MOUNTAIN LION FOUNDATION

Saving America's Lion

The mission of the Mountain Lion Foundation is to ensure that America's lion survives and flourishes in the wild.

September 14, 2021

Mary Wahl, Chair
Oregon Fish and Wildlife Commission
4034 Fairview Industrial Drive SE
Salem, Oregon 97302
odfw.commission@odfw.oregon.gov

Curt Melcher, Director
Oregon Department of Fish and Wildlife
4034 Fairview Industrial Drive SE
Salem, Oregon 97302
curt.melcher@state.or.us

RE: 2022 Big Game Regulations – Recommendations for Cougars (*Puma concolor*)

Dear Chairwoman Wahl, Director Melcher and Members of the Commission:

On behalf of the Mountain Lion Foundation (MLF) and our nearly 8,000 members and supporters nationwide, we submit the following comments on the Notice of Proposed Rulemaking for the Oregon Department of Fish and Wildlife's (department) *2022 Big Game Controlled Hunt Tag Numbers, Season Dates and Regulations*, included as Exhibit F on the September 17, 2021 Oregon Fish and Wildlife Commission Agenda.[1] We urge the department to revise its hunting quotas for cougars across the state to better align with the best available science for cougar management. We appreciate the opportunity to provide input to the Commission as it considers approval of the 2022 big game regulations, which unfortunately maintain the status quo for cougars, and encourage a more balanced approach to management of this apex carnivore moving forward.

Founded in 1987, the Mountain Lion Foundation is a national non-profit conservation organization whose mission is to ensure that America's lion survives and flourishes in the wild. MLF is deeply involved in cougar conservation and habitat management throughout the United States, including protection of these iconic big cats in their ecological communities and coexistence measures to ensure their long-term survival.

Oregon law and policy requires the department and Commission to manage wildlife to "prevent serious depletion of any indigenous species" and to "make decisions that affect wildlife resources…for the benefit of wildlife resources." O.R.S. 496.012. The department's 2017 Oregon Cougar Management Plan further seeks to "manage the state's cougar population at a level well above that required for long

[1] Notice of Proposed Rulemaking, Department of Fish and Wildlife, Chapter 635, Division 67. *2022 Big Game Controlled Hunt Tag Numbers, Season Dates and Regulations.*

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Post Office Box 1896
Sacramento, CA 95812
www.mountainlion.org
info@mountainlion.org
(916) 442-2666

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term sustainability."[2] In accordance with these obligations, we request that the department and the Commission consider the following recommendations for managing cougars in Oregon:

1. Adopt updated cougar population estimates using a revised population model that factors habitat suitability, prey abundance, and current population demography
2. Reduce the total annual anthropogenic mortality quota for adults, including hunting, to no greater than 12 percent of the estimated cougar population
3. Implement a 20 percent mortality sub-limit for female cougars within the total hunt quota to help stabilize cougar populations
4. Limit the cougar hunting season to December 1 – April 31 to avoid peak cougar birthing and denning periods
5. Require improved animal husbandry practices before granting depredation permits for cougar, and only permit the removal of animals identified with habitual predatory behavior on livestock

These recommendations are supported by the latest scientific research on cougars and additionally align with the department's mission to "protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations."[3]

1. Adopt updated cougar population estimates using a revised population model that factors habitat suitability, prey abundance, and current population demography

Current estimates of annual cougar abundance in Oregon are based on a deterministic, density-dependent population model published nearly two decades ago that was originally based on data collected from the 1960's through the early 1990's.[4] Oregon's current statewide population estimate of 6,987 for 2020[5] is based on this inaccurate model and likely overstates the actual total. Oregon's estimate further inflates cougar numbers by including all age classes (kittens, juveniles and adults), rather than just adults as is typical for cougar counts. Approximately 40-50 percent of mountain lion kittens do not survive to adulthood.[6] In fact, the department's 2017 Cougar Management plan estimates the number of adult cougars to be approximately half the total estimated across all age classes,[7] an important distinction for setting statewide hunt quotas.

It appears that the department has not updated or retested its model since 2006, and although it incorporates cougar mortality data annually, the model fails to include auxiliary information such as updated habitat suitability and prey abundance.[8] Incorporating auxiliary data from telemetry, scat surveys, catch-mark-recapture, or a combination of methods can improve the accuracy of population estimates. Relying on mortality data and biological data alone is not sufficient in estimating population parameters without incorporating auxiliary data.[9] If wildlife managers lack auxiliary data to inform an

