountain lions serve important ecological roles, including providing a variety of ecosystem services.<sup>iii</sup> As with most large carnivores, mountain lions are considered a keystone species because they help drive the ecosystems in which they live.<sup>iv</sup> As such, conserving these large cats on the landscape creates a socio-ecological benefit that far offsets any societal costs.<sup>v</sup> Their protection and conservation has ripple effects throughout their natural communities.

As a large predator, mountain lions regulate many of the other species in their communities, including herbivores, who then regulate the plant community.<sup>vi</sup> Wildlife managers and biologists also consider mountain lions to be an “umbrella” species – by protecting lions and their large habitat, a wide array of additional plants and animals in this habitat will also be protected.<sup>vii</sup> In Zion National Park, for example,

researchers found that by modulating deer populations, mountain lions prevented overgrazing near fragile riparian systems. The result was more cottonwoods, rushes, cattails, wildflowers, amphibians, lizards and butterflies, as well as deeper, but narrower stream channels.<sup>viii</sup> In other words, mountain lions enhance biological diversity. The carrion left from lion kills feeds scavengers such as bears and raptors, further enhancing biological diversity.<sup>ix</sup>

Mountain lions can help maintain the health and viability of wild cervid populations by preying on sick individuals, reducing the spread of disease such as CWD.<sup>x</sup> This ecosystem benefit is increasingly important as CWD infection continues to infiltrate deer, elk and moose herds in Colorado and beyond.<sup>xi</sup>

Hunters likely cannot substitute for mountain lions as providers of ecological services such as stopping the spread of disease.<sup>xii</sup> During a three-year study on Colorado's Front Range, researchers found that mountain lions preyed on mule deer infected with CWD.<sup>xiii</sup> The study concluded that adult mule deer preyed upon by lions were more likely to have CWD than deer shot by hunters. According to the study, "The subtle behaviour changes in prion-infected deer may be better signals of vulnerability than body condition, and these cues may occur well before body condition noticeably declines."<sup>xiv</sup> This suggests that mountain lions select for infected prey and may be more effective at culling animals with CWD than hunters who rely on more obvious signs of emaciation that occur in later stages of the disease. Moreover, the lions consumed over 85 percent of carcasses, including brains, thereby removing a significant amount of contamination from the environment.<sup>xv</sup>

Maintaining healthy, stable mountain lion populations is essential for reducing the spread of CWD among wild cervids, their primary prey sources. It is essential that the CWD Response Plan acknowledge this ecosystem service and incorporate mountain lion predation as a tactic to address CWD, especially in key areas or "hot spots" with a high prevalence of CWD. This must be done through the protection of mountain lion populations across Colorado from unnecessary and excessive trophy hunting.

## **2. The CWD Response Plan must consider the effects of trophy hunting on mountain lion populations and the resulting loss of predation on CWD-infected wild cervid populations.**

As detailed above, research has shown the benefits of preserving native carnivore populations, primarily mountain lions, to help maintain healthy, wild cervid populations. Even so, CPW permits excessively high rates of trophy hunting on mountain lions throughout Colorado. Colorado ranks as the third highest in the U.S. for its mountain lion trophy hunting mortality.<sup>xvi</sup> Colorado's mountain lion hunting quotas and mortalities have grown rapidly in recent years, with the highest numbers ever recorded during the 2016 trophy hunt, with 475 lions being killed by hunters.

While CPW does not rely on a formal statewide mountain lion population estimate, the agency's experts suggest the population likely numbers 3,500 to 4,500 cats of all ages,<sup>xvii</sup> which amounts to approximately 2,345 to 3,015 mature-aged cats who may be legally trophy hunted.<sup>xviii</sup> The 2016 trophy hunting mortality of 475 lions resulted in a loss of approximately 15.8% to 20.3% of Colorado's mature mountain lion population. This level of killing is excessive and unsustainable,<sup>xix</sup> likely harming the health and stability of Colorado's mountain lion populations as well as wild cervid populations who benefit from mountain lion predation on individuals infected with CWD.

Mountain lions are rare on the landscape and occur at low densities relative to their primary prey, making them sensitive to bottom-up (prey declines) and top-down (human persecution) influences.<sup>xx</sup> In order to survive, their populations must stay at a smaller size relative to their prey's biomass or risk starvation.<sup>xxi</sup> Social stability promotes their resiliency, but human persecution affects their social structure and harms their persistence.<sup>xxii</sup>

Research shows that trophy hunting results in additive mortality, causing total mortality to far exceed what would occur in nature.<sup>xxiii</sup> In fact, the effect of human persecution is “super additive,” meaning that hunter kill rates on large carnivores has a multiplier effect on the ultimate increase in total mortality over what would occur in nature, due to breeder loss, social disruption, and indirect effects including increased infanticide and decreased recruitment of their young.<sup>xxiv</sup> When trophy hunters remove the stable adult mountain lions from a population, it encourages subadult males to immigrate, leading to greater aggression between cats, mortalities to adult females, and subsequent infanticide.<sup>xxv</sup>

