LIVE OAK ASSOCIATES, INC.
an Ecological Consulting Firm

May 11, 2011

NoBearHuntNV.org
P.O. Box 394
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SUBJECT: Comments on the proposed CGR 393 Black Bear Hunt Regulations for the State of Nevada, to be heard by the Nevada Board of Wildlife May 12, 2011.

Dear Board of Directors NBHNV:

At your request I have reviewed the proposed CGR 393 Black Bear Hunt Regulations for the State of Nevada, and all of the background material you have received from the Nevada Department of Wildlife (NDOW). These include annual summary reports from 1998 until the present; the *Nevada Black Bear: Ecology, Management and Conservation* (1993); *Nevada's Black Bear: Ecology & Conservation of a Charismatic Carnivore* (2004); a June 25, 2010 powerpoint presentation given to the Nevada Board of Wildlife Commissioners; bear capture data from July 1997 to November 2010; *Carnivores, urban landscapes, and longitudinal studies: a case history of black bears* (Beckman, J.P. and C. W. Lackey. 2008. Human-Wildlife Conflicts, 2(2): 168-174. University of Nebraska – Lincoln); and *Black Bear Population Assessment Methodology and Data Analysis in Nevada: A Review* (Nevada Department of Wildlife 2011).

The proposed regulation has been placed on the May 12, 2011 agenda to be heard by the Nevada Board of Wildlife. I respond to this proposed black bear hunt in Nevada, as an expert on the ecology and biology of large mammals (particularly large predators) and as co-founder and Principal of Live Oak Associates, Inc., (LOA) an ecological consulting firm based in California with three offices, Oakhurst, San Jose and Bakersfield. LOA has supervised the preparation of more than 800 CEQA studies in the past eleven years.

LOA provides public and private clients with science-based solutions to complex natural resource issues. Our focus is to rely on sound ecological principles in evaluating the distribution and abundance of sensitive biological resources on or in the region of a project site, clearly evaluate the project's effects both on a site-specific basis and on a regional scale that is relevant to the species or resources (e.g., wetlands) that may be impacted by the project, and then provide for appropriate mitigations to offset these impacts. To this end, LOA is uniquely qualified to provide a statistically robust framework for predicting the effects that large projects

(e.g., several thousand acres) have on the suitable habitats and regional landscape connectivity for the key wildlife species, particularly large carnivores.

I have reviewed the background materials noted above and based on this review, it is my professional opinion that this Nevada Department of Wildlife (NDOW) fails to provide the detailed information about the unpublished population estimate as noted in the *Black Bear Population Assessment Methodology and Data Analysis in Nevada: A Review* (NDOW 2011 and what information it does provide, it greatly exceeds the inference space of the available data and estimates and the analysis fails to incorporate the spatial and social complexity that truly represents the majority of the black bear population in Nevada.

Over the last couple of decades, Nevada has truly embarked on some thoughtful and informative wildlife research as it relates to bears in Western Nevada. The majority of the bear population occurs in the National Forest land along the Carson Front (NDOW 2004). For example, Beckman and Lackey (2008) noted that "The current population estimate is 200-400 bears, the lowest of any western state…". These authors described bears in and around urban centers in Western Nevada, particular the Tahoe Basin, as being urban bears (90% of their locations within urban areas) and wildland bears (nearly 100% of their locations in wildland areas. These are largely behavioral differences and do not described truly different bear populations (Beckman, J.P. and J. Berger. 2003. *Using black bears to test ideal-free distribution models experimentally.* Journal of Mammalogy, 84:594-606). They found that mortality in urban areas is exceeding recruitment resulting in an urban sink. For the data they analyzed they reported a stable population growth rate for wildlife bears. Additionally, bear densities were much higher in the urban interface (as they noted, the 2nd highest density for black bears in North America) when compared with wildland bear densities. This lead the authors to conclude that wildland bears were being drawn out of the wildland areas into the urban areas with their clumped food resources. They painted a picture of a source-sink dynamic for the Tahoe Basin, "…with urban areas acting as a sink for bears produced in both urban and wildland source areas." These authors concluded that given this unique source-sink dynamic perpetrated by the large clumping of human food resources, that the bears of the Lake Tahoe Basis are currently unable to repopulate vacated wildland areas.

Population Estimate.

The well-known statistician George Box noted, "Essentially, all models are wrong, but some are useful." While I strongly believe in the use of predictive models to inform conservation of large carnivores, many aspects of the current analysis as to the estimated size of the bear population for Western Nevada and the rate of change of the population falls outside of the "useful paradigm" described by Box.

The data analysis used data collected from 1997 to 2008 and relied on the well-known software Program MARK. In summary, it was concluded that the Nevada bear population in the study area was estimated at between 200-300 bears at the end of 2008. It also concluded that the rate of population increase was estimated at 16% annually.

