

JOB PROGRESS REPORT RESEARCH PROJECT SEGMENT

STATE: Territory of Guam

PROJECT NO.: W-1R-7
SUBPROJECT NO.: W-1
STUDY NO.: 1
JOB NO.: 1

JOB TITLE: Determination of Current Population Size and Distribution of Guam Deer
(1460)

PERIOD COVERED: October 1, 1998 to September 30, 1999

SUMMARY

Official logs with deer harvest statistics for Andersen Air Force Base (AAFB) were examined and revealed a total of 3,699 hunter sorties, a harvest of 55 deer, and a harvest rate of one deer per 37.9 hunter-days. Population trend data obtained with spotlight counts at Pati Point, AAFB showed a significant decrease ($P < 0.001$) in deer numbers, with an average of 8.7 animals recorded per km during counts. The Munitions Storage Area (MSA) on AAFB experienced a similar decline ($P < 0.01$), with an average of 5.1 animals recorded per km during counts. On Naval Ordnance Annex (NOA), spotlight counts showed a non-significant decrease ($P > 0.05$) in deer numbers, with an average of 8.7 animals recorded per km during counts. Spotlight counts were expanded to include the Naval Computer and Telecommunications Area Master Station (NCTAMS). Revision of Guam's existing deer hunting regulations are ongoing in an attempt to increase deer take and reduce extensive habitat damage, especially on military lands.

BACKGROUND

The Guam deer (*Cervus mariannus*), or Philippine deer, has been under investigation by the Division of Aquatic and Wildlife Resources (DAWR) since 1961 (DAWR 1961-1998). Preliminary information on distribution, population trends, and biology appeared in Wheeler (1979). Deer hunting statistics have been compiled annually since 1968. Guam has a split deer hunting season, running from October 1 to December 31 and from September 1-30. There is a bag limit of one antlered deer per season per license holder exclusive of any special harvest.

OBJECTIVES

To determine the current size and distribution of the deer population on Guam and to monitor population trends.

PROCEDURES

1. Conduct monthly spotlight counts on AAFB and NOA, and periodic counts elsewhere on the island.
 - a. Record number, sex, age, and group composition.
 - b. Analyze count data and compare with previous data to discern population trends.

2. Monitor hunter participation and harvest during the legal hunting season.
3. Collect biological data from animals killed during the hunting season and from incidental sources such as road kills or confiscated animals.

RESULTS

Deer Hunting Statistics

Records of hunting activity and harvest were kept by officials at AAFB during the deer hunting season (Table 1). According to hunter logs from AAFB, 1,542.5 hunter-days (2,560 sorties; gun hunting only) were expended at Northwest Field (NWF) and resulted in the harvest of 48 deer. Hunting areas on the main portion of the base (MSA, Tarague basin, near the landfill, and areas north and east of the flightline) recorded 542.5 hunter-days (1,139 sorties; primarily bow hunting), with 7 deer harvested. Hunter logs for Andersen South were not kept this year. NCTAMS remained closed to all hunting.

Table 1. Hunter effort and deer taken on AAFB during October – December 1998 and September 1999, based on official hunter logs.

	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Sep</u>	<u>Total</u>
Andersen Air Force Base					
<u>Northwest Field</u> (gun hunting only)					
No. hunter sorties	632	580	656	692	2,560
No. hunter days (8 hr)	383.3	365.3	367.3	426.6	1,542.5
Deer taken	5	5	8	30	48
Days effort/take	76.7	73.1	45.9	14.22	32.1
<u>Main Base</u>					
Bowhunting					
No. hunter sorties	231	126	374	277	1,008
No. hunter days (8 hr)	94.8	61.2	177.4	136.1	469.5
Deer taken	3	0	2	1	6
Days effort/take	31.6	-	88.7	136.1	78.3
Gun hunting (log books missing for Oct. 1-Nov. 21)					
No. hunter sorties		14	48	69	131
No. hunter days (8 hr)		10.9	28.7	33.4	73.0
Deer taken	-	0	1	0	1
Days effort/take		-	28.7	-	73.0
<u>TOTALS for AAFB</u>					
Gun hunting					
No. hunter sorties	632	594	704	761	2,691
No. hunter days (8 hr)	383.3	376.2	396.0	460.0	1,615.5
Deer taken	5	5	9	30	49
Days effort/take	76.7	75.2	44.0	15.3	33.0
Bowhunting					
No. hunter sorties	231	126	374	277	1,008
No. hunter days (8 hr)	94.8	61.2	177.4	136.1	469.5
Deer taken	3	0	2	1	6
Days effort/take	31.6	-	88.7	136.1	78.3

Gun hunting totals revealed 1,615.5 hunter-days (2,691 sorties) were expended, resulting in the harvest of 49 deer (33.0 hunter-days/deer). Bowhunters expended 469.5 hunter-days (1,008 sorties) to harvest 6 deer (78.3 hunter-days/deer).

