Trends in annual estimated population and known mortalities of cougars in Oregon during 2000–2011. Population estimates are based on the deterministic model developed by Keister and Van Dyke (2002). Mortality data are current through 14 June 2012, and are based on check-in of cougars. Numbers may change as late data are added.

		Number of Mortalities by Source					
Year	Statewide Population Estimate	Hunter-Harvest	Damage	Human Safety	Administrative Removals	Other[a]	Total
2000	4,750	136	120	25	0	19	300
2001	4,951	220	97	25	0	23	365
2002	5,062	232	111	23	0	37	403
2003	5,229	248	111	28	0	25	412
2004	5,354	265	95	28	0	35	423
2005	5,495	224	125	28	0	30	407
2006	5,590	289	106	26	0	32	453
2007	5,548	309	114	21	52	41	537
2008	5,596	273	109	23	34	54	492
2009	5,652	274	110	31	21	37	473
2010	5,719	239	99	25	79	39	481
2011	5,848	241	139	23	71	32	506

[a]Includes roadkill, accidental, found dead, and illegal kill.

wildlife services data from Amy Rodrigues to you

	AZ	CA	CO	ID	MT	NM	NV	OR	TX	UT	WY	WA	OK	Total
1996	30	67	6	13	6	7	25	41	45	30	0	0	0	270
1997	43	71	10	8	13	9	28	45	50	42	1	0	0	320
1998	46	112	2	4	21	11	30	51	46	35	1	0	0	359
1999	55	102	4	2	16	19	28	63	33	36	1	0	0	359
2000	49	139	2	5	18	20	22	74	27	25	1	8	0	390
2001	46	141	6	5	9	20	18	71	43	44	1	0	0	406
2002	43	104	4	2	12	14	23	66	56	36	1	0	0	361
2003	58	110	6	2	7	24	29	91	86	47	2	0	0	462
2004	39	133	4	2	3	20	16	70	35	37	0	0	0	359
2005	33	120	4	1	7	14	20	73	23	35	0	0	0	330
2006	38	115	7	6	5	6	19	85	33	31	0	0	1	346
2007	33	137	5	2	8	13	27	71	29	8	3	0	0	336
2008	37	123	8	3	13	12	34	97	32	12	2	1	0	374
2009	29	103	11	2	12	7	32	88	28	25	5	0	0	342
2010	26	108	11	7	14	7	43	91	32	23	5	0	0	367
2011	42	104	16	2	17	11	44	117	30	15	4	0	0	402
16 Year Total	549	1789	106	65	181	214	438	1194	628	481	27	9	1	5783

Mandatory Harvest Reporting Response

	% Tags Reported					
Hunt Type	2007	2008	2009	2010	2011	2012
Controlled Spring Bear	6%	8%	61%	79%	79%	80%
SW Limited Spring Bear			47%	69%	66%	64%
General Fall Bear	4%	16%	35%	55%	49%	41%
Total Bear	4%	15%	37%	58%	52%	45%
Cougar	5%	17%	36%	56%	49%	39%

2012 % Tags Reported values as of January 7, 2013 and only for hunts ending prior to January 1, 2013

% of Tags Reported for 2007 - 2011 is through appx. July of the following year, not the actual reporting deadlines

Review of ODFW "Evaluation of cougar removal on human safety concerns, livestock damage complaints, and elk: calf ratios in Oregon"

Dr. Robert B. Wielgus, Director – Large Carnivore Conservation Lab, Dept. Natural Resource Sciences, Washington State University, Pullman, WA 99164-6410.

Unfortunately, this document and the resulting management recommendations contain a number of very serious errors.

Design: The scientific design of the study was seriously flawed – there were no replications of treatments and controls and no accounting for competing hypotheses. The questions asked (effects of administrative removals on complaints, livestock depredations, and predation on elk) could not be effectively answered with this design. That is extremely unfortunate, because the sample size of 3 study areas (3 areas with administrative removals and 3 adjacent areas without removals) could easily have been adapted to provide 3 replicate treatments and controls for each question.

Analyses: The analyses were almost entirely descriptive in nature – there was little or no use of statistical hypothesis testing to provide reliable tests and conclusions. That is also extremely unfortunate – because I easily conducted such tests on much of the data. My simple statistical tests refuted almost all of the descriptive conclusions based in this report.

Reporting: The claims made in this report seem to be based on pre-determined beliefs and philosophical positions – not scientific evidence.

I have published (see literature cited) and reviewed numerous peer-reviewed papers on cougars in scientific journals. I can say without a doubt, that these results would never be acceptable in a peer-reviewed journal. My detailed comments follow.