While it is inferred by NDOW that there has been a population increase, they have not provided sufficient information to support that notion. As noted above, Beckmann and Lackey (2008) reported that the estimate for bears in the same general region of Nevada was between 200-400 bears. A presentation by NDOW June 25, 2011 provided point estimates for the bear population as Goodrich and Stiver (1992) of 150, Beckmann and Lackey (2002) and unpublished data from NDOW in 2010 as 253 bears. A note of caution, point estimates as noted in the June 25, 2011 presentation, are of limited value in ecology. They convey little useful information and are hard to interpret within a conservation or management framework. Population estimates if they are statistically derived are bounded by the variance (e.g., uncertainty of the estimate) associated with the quality of the data and methodology. The conservation goals or management strategies would likely be very different if for example, the true size of the population is 200-250 than if it is between 200-400. In other words, higher levels of uncertainty in the population estimates should be reflected in a more cautious approach in setting harvest quotas.

Essentially, the more recent unpublished estimates are not different from what Beckmann and Lackey noted in 2008; the estimate has better precision, but the range (the more important metric as it incorporates the uncertainty around the estimate) is similar, 200-400 vs 200-300. Also, I find no evidence that this analysis integrated in the spatial complexity that occurs within the population as noted by Beckmann and Lackey (2008). I am struck by the cautionary note offered by these authors that noted that urban areas support higher densities than wildland areas and that urban areas act as a sink in the larger population dynamic within much of their range within Nevada.

The summary of the unpublished data analysis that I was able to review also concluded that the rate of population increase was estimated to be approximately 16% annually. I have to ask over what period of time was this rate of increase estimated for – one year, 2 years, 5 years or more? While NDOW has not suggested that the population has increased 16% annually since 2002 (Beckmann and Lackey), just to provide a clear point of reference, if you assumed that the population increased annually from a population estimate in 2002 of 180 bears, you would have nearly 600 bears in 2010. Given that the range of bear numbers is nearly the same as noted by Beckmann and Lackey (2008), simply more precise, the 16% rate of annual increase is simply unremarkable. Holling's (1973. *Resilience and stability of Ecological Systems.* Annual Review of Ecology and Systematics, 4:1-23) seminal paper on resilience argued that many natural systems undergo large fluctuations and that these large fluctuations are very much part of the system. So having a positive rate of increase from time to time is to be expected and should. In no way, should one assume that the rate of increase would remain positive. As conditions change it is just as likely to shift to a negative rate of increase. Fluctuating up or down is normal and proposals to manage for statis are simply unrealistic as our ability to note a change is always after the fact.

It must also be noted, the cautionary conclusions of Beckmann and Lackey (2008) where they noted that at least during the timeframe they studied, that urban centers act as sinks, and are

unable to repopulate vacated wildland areas. Bear hunting would occur almost exclusively in the wildland areas with urban areas continuing to act as sinks. In other words, the urban areas would not provide a source for these newly hunted widland areas. Anthropogenic mortality will continue to be the greatest mortality factor for bears frequenting the urban areas and now human-caused mortality may well become the greatest mortality factor or bears within the wildland areas. Something the relatively simple summary of the most recent unpublished data that I was provided did not take into account.

The most parsimonious explanation is that the bear population fluctuates (as do most wildlife populations) dependant upon variation in the abundance and distribution of food resources, and the overall size of the population since the 2002 has changed relatively little. Long-term statis or stability in wild population is rare and unnecessary. Fluctuating food resources result in fluctuating wildlife populations, particularly for a species such as black bears that can respond relatively quickly to an abundance of food – at least in productivity and cub survival. NDOW and others have noted that the problem with bears in the Tahoe Basin is not the good years of food production, but extremely poor years, as noted in incredible spike in nuance complaints in 2007.

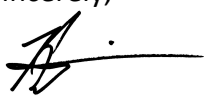
Conclusion

In summary, NDOW has provided absolutely no information that would lead one to believe that bear populations have increased in the core area of Nevada in the last decade. At best, the precision of the estimate has been improved and nothing more. Any reported rate of population increase for a year or two in the unpublished data analysis is unremarkable as wildlife populations (particularly bear populations) fluctuate naturally due well documented changes in food abundance, diversity and distribution.

Harvesting small populations (e.g., 200-300 animals) is inherently risky. Particularly given uncertainty in the current population estimates (which by the way occurs with all population estimates, we simply accept large amount of uncertainty and manage accordingly or look for ways to reduce uncertainty and increase the precision of our estimates) or normal population fluctuations, and the lack of integration of the unique population dynamics (e.g., spatial complexity) of this population into the proposed rule. The uncertainty around these factors has not been suitably integrated and does not follow the precautionary rule that should govern management decisions related to small populations.

If you have any questions regarding my analysis please contact me at your earliest convenience.

Sincerely,



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