[2] Oregon Department of Fish and Wildlife. 2017. Oregon Cougar Management Plan at i-ii.
[3] Oregon Department of Fish and Wildlife. 2021. *Agency Mission.* https://www.dfw.state.or.us/agency/
[4] Keister, G.P. Jr. and W.A. Van Dyke. 2002. A predictive population model for cougars in Oregon. Northwest Science 76(1): 15-25.
[5] Oregon Department of Fish and Wildlife. 2021 Staff proposals for Big Game Regulations at 13-14.
[6] Robinson et al. 2008. Sink populations in carnivore management: cougar demography and immigration in a hunted population. Ecol. Appl. 18(4): 1028-1037; Wielgus et al. 2013. Effects of male trophy hunting on female carnivore population growth and persistence. Biol. Cons. 167: 69-75.
[7] Oregon Department of Fish and Wildlife. 2017. Oregon Cougar Management Plan at 50-51.
[8] Oregon Department of Fish and Wildlife. 2017. Oregon Cougar Management Plan at 49-50.
[9] Howard, A. L., M. J. Clement, F. R. Peck and E. S. Rubin. 2020. Estimating Mountain Lion Abundance in Arizona Using Statistical Population Reconstruction. Journal of Wildlife Management 84(1): 85-95.

accurate census, the scientific literature recommends using a resident adult density of 1.7 cougars/100 km^2 as it represents the probably average value for western populations of cougars.[10] Regardless of what data or method is used, population estimates must distinguish between cougar age classes, and set hunting quotas and mortality caps based only on the adult population.

Factoring prey abundance and distribution, and habitat suitability can improve the accuracy of predictions of cougar distribution and densities. Cougar prey distribution and abundance, mainly mule deer, limit cougar populations. Their prey is limited by access to quality forage. Cougar populations typically respond to changes in mule deer populations with a four-year lag.[11] Drought resulting from climate change has been shown to be a limiting factor to cougars through bottom-up effects. Stoner et al (2018) found a positive relationship between mule deer population size and primary plant productivity. Cougars decreased their home range size when primary plant productivity increased.[12] Therefore, as primary plant productivity declines in response to drought, cougar home ranges increase. This in turn may cause cougars to expend more energy to sustain themselves over larger ranges, impacting survival and reproduction, and lowering population densities during years of prey scarcity.

Oregon is currently experiencing statewide drought conditions with increased fire risks.[13] Cougars are known to utilize burned areas two to five years after the burn, but avoid burned landscapes within the first year.[14] Oregon's current drought conditions, high temperatures, and decades of active fire suppression have increased the likelihood of larger and more destructive fires that affect entire landscapes, reducing the amount of suitable habitat for cougars and their prey until ecosystems recover.[15] Such information should be considered in population estimates.

2. Reduce the total annual anthropogenic mortality quota for adults, including hunting, to no greater than 12 percent of the estimated cougar population

Cougars do not typically require management to control population growth, as their populations are self-regulating. This regulation comes from the species' social structure, territoriality, limited prey abundance, and the carrying capacity of the land to support cougar populations.[16] Cougar hunting causes additive mortality that is greater than what would be experienced in the absence of hunting. This increased mortality can cause instability and decline in a population. To maintain a stable cougar population, total anthropogenic mortality (from depredation, poaching, public safety removals, etc.) should not exceed the intrinsic growth rate of cougars in a non-hunted population of 1.14 or 14 percent.[17] If mortality from hunting and other sources exceeds this level, then cougar populations may

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[10] Beausoleil et al. 2013, Research to Regulation: Cougar Social Behavior as a Guide for Management. Wildlife Society Bulletin 37(3):680-688.
[11] Laundré, J. W., L. Hernández, and S. G. Clark. 2007. Numerical and Demographic Responses of Pumas to Changes in Prey Abundance: Testing Current Predictions. The Journal of Wildlife Management 71(2): 345-355.
[12] Stoner, D. C., J. O. Sexton, D. M. Choate, J. Nagol, H. H. Bernales, S. A. Sims, K. E. Ironside, K. M. Longshore and T. C. Edwards Jr. 2018. Climatically Driven Changes in Primary Production Propagate Through Trophic Levels. Global Change Biology 24(10): 4453-4463.
[13] Oregon Water Supply Outlook. 2021. National Weather Service Portland OR.
[14] Jennings, M. K., R. L. Lewison, T. W. Vickers, W. M. Boyce. 2016. Puma response to the effects of fire and urbanization. The Journal of Wildlife Management 80(2):221;234.
[15] Oregon Water Supply Outlook. 2021. National Weather Service Portland OR; Swanson, Fred. 2002. When forest burns: Making sense of fire history west of the Cascades. Pacific Northwest Research Station Science Findings 46.
[16] Wallach, A. D., I. Izhaki, J. D. Toms, W. J. Ripple and U. Shanas. 2015. What is an apex predator? Oikos 124(11): 1453–1461.
[17] Beausoleil, R.A., G.M. Koehler, B.T. Maletzke, B.N. Kertson and R.B. Wielgus. 2013. *Research to Regulation: Cougar Social Behavior as a Guide for Management.* Wildlife Society Bulletin 37(3): 680-688.