A recently published study on mountain lions in the Teton region of Wyoming shows that mountain lions are quite social animals and live in “communities,” as females share kills with other females and territorial males, and males may help protect the kittens they’ve fathered from incoming, competing males.<sup>xxvi</sup> Disrupting these communities can cause negative effects and increase conflicts by creating social chaos within their populations.<sup>xxvii</sup> Trophy hunting can easily destabilize mountain lion populations, causing increased conflicts with humans, pets, and livestock.<sup>xxviii</sup> Moreover, over-hunting harms a population’s ability to recruit new members if too many adult females are removed.<sup>xxix</sup>

Heavy persecution of mountain lions is not a long-term solution to boosting prey species populations and should not be used as a strategy for protecting wild cervid populations as we tackle the spread of CWD. The decline in Colorado’s mule deer population is part of a broad, regional pattern. This decline is likely the result of a combination of multiple limiting factors, such as disease, lack of high-quality winter range, and access to adequate nutrition.<sup>xxx</sup> Removing natural predation from the landscape in order to artificially adjust for these primary limiting factors is unsound wildlife management.

Because mountain lions are vital to maintaining the health and viability of wild cervid populations, including by removing sick individuals, protecting and preserving stable mountain lions populations is an appropriate and necessary strategy to reduce the spread of CWD. Killing mountain lions, especially in areas with CWD-infected cervids, is harmful to these wild species as well as entire ecosystems. Therefore, wildlife managers must prohibit the trophy hunting of mountain lions throughout Colorado, especially in CWD “hot spots.” If a complete prohibition on trophy hunting of mountain lions is not possible, the CWD Response Plan must include options for reduced hunting quotas and shortened trophy hunting seasons for mountain lions.

### **3. The CWD Advisory Group must consider actions to reduce the spread of CWD from captive cervids.**

The CWD Response Plan addresses wild cervid populations but lacks tactics to reduce the spread of CWD between captive and wild populations. We recommend the CWD Advisory Group include a strategy within the CWD Response Plan to address this issue. This strategy should include increased fencing requirements for captive cervid facilities. Enforcement is key, and if funding is an obstacle, increased fees to the captive cervid industry should be implemented. Captive cervid facilities are directly contributing to the spread of CWD. They concentrate the animals in unnaturally high densities, greatly increasing the risk of disease transmission and posing significant threats to animals both inside and outside the fence. Because of the unique nature of CWD, it is a highly infectious disease. Cervids with CWD can shed the infected prions through bodily fluids such as saliva and feces. These prions can survive in the soil for an unknown number of years, potentially infecting any cervids that come into contact with it.<sup>xxxi</sup> CWD has already shown that it cannot be contained by a fence, and all efforts must be made to prevent its spread from captive populations to wild herds.

The most effective solution toward controlling CWD, short of ideally eliminating captive facilities altogether, is to enact a double-fencing requirement to current permit holders. Single-fencing puts both

captive and wild cervid populations at a greater risk of contracting CWD as these animals are easily able to make nose-to-nose contact through the fence.<sup>xxxii</sup> Furthermore, escapes can and do happen, greatly increasing the chances of CWD to further spread from captive to wild populations.

The strategy should also include the implementation of fines related to escaped captive cervids. Due to a lengthy incubation period, and the absence of symptoms in some cases, CWD may go undetected for years.<sup>xxxiii</sup> For this reason, it's essential to deter captive cervid owners from either allowing animals to escape – either intentionally or through negligence. Implementing fines for such behavior would be an excellent first step.

The economic impact CWD can have on a state is astounding. Since its detection in 2002, Wisconsin's wildlife agency alone has spent \$45 million responding to the disease and estimates of lost revenue to the state are even higher.<sup>xxxiv</sup> A study in Tennessee reported that an outbreak of CWD in the state would cost an estimated \$98 million and a loss of over 1,400 jobs.<sup>xxxv</sup> It's reasonable to require captive facility owners to share some of this burden.

Lastly, the CWD Advisory Group must consider a complete prohibition on new captive cervid facilities in Colorado. We have little to gain, and much to lose, by allowing new captive cervid facilities in the state. The spread of CWD threatens industries that generate revenues that dwarf those produced by captive cervids, notably the wildlife watching and traditional, fair-chase hunting industries. With no live test, and no way to determine if a herd is truly CWD-free, potentially-infected captive cervids are already trucked all around the state to new areas. A prohibition on new facilities would at least stem some of that movement, and stop the spread to brand new areas.