Introduction

1.) ***Page 2 para 5.*** The statewide cougar population (including area sub-populations) is estimated as 5,101 – based on a model from Keister and Van Dyke (2002). The modeled estimates for each area must be verified by empirical data and this was not done here. The estimates for these treatment and control areas have no scientific validity because of this lack of verification. See point 4.

2.) ***Page 3 , para 1.*** cougar depredation removals increased from 23.4/yr (pre ballot initiative) to 116.9/yr (post ballot initiative). This may correspond to the socio-political fallout from the ballot initiative – not increased numbers of cougars as implied here (same as occurred in WA). The jump in total cougar removals from 75 in 1995 to 123 in 1996 implies a cougar population increase of 64% in 1 year – a biological impossibility.

3.) ***Page 4, para 4.*** These citations (except for Harrison 1989 and Hayes 2000) are all unpublished, un-peer reviewed grey literature and cannot be relied upon.

4.) ***Page 5, para 4.*** Estimates of cougar density were based on zone specific population models. Were the modeled estimates ever verified? Were they tested against real data? Are they reliable? What were the estimated densities? How do they compare with published estimates? Were they published? For example, on Page 20, para 4 the authors estimate 15 adult and subadult cougars /100 mi2 (5.8 cougars/km2) in their Heppner study area compared to 1.58 and 1.87 adult and subadult cougars/100 km2 at carrying capacity K in 2 of our WA study areas (Cooley et al. 2009a). That is a whopping 3 fold increase over our peer-reviewed published estimates – and corresponds to the 3 fold overestimate we documented for traditional methods. I don't believe these estimates are realistic – see point 9 .

5.) ***Page 6, para 2.*** It was "assumed" that the cougar removals would not significantly reduce the cougar populations in each zone. This 1st assumption was based on the 2nd assumption that <14% of cougars in any zone are harvested, and this was based on the 3rd assumption that the population density estimates were correct. This line of reasoning is like a house of cards; unproven assumptions piled one upon the other. All the target mortality objectives and related experimental conclusions are simply opinions and guesses. Real data, based on studies of population demography, such as done by my team in 3 areas of WA (Lambert et al. 2006, Robinson et al. 2008, Cooley et al. 2009a, Cooley et al. 2009b, Maletzke et al. 2010a,b) are required. This cannot be overstated; real, area-specific, scientific data are needed to conduct reliable experiments, the use of un-tested assumptions and conjecture are simply unjustifiable.

Jackson County Target Area (cougar-human conflicts)

6.) ***Page 8, para 1.*** The control area is said to have similar habitats, cougar populations, and human populations. Where are the data? County records should provide human and livestock densities, GIS maps should provide habitat composition, cougar demography should provide cougar densities. Why are these data not reported or available?

7.) ***Page 8, para 4.*** The descriptive results in the beginning of the paragraph imply that administrative removals resulted in reduced **control kills** and are reported as effective for reducing conflicts on page 13, para 4. I conducted a simple ANOVA using area and year (pre & post removal) as independent variables and control kills as the dependent variable. There was NO EFFECT for year ($N = 12$ kills, $F = 1.09$, $P = 0.327$) and there was NO EFFECT for an area by year interaction ($F = 0.12$, $P = 0.737$) on number of control kills. There was an area effect ($F = 43.75$, $P = 0.000$) on number of control kills. For unknown reasons, there were more control kills in the treatment area, but administrative removals had NO EFFECT on control kills.

8.) ***Page 8, para 4 and 5.*** These descriptive results using the administrative removal period only (at the end of the paragraph) also imply that **complaints** were more numerous in the treatment area because of higher numbers and densities of cougars and that administrative removals reduced these complaints – however unlike the control kills, there were no pre and post removal comparisons! Why not? Were the complaint data not available pre-removal? That seems unlikely. Were the pre and post complaint data available – but not reported because they failed to support the assertion that administrative removals reduced complaints? Failing to include pre-removal data appears to be an attempt to elude the facts. At any rate, I conducted a simple t-test on numbers of annual complaints during the post-removal period using area as the independent variable. Mean annual number of complaints were marginally higher in the treatment area ($N = 6$ yrs, annual complaints = 52 vs. 23, $T = 2.6$, at $P = 0.06$) but THERE ARE NO DATA TO SUGGEST THAT ADMINISTRATIVE REMOVALS REDUCED COMPLAINTS. Furthermore, so far as I know, there are no scientific data indicating that numbers of complaints and numbers and densities of cougars are positively related. Work in WA indicates that numbers of complaints are related to socio-political factors such as ballot initiatives and perceptions of cougars (Kertson 2005), and perhaps age structure. Younger animals use human-occupied areas more (Kertson 2010) and have higher encounter probabilities with humans than older animals (Maletzke et al 2010a) - but complaints are not related to numbers and densities of cougars (Lambert et al. 2006). Furthermore, high hunting mortality simply causes increased immigration by younger animals (Robinson et al. 2008, Cooley et al. 2009a, b).

