

INTERVIEW WITH A BIOLOGIST

At a time when public discourse on the topic of large predators, and especially the hunting of such animals, is increasingly fraught with misinformation and vitriol – we figured it was appropriate to reach out to one of our state’s resident experts on predators. We recently sat down (via e-mail) with NDOW’s Predator Management Staff Specialist, Mr. Pat Jackson, PhD candidate, to briefly discuss predators in Nevada. Topics covered range from black bear disease transmission, delayed implantation, and selective harvest to sex (gender) ratios among mountain lions and genetic diversity. The following is an exact written transcript of our e-mail interview with Mr. Jackson.

1. What are the management objectives for mountain lions?

Bears?

The Nevada Department of Wildlife captures our objectives in our management plans and mission statement. Following is a portion of the Department's mission statement.

“To protect, preserve, manage and restore wildlife and its habitat for the aesthetic, scientific, educational, recreational, and economic benefits to citizens of Nevada and the United States, and to promote the safety of persons using vessels on the waters of Nevada.”

Management plans speak to the need to recognize multiple uses, protection of public safety, and conservation of the species. In simple terms, the Department values the species and the ecological role that they play in the environment. The Department also recognizes that sustainable use is a viable conservation goal, while at times predation management is important in maintaining optimal levels of all wildlife species. Public safety concerns may at times play an important role in dealing with specific animals, but human activities (such as food availability and trash disposal) substantially influence the likelihood of a predator-human conflict.

2. How does NDOW establish population estimates for predators that are typically more difficult to count than ungulates?

Population estimates are not always necessary to manage wildlife populations. Trends in populations can be inferred from research conducted on known-size populations with other indices like harvest data.



Populations managed on harvest data are routinely managed more conservatively than those on population data. For mountain lions, we currently follow two indices:

- The total number of adult females harvested
- The total number of all females harvested

For black bears, the Department currently uses a mark-recapture method to estimate the statewide population. We are currently engaged in the development of an integrated population model for mountain lions that will allow us to use the data we have on movements and harvest to inform the estimate. We are also expanding our efforts to estimate bear populations using passive genetic sampling (that is, we don't have to capture individual animals) in collaboration with Michigan State University and the University of Montana

- 3. Overall, what is the status of predator populations (e.g. stable, declining, or expanding) in Nevada, specifically:**
 - a. Mountain lions**-stable
 - b. Bears**-stable to increasing
 - c. Bobcats**-stable to increasing. This is another species that we are collaborating with other researchers to develop better estimates of abundance.
 - d. Coyotes**-unknown
- 4. Do you subscribe to a top-down or bottom-up approach to predator/prey dynamics, that is - do predators suppress prey populations or do prey populations determine the number of predators?**

I don't subscribe to either theory exclusively, but instead believe it's normally a combination of the two. I believe habitat plays a crucial role in prey abundance. Obviously with Nevada being the most arid state in the nation, precipitation is very important and oftentimes a limiting factor both in terms of free water availability and on forage quantity and quality.

- 5. What, if any, are the major threats or hindrances to the bear population? Lions?**

Mountain lions inhabit almost all of Nevada. At this time I know of no major threats or hindrances to the statewide population. Black bears are currently recolonizing Nevada. Smaller populations are always more susceptible to stochastic events. I believe black bear-vehicle collisions and black bear-human interactions may slow this recolonization. It is important to

remember Nevada's black bear population is part of a larger metapopulation in California.

6. Are there any plans to facilitate expansion of black bears into their historic ranges?

Not at this time.

7. What is the status of the lion/bear interaction study? Are there any preliminary conclusions from that work that you can share?

This study was identified as Project 32 in the Predator Plan. Currently, this project is in its last year of field work. Wildlife Conservation Society, the Department's collaborator and project lead for Project 32 will be preparing a final report within the next year, and submitting papers for publication in various journals.

We can state that bears certainly do scavenge kills made by mountain lions, but they are not the only species that do. It is difficult to attribute much ecological effect to this without completing the complex analyses that will be applied.

8. Some states, like Utah, employ the use of hounds for tracking and treeing problem predators for relocation. Does or has NDOW ever used hounds for this purpose?

While the Department has used hounds to assist in our work, including capturing predators for a variety of reason, our principal use of dogs is through aversive conditioning of bears after release.

9. The majority of bears harvested in the Nevada bear hunt were consumed by successful hunters, yet this is not a requirement as it is for other big game species. Why isn't consumption of the meat required, and what would need to change in order to require the consumption of the meat?