Spotlight Count Trends

At Pati Point, deer numbers significantly decreased this year (Mann Whitney *U*-Test, $U' = 75$, $n_1 = 9$, $n_2 = 9$, $P < 0.001$) from those of the previous year. The average number of deer seen per count decreased from 87.3 (13.5 deer/km) in FY98 to 52.1 (8.7 deer/km) in FY99 (Table 2). The largest single nightly count at Pati Point decreased from 97 deer in FY98 to 87 deer in FY99.

Table 2. Composition of deer seen during spotlight counts at Pati Point on AAFB, FY99.

Class	----- 1998 -----			----- 1999 -----									Total	Mean	SD
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep			
Unclassed buck		3	3		6	1	3	3	2	1		0	22	2.4	1.7
Spike		5	0		1	1	2	3	0	3		2	17	1.9	1.6
2 pt		6	4		3	0	0	6	2	1		2	24	2.7	2.3
3 pt		5	1		1	2	6	3	5	4		1	28	3.1	2.0
4 pt		0	0		0	0	0	0	0	1		0	1	0.1	0.3
Doe		29	18		15	7	26	21	24	16		12	168	18.7	7.0
Yearling		8	6		2	2	7	8	3	4		8	48	5.3	2.6
Fawn		2	6		2	0	5	2	4	3		3	27	3.0	1.8
Unclassed deer		15	13		17	12	13	41	22	26		5	164	18.2	10.4
Total deer	nc	73	51	nc	47	25	62	87	62	59	nc	33	499	55.4	19.1
Miles traveled		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0		4.0	36.0	4.0	0.0
Km traveled		6.4	6.4		6.4	6.4	6.4	6.4	6.4	6.4		6.4	57.6	6.4	0.0
Deer/mi		18.3	12.8		11.8	6.3	15.5	21.8	15.5	14.8		8.3	125.1	13.9	4.8
Deer/km		11.4	8.0		7.3	3.9	9.7	13.6	9.7	9.2		5.2	78.0	8.7	3.0

nc = no count was made.

Deer numbers at MSA also experienced a significant decrease this year (Mann Whitney *U*-Test, $U' = 32$, $n_1 = 5$, $n_2 = 7$, $P < 0.01$) as compared to FY98 (Table 3). The average number of deer recorded per kilometer decreased from 8.2 in FY98 to 5.1 in FY99.

Table 3. Composition of deer seen during spotlight counts in the Munitions Storage Area on AAFB, FY99.

Class	----- 1998 -----			----- 1999 -----									Total	Mean	SD
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep			
Unclassed buck	1		2	2		3		2	2	2			14	2.0	0.6
Spike	3		2	5		2		5	1	4			22	3.1	1.6
2 pt	1		0	1		1		1	0	1			5	0.7	0.5
3 pt	7		6	4		3		2	2	6			30	4.3	2.1
4 pt	0		0	0		1		0	0	0			1	0.1	0.4
Doe	23		16	30		21		50	10	28			178	25.4	12.8
Yearling	13		8	6		7		11	8	6			59	8.4	2.6
Fawn	3		2	6		2		8	1	6			28	4.0	2.6
Unclassed deer	17		13	18		13		28	15	21			125	17.9	5.3
Total deer	68	nc	49	72	nc	53	nc	107	39	74	nc	nc	462	66.0	22.3
Miles traveled	8.1		8.0	8.0		8.0		8.0	8.0	8.0			56.1	8.0	0.0

Km traveled	13.0	12.9	12.9	12.9	12.9	12.9	12.9	90.4	12.9	0.0
Deer/mi	8.4	6.1	9.0	6.6	13.4	4.9	9.3	57.7	8.2	2.8
Deer/km	5.2	3.8	5.6	4.1	8.3	3.0	5.7	35.7	5.1	1.7

nc = no count was made

On NOA, deer numbers showed a non-significant decrease (Mann Whitney *U*-Test, $U' = 38$, $n_1 = 8$, $n_2 = 9$, $P > 0.05$) in FY99 (Table 4) from FY98. The average number of deer recorded per count dropped from 52.0 animals (2.4 deer/km) in FY98 to 50.6 animals (2.3 deer/km) in FY99 (Table 4). The largest single nightly count decreased from 110 deer in FY98 to 76 deer in FY99.

Table 4. Composition of deer seen during spotlight counts on Naval Ordnance Annex, FY99.