9.) ***Page 10, para 1.*** ODFW was not able to achieve its target number of administrative removals – ostensibly because land ownership patterns precluded effective hunting with hounds. An alternative explanation could be that the estimated numbers of cougars and targeted numbers of kills were inflated to begin with - and that the expected number of kills could not be achieved at biologically realistic densities. My research in WA indicates that traditional methods to estimate cougar numbers and densities (number of cougars captured or otherwise documented in a fixed study area) DOUBLE OR TRIPLE THE REAL NUMBERS AND DENSITIES because most cougars spend time outside the trapping area and actually inhabit a vastly larger area at much lower densities (Maletzke et al. 2010b). I suspect that failing to achieve the target number of kills may be due to over-estimates of the cougar population and subsequent over-exploitation of the same. Only real demographic studies can answer this question.

Beulah Target area (livestock depredations)

10.) ***Page 13, para 1.*** The descriptive results imply that cougar **depredation kills** were reduced because of administrative removals. I tested that assertion using the chi-square test of homogeneity with area (treatment and control) and years (pre and post-removal) as row and column factors and frequency of kills as the dependent variable. There was NO RELATIONSHIP BETWEEN FREQUENCY OF KILLS AND

ADMINISTRATIVE REMOVALS (N = 41 kills, X2 = 1.07, P = 0.30). Administrative removals did not reduce the frequency of control kills.

11.) ***Page 13, para 1.*** The descriptive results also imply that **cougar complaints** were reduced because of administrative removals. I tested that assertion using the chi-square test of homogeneity with area (treatment and control) and years (pre and post-treatment) as row and column factors and frequency of complaints as the dependent variable. There was NO RELATIONSHIP BETWEEN FREQUENCY OF COMPLAINTS AND ADMINISTRATIVE REMOVALS (N = 33 complaints, X2 = 2.9, P = 0.08). Administrative removals did not reduce frequency of complaints.

12.) ***Page 13, para 2 and 3.*** These descriptive results on cougar mortalities (para 2) and deer fawns and numbers (para 3) use no statistical tests and are meaningless.

13.) ***Page 13, para 4.*** The authors state that these results provide evidence that administrative removals reduce cougar-livestock conflicts. But the statistical tests show that there is NO EVIDENCE that administrative removals reduce conflicts. Same goes for cougar complaints – the authors state that removals reduced complaints but the tests showed they didn't!

14.) ***Page 13, para 5.*** The authors admit that fawn recruitment did not increase following removals but they suggest that deer increased because of removals. How did the deer increase? The authors suggest increased adult survival (without corresponding increased fawn survival?). That seems unlikely since fawns are more susceptible to predation than adults. Once again, there are no tests of adult or fawn survival or recruitment – so these so-called results are just opinions or guesses. To their credit – the authors indicate that real deer monitoring is required.

Heppner Target Area (elk predation)

15.) ***Page 14, Table 5.*** The drop in cow calf ratios following 2004 corresponds to high snowfall that year. The variability in cow calf ratios throughout the time series might be caused by immediate and time-lagged weather effects - not by cougar predation. The variability in calf cow ratios could be caused by anything. A proper comparison and analysis of competing hypotheses (predation, weather, density dependence, interspecific competition, etc – (see Robinson et al. 2002, Cooley et al. 2008, Keehner et al. 2010) would have to be conducted to determine likely causal factors of elk decline. This research also needs to be done over multiple years to account for environmental variability – not just 1 year which as done here.

16.) ***Page 15, para 3.*** The increase in calf cow ratios in 2008 (not in 2006 when cougar removals began) could have been caused by anything. Competing hypotheses must be tested.

17.) ***Page 16, para 2.*** Deer did not respond to administrative removals. If elk did, why not deer? Deer usually comprise the primary prey of cougars and should show a stronger response than elk (White et al. 2010).

