Factors explaining the decline of black-tailed deer: a comparative study on public and private lands in northern California

Agreement #: P0880013 between the University of California and the California Department of Fish and Game

Second Quarter Fiscal Year 2009/2010 Progress report
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(Note: results presented here should be considered preliminary and are not intended for wide dissemination)

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Progress September 10 until December 31, 2009

1) Adult deer

a) Captures:

Despite 3 additional capture sessions, only 1 additional deer (ID 8834) has been added to our sample of collared individuals since September. The female was in extremely good body condition with an estimated weight of 68 kg (150 pounds; based on morphometric measurements). Since the beginning of the project, we have now fitted a total of 15 deer with GPS collars (Table 1). The low capture success in the fall was likely a consequence of changes in deer behavior (such as avoidance of roads) during the hunting season. While we will continue to capture deer opportunistically, the bulk of additional captures will be delayed until spring when success rates are expected to be higher.

b) Monitoring:

We continued weekly monitoring of adult deer until late November. At that time, snow on the ground made access to the study area more difficult. Since December, we have thus switched to a more opportunistic (weather permitting) monitoring interval. Despite our attempts to continue monitoring deer from the ground, we have been unable to locate some deer for an extended period of time (Table 1) suggesting that aerial monitoring during winter will be essential. Without the ability to monitor the status of adult deer at least once every 2 weeks, we risk being unable to determine cause of mortality for animals that have died. Aerial monitoring will also help relocating individuals that have moved to their winter ranges.

c) Status:

One additional adult deer (ID 8796) has died since the last report in September increasing the total number of adults that have died to 2 individuals (Table 1). Cause of mortality has been established as predation in the field but awaits DNA verification. Long bones have been collected for a more detailed lab analysis of the fat content in the bone marrow to accurately determine deer condition.

Table 1: Status of adult black-tailed deer Mendocino black-tailed deer project; December 31, 2009

Number	ID	Group	Capture date	Sex	Age (estimated)[1]	Weight (kg)	Date last observed	Status	Cause of mortality (estimated)[2]
1	8796	M1	8-Jun-09	female	2 to 3	52.2	10-Oct-09	dead	predation (unknown)
2	8809	M1	9-Jun-09	female	3	55.8	16-Nov-09	alive	
3	8805	M1	9-Jun-09	female	2	43.1	22-Dec-09	alive	
4	5740	M1	9-Jun-09	female	7	44.5	16-Nov-09	alive	
5	8810	M1	9-Jun-09	female	5+	58.1	16-Nov-09	alive	
6	8801	M1	10-Jun-09	female	4	47.2	18-Dec-09	alive	
7	8808	FH7	10-Jun-09	female	2	32.7	08-Aug-09	dead	predation (unknown)
8	8798	FH7	10-Jun-09	female	4	52.2	17-Dec-09	alive	
9	8803	FH7	11-Jun-09	female	2	37.2	16-Nov-09	alive	
10	8804	FH7	11-Jun-09	female	4+	47.7	16-Nov-09	alive	
11	8800	FH7	11-Jun-09	female	4 to 5	60.0	17-Dec-09	alive	
12	8802	M1	8-Aug-09	female	2 to 3	48.1	18-Dec-09	alive	
13	8835	M1	13-Aug-09	female	2 to 3	45.8	22-Dec-09	alive	
14	8817	FH7	14-Aug-09	female	1	41.7	17-Dec-09	alive	
15	8834	M1	21-Dec-09	female	3+	68.1	22-Dec-09	alive	

[1] Age estimated from tooth wear and replacement; confirmation using cement-annuli from extracted tooth pending

[2] Cause of mortality preliminary until verified using DNA evidence collected at kill/mortality site

2) Fawns

a) Monitoring:

Fawn monitoring switched to weekly intervals from September onwards. However, VHF ear tags have been increasingly difficult to monitor since animals have moved to their winter ranges. Colder temperatures have also likely affected signal strength. Thus we have only been able to relocate 1 collared fawn in December. Aerial monitoring is required to improve monitoring success.

b) Status:

Two additional fawns have been found dead since September (Table 2). One (R1068) likely died of predation but the cause of mortality has been conservatively determined as unknown until DNA data has been processed. The other (R1125) was found in very good condition with no indication of cause of death. In the future, individuals found almost intact should be brought into the lab to conduct a detailed autopsy. In total, 11 of 14 fawns (or 79%) of the fawns have been confirmed dead. The status of 2 of the remaining 3 collared fawns is unknown.