Nevada state statute (NRS 503.050) does not require that sportsmen retrieve black bear and mountain lion meat from the field as is the case for big game animals. NRS 503.050 would need to be amended to require meat from black bears and mountain lions to be kept. No statute for any species currently requires that it be consumed, only that it is retrieved from the field and not allowed to go to waste.

10. What is the primary mechanism that dictates denning dates for bears? Is it true that a bear won't hibernate in the presence of a perennial food source?

Bears have evolved behavioral adaptations known as hibernation that avoids periods of food scarcity and cold temperatures. Bears that are conditioned and habituated to make use of human foods and garbage have demonstrated that hibernation is not essential if they can consume sufficient calories. Interestingly, bears throughout the US tend to go into and emerge from dens at largely the same time if they are not influenced by non-natural food sources.

11. Mountain lions are likely the most geographically distributed big game animal in the state. Given this, what are the primary barriers, if any, to genetic diversity among mountain lions?

There is no evidence that we have found to indicate that mountain lions are suffering from barriers to genetic diversity. There has been some research done to date that indicates that gene flow tends to move from areas with the least exploitation toward regions of greater exploitation, which is not unexpected. Although widely distributed, mountain lions are not equally distributed across the landscape.

For more information, please read "Identification of source-sink dynamics in mountain lions of the Great Basin." See attached.

12. Bears employ a reproductive strategy of delayed implantation, or embryonic diapause. In your opinion, is there evidence that this reproductive strategy serves to control bear populations?

Delayed implantation allows bears to avoid pregnancy when their caloric intake is insufficient to support cubs through the winter. In that sense, a bear on a poor caloric plane during fall may not begin gestation although it had bred during the prior spring, which may be inferred as population control. However, if that bear had carried cubs to full term and given birth, those cubs may have died from malnutrition and may have reduced the female's survival odds as well. So in this case, if the delayed implantation had not occurred, it only put off the inevitable death of the cubs and may have reduced the female's chance of survival. I'm not certain I would characterize delayed implantation as controlling bear populations.

13. What are the appropriate sex ratios among lions and bears? How are these ratios determined?

Appropriate sex ratios are difficult to determine. Unexploited populations tend to have different sex and age ratios than do exploited populations, but there is often a good deal of variability that is biologically acceptable and does not influence recruitment on population growth.

The Department does use harvest characteristics that include ratios in the harvest to determine the degree of exploitation, with an emphasis of maintaining light harvest for these species.

NDOW monitors adult female and overall female harvest in mountain lion harvests. If the 3-year mean percentage of adult (≥ 3 year old) female in the regulated hunting seasons within any specific management zone exceeds 35%, the Department will establish a separate harvest objective for that zone to limit harvest.

NDOW follows the following percentages for black bear harvest:

Parameter	Light Harvest	Moderate Harvest	Heavy Harvest
% Females in Harvest	< 30%	30-40%	> 40%
% Adult Females in Harvest	> 55%	45-55%	<45%
Mean Age of Harvested Males	> 4 years	2-4 years	<2 years

Again, bears are managed to maintain a light harvest that does not influence population growth.

14. Does the selective harvest of mature males of either lions or bears benefit the respective population?

There is no evidence that selective harvest of males provides a benefit to the lion or bear populations. The selective harvest of males does provide the least detriment to those populations.

15. What are the rates of infanticide and/or fratricide among lions and bears?

NDOW does not have any information on infanticide rates.

16. Rates of documented vehicle mortality for bears have been nearly equal with the rates of hunter harvest over the last six years. Are there any particular travel corridors that NDOW has evaluated for a potential wildlife crossing to mitigate vehicular mortality?

The Department is work with the Nevada Department of Transportation to identify big game wildlife crossings around the state. The focus of identifying these areas is to limit risks to public safety. Building wildlife crossing structures in high traffic areas will benefit all wildilfe, including black bears and mountain lions. Not all areas need crossing structures, and in some instances simply limiting crossings with fencing or other structures may benefit both the public and the wildlife at lower expense. The Department of Transportation is welcoming NDOW's input to assist in interpreting the data we have available.

17. Recently there were at least two bear cubs in a Tahoe-based wildlife sanctuary that contracted and died from Adenovirus. Is disease transmission a concern among wild bears?