#### 4. Conclusion.

We commend the CWD Advisory Group for its proposed CWD Response Plan, but we also request that the plan go one step further by including protections for mountain lion trophy hunting. Maintaining healthy, stable mountain lion populations is essential for reducing the spread of CWD among wild cervids, their primary prey sources. It is essential that the CWD Response Plan acknowledge this ecosystem service and incorporate mountain lion predation as a tactic to address CWD, especially in key areas with a high prevalence of CWD.

We also request the CWD Advisory Group develop a strategy to reduce the spread of CWD between captive and wild cervid populations. The disease and associated economic risks that captive hunts and cervid breeding farms pose to the health and stability of Colorado's wild deer, elk and moose herds are simply too high not to take severe action. Thank you for your consideration.

Sincerely,

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- <sup>i</sup> Treves and Karanth (2003), Ritchie and Johnson (2009), Beausoleil et al. (2013), Darimont and Child (2014), Ripple et al. (2014), Child and Darimont (2015), Ripple et al. (2016), Ripple et al. (2017)
- <sup>ii</sup> Beausoleil et al. (2013)
- <sup>iii</sup> e.g., Alexander and Waters (2000), Barnard (2008), Beausoleil et al. (2013), Allen et al. (2014), Allen et al. (2015), Elbroch et al. (2017)
- <sup>iv</sup> Soule et al. (2003)
- <sup>v</sup> Gilbert et al. (2016)
- <sup>vi</sup> Allen et al. (2014), Elbroch et al. (2014)
- <sup>vii</sup> Logan and Sweanor (2001)
- <sup>viii</sup> Ripple and Beschta (2006), Elbroch and Wittmer (2012)
- <sup>ix</sup> Elbroch and Wittmer (2012), Elbroch et al. (2017)
- <sup>x</sup> Miller et al. (2008), Krumm et al. (2009)
- <sup>xi</sup> Colorado Parks & Wildlife (2018)
- <sup>xii</sup> Darimont et al. (2015)
- <sup>xiii</sup> Krumm et al. (2009)
- <sup>xiv</sup> Krumm et al. (2009, p. 210)
- <sup>xv</sup> Krumm et al. (2009)
- <sup>xvi</sup> The Humane Society of the United States (2017)
- <sup>xvii</sup> CPW stated an informal estimate of 3,500 to 4,500 mountain lions of all ages during a Colorado Legislative Animal Welfare Caucus hearing in February 2016.
- <sup>xviii</sup> Mature-aged cats, or adults and subadults, account for approximately 67% of a mountain lion population Logan and Sweanor (2001). State wildlife agencies must consider this subset of the population when setting trophy hunting quotas as mountain lion kittens are not legally trophy hunted.
- <sup>xix</sup> A ten-year study of hunting cougars on the Uncompahgre Plateau by CPW found that a sustainable offtake rate amounted to 11 to 12 percent of the population Logan (2014), while a study in Montana suggests no more than 12 percent Robinson and Desimone (2011).
- <sup>xx</sup> Stoner et al. (2006)
- <sup>xxi</sup> Hatton et al. (2015)
- <sup>xxii</sup> Lambert et al. (2006b), Stoner et al. (2006), Darimont et al. (2009), Miller et al. (2011), Peebles et al. (2013), Bryan et al. (2014), Darimont et al. (2015), Wallach et al. (2015)
- <sup>xxiii</sup> Vucetich et al. (2005), Wright et al. (2006), Eberhardt et al. (2007), Darimont et al. (2015)
- <sup>xxiv</sup> Creel and Rotella (2010), Ausband et al. (2015), Darimont et al. (2015)
- <sup>xxv</sup> Lambert et al. (2006a), Cooley et al. (2009), Robinson and Desimone (2011), Wielgus et al. (2013), Robinson et al. (2014)
- <sup>xxvi</sup> Elbroch et al. (2017)
- <sup>xxvii</sup> Lambert et al. (2006b), Cooley et al. (2009), Robinson and Desimone (2011), Wielgus et al. (2013), Robinson et al. (2014), Ausband et al. (2015), Creel et al. (2015), Darimont et al. (2015)
- <sup>xxviii</sup> Peebles et al. (2013)
- <sup>xxix</sup> Anderson and Lindzey (2005)
- <sup>xxx</sup> Bergman et al. (2014), Bergman et al. (2015), Johnson et al. (2016)
- <sup>xxxi</sup> Miller et al. (2004), Mathiason et al. (2006)
- <sup>xxxii</sup> VerCauteren et al. (2007)
- <sup>xxxiii</sup> Rorres et al. (2018)
- <sup>xxxiv</sup> Smith (2013)
- <sup>xxxv</sup> Menard et al. (2003)

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