Table 2: Status of black-tailed deer fawns Mendocino black-tailed deer project; December 31, 2009

Number	ID	Group	Capture date	Sex	Age (estimated)	Weight (kg)	Date last observed	Status	Cause of mortality (estimated)[1]	Predator species[2]
1	R1130	M1	30-Jun-09	male	<1 week	2.7		dead	predation	coyote
2	Y10	M1	1-Jul-09	female	5-7 days	3.1		dead	predation	coyote
3	R1110	M1	1-Jul-09	female	5 days	4.5	01-Jul-09	unknown		
4	R1123	M1	1-Jul-09	female	<1 week	3.1		dead	predation	coyote
5	R1125	M1	2-Jul-09	female	4-5 days	4.3		dead	unknown	
6	R1109	M1	3-Jul-09	male	<3 days	2.3		dead	predation	bear/coyote
7	R1121	M1	3-Jul-09	female	<3 days	2.3		dead	starvation/disease	
8	R1071	M1	6-Jul-09	male	<1 week	3.9	16-Nov-09	alive		
9	R1119	FH7	7-Jul-09	female	>1 week	3.5		dead	predation	coyote
10	R1068	M1	8-Jul-09	female	1 week	3.1		dead	unknown	
11	R1116	M1	9-Jul-09	female	5 days	2.7	05-Dec-09	alive		
12	R1054	M1	9-Jul-09	female	>1 week	3.9		dead	predation	coyote
13	R1055	M1	11-Jul-09	female	>1 week	4.1	16-Nov-09	alive		
14	R1191	FH7	12-Jul-09	male	>1 week	5.0		dead	predation	cougar
15	R1185	FH7	14-Jul-09	male	<1 week	4.4		dead	predation	bobcat

[1] Cause of mortality preliminary until verified using DNA evidence collected at kill/mortality site

[2] Predator species preliminary until verified using DNA evidence collected at kill/mortality site

3) Cougar captures

In December 2009, we began our attempts to capture cougars. Capture personnel consisted of DFG personnel (David Casady and 2 scientific aides), houndsman Cliff Wiley, as well as 3 UCD employees (Max Allen, Boone Smith and Heiko Wittmer). Between December 17th and December 24th, 2 lions were treed but in both cases, the cats retreated into trees that were too high to climb. To ensure safety for capture personnel and cougars, animals had to be let go in both cases. While we have shown that cougars can be treed in our study area, the availability of large trees as safety habitat for cougars will continue to challenge capture success. For future captures we would like to request permission to trap cougars using both snares as well as cage traps as an alternative to hounds. A request to trap cougars will be submitted to DFG in January.

4) Bone marrow analyses

All equipment has been set up in the lab to begin conducting bone marrow analyses. Bone marrow analyses will be conducted on both collared deer that have died as well as deer found at kill sites of collared cougars to determine the nutritional status of deer in the study area.

5) DNA analyses

DNA collected at kill sites has been given to Dr. Ben Sack's lab at UC Davis. Together with his collaborators, Dr. Sacks has begun identifying DNA found at kill sites to determine predator species. First results of these analyses are expected to become available in January.

6) Outlook

a) Deer:

We currently still have 16 GPS collars ready for deployment of adult deer. Five additional GPS collars will be purchased using a grant from the California Deer Association. With 15 deer collared on public lands, we need to shift capture

efforts for deer to private lands. Scott Koller has proven invaluable establishing ties with private landowners in the area and PhD student Tavis Forrester is currently in negotiations with landowners to discuss captures on private lands. Two large landowners have indicated willingness to grant access to their land for the study, and negotiations will be finalized in January and February. While we will continue to sporadically capture deer, most captures will be delayed until spring to improve capture success.

b) Cougars:

Cougar capture efforts will be intensified during January. We hope to be able to capture 6 individuals before the beginning of March. Max Allen is currently being trained to do the kill site analyses.

c) Pigs:

DFG will be able to order 10 GPS Argos collars for pigs (Marc Kenyon, pers. communication). Since most pigs likely occur on private lands, we are also currently seeking permission from private landowners to collar pigs on their properties. Pig captures will be delayed until later in the year, most likely late summer and fall.

Appendix 1: Spending report including expenses occurred until December 1, 2009. Total amount allocated for 2008-09 and 2009-2010 fiscal year = 227,616.

	2008-09 4th quarter	**2009-10 1st quarter**	**2009-10 2nd quarter***	**Total**
Salary	5,450.00	11,196.82	12,537.33	29,184.15
Benefits	1,734.29	2,078.8	3,870.55	7,683.64
Supplies and Expenses	69,389.91	7,447.19	30,074.58	106,911.68
Indirect costs	19,396.38	5,064.48	11,359.62	35,820.48
Total	95,970.58	25,787.29	57,842.08	**179,599.95**

*Note: expenses for December 2009 unavailable until January 9, 2010.