Class	----- 1998 -----			----- 1999 -----									Total	Mean	SD
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep			
Unclassed buck	2	3		4	0		10	2	3	1	2		27	3.0	2.9
Spike	2	2		1	3		2	4	5	2	4		25	2.8	1.3
2 pt	0	1		0	3		7	2	0	0	1		14	1.6	2.3
3 pt	4	5		3	2		7	6	6	2	7		42	4.7	2.0
4 pt	0	1		0	0		0	0	0	0	1		2	0.2	0.4
Doe	22	24		16	28		55	25	18	15	27		230	25.6	12.0
Yearling	4	6		5	5		10	6	9	3	4		52	5.8	2.3
Fawn	4	2		3	6		4	3	5	1	3		31	3.4	1.5
Unclassed deer	18	16		24	16		15	21	26	13	13		162	18.0	4.7
Total deer	56	60	nc	56	63	nc	110	69	72	37	62	nc	585	65.0	19.6
Miles traveled	14.0	14.0		14.0	15.0		14.0	14.0	14.5	14.0	14.0		127.5	14.2	0.4
Km traveled	22.5	22.5		22.5	24.2		22.5	22.5	23.3	22.5	22.5		205.0	22.8	0.6
Deer/mi	4.0	4.3		4.0	4.2		7.9	4.9	5.0	2.6	4.4		41.3	4.6	1.4
Deer/km	2.5	2.7		2.5	2.6		4.9	3.1	3.1	2.6	2.8		26.8	3.0	0.8

nc = no count was made.

Spotlight counts at NCTAMS were initiated this year, with an average of 50.0 (6.2 deer/km) deer seen per count (Table 5). The largest single count was 79 deer.

Depredation Permits

Twenty-one animal depredation permits were issued during this fiscal year. Fifteen permits authorized deer take in agricultural areas, while two permitted take in suburban areas. Of these, 11 permits were issued to farmers registered with the Guam Department of Agriculture. Two permits were issued to golf resorts. Two permits authorized deer take on federal lands (AAFB and Guam National Wildlife Refuge). Permittees are required to submit a report of all deer taken. Two deer were killed on AAFB, while four deer were reported taken on farmlands.

Hunting Regulations

New hunting regulations allowing the take of three deer of either-sex during a six-month period per fiscal year were submitted to the Twenty-Fourth Guam Legislature for approval and will hopefully be enacted for the FY00 hunting season.

Vegetation Survey

A vegetation survey was initiated at Pati Point to investigate the impact of deer browsing on native plants in the area. Changing forest structure observed by biologists over the past decade prompted the study. Deer are thought to be primarily responsible for the degradation because pigs are somewhat scarce at Pati Point, which is dominated by karst topography. A summary of the findings will be available in FY01.

Table 5. Composition of deer seen during spotlight counts on NCTAMS, FY99.

Class	----- 1998 -----			----- 1999 -----									Total	Mean	SD
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep			
Unclassed buck	1		0	3	4		1	2	1	3			15	1.9	1.4
Spike	2		0	1	2		3	2	2	1			13	1.6	0.9
2 pt	3		1	0	1		0	0	0	1			6	0.8	1.0
3 pt	5		0	4	2		7	4	3	5			30	3.8	2.1
4 pt	0		0	0	0		0	0	0	0			0	-	-
Doe	8		5	12	19		21	17	15	9			106	13.3	5.7
Yearling	6		2	2	4		4	4	2	2			26	3.3	1.5
Fawn	2		0	1	1		2	3	1	2			12	1.5	0.9
Unclassed deer	21		18	23	46		18	26	20	14			186	23.3	9.9
Total deer	48	nc	26	52	79	nc	56	58	44	37	nc	nc	400	50.0	15.7
Miles traveled	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0			40.0	5.0	0.0
Km traveled	8.1		8.1	8.1	8.1		8.1	8.1	8.1	8.1			64.8	8.1	0.0
Deer/mi	9.6		5.2	10.4	15.8		11.2	11.6	8.8	7.4			80.0	10.0	3.1
Deer/km	5.9		3.2	6.4	9.8		6.9	7.2	5.4	4.6			49.4	6.2	2.0

nc = no count was made.

RECOMMENDATIONS

Continue spotlight counts at present intensity at Pati Point, MSA, NOA, and NCTAMS. Expansion of spotlight counts to other areas such as Route 17, Bubulao, and Nimitz Hill is recommended. Biological data should be collected from carcasses whenever possible. Written guidelines concerning hunter logbooks should be given to the proper military personnel to ensure complete and accurate hunter participation records on military lands. Hunting on NCTAMS should be reopened. A comprehensive investigation into the movements and habitat use of these ungulates is needed. A study to examine the impacts of deer on native ecosystems remains a high priority.

PROGRAM COST

The estimated cost of the deer population and distribution project under W-1R-7 is \$32,000.

LITERATURE CITED

- Division of Aquatic and Wildlife Resources. 1961-1998. Job Progress Reports - Federal Aid to Fish and Wildlife Restoration. Guam Dept. Agric., Mangilao.
- Wheeler, M. E. 1979. The biology of the Guam deer. Div. Aquatic Wildl. Resources Tech. Rept. No. 3, Mangilao, Guam. 53 pp.

Report prepared by: Dana T. Lujan