decline. Cougars are a keystone species that contribute greatly to their ecosystems. Their decline can trigger increases in prey populations with cascading effects on habitats, and a loss of carrion that supports large diversity of vertebrate scavengers. This can result in landscape-level changes from a loss of biodiversity.[18]

The Department should limit annual anthropogenic mortality, including hunting, so that it does not exceed 12 percent of the adult (>2-year-old) cougar population in Oregon. This quota provides a slight buffer to account for stochastic events, increasing impacts from climate change, unexpectedly high losses from vehicle strikes and other factors that may contribute to unanticipated increases in anthropogenic mortality. If we assume the adult cougar population is approximately 3,837 (based on the 2021 population estimate with a liberal 55 percent ratio of adults) and apply the hunt and non-hunt mortality thresholds from 2021 (970 cougars), that constitutes an unsustainable potential quota of more than 25 percent of the adults removed from the population.[19] For the upcoming 2022 hunting season, we suggest lowering the total threshold for anthropogenic mortality—including hunting—to no more than 460 adult cougars (12 percent). (This total mortality quota, including take from hunting, should be further adjusted upon updating the population estimator per our recommendations above.)

3. Implement a 20 percent mortality sub-limit for female cougars within the total hunt quota to help stabilize cougar populations

Cougars are a long-lived species in which females contribute disproportionately to the population. Adult females are crucial for population recruitment as kittens depend on maternal care. When too many adult female cougars are removed from a population, that population can become unstable, and begin to decline.[20] Recruitment of females in an area typically arises from short-distance dispersal from their mother's home range, while male recruitment to an area typically arises from immigration of males dispersing long distances.[21] This can make female cougars more sensitive to hunting mortality. If mortality rates (anthropogenic and natural) exceed 20 percent of the resident adult female population, the population is likely to experience a lack of stability and decline.[22]

Additionally, Stoner et al (2006) found that the killing of more than 30 percent of the adult population—with 42 percent killed being adult females—led to reduced density and fecundity and skewed the age structure of the cougar population to be younger.[23] Skewing a population age structure lower can result in a higher saturation of young cougars that are more likely to prey upon livestock and pets from a lack of experience.[24]

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[18] Beschta, R. L. and W. J. Ripple. 2012. The role of large predators in maintaining riparian plant communities and river morphology. Geomorphology 157-158: 88-98; Elbroch, L. M., C. O'Malley, M. Peziol, H. B. Quigley. 2017. Vertebrate diversity benefiting from carrion provided by pumas and other subordinate, apex felids. Biological Conservation 215: 123-131.

[19] Cougar Quota by Zone. 2021. Oregon Department of Fish and Wildlife, retrieved from https://myodfw.com/cougar-quota-zone

[20] Anderson and Lindzey. 2005. Experimental evaluation of population trend and harvest composition in a Wyoming cougar population. Wildlife Society Bulletin 33(1): 179-188.

[21] Robinson, H. S. and R. DeSimone. 2011. The Garnet Range Mountain Lion Study: Characteristics of a Hunted Population in West-Central Montana. Final Report. Montana Fish, Wildlife & Parks. Helena, MT.

[22] Robinson, H. S. and R. DeSimone. 2011. The Garnet Range Mountain Lion Study: Characteristics of a Hunted Population in West-Central Montana. Final Report. Montana Fish, Wildlife & Parks. Helena, MT.

[23] Stoner, D. C., M.L. Wolfe, D. M. 2006. Choate. Cougar exploitation levels in Utah: Implications for demographic structure, population recovery, and metapopulation dynamics. Journal of Wildlife Management 70(6): 1588-1600.

[24] Dellinger, J. A., K. K. Macon, J. L. Rudd, D. L. Clifford, S. G. Torres. 2021. Temporal trends and drivers of mountain lion depredation in California, USA. Human Wildlife Interactions 15(1): 162-177.

Due to their importance to the cougar population many agencies have implemented female sub-limits within the total hunt quota. We recommend implementing a sub-limit within the hunt quota for female cougars to 20 percent of the quota for the season to help maintain stable cougar populations.[25]

4. **Limit the cougar hunting season to December 1 – April 31 to avoid peak cougar birthing and denning periods**

Sport hunting of cougars is generally allowed year-round in Oregon, although females—seen to be accompanied by kittens—are not allowed to be taken. However, during the denning period female cougars away from their den are often without their dependent young. In these instances, hunters may be unaware that a female cougar has dependent kittens and take her as part of a hunt. Mortality among orphaned kittens is usually high.