18.) ***Page 17, para 1.*** The authors claim that administrative removals "appears to have had the desired effect on elk calf ratio". But there is NO EVIDENCE TO BACK UP THIS STATEMENT. The authors then invoke a bunch of speculation involving 1.) snowfall, 2.) elk immigration, 3.) mysterious increase in deer survival, etc, etc to explain away any discrepancies from their cougar limitation theory. This is just making up stories and has no basis in evidence or science.

19.) ***Pages 18-24.*** Most of the discussion follows the same pattern: with wishful thinking, unsubstantiated belief, and philosophy - not empirical science, guiding the discussion of the results and conclusions.

Summary

No valid scientific conclusions supporting the beneficial effects of administrative removals can be drawn from this study. There was no scientific evidence that administrative removals achieved any of the stated goals (reduced complaints, livestock depredations, and increased elk calves). The report lacks any scientific credibility. The authors must go back to the drawing board and begin again. The authors should consult with reputable wildlife scientists and statisticians to obtain a reliable experimental design, analysis, and report. We recommend they consult with Scientists at Oregon State University, University of Oregon, or another research university to design a scientifically credible study.

Literature Cited

Cooley, H.S., Wielgus, R.B., Robinson, H.S., Koehler, G.M., and Maletzke, B.T. 2009a. Does hunting regulate cougar populations? A test of the compensatory mortality hypothesis. Ecology. 90: 2913-2921.

Cooley, H.S., Wielgus, R.B., Koehler, G.M., and Maletzke, B.T. 2009b. Source populations in carnivore management: cougar demography and emigration in a lightly hunted population. Animal Conservation. 12: 321-328.

Cooley, H.S., Robinson, H.S., Wielgus, R.B., and Lambert, C.S. 2008. Cougar prey selection in a white-tailed deer and mule deer community. Journal of Wildlife Management. 72(1): 99-106.

Keehner, J.R., Wielgus, R.B., Warheit, K.I., and Thornton, A.M. 2010. Spatial segregation by female mountain lions (*Puma concolor*) drives prey selection in a heavily hunted area. Biological Conservation. ***Submitted.***

Kertson, B.N. 2005. Political and socio-economic influences on cougar management in Washington State. Pages 92-103. Proceedings of the Eighth Mountain Lion Workshop, Olympia, WA.

Kertson, B.N. 2009. Cougar residential use and interaction with people in a wildland-urban environment in western Washington. Ph.D. Thesis, University of Washington.

Lambert, C., Wielgus, R.B., Robinson, H.S., Cruickshank, H.S., Katnik, D.D., Clarke, R., and Almack, J. 2006. Dynamics and viability of a cougar population in the Pacific Northwest. Journal of Wildlife Management. 70(1): 246-254.

Maletzke, B.T., Cooley, H.S., Wielgus, R.B., Koehler, G.M., and Alldredge, R.A. 2010a. Estimating densities of a solitary carnivore. Journal of Wildlife Management. ***Submitted.***

Maletzke, B.T., Cooley, H.S., Koehler, G.M., Wielgus, R.B., and Alldrege, R.A. 2010b. Effects of hunting on cougar social organization. Ecology. ***Submitted.***

Robinson, H.S., Wielgus, R.B., and Gwilliam, J.C. 2202. Cougar predation and population growth of sympatric mule deer and white-tailed deer. Canadian Journal of Zoology. 80(3): 556-568.

Robinson, H.S., Wielgus, R.B., Cooley, H.S., and Cooley, S.W. 2008. Sink populations in carnivore management: cougar demography and immigration in a hunted population. Ecological Applications. 18(4): 1028-1037.

White, K.S., Koehler, G.M., Maletzke, B.T., and Wielgus, R.B. 2010. Differential prey use by male and female cougars. Journal of Wildlife Management. ***Submitted.***

Oregon
John A. Kitzhaber, MD, Governor

Department of Fish and Wildlife
Wildlife Division
3406 Cherry Ave NE
Salem, OR 97303-4924
(503) 947-6300
Fax (503) 947-6330
www.dfw.state.or.us

October 12, 2012

Frederick Hull
Mountain Lion Foundation
P.O. Box 1896
Sacramento, CA 95812

Dear Mr. Hull,

In response to your letter received September 27, 2012, I have provided information related to cougar populations and known mortalities in Oregon during 2000–2011 (note that 2012 data are either incomplete or unavailable at this time).

If you have any further questions related to this data or cougar management, please do not hesitate to contact me at (503) 947-6319 or timothy.l.hiller@state.or.us.

Sincerely,

Tim L. Hiller, Ph.D.
Carnivore-Furbearer Coordinator