Bears are susceptible to a wide range of diseases, some of which influence human health. Bears may be exposed to rabies, bubonic plague, and trichinellosis. Many of these diseases are rare or have little influence on the bear population, but the Department routinely monitors bear health on any individual we handle. There is no current disease of concern to humans or that is limiting population growth in the bear population. Hunters are always advised to cook bear meat to well done to avoid contracting trichinellosis.

18. In an apparently isolated 2007 case a wildlife biologist in Arizona contracted pneumonic plague after performing a necropsy on a mountain lion. More recently plague has been confirmed in squirrels in Washoe County. Is there a nexus of transmission from prey species to predators? To humans?

The Arizona biologist inhaled contaminated air while conducting a necropsy on the a mountain lion without taking adequate precautions. When you don't know why an animal died, it is important to protect yourself from exposure.

Bubonic plague is normally spread through fleas from infected animals that subsequently bite a health animal. Avoid colonial rodents – tree squirrels rarely have the exposure risk that ground squirrels may. Predators that eat ground rodents that live in colonies may become exposed, and noting and avoiding fleas can be to your benefit. If you become sick after a potential exposure, seek medical attention and let them know you may have been exposed to the plague. Pneumonic plague generally is much more aggressive because it has already reached the lungs of a species.

19. Some speculate that while black bears only occupy a portion of their historic range throughout the continent, they may exist in greater numbers today than ever before. What are your thoughts?

Estimating wildlife populations during present times with the use of helicopters, GPS collars, college trained wildlife biologists, and complex computer models is still extremely difficult. Current population estimates come with wide confidence intervals. Regardless, these current estimates are far more accurate than historic estimates that lack the rigor and science we use today. Comparing current to historic population estimates directly is subject to substantial conjecture.

Recent estimates certainly point to substantial recovery in many areas and most jurisdictions do believe bear populations are growing.

20. Similarly, some people claim that black bears are indicator organisms, and yet their population appears to be expanding despite degradation of habitat as wildfires convert landscapes into annual grasslands. What are your thoughts?

Fire has not drastically impacted the portions of Nevada inhabited by black bears. In other parts of North America, black bears do well in new habitats, eating vegetation during spring green up and using soft mast (like berries) in the fall. Changes in timber management may have favored bear population growth as well.

21. What types of harvest data does NDOW collect for lions and bears? What are the benefits of this data?

Please see the attached blank forms for black bears and mountain lions. These data allow for monitoring harvest trends. The age, sex, and even size of harvested animals can be used to determine the level of harvest the population is experiencing.

22. In your opinion, does the use of the Karelian Bear Dogs in the bear aversion program result in a reduction of repeat bear conflicts or nuisance behavior? If so, do you believe the use of hounds has a similar effect?

The use of Karelian Bear dogs in aversive conditioning was proven to have a significant impact on the amount of time it took black bears to return to an area. We are currently investigating the effects of these dogs in a more detailed analysis with satellite collars on bears to better understand aversive conditioning in general and bear dogs specifically.

Please follow this link for more information.

http://www.ndow.org/uploadedFiles/ndoworg/Content/Nevada_Wildlife/Bear_Log/Beckmann-Lackey-deterrent-tech-2002.pdf

23. Are there any compelling biological reasons to not hunt predators?

Predators serve important biological and ecological functions. Regulated and monitored harvest in general does not provide any compelling reason to avoid hunting predators. Conversely, there are rarely compelling reasons to hunt most predators. In some instances, limited lethal removal is the best and most effective way to obtain a response in a sensitive or endangered prey species – in these instances hunter harvest is generally insufficient and too broadly applied to have the desired effect. Socially and morally, many individuals will argue the need or lack thereof to hunt predators or any species. There is no correct answer to your question, just a series of compromises that will appease one side of the spectrum and anger the other.

24. Obviously, as a sporting dog group, we're keenly interested in the application of dogs for hunting and conservation. In your opinion, what role, if any, do sporting dogs play in the management of predatory species?

The use of dogs for hunting can increase a hunter's success. Hunters also claim that the use of dogs can allow them to be more selective in their harvest. This has been repeatedly demonstrated by lion hunters that use hounds, but it is less consistent with bear hunting. In Arizona, a relatively large sample demonstrated no selection by hound hunters when compared with hunters that call, glass, or still hunt. In Nevada, our data demonstrates that hunters that use hounds have been more selective than other hunters in the bear hunt. Dogs that put game at bay probably provide hunters with the opportunity to be more selective, but it remains the choice of the hunter to exercise that selectivity.