In fact, cougar hunting leads to an increased rate of kitten mortality in heavily hunted populations.[26] Cougars are dependent on their mothers for up to 18 months of age. The loss of an adult female with kittens can result in the death of her young from dehydration, malnutrition, predation, and/or exposure, even in young six months to a year old.[27, 28] The removal of too many adult female cougars can reduce recruitment into a population, leading to diminished resiliency to anthropogenic and natural mortality.[29, 30]

Limiting the hunting season to between December 1 and April 31 would significantly reduce overlap with the peak cougar birthing season during June through October as well as the denning period, reducing potential impacts of hunting on cougar reproduction and recruitment.[31] Aligning the hunting season to avoid birthing and denning provides hunters a better opportunity to detect kittens, visually or through tracks and signs, and avoid taking females with dependent young, reducing the likelihood of orphaning kittens.

5. **Require improved animal husbandry practices before granting depredation permits for cougar, and only permit the removal of animals identified with habitual predatory behavior on livestock**

Lethal cougar control is commonly used in attempt to solve cougar-human conflicts. But lethal measures can often exacerbate the problems they aim to solve. Higher rates of cougar depredation can result in increased predation rates on pets and livestock in the years that follow. The removal of

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[25] Laundre, J.W. et al. 2007. Numerical and Demographic Responses of Pumas to Changes in Prey Abundance: Testing Current Predictions, Journal of Wildlife Management 71, no. 2.
[26] Logan, K. A. and L. L. Sweanor. 2001. Desert puma – evolutionary ecology and conservation of an enduring carnivore. Island Press, Washington, D. C., USA.
[27] Stoner, D. C., M.L. Wolfe, D. M. 2006. Choate. Cougar exploitation levels in Utah: Implications for demographic structure, population recovery, and metapopulation dynamics. Journal of Wildlife Management 70(6): 1588-1600;
[28] Cooley, H. S., R. B. Wielgus, G. M. Koehler, H. S. Robinson and B. T. Maletzke. 2009. Does hunting regulate cougar populations? A test of the compensatory mortality hypothesis. Ecology 90(10): 2913-2921
[29] Robinson, H. S. and R. DeSimone. 2011. The Garnet Range Mountain Lion Study: Characteristics of a Hunted Population in West-Central Montana. Final Report. Montana Fish, Wildlife & Parks. Helena, MT.
[30] Anderson, C. R. and F. G. Lindzey. 2005. Experimental evaluation of population trend and harvest composition in a Wyoming cougar population. Wildlife Society Bulletin 33: 179–188.
[31] B.D. Jansen and J.A. Jenks, 2012. Birth Timing for Mountain Lions (Puma Concolor): Testing the Prey Availability Hypothesis, PLoS ONE 7 no. 9; O'Malley, C., L. M. Elbroch, A. Kusler, M. Peziol, and H. Quigley. 2018. Aligning mountain lion hunting seasons to mitigate orphaning dependent kittens. Wildlife Society Bulletin 42: 438–443.

cougars from a population, especially adult male cougars, can produce empty territories and disrupt cougar social structures. Juvenile male cougars often move into unoccupied territories, and are known to prey upon livestock and pets at higher rates than female cougars and adult male cougars.

Considering these consequences, improving animal husbandry practices is a more effective way of preventing conflicts within an established, functioning cougar population area. Control measures could then focus on specific and identified cougars that habitually prey on livestock or pets. The Department should work with sister agencies to promote and require improved animal husbandry before authorizing individuals to kill specific cougars. These can include adequate fencing height, electrical fencing, practices such as housing small hoofstock and pets in enclosures at night and using livestock guardian dogs to protect herds. Improved animal husbandry practices offer a long-term solution to prevent conflict, maintain sustainable cougar populations, and increase livestock herd survival and production.

The state of Oregon has also conducted general, non-specific lethal removal of cougars within "Target Areas" as a management tool to mitigate human-cougar conflict or achieve other management objectives. In fact, non-targeted lethal removal in conflict areas is unlikely to effectively reduce conflict.[6] General zonal cougar control has not proven effective for other management purposes, including for increasing ungulate populations. The Department could potentially resume Target Area control in accordance with the 2017 Cougar Management Plan. We strongly object to any such future departmental control actions for the reasons stated above.

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We appreciate the opportunity to comment on the 2022 Big Game regulations, and for your consideration of our recommendations for updating cougar hunting and mortality quotas, seasons and population data. We look forward to working together to implement robust, science-based management of cougars throughout Oregon. Please include these comments as part of the official record regarding your decision on this matter.

Sincerely,

Paige Munson
State Policy Associate, Field Biologist
(916) 442-2666
pmunson@mountainlion.org

Josh Rosenau, ABD
Conservation Advocate, Region 1
(916) 442-2666
jrosenau@mountainlion.org

cc: Roxann Borisch, Rules Coordinator Wildlife Division